

# TWINELINE

2012 SPRING/SUMMER EDITION VOL.34/NO.2

## The tide of *Uncertainty*

Major environmental issues may  
challenge Lake Erie's future





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2012 SPRING/SUMMER EDITION

TWINE LINE



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2012  
**STONE LAB**  
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Want to know the latest in Lake Erie research and information? Join us every Thursday evening this summer, either at Stone Lab or remotely on the web.



For more information, visit [stonelab.osu.edu/events](http://stonelab.osu.edu/events)

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## Major Environmental Issues May Challenge Lake Erie's Future

by Christina Dierkes, Ohio Sea Grant Communications



Lake Erie has seen some difficult times. Considered the poster child of water pollution in the 1960s, with one tributary so polluted it burned, many thought of it as dead. But Lake Erie recovered, thanks to comprehensive phosphorus restrictions and inter-agency collaborations, and turned into an impressive success story of what ecosystem recovery efforts can accomplish in just a few years. The lake became a major economic player once again, producing more fish than the other four Great Lakes combined, supporting thousands of jobs, and showing nay-sayers just how resilient it can be.

sustainable business development along the shoreline is important to the economy but can be a challenge to the ecosystem.”

As happens in all natural systems, none of the seven issues are entirely separate from the others; all are interconnected, and all of them can have negative impacts if not managed properly. “Currently, the trends are all in the wrong direction,” says Reutter. “Nutrient loading is higher, storms are more frequent, and climate change makes many of the other issues worse.”

The lake plays a huge role in Ohio’s economy. According to the U.S. Fish & Wildlife Service, the economic impact of sport fishing alone is estimated at more than \$800 million, and most of those recreational activities occur within the Lake Erie watershed. The lakeshore attracts millions of visitors each year—birdwatchers, for example, contribute \$30 million to northern Ohio’s economy. And the shipping industry on Lake Erie is worth about \$6.5 billion. All of these economic powerhouses are impacted by the seven issues.



The Seven

### ISSUES

Facing Lake Erie

1 ▶ Sedimentation and Dredging

2 ▶ Nutrient Loading and Phosphorus

3 ▶ Harmful Algal Blooms

4 ▶ The Dead Zone

5 ▶ Aquatic Invasive Species

6 ▶ Climate Change

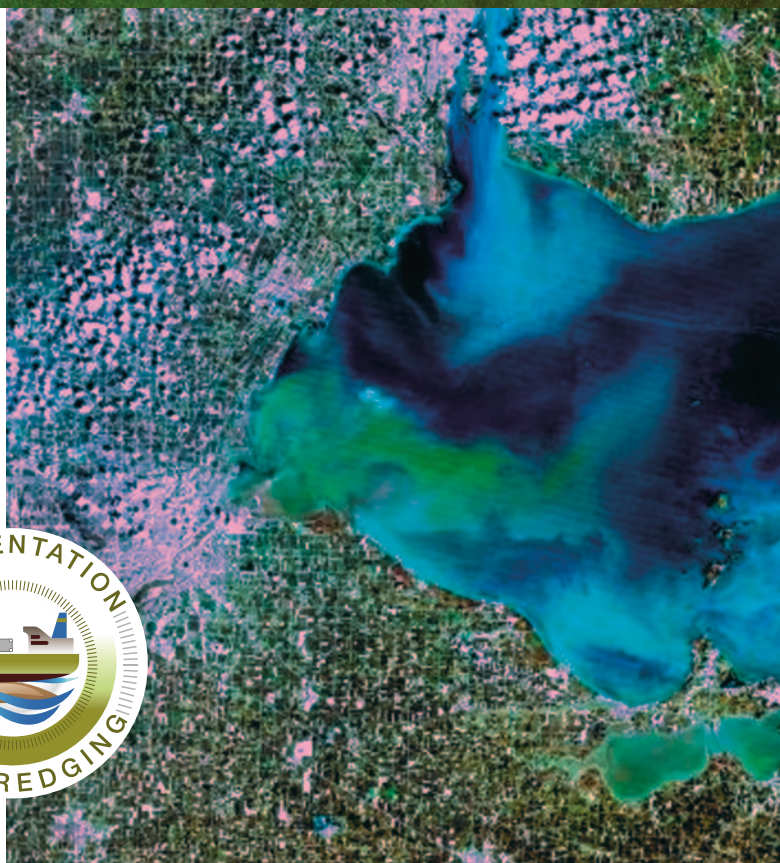
7 ▶ Coastal Community and  
Economic Development

But over the last ten years, Lake Erie has had to do battle once again. And it’s a battle many fear could seriously challenge its resiliency.

“While arguably the most important lake in the world, the Lake Erie ecosystem is currently facing many challenges,” says Dr. Jeff Reutter, Ohio Sea Grant and Stone Laboratory Director. “Excessive loads of sediment and nutrients are creating blooms of toxin-producing algae that threaten the entire ecosystem and contribute to the dead zone in the central basin. Aquatic invasive species can make algal blooms worse and threaten the most valuable fishery in the Great Lakes. Climate change is increasing lake temperature and the frequency of severe storms, and



► Algal blooms (green) in Maumee Bay have become more and more severe in the past decade, in large part due to increased precipitation and sediment runoff (light blue) that transports additional nutrients into Lake Erie.



► In addition to damaging scenery, the health effects of HABS can be severe, and visitors are discouraged from coming into contact with the contaminated waters, which has had a drastic effect on area tourism.

Brenda Culler

## Where to Start?

**W**ell, there's the sediment. The Maumee River on western Lake Erie transports more sediment each year than any other Great Lakes tributary, mostly in runoff from agricultural fields, when snowmelt or heavy rains wash soil into quick-flowing rivers and streams. These keep more sediment suspended in their waters than slow-moving Lake Erie, and soil particles tend to be deposited at the mouth of a river, where many commercial shipping ports are located.

*"To eliminate HABS in Lake Erie, we need to modify agricultural practices to greatly reduce nutrient runoff, but we also all need to reduce our personal nutrient contributions."*

— DR. JEFF REUTTER

Those ports then need to be dredged regularly to remove sediment and maintain adequate depth for freighters transporting cargo to and from the region. Not doing so could result in severe financial losses for the shipping industry: at Toledo Harbor, the sixth largest port in the Great Lakes, light loading—not filling ships to capacity because they would then lie too deep in the water—could lead to additional transportation costs of up to \$2.5 million a year, according to the U.S. Army Corps of Engineers. "Economically, the Port of

Toledo is very important, but it is in the shallowest portion of Lake Erie, and the Maumee River flows through 4.5 million acres of prime agricultural land. Runoff from that land contributes millions of cubic yards of sediment to Lake Erie," says Reutter. "To keep the port open, the Army Corps dredges approximately 1 million cubic yards of material from about 20 miles of the channel each year. This is more sediment than all the tributaries combined put into Lake Superior, and Superior is twenty times larger in volume than Lake Erie."

However, budgets everywhere are tight, and dredging in Toledo has had to be even less than what is required to maintain minimum clearance in the shipping channel. In 2012, the Corps' budget for dredging Toledo Harbor is only slightly more than half the

estimated \$10.5 million required to maintain and restore the shipping lanes in Maumee Bay and the Maumee River.

What to do with the sediment once it's removed from Lake Erie ports is another important question. The vast majority of the material is transported onto the open lake and dumped there, but some is impounded in large lots around the harbor area. Ohio Sea Grant is supporting a research project, led by Ohio State University's Elizabeth Dayton, that will examine the feasibility of using dredge materials as part of custom soil blends in landscaping and horticulture—"the ultimate recycling," according to Dayton. A reduction in open-lake dumping could even reduce harmful algal blooms, as dredge materials often carry nutrients that can stimulate algal growth.





More information on Dr. Martin's research is available at [ohioseagrant.osu.edu/maumeebay](http://ohioseagrant.osu.edu/maumeebay).

## Nutrients and Algae

**N**utrient load” is the total amount of a nutrient, such as nitrogen or phosphorus, entering the water during a given time. Nutrients arrive in ecosystems in a variety of ways, but in the case of Lake Erie, most come from agriculture in the form of fertilizer runoff, or from wastewater treatment plants. Once these nutrients enter the lake, they contribute to nuisance algal blooms, which are unattractive and may have a negative impact on tourism and water quality, and to harmful algal blooms, or HABs, which can threaten the health of people and animals.

“Lake Erie has always been the lake that receives the most nutrients,” explains Reutter. “We have the most agriculture”—70% of the Lake Erie watershed is used for this purpose—“and we have the most urban and residential areas”—which tend to increase the amount of impervious surfaces such as pavements, where water can’t seep into the ground—“so we have a lot of sewage treatment issues that contribute nutrients.” Because the Western Basin, which stretches from Toledo to Sandusky, is the smallest and shallowest, but also has the most agriculture in its watershed, it is especially susceptible to the effects of nutrient loading.

HABs are an excessive growth of cyanobacteria, often called blue-green algae, which can produce toxins that damage the liver, nervous system, and skin. Cyanobacteria bloom when there is an excess of nutrients in very warm water: freshwater HABs are generally caused by excess phosphorus, with runoff from agricultural fields acting as a major contributor. Dissolved phosphorus concentrations in Lake Erie have been rising since 1995, and HABs have been occurring annually

during the late summer and early fall since 2002, increasing in severity and lasting longer each year. HABs aren’t limited to Lake Erie; they’re a growing global problem caused by changes in agricultural practices and the warmer weather and more frequent severe storms associated with climate change, which increase nutrient runoff from agriculture and combined sewer overflows.

“To eliminate HABs in Lake Erie, we need to modify agricultural practices to greatly reduce nutrient runoff, but we also all need to reduce our personal nutrient contributions by using low phosphate cleaners, being sure septic tanks are working properly, eliminating phosphorus from lawn fertilizers, and working to lessen combined sewer overflows by improving sewage treatment plants and using rain barrels, rain gardens, and low-flow toilets and shower heads,” explains Reutter.

Dr. Jay Martin of Ohio State University’s Department of Food, Agricultural and Biological Engineering is one of the researchers leading a four-year National Science Foundation project that will examine the relationship between land use, climate change, and the health of Lake Erie. That health largely depends on the level of algae

in the lake, so part of the project examines nutrient runoff and how it can be managed better to minimize or prevent harmful algal blooms.

“Management” can include a number of options: voluntary measures might focus on educating the public about the consequences of contributing excess nutrients to the watershed, through agriculture, industrial runoff, or private land use. Or they might provide an incentive program for land owners and public utilities that install natural buffer systems—such as strips of grass, trees and shrubs that trap sediment and filter out nutrients—to separate their land from a body of water. Regulations created by local, state, or federal governments may put limits on the amount of nutrients that can be present in water that exits a wastewater treatment plant, leveraging fines and other punitive measures if those limits are not observed. Regulations may also be needed for agriculture.

Whichever measures are chosen, educating stakeholders always needs to be an important component to ensure compliance, and Ohio Sea Grant can assist public officials in developing and distributing information. After all, history has already shown that it is possible to turn around an endangered ecosystem.

“After Lake Erie was declared

dead in the 1970s, sewage treatment plants had to greatly reduce the amount of phosphorus going into the lake,” explains Martin. “When those changes took effect, phosphorus concentrations went down and the lake recovered. That attracted people back to the lake, farming practices and land management practices have changed, and now we have more phosphorus going back into the lake again. It’s another iteration of the cycle, so our project is looking at how the condition of the natural Lake Erie ecosystem impacts how humans behave towards it.”

While phosphorus tends to be the major nutrient linked to harmful algal blooms, new Ohio Sea Grant research is also examining the connection between nitrogen and algal growth. Nitrogen is another major component of fertilizers, but little is known about how it affects the Lake Erie ecosystem. Dr. Darren Bade, Assistant Professor of Biological Sciences at Kent State University, is examining whether limiting nitrogen runoff will be effective in reducing excessive algal growth, or whether nitrogen-fixing cyanobacteria, which can take in nitrogen from the atmosphere, would simply take over from current dominant algal species.

Read more about this planned project on page 12 of this issue.

USDA



► Buffer strips capture sediment and nutrients before they can enter the waterway, and play an important part in maintaining the health of Lake Erie.



## Algal Fallout

In addition to causing problems when they're growing at the surface, algal blooms are also problematic in death. At an average depth of just 62 feet, Lake Erie is the warmest Great Lake—sunlight can heat much of the water column and support plant growth below the surface—leading to high levels of productivity in both plant and animal life.

When those algae die, they sink to the bottom of the lake, where they are decomposed by resident bacteria. This process, along with the formation of a thermocline—a sharp delineation between an upper warm layer and a cold bottom layer of water—leads to the creation of the “dead zone.” This low-oxygen area develops in the Central Basin of Lake Erie in late summer, when microscopic organisms and other aquatic life use up dissolved oxygen faster than it can be replenished from the surface.

Lake Erie's bathymetry—in other words, the lake bottom—can be divided into three basins. The Western Basin is the shallowest with 24 feet of depth. The Central Basin, which stretches from Sandusky to Erie, Pennsylvania, is about 60 feet deep, while the Eastern Basin is the deepest of the three, with over 200 feet of depth in some places.

“Typically in Lake Erie the thermocline forms at about fifty feet, so if the Central Basin has an average depth of sixty feet, and the thermocline is down at fifty, you have a really thin layer of cold water at the bottom,” says Reutter.

When algae sink down into this thin layer of cold, oxygen-rich water and decompose, the process can use up all of the available oxygen, leading to fish kills and other negative impacts on the ecosystem. “It may not be possible for us to ever get rid of the dead zone,” says Reutter. “But I do believe it's entirely possible for us to get



The full task force report is available at [epa.ohio.gov/dsw/lakeerie/ptaskforce/index.aspx](http://epa.ohio.gov/dsw/lakeerie/ptaskforce/index.aspx).

rid of HABs” through nutrient runoff reduction, which could significantly reduce the impacts the dead zone has on coastal communities.

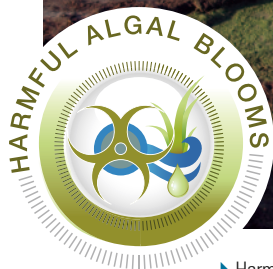
As part of this effort, the Ohio EPA convened the Lake Erie Phosphorus Task Force to give recommendations for managing phosphorus in the Lake Erie watershed. The task force's final report, issued in 2010, pinpoints sources of nutrient runoff and provides guidance on addressing them: from developing regulations and incentive programs that limit phosphorus at both point sources like wastewater treatment plants and non-point sources like agricultural areas, to increasing soil testing that determines whether fertilizers are actually needed before they are applied.

“Ohio's Phosphorus Task Force was an incredibly valuable effort

to identify the causes of harmful algal blooms and research priorities,” says Reutter. “The Ohio Lake Erie Commission and USEPA's Great Lakes National Program Office then funded a number of projects, including 7 that I helped to coordinate, to address the research priorities. The synthesis report from those projects lays out a number of options that the farming community could take to eliminate harmful algal blooms while maintaining agricultural production.”

The task force also recommends research and education initiatives, carried out by state agencies, non-profit organizations and academic partners like Ohio Sea Grant, to increase knowledge about phosphorus and harmful algal blooms, and to heighten public awareness of environmental and economic benefits for businesses and lakeshore residents.

Donna Bragg



► Harmful algal blooms can make it look like shoreline waters have been doused in green paint.

► Crowded beaches and other tourist spots along the Lake Erie coast illustrate the need to balance economic development opportunities with taking care of a fragile environment.



Lake Erie Shores & Islands



**Supporting Solutions** Lake Erie is arguably Ohio's most valuable natural resource, and possibly even one of the most important lakes in the world, according to Reutter. But the lake has begun to deteriorate again recently, and turning that trend around is a large part of Ohio Sea Grant's mission. Along with Sea Grant organizations on the other Great Lakes, the program is working to support research, improve Great Lakes and climate literacy, and distribute information to policy makers, land managers, and the public to ensure their knowledge of the Great Lakes is as up-to-date as possible. Current information is always available at [ohioseagrant.osu.edu](http://ohioseagrant.osu.edu).





Reutter

► Bighead carp, one invasive species of Asian carp potentially on their way into the Great Lakes, could displace native fish species and damage Ohio's \$800 million sportfishing industry.



## Foreign Invaders

Invasive species—aquatic and terrestrial animals and plant life not native to a region—threaten native species because they may prey on natives, interfere with their reproduction, or simply crowd them out of their habitats by using resources more efficiently. In the case of the round goby, which preys on smallmouth bass nests and can have severe negative impacts on recreational fishing, its introduction has also had a surprising positive side effect: the Lake Erie water snake has found it to be a tasty addition to its meal plan and now primarily lives on the invasive fish. The snake, which until August 2011 had been listed as a threatened species, was also able to recover in large part thanks to Ohio Sea Grant, Stone Laboratory, Ohio Division of Wildlife and U.S. Fish & Wildlife Service education efforts led by Kristin Stanford, Education & Outreach Coordinator at Stone Lab.

However, most stories of invasive species do not end on such a positive note. Everyone who has spent some time around Lake Erie has probably heard about zebra mussels, small freshwater mussels originally native to the Black and Caspian Seas. They were introduced into the Great Lakes by ocean-going ships—likely in ballast water or attached to anchor chains—in 1988, and have continued to spread across North American waterways, creating control costs that have exceeded \$30 million a year in Ohio.

Currently, some species of Asian carp are considered on the cusp of invading the Great Lakes, where they could outcompete native fish species for phytoplankton, their main food resource. This would in turn affect Ohio's \$800 million sport fishing industry—the carp are filter feeders that show little reaction to bait, making them an unlikely replacement for the native sport fishing species they may displace. The Army Corps of Engineers and various state departments of natural resources are exploring options that include electric fish barriers in channels that connect the Mississippi River region, where the carp are already established, to the Great Lakes, as well as fences and other barriers in flood plains where fish would otherwise be able to cross over during heavy flooding. The effectiveness of these measures is yet to be determined, but the potential threat of yet another invasive species in the Great Lakes remains a matter of concern for Sea Grant programs along the lakes.

## Developing in a Changing Climate

Pollution and invasive species have played a role in the health of Lake Erie for many years, but more recently, a new problem arrived on the scene: climate change. In the Great Lakes region, rising temperatures, increased precipitation and the accompanying danger of flooding are of special concern, and will likely worsen many of the seven issues, from sedimentation to invasive species.

In many Great Lakes communities, tight budgets require creative approaches to climate change adaptation, and advisors like Ohio Sea Grant and the Ohio Coastal Training Program advocate integrating adaptation and mitigation into other community improvement programs. Additional green spaces not only make downtowns more attractive to businesses and visitors, but also help mitigate the impacts of increased precipitation, as water can seep into the ground instead of entering sewer systems. They also reduce the “urban heat island” effect of blacktop surfaces, which attract and hold on to heat far longer than planted spaces, and therefore decrease demand on local power grids as the need for air conditioning lessens.

This is just one example of how local communities can create multiple positive impacts from one kind of project to prepare for the very real changes we're already seeing in the Great Lakes climate. “The impact of climate change is very easy for us to show, in that the frequency of severe storms between 1960 and 2010 has increased somewhere between 40 and 60 percent, depending on what measurements

you use,” says Reutter. “It's also easy for us to show how the temperature has increased—there are a number of measures of that as well, but basically they are all in the direction of things getting warmer.”

Climate-ready coastal communities also benefit in terms of economic development, and because such concerns tend to be much more immediate to residents' lives, linking climate adaptation and sustainable development with economic benefits is an excellent way to garner support for new projects. At the same time, the environmental link reminds planners that their actions influence not only a region's economy, but also its ecosystem. For example, Lake Erie provides many opportunities for tourism and industry, but an increase in visitors and resident businesses adds not only revenue, but also nutrient runoff and pollution to the state's balance books. Sustainable tourism addresses the growing demand for eco-centric activities and allows lakefront communities to benefit from the scenic aspects of their surroundings.

“Coastal economic development connects to all of these other issues,” says Reutter. “When you have harmful algal blooms, people don't want to use the water, so coastal businesses suffer. When things are really good on the lake, property values are high and everyone wants to visit the area, so the economy grows. But when we get too many people using the ecosystem, we tend to degrade it, so that's why, nationally, we're looking at sustainable tourism as a tremendous opportunity for Sea Grant programs.” **TL**



More detailed information on climate change in the Great Lakes region is available at [changingclimate.osu.edu](http://changingclimate.osu.edu).



# SEA GRANT LEADERSHIP ACADEMY

## Takes Training to Local Officials

by Matthew Forte, Ohio Sea Grant Communications



Findlay, Toledo, and Youngstown host annual Leadership Academies at the beginning of each year. Pictured here is the 2012 class of Toledo.

After 25 years in public service, Chief Ernie Cook of the Trumbull County Sheriff's Department began to get frustrated because it was difficult to change how government works. A few years ago, Mahoning County hosted Ohio Sea Grant's Local Government Leadership Academy, which energized him in his work and opened his eyes to some new opportunities to make his department more efficient. Now, he's excited about the innovative approaches he has helped lead.

"I graduated from the Academy and we came up with a regional fuel and gas purchasing agreement that is saving us 30 cents per gallon," Cook says. "There are 23 different police departments in the county who were writing 23 different reports. We purchased a records management system so

now we have those departments all using one reporting system. Now, our crime analyst can sort through all those reports and connect the dots. It's probably the best crime-solving tool we've ever had."

Mahoning County is one of three counties that host Ohio Sea Grant Extension's Ohio

Local Government Leadership Academy every year. The Academy, which takes place over 10 consecutive weeks, provides training to elected officials and anyone working with local government representatives throughout Ohio, with classes covering various subjects relevant to public service positions.

Ohio Sea Grant Extension Educator Joe Lucente coordinates, teaches, and arranges for past graduates and other public officials to teach the classes and teams up with counties' chambers of commerce, which host the sessions. Municipalities pay only \$250 per person to cover travel for the speakers and food and students must complete seven of the 10 two-hour sessions to graduate.

All participants complete two of the required sessions; one discussing the duties and responsibilities of various local official roles, and the other giving an overview of ethics and conflict of interest laws for public officials. After those classes, Academy students attend five elective sessions that range from conducting effective meetings to working with the media. Lucente and his partners tailor these elective classes to address topics officials specifically want to learn. Lately, officials have asked to spend less time covering electronic technology and instead wanted to learn more about the ins and outs of running for office, like how to



*Ohio Sea Grant's Local Government Leadership Academy offers public officials and members of the public 10 weeks of two-hour sessions that cover topics relevant to public servants, like dealing with the media, creating sustainable communities, and making effective decisions.*





Ohio Senator Mark Wagoner and Representative Barbara Sears, both graduates of the Leadership Academy, have also taught sessions to local government officials and members of the public who work with the government.

*“These classes are helpful not only because they provide good information, but also because they bring things like effective decision-making into an elected official’s world.” — BARBARA SEARS*

campaign, how to raise money and how much is needed, depending on the position.

“If there is a community that wants to focus on a certain topic, we can work with those officials and figure out how to address the topic in a session,” Lucente explains. “We’re able to adapt the material to the needs of an individual county. The curriculum consists of interchangeable parts so we can modify it for different parts of the state.”

Barbara Sears, Assistant Majority Floor Leader (District 46-R), who attended the Academy during its second year and taught some sessions after that, says the sessions are valuable because they’re specialized for public officials.

“These classes are helpful not only because they provide good information, but also because they bring things like effective decision-making into an elected official’s world,” she explains. “It’s something all of us approach in our personal lives differently than we do professionally. Likewise, we deal with issues differently as an elected official and the Academy sessions address issues in those terms.”

Similar to the adjustable course material, Academy teachers change frequently to keep material fresh and updated. Lucente gives instructors freedom to cover the required material in various ways—group discussion, lecture, PowerPoint, etc.

The Academy has grown a lot since Lucente watched his first class of 30 graduates in Lucas County back in 2002. Now, nearly 400 graduates are better equipped to make farsighted decisions and better serve their constituents thanks to leadership academies held in Huron, Green, Marion, and Ashtabula

counties. And 50 students recently graduated in April from Academies held annually in Youngstown, Toledo, and Findlay.

Lucente wasn’t the first to think of educating government officials as the Academy was an improvement upon leadership classes begun in 2002 by the Ohio Township Association, a statewide organization that promotes township government. Held at the group’s annual meeting in Columbus, officials had to travel for the classes over a span of three years to attend enough to graduate. The Toledo Chamber of Commerce called Lucente and said Toledo public officials wanted leadership training; Lucente suggested that the Association’s state-wide curriculum be taken to local governments.

“Everyone knew they could go to the state township association, but we wanted something more localized with the hopes of getting more people at different levels of government going through it over a shortened period,” Lucente says. “Our partners and I decided we could accomplish this over a few months by offering classes in different counties.”

Working in partnership with the Ohio Township Association, Ohio State University Extension Community Development, and Ohio State University’s John Glenn School of Public Affairs, Lucente and retired State Community Development Specialist Donald Lacy formed the Ohio Local Government Leadership Academy in 2002. While the Ohio Township Association still holds its own annual training where Lucente and others teach, Lucente and Lacy took the curriculum and made it their own in counties throughout the state.

While it’s not required, the training has proven helpful for Academy graduates.

Youngstown and Warren Regional Chamber of Commerce Vice President Tony Paglia encourages local officials and government employees to attend the Academy to promote the chamber’s priority for government reform.

“Two things have happened since the Academy began,” he explains. “First, graduates of the Academy who are in a network of government employees and officials are leading efforts to build local government cooperation and create efficiencies. Second, the Academy is a good way to get people more involved in our government initiatives.”

Paglia says that several people who have completed the Academy are taking a more active role in the chamber and that many of the participants in Grow Mahoning Valley, a local initiative to attract businesses, are Academy graduates.

Pre- and post-academy surveys show that the curriculum is effective. In its ten years, the Academy has racked up impressive survey results in terms of knowledge gained. The biggest increases are in areas where public officials are likely to have less training—conflict management, building sustainable communities, and working with the media.

Another area that is ripe for improvement is networking across municipalities. Many local officials don’t interact with others in their area, nor do they take into account the concerns of officials and residents in other communities. Ohio has the fifth largest number of local governments, but ranks 34th in land area, meaning many jurisdictions are close together.

“One of the goals of the Academy is to create a venue where local officials can get to know and understand their colleagues and citizen volunteers better,” Lucente says. “A second goal is to build bridges across the local jurisdictions and the disjointed local governments.”

Sears makes the point that many disagreements across jurisdictions are rooted in the style of the disagreement itself, rather than its substance.

“Relationships, which the Academy helps foster, can help prevent those misunderstandings,” she says. “Networking with others is always a good thing.” **TL**

For more information about the Academy and to arrange one in your county, please contact Ohio Sea Grant Extension Educator Joe Lucente at [lucente.6@osu.edu](mailto:lucente.6@osu.edu) or **419.213.2028**.



# RECYCLING

One person's trash ➤ Another person's treasure

## Shrink Wrap Recycling Saves Lake Erie Marinas and Environment a Million

*by Matthew Forte, Ohio Sea Grant Communications*



Bill Schaeffer breathes a sigh of relief as he waves goodbye and the garbage truck pulls away carrying bundles of white, blue, and clear boat shrink wrap to a recycling facility in southern Ohio. Before he started recycling shrink wrap through Ohio Sea Grant's Ohio Clean Marinas Program, Schaeffer's Beaver Park Marina in Lorain, Ohio had to pay upwards of \$300 to remove dumpsters full of shrink wrap each spring. But now, thanks to an Ohio Clean Marinas Program partnership with Mondo Polymer Technologies, Lake Erie marina owners and boaters can keep trash out of local landfills and instead, recycle it into something useful.



Shrink wrap is plastic sheeting that boaters use to cover their boats during the winter to protect against moisture and nuisance critters. Commercial nurseries and greenhouses also use the plastic to cover their buildings during the cold months in order to protect their young plants. When spring rolls around, the plastic comes off the boats and greenhouses and ends up in landfills.

"We were filling our landfills with this plastic that doesn't deteriorate," Schaeffer says. "Since we take this shrink wrap off of nearly 60 boats in our marina, it didn't take long for our dumpsters to fill up, which gets costly itself."

An average 30-foot boat requires about 25 pounds-worth of shrink wrap and with some marinas along Lake Erie containing 300 or more slips, the larger marinas may each have more than 7,500 pounds of shrink wrap to trash in the spring. "When you multiply that by the nearly 300 marinas along Lake Erie, it's quite a bit of trash," points out Sarah Orlando, Ohio Sea Grant Extension Educator and Ohio Clean Marinas Program Coordinator.

The Ohio Clean Marinas Program is a partnership of more than 15 organizations,

The Ohio Clean Marinas Program coordinates the recycling of nearly 160,000 pounds of boat shrink wrap each year. Boaters use the plastic sheeting to protect their vessels against the winter weather.

Mondo Polymers Technologies of Marietta, Ohio, has recycled boat shrink wrap into nearly 250,000 guardrail blocks for use along roads since the Shrink Wrap Recycling Program began six years ago.

including federal, state, local agencies, and boat associations that promotes environmental stewardship to keep Ohio's coastal and inland waterway resources clean. By making marinas and boaters more aware of environmental laws and rules, the partners encourage marinas to become certified Clean Marinas by following a list of voluntary best management practices.

One of those management practices asks that marina operators know what trash they throw away and what they could recycle. That gave Ohio Sea Grant Extension Specialist Dave Kelch the idea for recycling shrink wrap. "We already recycled boat batteries, we provided containers to marinas for recycling aluminum cans, and marinas recycled used oil," Kelch points out. "We thought, 'It would be great to recycle all this plastic shrink wrap too,' and then we thought, 'Well, maybe we can!'"

The program launched the Shrink Wrap Recycling Program in 2006 in partnership with Mondo. Schaeffer's marina joined that first year and other marinas quickly followed suit. In the program's first year, 70 Ohio marinas collected 101,000 pounds of plastic. The next year, 102 marinas collected a half million pounds of shrink wrap and reported a savings of \$86,000 in trash disposal.

Now, 130 Lake Erie marinas participate. Mondo schedules collection trips to these northern Ohio locations each spring, melts down the plastic and turns it into raw material that become the blocks connecting road guardrails to the posts. To make trips north even more worthwhile, Mondo works with greenhouses and nurseries and last year collected 53,600 pounds of plastic from greenhouses alone.

In its short history, the recycling program has coordinated the collection of more than 1.7 million pounds of plastic and Mondo has recycled this discarded shrink wrap into nearly 250,000 highway guardrail blocks that help make more than 300 miles of Ohio roadways safer and reduce landfill content.

Ohio was the first state to pioneer this type of program with Mondo and the public-

private partnership has grown so successful that Clean Marina programs in other states are also running their own shrink wrap recycling programs. New York, Pennsylvania, Michigan, Maryland, and Delaware have already recycled more than 500,000 pounds of shrink wrap.

"The program provides a greener environment and since the Lake Erie Marine Trades Association (LEMTA) has a relationship with the water and environment, we're sensitive to having clean water and a better environment for now and future," says Ken Alvey, LEMTA president. "It's a great program that allows everyone to participate whether they're recreational boaters, or marinas, or nurseries. We're always trying to foster a better environment and create better environmental awareness, and the Shrink Wrap Recycling Program helps us accomplish both of those goals."

This year's collections will take place between April 15 and June 15 with seven marinas volunteering to be public drop-off locations for shrink wrap from individual boaters. Before recycling the plastic, boaters should remove all metal, lumber, vents, and rope. Mondo requests that the plastic be kept

as clean as possible, rolled into bundles five feet long, similar to a rolled sleeping bag, and tied with a strip of shrink wrap.

"I would encourage both boaters and marinas to recycle their shrink wrap," Schaeffer says. "We're all trying to be friendly to the natural habitat and save our environment for our kids. As a marina, our livelihood depends on a clean lake and I think the customers appreciate our effort to keep our marina clean." **TL**



©John Henderson II

Boaters who would like to recycle their shrink wrap can do so at the following collection sites April 15 through June 15. Information on additional collection sites and program participation is available by calling the Ohio Clean Marinas Program office at 419.609.4120.



#### RECYCLE YOUR SHINK WRAP

- ▶ Beaver Park Marina, 6101 W. Erie Ave., Lorain
- ▶ Brenner 75 at Harrison's Marina, 3840 N. Summit St., Toledo
- ▶ Catawba Landing, 2021 NE Catawba Rd., Port Clinton
- ▶ Emerald Necklace Marina, 1500 Scenic Park Dr., Lakewood
- ▶ Geneva State Park Marina, Padanarum Rd., Geneva
- ▶ Sandusky Harbor Marina, 1 Huron St., Sandusky
- ▶ Spitzer Riverside Marina, 485 California Ave., Lorain

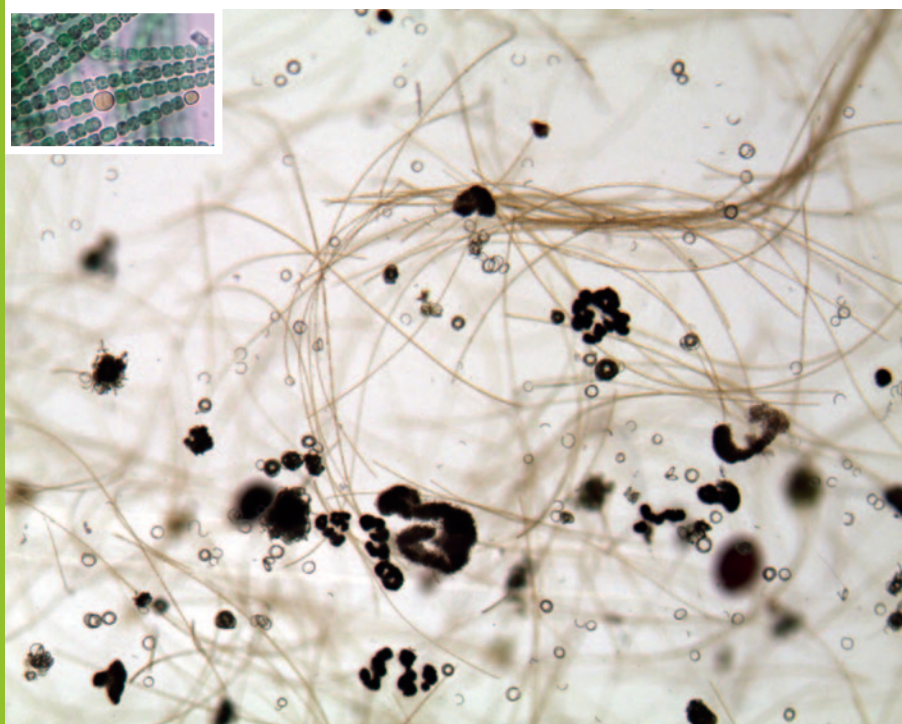
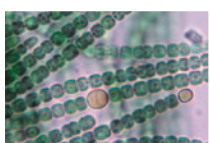




# Is Nitrogen Another Concern For Lake Erie?

# N<sub>2</sub>

(Inset) Heterocysts appear as larger “beads” on strands of *Anabaena*. Because some cyanobacteria can take nitrogen gas from the air (which is about 78% nitrogen), they may have an advantage over other blue-green algae if nitrogen influx to Lake Erie is reduced.



This close-up of a water sample from Lake Erie's western basin shows nitrogen-fixing *Anabaena* (small dark-green curls), as well as *Microcystis* (darker clumps) and the diatom *Aulacoseira* (long green strands), both of which cannot fix nitrogen. Bade's research may determine how dominance of these algae could be affected if nitrogen availability in Lake Erie changes.

According to Bade, there are two main possibilities: reducing nitrogen levels might limit algal growth, similar to what happens when phosphorus load is reduced in the lake and contributing waterways. This would create more desirable conditions along the lakeshore, where algal blooms—of both blue-green and green algae—can hurt recreation, tourism, and general living conditions.

However, it is also possible that reducing the input of nitrogen from human sources will favor a specific type of cyanobacteria, which is able to take in or “fix” nitrogen from the air and use it for growth. These nitrogen-fixing cyanobacteria, which include better-known species like *Anabaena* and *Aphanizomenon*, potentially have the ability to overcome any nitrogen shortages created through management efforts, resulting in blooms of different algal varieties but of the same intensity.

“In essence, we could spend a bunch of money trying to prevent nitrogen from getting into the lake, and it would have no positive impact whatsoever,” Bade explains. “But we really just don’t know how lakes will respond to changes in nitrogen input.”

Bade's focus is on Sandusky Bay in western Lake Erie, where the research team will collect basic measurements on the current levels of nitrogen fixation. The observational study components will fill a gap in the

**Phosphorus:** It's what most people think about when conversations turn to harmful algal blooms (HABs) in Lake Erie. However, it's not necessarily the only nutrient influencing algal growth in the lake. A new Ohio Sea Grant-funded research project at Kent State University is investigating the role nitrogen plays in supporting the growth of cyanobacteria—more commonly called blue-green algae and a frequent culprit in HAB events.

Dr. Darren Bade, Assistant Professor of Biological Sciences at Kent State, will examine the effects of nitrogen, a common nutrient found in fertilizers as well as animal waste, on the growth of cyanobacteria. “Because of our focus on phosphorus, we’ve been left with not a whole lot of knowledge about how nitrogen influences the lakes in terms of the growth of algae,” explains Bade, who also teaches classes at Ohio State University’s Stone Laboratory in the summer. “So perhaps we could also benefit from trying to reduce nitrogen runoff into the lake, but we don’t really know enough about how the lake will respond to a change in nitrogen.”



REU student Nathan Arroyo measures Chlorophyll A in experiments that limit available nitrogen by growing Lake Erie algae in artificial lake water. Chlorophyll A is a proxy measurement for the amount of algae present, and evidence shows that algae may reduce their growth rate when deprived of nitrogen.



## Preparing Coastal Communities for Climate Change, Great Lakes Style

by Christina Dierkes, Ohio Sea Grant Communications

Educators and researchers from the Great Lakes Sea Grant Network, Great Lakes Environmental Research Laboratory, and Case Western Reserve University have completed “Preparing Coastal Communities for Climate Change,” a four-year research and outreach project funded by NOAA’s Sectoral Applications Research Program (SARP). The program aimed to create resources for Great Lakes states to use when planning for climate change, in areas as varied as port infrastructure, stormwater management, and climate change education.

Available resources include fact sheets covering topics from weather changes to lake level variation, research reports on many of the project’s modeling efforts, and workshops and seminars that introduce community managers to the challenges they could face under a changing climate. The project also produced an economic analysis tool to estimate the value of port infrastructures in the Great Lakes and the cost of maintaining and improving said infrastructure, as well as teaching tools to address the uncertainty that comes with trying to make future decisions based on modeling the potential impacts of climate change.

“I think the SARP project has helped us make a lot of progress on those things, whether they were directly related to it or not,” says Frank Lichtkoppler, Ohio Sea Grant Extension Program Leader. “Some of these models were a direct result of the SARP grant, but they also helped identify some things that weren’t key on it, but provided more adaptation guidance.”

The Great Lakes Sea Grant Network includes Sea Grant offices in Illinois-Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin, as well as Lake Champlain Sea Grant in Vermont. More information about the network and links to the partner sites are available at [miseagrant.umich.edu/greatlakes](http://miseagrant.umich.edu/greatlakes).

More information and the project’s final products are available at [miseagrant.umich.edu/greatlakes/climate/about.html](http://miseagrant.umich.edu/greatlakes/climate/about.html). An archived webinar introducing the economic analysis matrix for port infrastructure can be found at [changingclimate.osu.edu/webinars/archives/2011-03-01](http://changingclimate.osu.edu/webinars/archives/2011-03-01).

*“Because of our focus on phosphorus, we’ve been left with not a whole lot of knowledge about how nitrogen influences the lakes in terms of the growth of algae.” — DR. DARREN BADE*

current literature by determining which kinds of algae in the area are fixing nitrogen from the atmosphere, at what times of the year the process occurs, and how big the contribution of those algae to total nitrogen load in the lake might be.

The second part of the study will use artificial lake water—which contains all the components of real lake water, but is prepared in the lab to allow manipulation of certain nutrient concentrations—to determine the effects of various nitrogen levels on algal growth. While there are drawbacks to this kind of experiment, it is currently the best way to determine how nitrogen affects Sandusky Bay without being able to control the entire lake ecosystem.

Unless Mother Nature is willing to help out a bit, that is. “We’ve seen fairly low nitrogen concentrations in Sandusky Bay over the past couple years, so we’re crossing our fingers that we’ll be able to get some natural

experiments going where the lake goes into this low nitrogen condition again and we’ll be able to study it to have some comparisons between a year that’s low in nitrogen and a year that has higher nitrogen levels,” Bade says.

In addition to the fundamentals that will be determined in this project, Bade and his colleagues are also hoping to develop an easy method to determine the amount of nitrogen fixation happening in the lake. “The laboratory methods that we’re going to be using are somewhat laborious,” Bade says. “But we might be able to use a simpler means of estimating nitrogen fixation, and that’s through the fact that many of these nitrogen-fixing cyanobacteria produce something called heterocysts. These are specific types of cells where the nitrogen fixation happens, and they look very different from the other cells. So we’re hoping to develop a method that would allow us to very quickly quantify the numbers of these heterocysts in a sample of water, and then draw a connection between that and the amount of nitrogen fixation.”

The two-year project will officially start in early 2013, but Bade is planning to have a graduate student begin preparations for the experiment with the start of the new academic year. **TL**

For more information about this project, contact Dr. Bade at [dbade@kent.edu](mailto:dbade@kent.edu).





## CLIMATE - PROOFING

# science education

IN THE GREAT LAKES

by Christina Dierkes,  
Ohio Sea Grant Communications



Climate change is becoming a challenge for individuals, communities, and countries across the world. But the Great Lakes ecosystem will face its own set of trials (and advantages) as the local climate shifts along with the global. And while community managers, policy makers and public health officials are dealing with the effects of climate change on the region, teachers are looking for materials they can use to teach the next generation of Great Lakes residents about a changing climate.

Ohio Sea Grant first created the *Great Lakes Instructional Materials for the Changing Earth System*—more commonly known as GLIMCES—in 1995 in an effort to provide teachers with lessons and activities that helped students localize climate change to their own backyard instead of seeing it as an abstract global phenomenon. Along with 1993's *Activities for the Changing Earth Systems* (ACES), these lessons allow Great Lakes teachers to include climate change into their courses without having to start entirely from scratch.

But science never stands still, and with 20 more years of climate change research available, an update to the curriculum is in the works. Leading the effort are Dr. Rosanne Fortner, Ohio Sea Grant's former Education Coordinator and an integral part of its education efforts for over 30 years, and

Lyndsey Manzo, Ohio Sea Grant Educator and a classroom teacher at Westerville North High School, near Columbus.

"The curriculum is there, we do not need to reinvent the wheel," explains Manzo. "What we need to do is update the data, so we're taking selected activities from GLIMCES and ACES, and we're updating them not just for the climate science, but also for the pedagogical structure." That structure will now follow the "Five E's" of classroom teaching: engage, explore, explain, extend, and evaluate.

Another change will be the layout of the activities, which takes full advantage of the curriculum's new online format. "Now that we aren't relying on a printed product, we have the ability to make everything much more efficient," Manzo says. "We can have a teacher page, and we can have a student page that's

basically a prepared worksheet. We're also able to use electronic links and data sets that are always updating online, so students can see interactions and simulations on the computer. It allows us to use our educational technology better, in addition to using more current data."

Having a regionally focused curriculum available helps teachers take an abstract concept like climate change and relate it to students' lives right here in the Great Lakes region. "There are great climate change activities out there, but they're often on a global scale, or they're on a regional scale but it's not our region," Manzo says. "They're focusing on the Arctic, or they're looking at alpine glaciers of the Himalayas. That's really hard for students to grasp when you're here by the Great Lakes."

Feedback on the old lessons has been overwhelmingly positive, and the updated curriculum is likely to continue that trend. "There is practically no workshop I've ever done where some teacher didn't say 'where have you been all my life?'" says Fortner. "The biggest challenge we have in Sea Grant education is not getting people to use the curriculum, it's that people don't know the curriculum is out there. That's why we keep





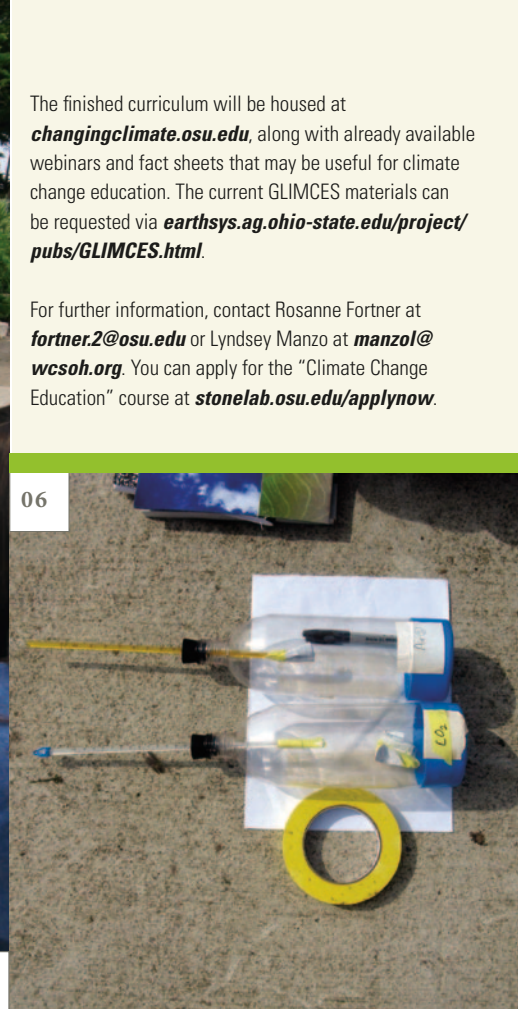
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The finished curriculum will be housed at [changingclimate.osu.edu](http://changingclimate.osu.edu), along with already available webinars and fact sheets that may be useful for climate change education. The current GLIMCES materials can be requested via [earthsys.ag.ohio-state.edu/project/pubs/GLIMCES.html](http://earthsys.ag.ohio-state.edu/project/pubs/GLIMCES.html).

For further information, contact Rosanne Fortner at [fortner.2@osu.edu](mailto:fortner.2@osu.edu) or Lyndsey Manzo at [manzol@wcsoh.org](mailto:manzol@wcsoh.org). You can apply for the "Climate Change Education" course at [stonelab.osu.edu/applynow](http://stonelab.osu.edu/applynow).

sending people to teacher conferences, why we keep writing about them and so forth. There are new people that come to the teaching profession every year, and we always have a fresh audience to work with."

That audience has a number of options for learning how to integrate the climate change curriculum into their classrooms. This summer, Ohio State University's Stone Laboratory on western Lake Erie is offering "Climate Change Education," a one-week course that introduces classroom teachers, education students, and informal educators to the science of climate change and the opportunities inherent in having a regional curriculum at hand.

Like all Stone Lab classes, Climate Change Education is hands-on. "The focus of the class will be on making the new curriculum available," says Fortner. "We'll have presentations about the science content, but the way that I teach is to learn by doing. Rather than give a lecture and

then a lab, I would prefer to have the lab and then a discussion with the students." In that spirit, students in the course will visit some of the Lake Erie islands to look for evidence of change over time: in the orientation of glacial grooves, in the growth of the trees on the islands, and in the size and arrangement of sand and pebbles on the islands' beaches.

They will also work through some of the curriculum activities they may later present to their own students. "Participating educators engage in the activities very much the way they would in their own classes," Fortner says. "It helps them to see in advance what they still need to change for their class, what things won't work at all for them, things like that. It's a very useful way to prepare for your own use of the materials."

For teachers that are unable to attend a week-long class, Ohio Sea Grant will be offering two one-day professional development workshops, as well as a webinar, to allow more educators to fit these trainings

into their schedule. Dates for these programs are now available at [ohioseagrant.osu.edu/events](http://ohioseagrant.osu.edu/events), and registration information will be added shortly.

While current teachers have traditionally made up a large proportion of curriculum users, pre-service teachers (education students preparing for the profession) also benefit from targeted climate change education, Manzo believes. "There's certainly value in doing professional development for current teachers because they know exactly what they need in their classroom," Manzo says. "But at the same time, I think there's a huge value in serving pre-service teachers and people that are getting their teaching certification. Very few programs require a specific course in climate change, so they really don't look at it as a systems approach. Climate change spans many disciplines, so there's value in not just teaching the science, but also the pedagogy: here's the climate science, and here's how you convey it to your students." **TL**





Add

by Matthew Forte, Ohio Sea Grant Communications

# LAKE ERIE to Your SCIENCE Vacation Plans

**C**rowds swell in the summer months at Put-in-Bay as vacationers visit Lake Erie to fish, boat, and relax, and as young scientists study at Stone Lab. But students don't need to be the only ones having fun while learning about Lake Erie. Visitors can take advantage of Ohio Sea Grant's science and history tours at landmarks all around the bay, from the South Bass Island Lighthouse to Gibraltar Island. The tours are a fun way to learn about Lake Erie without attending a traditional lecture.

"We have the amazing opportunity to reach those visiting South Bass Island and Put-in-Bay," says Melinda Huntley, Ohio Sea Grant Extension's Sustainable Tourism Program Director. "Visitors are seeking interesting things to see and do, and Ohio Sea Grant can meet these needs while also teaching people about Lake Erie."

The Aquatic Visitors Center, the historic State Fish Hatchery on South Bass Island, will be open from 11 a.m. to 5 p.m. Wednesdays through Saturdays, June 20 – August 18, with free admission. Guests can investigate artifacts

from the center's history, use microscopes to inspect Lake Erie's tiniest inhabitants, and observe native fish in large aquaria. Children can try their hand at fishing on the pier for free by borrowing rods and bait provided by the Ohio Department of Natural Resources.

Treasure hunting is another activity that will draw vacationers to the Aquatic Visitors Center, thanks to a geocache hidden near the building. The geocache is a small hidden container with its geographic coordinates available online. People plug the coordinates into their smartphone or

GPS and track down the cache, which holds a finders' log and some prizes for the finders. Coordinates for the Aquatic Visitors Center cache are available at [go.osu.edu/cachesite](http://go.osu.edu/cachesite).

"Our geocache is a great way to bring people to an area of South Bass Island that they may not have otherwise visited," says Dr. Rosanne Fortner, Ohio Sea Grant Education Coordinator, who originally hid the cache. "People geocache so they can learn something, and that's the very thing our cache does—it introduces people to the Aquatic Visitors Center."

On an island just across the bay from the Aquatic Visitors Center, visitors can get a look inside Stone Laboratory, the country's oldest freshwater biological field station, during the Gibraltar Island and Stone Laboratory Tour from 11 a.m. to 1 p.m. each Wednesday, June 20 – August 15. A tour fee of \$10 (\$5 for children 6 – 12) supports student scholarships for summer classes. To reach Gibraltar, visitors can take a water taxi at 10:45 a.m. from the Boardwalk Restaurant Harbor Taxi Landing on South Bass Island at a cost of \$6 round-trip.

Tour guides lead one-hour walking tours of the island, including Perry's Lookout, the glacial grooves, Stone Lab buildings, and the outside of Cooke Castle, Jay Cooke's summer home built in 1865. As a Civil War financier and the third owner of Gibraltar Island, Cooke hosted influential figures like President Rutherford B. Hayes and General William Sherman on the island. Guests also can learn about current Lake Erie research conducted at the lab, which helps increase understanding of some of the challenges facing Lake Erie's ecosystem.

For a great view of Lake Erie and its islands, sightseers can climb the South Bass Island Lighthouse tower from 11 to 5 p.m., Mondays and Tuesdays, June 18–August 14. Cost is \$3, free for children under 6. You'll also discover information about a few of the 1,700 shipwrecks scattered across the floor of Lake Erie, and find out more about the lake's role as Ohio's most valuable natural resource.

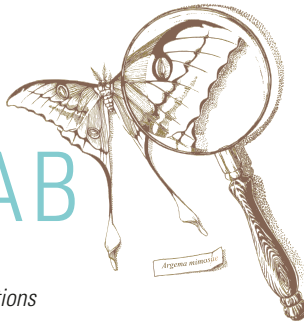
"Nationwide, people are visiting locations where they can see, tour, and learn about a place," Huntley says. "Our sites give visitors additional reasons to visit the islands, giving a boost to the local economy. They also are a fun way to learn about the lake, ongoing research, and how we can become better stewards." **TL**

For more information about any tour, contact the Stone Lab Bayview Office at 419.285.1800 or visit [stonelab.osu.edu/tripsandtours/island-tours](http://stonelab.osu.edu/tripsandtours/island-tours).



# Back to School at STONE LAB

by Matthew Forte, Ohio Sea Grant Communications



For someone like Lisa Bowers who loves learning, Stone Lab is the perfect spot to continue her educational journey. With the exception of one course, it had been 14 years since Bowers had taken a college course. But one week in Stone Lab's Introductory Insect Biology course reinvigorated her desire to take classes again.

When a colleague told Bowers about the summer class at Stone Lab, she jumped at the opportunity and applied. As a Regional Urban Forester for the Ohio Department of Natural Resources, Division of Forestry, Bowers has worked for the last 11 years to educate people about trees and in recent years, find ways to deal with destructive insects.

"I enjoy learning and education

has always improved my skills and knowledge," she says. "I thought that by gaining a better understanding of entomology, it would further benefit my current position, plus it would give me a chance to go back to the lab."

Bowers' first visit to Gibraltar Island came when she was a Groundskeeper at Ohio State's main campus. Her responsibilities sent her to the island to help plant and remove trees. The Stone Lab environment made an immediate impression on Bowers.

She came back to the island for a plant clinic about six years ago, but still, she hadn't taken an actual class at Ohio State's Island Campus on Lake Erie. When Bowers found out about Stone Lab's entomology class, she realized it would be an opportunity to refresh and

improve her knowledge of insects.

While her position calls for Bowers to deal with harmful insects, it had been a while since she had looked at an entomology textbook—the last time had been as an Ohio State undergraduate. Bowers dug out her notebook from that entomology class to prepare for the week at Stone Lab and that's when she realized that Dr. David Horn, the Stone Lab instructor, was the same professor who originally instructed her in insects at Ohio State so many years ago.

Bowers' studying paid off and she didn't have a problem keeping up with her high school and college student classmates during the fast-paced class. Horn took the class to a different island each

day, collecting insects as one of the class projects.

Overall, the class was a great experience for Bowers. "Stone Lab's facility is unique and the field work experience and hands-on activities really helped me learn the material," Bowers says. "It was almost more of a vocational class. This would have been a wonderful experience for me as an undergraduate."

The class at Stone Lab was a jumpstart for Bowers. She took a graduate-level plant-pathology course last winter and she just doesn't want to stop learning.

And, as if to prove her point, she has her eye on either Stone Lab's local plant biology or ecology course for this summer. **FOSL**



LISA BOWERS

*"I thought that by gaining a better understanding of entomology, it would further benefit my current position, plus it would give me a chance to go back to the lab."*





# Friends Of Stone Laboratory

## Dear friends,

Dear Friends,

*Gibraltar was bustling with FOSL friends during the Spring Work Weekend this past month. Fresh coats of paint and clean facilities will greet students arriving for spring workshops and summer classes. As the lake turns over and the trees green and bloom, I think of Stone Laboratory and the opportunities it provides for students to grow and change. With each passing year, FOSL increases the scholarship support for students to pursue their academic and research goals and dreams at Stone Laboratory.*

*Many changes are underway at the lab, including major improvements to research laboratories and classrooms. Come and see these exciting changes for yourself! Join us for our Open House on Saturday, September 8, 11:30 a.m. – 3:30 p.m., and for the Annual Meeting on Sunday, September 9. Take a tour of the Stone Laboratory upgrades, engage in science activities, and visit the South Bass Island Lighthouse. This year is the 199th Anniversary of the Battle of Lake Erie, so join the festivities to commemorate Perry's victory and celebrate international peace.*

*Be one of the first FOSL friends on this year's Science and History Tour of Gibraltar Island from 11 a.m. – 1 p.m. every Wednesday, June 20 – August 15. A fee of \$10 for adults and \$5 for children will support research and education scholarships for Stone Lab students. Or attend a Thursday evening lecture supported by FOSL to hear the latest Lake Erie research updates. Visit [stonelab.osu.edu/events](http://stonelab.osu.edu/events) for lecture dates, times, and presenters.*

*Keep in touch with us throughout the summer by visiting the Stone Laboratory website for information and updates at [stonelab.osu.edu](http://stonelab.osu.edu) and by checking our FOSL Friends Facebook page. Thank you for your continued support of Stone Laboratory through promotion, donations, and service. I hope to see you at the upcoming FOSL events this summer!*

Sincerely,

Tracey Meilander  
FOSL President

[broaderimpacts@yahoo.com](mailto:broaderimpacts@yahoo.com)

## Goodbye Quarters

No, there is not soon to be a lack of pocket change; rather all of Ohio's state-supported universities will be switching from a quarter-based schedule to a semester schedule. The Ohio State University, including Stone Laboratory, is implementing the switchover beginning this summer.

The old traditional two- and five-week quarters will be no more as this summer season is set to begin June 10, with one week of 2-credit hour courses, such as Field Herpetology and Spider Biology. Following the first week, traditional 5-week courses will last from June 17 – July 21. These 5-week classes are now worth 4 credit hours. Beginning July 22, the lab will again offer 1-week, 2-credit hour classes as well as a variety of shorter non-credit workshops. For specific information on the new semester and course schedule, go to the Stone Laboratory website at [stonelab.osu.edu](http://stonelab.osu.edu).

A lot of time and effort went into devising the new semester schedule. The dedicated staff and faculty evaluated many different possibilities. Aligning the summer classes to this schedule should allow for students from all universities and colleges to more easily fit Stone Laboratory into their educational programs in the future. **FOSL**

## Northeast Ohio Walleye Association Cuts Check for Lab

After holding a raffle and selling 871 tickets, the Northeast Ohio Walleye Association (NEOWA) wrote a \$1,000 check to support Stone Lab student scholarships. "We hope to make this an annual fund-raising effort for Stone Lab," says Association President Dustin Morgan. "We feel that the research and education conducted at Stone Lab is of great value to Lake Erie sport anglers."

"This donation from the Northeast Ohio Walleye Association will significantly benefit a student's science experience during summer courses at Stone Lab," says Ohio Sea Grant and Stone Lab Director Dr. Jeff Reutter. "I hope this gift will inspire more groups to support Lake Erie research and education."

The 30-year-old association was founded by nine friends who wanted to help Lake Erie's walleye fishery and the environment. The NEOWA focuses on youth fishing and helping the physically challenged enjoy fishing. **FOSL**



*The Friends of Stone Laboratory (FOSL) began in 1981 as a support group to “bring Stone Laboratory into the 21<sup>st</sup> century with the best possible facilities, equipment, and professors, and make this an unequaled learning experience available to all outstanding students.” Members of the Friends provide a way for former students to support the facility by raising awareness and funds for scholarships, research, and equipment.*

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#### STONE LAB STAFF

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# FOSL

#### Dates to Remember

May 5, 2012	Ohio Academy of Science State Science Day
September 7-9, 2012	Stone Laboratory Open House/Annual Meeting
September 28-30, 2012	Buckeye Island Hop

## Winter Reception Wrap-Up

The 14th annual Ohio Sea Grant Winter program was held on January 24, 2012. Despite being the middle of winter, it was a very warm and welcoming time for everyone to gather for the first time at the Longaberger Alumni House on Ohio State's main campus. A very enjoyable atmosphere was set for the evening with music being provided by Eugene Braig and Linda Merchant-Masonbrink. The early evening was a time for everyone to mingle, enjoy refreshments, and bid on items on display in the silent auction.

The main program featured Ohio Sea Grant and Stone Lab Director Dr. Jeff Reutter speaking about “Harmful Algal Blooms in Lake Erie: Causes, Solutions, and Predictions for 2012 and Beyond.” Stone Laboratory Manager Matt Thomas brought everyone up to speed on the many renovations taking place at the lab in the fall and the upcoming spring. FOSL President Tracey Meilander welcomed everyone and also recognized the long-term and dedicated support of Nancy Cruickshank and Arleen Pineda with a presentation of the FOSL Board of Director's Award to each of them. Dr. Reutter also recognized the dedicated support of Chris Henderson, Rick Van Deusen, and Chris Redfern with the Stone Laboratory Director's Award. In addition, one of the students in attendance received a one-week scholarship, to cover room and board at Stone Lab, worth \$395.

Nearly 100 guests attended the evening and more than \$2,100 was raised from the auction, donations, and sales of items. This money goes directly to support the students attending classes at Stone Laboratory. **FOSL**







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## *Go beyond polar bears and* **Teach Great Lakes Climate Science! ➤**

Learn about activities for teaching regionally relevant climate science in your classroom, work through hands-on lessons with fellow educators, and get suggestions on how to adapt classroom activities to informal and outdoor education settings.



Registration for all of these events is now open at [changingclimate.osu.edu/topics/education](http://changingclimate.osu.edu/topics/education).

**JUN  
11**

9am to 4pm  
Lake Erie Nature & Science Center  
Bay Village, Ohio

**AUG  
7**

9am to 4pm  
UT Lake Erie Center  
Oregon, Ohio

These free workshops are taught by educators who have used the resources in their own classrooms. We'll cover Ohio Sea Grant's updated Great Lakes climate curriculum, along with climate and Great Lakes literacy principles, and informal resources like OSU's Global Change, Local Impact webinar series.



***Can't attend in person?  
Tune in for the webinar.***

Ohio Sea Grant will offer an introductory webinar: **Introduction to Great Lakes Climate Education Resources**  
time & date ➤ Friday October 19, 2012 // 10am to 12pm ET // Online event