TWINELINE

2016 SUMMER EDITION VOL.38/NO.1

LEARNING *for Life*

Stone Laboratory offers valuable lessons for all ages

NOAA

The Ohio State University

Sea Grant
Ohio Sea Grant College Program

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2016 SUMMER EDITION

Stone Lab Guest Lectures Offer a Glimpse into Real-World Science

The Stone Lab Guest Lecture Series returns for the summer of 2016, bringing Lake Erie research and state agency updates to the public. There are two ways to attend the lectures: in person on Gibraltar Island, or online via streaming video. Information on both options is available at ***go.osu.edu/guestlectures***. The lectures will also be recorded and available at ***youtube.com/user/ohioseagrant***.

On the cover: Students from Utica High School's science club enjoy a science cruise as part of their Lake Erie Science Field Trip. Each year, more than 3000 people participate in the program.

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LEARNING *for Life*

Stone Laboratory offers valuable lessons for all ages

by Christina Dierkes & Lisa Aurand Rice, Ohio Sea Grant Communications

For many, Stone Lab, Ohio State's island campus on Lake Erie, is more than just a place to take some summer classes that doesn't involve sitting in a lecture hall. It's a way of life that gets in your bones and stays with you from the first time you step off a boat onto the Gibraltar Island docks.

Stone Lab experiences often start with a field trip for kids as young as fifth grade. The Lake Erie Science Field Trip Program takes students out onto the lake for a fish trawl and water sampling session before bringing them back to the lab to dissect their catch and analyze their water samples under microscopes. Additional activities include everything from a plant walk around the island to meeting some of Stone Lab's reptilian residents.

For many of the students, it's the first time they get to experience science beyond reading about it in a book.

"Most of them hadn't had the experience of dissecting a live, fresh fish," said Brian Niemeyer, who teaches fifth grade at Lincolnview Local Elementary School in Van Wert, Ohio. "At that grade level, it's a great first experience for them." Niemeyer has regularly brought his classes to Stone Lab since 2013 to help them feel more connected to what they were learning in the classroom.

High school students enjoy those experiences as well. Frances O'Flaherty, adviser to the Utica High School science club in Utica, Ohio regularly brought her students to the island starting in 2010, and the students looked forward to the trip so much that they held fundraisers throughout the year to make sure everyone could afford to have that Stone Lab experience.

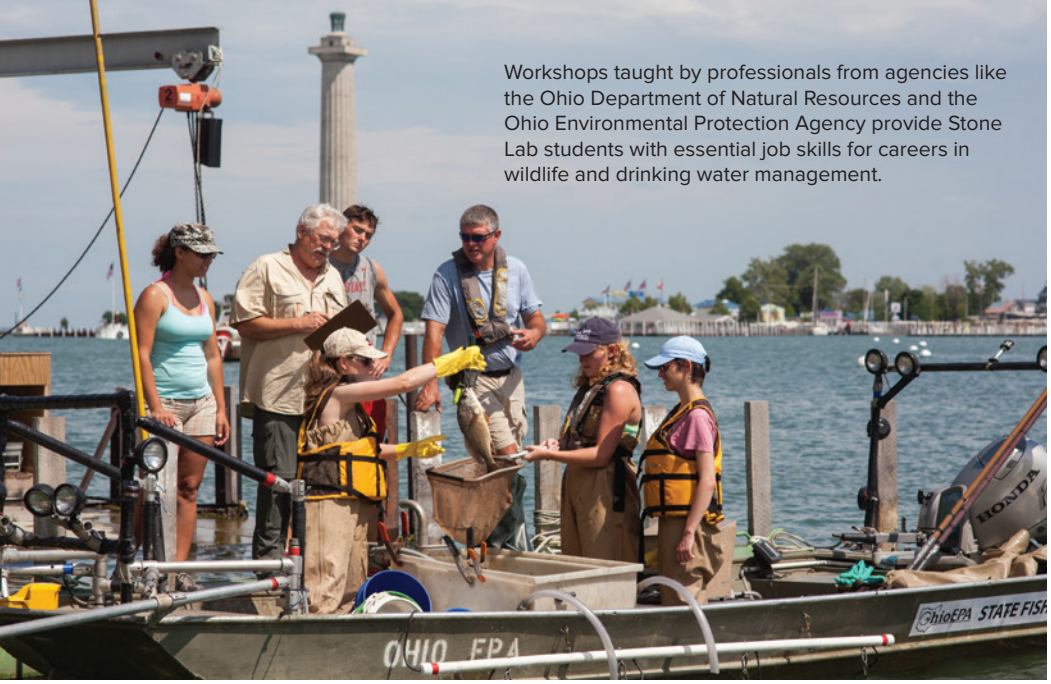
> "Everything is really hands on, where we take those lectures and actually apply the different theories and methods in the field."

"I've had kids come back and say 'That was my favorite thing ever from high school,'" O'Flaherty said. This year, her students were especially interested in the tour of the Aquatic Visitors Center (AVC), a former Ohio Department of Natural Resources (ODNR) fish hatchery on South Bass Island that now functions as a visitors and nature center managed by Stone Lab.

While field trips are only held during the school year, half-day AVC Adventures allow students to explore the Lake Erie ecosystem over the summer as well. Collecting macroinvertebrates during the water quality walk and holding snakes in the reptiles and amphibians class are among the most popular activities, said Kelsey Dick, a former AVC supervisor. "The kids love herpetology. They love sending pictures home to their parents of them holding snakes."

Although Stone Lab has only offered AVC Adventures since 2014, staff members have already seen how successful they can be at encouraging an interest in science, especially for younger students. More information about field trips and AVC Adventures is available at ***go.osu.edu/SLfieldtrips***.

Once they're hooked on Lake Erie science, high school juniors and seniors who want to get a head start on college credits can take one of Stone Lab's introductory courses, like Aquatic Biology or Insect Field Biology. These one-week classes allow students to get a taste of the independent learning that comes with being in a college class and provide them with college credit that will



Workshops taught by professionals from agencies like the Ohio Department of Natural Resources and the Ohio Environmental Protection Agency provide Stone Lab students with essential job skills for careers in wildlife and drinking water management.

transfer to most universities when they're ready to apply.

"The professors are great – very knowledgeable about their subjects," said Stamatina Tolias, a senior at Carrol High School in Dayton who took Aquatic Biology in 2015. She was awarded a Stone Lab scholarship at Ohio State Science Day, where the Friends of Stone Lab award scholarships to top students every year.

Connecting with Stone Lab professors and researchers can also provide students with letters of recommendation for universities and scholarships, as well as future research and work opportunities if they decide to major in the sciences.

College and graduate students can choose from the lab's wide range of upper-level courses, with most being either one week or five weeks in length. The classes are an intensive immersion in Lake Erie science and include extensive field experiences, from banding birds on the islands to trawling for fish in the open waters of the lake.

Kayla Moore, who graduated with an environmental science degree from Cleveland State University and is seeking a position in that field, took Ecology at Stone Lab in 2015. She was awarded a Research Experience for Undergraduates (REU) scholarship, which covers tuition and living expenses for a five-week course as well as an independent research project.

"I really like that we're right out on the lake, and that's what I'm studying," Moore said. "Everything is really hands on, where we take those lectures and actually apply the different theories and methods in the field."

Being able to apply the concepts from her class was beneficial both for learning and for future job prospects, she said. "The things that I'm learning I think I could use for a future career, even though I'm not really sure exactly what I want that to be," Moore said. "I am loving actually getting experience with the equipment."

And the opportunities for learning don't end after graduation. Stone Lab workshops for the general public introduce people to Lake Erie sport fishing and enhance their outdoor photography skills to help Great Lakes residents better appreciate the beauty and resources characteristic of their environment.

Professional development opportunities range from continuing education workshops for teachers and informal educators to technical expertise development for current and future natural resource agency personnel.

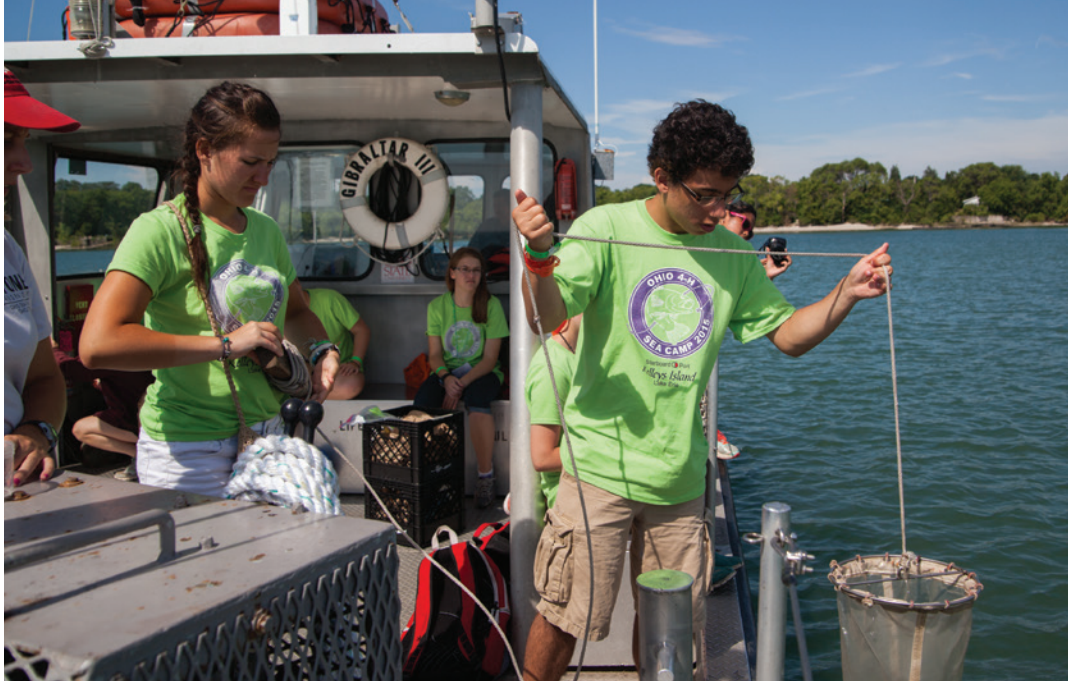
To help water treatment plant operators identify harmful algal blooms (HABs) and remove toxins from the water going through their facilities, Stone Lab and the Ohio Environmental Protection Agency (OEPA) host workshops for water quality professionals every summer. The workshops provide attendees with professional certification contact hours and have had direct impacts on their work.

"A week after one of the workshops last year, one of the participants worked with Stone Lab staff to correctly identify a harmful algal bloom in the reservoir at the Norwalk water plant and averted what could have been a serious problem," says Dr. Jeff Reutter, Ohio Sea Grant's former director. "Our hope is that other workshop students will be able to do the same for their facilities should the need arise."

Educator workshops aim to have the same real-world focus as the more technical professional development programs for natural resource personnel. The workshops can be taken for university credit hours or as non-credit workshops that don't require a tuition payment. Stone Lab also offers educator scholarships to make sure as many people as possible can take advantage of these professional development opportunities.

"The course was set up to take you through different curriculum books, and our instructors focused on activities we could do in the classroom, " said Brian Ringholz, a teacher at Tecumseh High School in New Carlisle, Ohio who took Group Studies: Water and Wildlife Training for Educators last summer. The class certifies educators in five different science curriculum programs in just one week.

Workshops like Fish Sampling Techniques are definitely a boon for those seeking to beef-up their resumes for careers in wildlife management, according to Dr. Chris Vandergoot at the Ohio Department of Natural Resources (ODNR) Division of Wildlife. "When we hire people every year in our Fairport and Sandusky offices, these are definitely things that we look for," Vandergoot said. Being able to come into a position with a basic knowledge of the required techniques will always give applicants an advantage in the kinds of jobs ODNR has to fill.



Stone Lab field trips introduce students in grades 5-12, college students and adults to hands-on Lake Erie science. Field trips always include a science cruise and fish dissection, along with a range of other activities teachers can select in advance.

To learn more about all the different opportunities the lab offers, visit ***stonelab.osu.edu*** or find us on Twitter ***@stonelab***.

Matthew Sarver, a 2012 Ohio State University graduate with a zoology degree, attended the workshop before graduation. "I thought it was a good way of getting an introduction to how real-world sampling is done," he said.

Sarver had previously done some trawling and a little bit of electrofishing during a Stone Lab ichthyology course, but he was able to get even more experience – and just as important, do some networking – at the two-day workshop.

"I probably wouldn't be doing what I'm doing without at least meeting the people that I met there," said Sarver, who is now a research associate with the Midwest Biodiversity Institute and works on five to six fish sampling trips each year. "It's part networking and part gaining skills. It's definitely a good way to go."

A long list of Stone Lab alumni would agree with Sarver, too. They're represented in organizations all over the country, from local watershed partnerships to the National Oceanic and Atmospheric Administration (NOAA).

Jefferson Beck, who attended Stone Lab in the summer of 1990, went from an undergraduate thesis in freshwater ecology to working as a field biologist in Alaska after graduation. Today, he introduces the public to National Aeronautics and Space Administration (NASA) earth science projects as a video producer for the NASA Goddard Space Flight Center.

"My time at Stone Lab was truly formative and has definitely factored into my career as a science storyteller," said Beck, who also holds an MFA degree in science and natural history filmmaking from Montana State University – Bozeman.

From public workshops and classes to tours and lectures, there's science and recreation for everyone at Stone Lab. **TL**

Harmful Algal Bloom Research Initiative Series

The Ohio Department of Education (ODHE) Harmful Algal Blooms Research Initiative (HABRI) was started in response to the August 2014 water crisis in Toledo, when hundreds of thousands of residents were advised not to drink their tap water due to toxins from a harmful algal bloom. In response, ODHE provided $2 million in funding to Ohio universities for research addressing the problem, with universities matching that funding for a total of over $4 million.

Led by representatives from The Ohio State University and the University of Toledo, and managed by Ohio Sea Grant, HABRI brings together researchers from a number of Ohio universities and partners as far-flung as South Dakota and Japan to help solve the harmful algal bloom problems plaguing Lake Erie and Ohio's inland lakes.

The 18 projects funded by the first year of HABRI are divided into four focus areas: tracking blooms from the source, protecting public health, producing safe drinking water, and educating and engaging people about addressing harmful algal blooms.

Tracking Harmful Algal Blooms from Source to Impact

by Christina Dierkes, Ohio Sea Grant Communications

The three current projects in this focus area aim to improve use of existing technologies as well as develop new methods to detect, prevent and mitigate harmful algal blooms (HABs) and their impacts. This helps to ensure drinking water safety and a healthy environment for lakeshore residents by connecting the dots between many of HABs' potential causes and effects.

To track the problem where it begins – high up in the Lake Erie watershed – Laura Johnson at Heidelberg University is leading a project that monitors runoff from farm fields farther up in the rivers and streams that bring nutrients and pollutants to the lake. Samples collected from rivers like the Blanchard, which flow into the Maumee and then Lake Erie, will record changes in phosphorus runoff from fields planted with different crops, and after heavy rainfall events, to determine how those factors affect overall runoff.

In addition, the project scientists will analyze water samples to develop a "fingerprinting" method for different types of phosphorus. Looking at different isotopes of oxygen in phosphate – which differ in their atomic weight – may help pinpoint phosphorus that comes from commercial fertilizers instead of other sources, while the molecular structure of dissolved organic phosphorus connects the nutrient to organic sources like manure or wastewater treatment plant discharge.

"Having those two things together, we're hoping that we can then distinguish different sources of phosphorus," said Johnson, the project's lead researcher and director of the National Center for Water Quality Research at Heidelberg University. "The ultimate goal is that we would end up with the ability to collect samples at the ends of watersheds and have some understanding of where that phosphorus came from: what percentage of it is manure, what percentage commercial fertilizer, and so on."

Stone Lab supports harmful algal bloom research by providing data from a buoy anchored near Gibraltar Island, as well as by training the next generation of Lake Erie scientists in its state-of-the-art water quality lab.

More information about the current HABRI projects is available at ***go.osu.edu/habri***, where you can also download the 2015 annual report.

Rivers and streams in Ohio not only contribute nutrients that cause Lake Erie's harmful algal blooms, but can also suffer from algal blooms themselves.

Two complementary projects in this focus area are developing warning networks for Lake Erie's western basin, where harmful algal blooms are most common. Tailored specifically for Maumee Bay and Sandusky Bay, the networks provide basin-wide data coverage of bloom-affected areas by streaming data from water quality buoys and sensors positioned near water treatment plant intakes to an online database.

"The main goal of the project was to create a harmful algal bloom early warning system for the use of water plant managers who use water from Lake Erie," said Tom Bridgeman, principal investigator on the Maumee Bay project and associate professor at the University of Toledo. "Along with placing a buoy upstream of the Toledo water intake, we instituted a weekly sampling regime around the water intake and into Maumee Bay so that if there was a toxic bloom approaching the intake, we could give them a heads-up."

In addition, the researchers are collecting background environmental information such as temperature, sunlight, water clarity, phosphorus and nitrogen levels to better understand what triggers harmful algal blooms, and how changes in water chemistry can cause them to produce toxins.

The early warning system in Sandusky Bay focuses on similar parameters, just in a different part of the lake. Both projects also work with scientists from NASA to match aircraft and satellite observations of Lake Erie algal blooms to actual water quality data. Although satellites cover a larger area, aircraft can provide more detailed imagery of blooms and operate on cloudy days when satellites can't see the lake, Bridgeman explained. These methods could allow researchers to determine which kinds of algae make up a bloom from remote sensing images instead of having to take boats out to specific sampling locations.

The Sandusky system already demonstrated its potential during the 2015 season. A rapid increase in chlorophyll, a green algal pigment, was detected on July 17, indicating that algae were present at the primary water intake for Sandusky's Big Island Water Works.

"On that day, there was a lot of chlorophyll that entered the water treatment plant," said George Bullerjahn, project lead and professor of biology at Bowling Green State University. "However, the parallel phycocyanin (a blue-green pigment found in HABs) sensor was silent, indicating that all the material that entered the water treatment plant was green algae, it wasn't cyanobacteria. So the plant staff didn't have to worry about toxicity, but they did have to worry about green algae which may have affected taste and odor issues."

The same warning systems will be deployed in both bays again in future years to reduce the likelihood of future bloom events interrupting water services to residents and tourists, potentially causing large-scale economic damage for the area.

Combining data from river sensors with information from lake buoys will help refine predictive models that can relate weather events to runoff and subsequent algal blooms, giving water managers more time to react to potential bloom events.

"By the end of this project, we will have a good idea of where the optimal sites to place these buoys are and what the optimal number of buoys is," said Bridgeman. "The Maumee and Sandusky Bay projects each operate one buoy, but if you put the data from all of the buoys in the remote sensing network together, you certainly develop a more comprehensive picture of bloom dynamics in the western basin." **T**L

Projects in this Focus Area

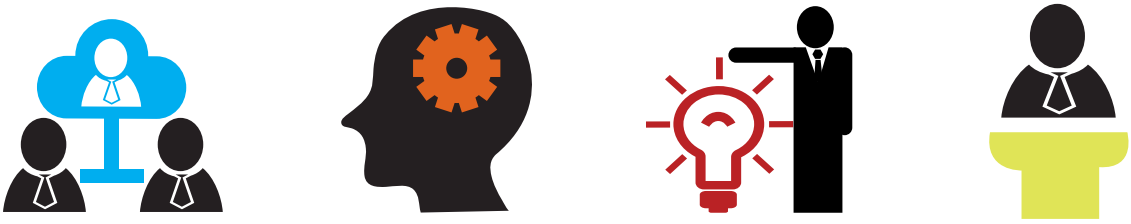
HAB Detection, Mapping and Warning Network: Maumee Bay Area
University of Toledo

HAB Detection, Mapping and Warning Network: Sandusky Bay
Bowling Green State University

Identifying the Best Strategy to Reduce Phosphorus Loads to Lake Erie From Agricultural Watersheds
Heidelberg University

15TH Class Graduates from Toledo Local Government Leadership Academy

by Lisa Aurand Rice, Ohio Sea Grant Communications



More than 300 people have graduated from the Toledo Local Government Leadership Academy since 2002.

This spring, the academy – a partnership between the Toledo Regional Chamber of Commerce and Ohio Sea Grant – celebrated its 15th year with another 28 graduates, who received their certificates of completion at a ceremony held at Toledo's Stranahan Theater on March 22, 2016.

The 2016 Toledo Leadership Academy class.

Among the 300 academy alumni is Barbara Sears, former House majority leader for the Ohio General Assembly.

In 2003, Sears was a Sylvania City Council president and a member of the Toledo Metropolitan Area Council of Government – by no means a newcomer to the realm of politics and government. Even so, she found the academy to be an invaluable resource.

"It pointed out some skill sets that I needed to freshen up on and it was an opportunity to build relationships with other folks in the region that I … wouldn't have had the opportunity to otherwise," said Sears, who was a member of the academy's second graduating class and now teaches one of the workshops. She frequently recommends the academy to others, both in the public and private sectors.

The program is the oldest of several similar programs across the state coordinated by Ohio Sea Grant, said Sea Grant Extension Educator Joe Lucente.

"The goal is to create good leaders," Lucente said, "to teach public officials about the inner workings of running for office and, for those who work on local government boards and commissions, how to interact with government officials in the decision making processes they go through."

The 10-week academy includes an introductory course on Public Officials, Public Service and Conducting Effective Public Meetings, taught by Lucente, which covers duties and responsibilities of public officials, ethics and open meetings laws, among other topics. Overall, participants must complete seven of 10 2-hour workshops – including the introductory class – on issues such as communication, leadership skills and styles, effective decision-making, technology, team building or conflict management.

Leadership academy workshops can be offered on a local or regional basis. For information on organizing a leadership academy program, contact Joe Lucente at ***lucente.6@osu.edu***.

"Our classes offered over those ten weeks really apply to anybody," said Brian Dicken, vice president of advocacy and public policy for the Toledo Regional Chamber of Commerce. "It doesn't matter what industry you're in, these things are applicable across the board. It's a great professional development resource."

Academy alumni often return not only for graduation, but to lead the workshops as well.

"The well-respected public officials who teach these workshops bring a unique and rich perspective from people who have been in this arena for a long time," Lucente said.

"I think it's a great opportunity to get a broad overview of what it means to be a leader and interact with other leaders," said Sears, who teaches the academy workshop on Communicating and Working with Citizens.

For the last two years, the workshop on ethics has been led by Mark Wagoner, an attorney who graduated from the Toledo Local Government Leadership Academy in 2004 and went on to run for office and serve in the Ohio House from 2005 through 2008 and the Ohio Senate from 2008 to 2012, serving as the majority whip.

"I thought the academy was a terrific crash course on how public policy decisions are made," Wagoner said.

Feedback from participants is overwhelmingly positive, said Lucente and Dicken.

"What we're trying to do is create a leadership network," Lucente said. "Graduates use it as a networking tool where people can come together and feel free to call upon each other to ask for advice or share stories or resources." **TL**

Ohio Clean Marinas Program Re-Launches Shrink Wrap Recycling Program

by Christina Dierkes, Ohio Sea Grant Communications

It's that time of year again: all across the state, boaters have removed the shrink wrap covering that protected their vessels over the winter months to get ready for another summer of cruising the Lake Erie shore and inland waters. But what are boaters to do with the pounds of plastic needed to cover a typical boat for the winter? Since 2006, the answer along the Lake Erie shore has been: recycle it, of course.

The Ohio Shrink Wrap Recycling Program has recycled more than 2 million pounds of shrink wrap since its inception by connecting marinas to vendors who turn the wrap into highway guardrail blocks and other construction materials. After hitting a bit of a bump in 2014, Clean Marinas Program staff is working hard to bring back a new format for the recycling program to continue to keep this plastic out of landfills.

With the statewide expansion of the Ohio Clean Marinas Program, the staff is also working to help inland marinas and boaters find a recycling option.

"As we're transitioning to a statewide program, we are building a list of recycling contacts in each of our five state regions, so based on where the marina is in Ohio, we should be able to direct them to recyclers that are convenient logistically," explained Sarah Orlando, the Ohio Clean Marinas Program manager. "We are continuing the partnerships with past recyclers and adding new options so that we have a more diversified and efficient program next year."

A current list of shrink wrap recyclers is available on the Clean Marinas website, but program staff is also happy to help marinas and boaters find the right fit for their individual recycling needs.

Ohio's Shrink Wrap Recycling Program has helped boaters keep more than 2 million pounds of plastic out of landfills by connecting them with recyclers in their area.

"We encourage anyone who's interested in recycling shrink wrap to contact us," said Orlando. "What we do from there is provide them with a couple of recommendations for recyclers based on where the marina is located and what type of facility it is, so they don't have to go through that whole list."

The recyclers who partner with the Ohio Clean Marinas Program fall into a few different categories, unrelated to their locations. Some will accept mailed-in shrink wrap or drop-offs at their facilities, while others coordinate with marinas to create a pick-up day or location for their members. One company caters to boaters who do not belong to a marina, or whose marina does not participate in recycling.

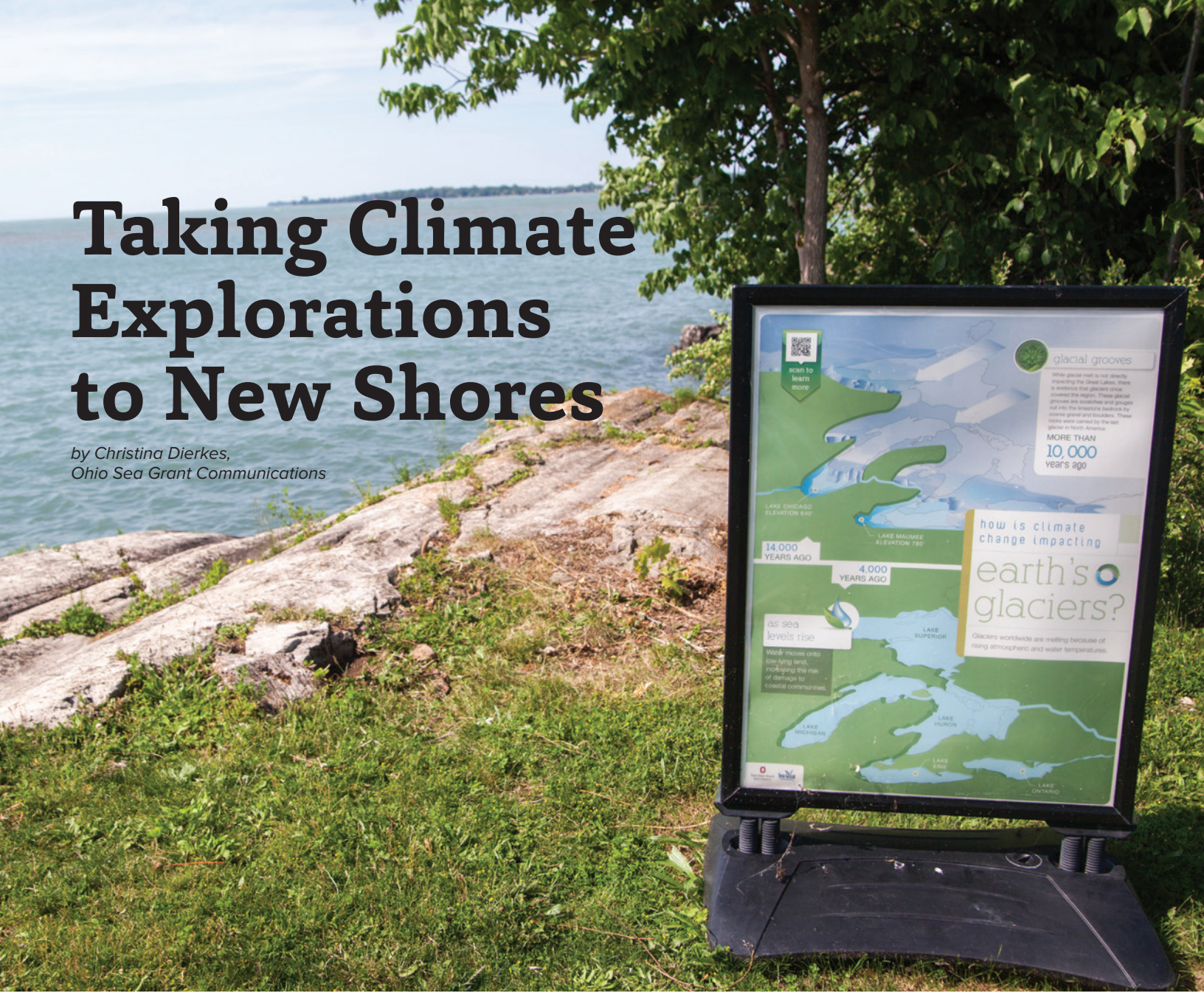
"If there are boaters across Ohio that do not belong to a marina, or belong to a marina that doesn't recycle shrink wrap, Dr. Shrink and Bay Area Recycling for Charities (BARC) coordinate a 'Recycling Run' program that is geared toward the individual boater," Orlando said. "The boater pays a small fee to receive a bag for their one boat's worth of shrink wrap, and then they sign up for the recycling run and Dr. Shrink will work with a local partner to come around and pick up the bag."

Coordinating those pickups saves the company money and time, making it possible for them to offer an affordable, important service to boaters who may not otherwise be able to recycle their boat shrink wrap.

An updated PDF list of shrink wrap recyclers can be downloaded directly at ***go.osu.edu/recycleSW*** or found on the Clean Marinas website at ***ohiocleanmarina.osu.edu***. The site also offers guidance on how to prepare shrink wrap for recycling, as well as other information on the Clean Marinas and Clean Boater programs. **TL**

Taking Climate Explorations to New Shores

by Christina Dierkes,
Ohio Sea Grant Communications



Climate change is likely to have a profound impact on the Great Lakes, affecting everything from residents' electricity bills to local crops and insect pests. However, many Great Lakes residents don't know what those impacts could be, or what actions could address or prevent them.

Ohio Sea Grant's outreach programs are committed to closing that knowledge gap, with approaches as varied as a webinar series and a curriculum set for middle and high school classes. Stone Lab's Lake Erie Science Field Trip program has also added a climate change activity to its lineup, using display panels on Gibraltar Island to educate participants about the impacts of climate change on the region, as well as about ways to prevent and mitigate those impacts with personal actions.

The Climate Exploration field trip activity has become an integral part of the lab's education and outreach efforts in its first two years. The displays, which are also used for conferences and donor visits, combine educational posters with activities like weather data collection, and give students a chance to participate in ongoing monitoring efforts at the lab.

According to Stone Lab education associate Sue Bixler, the goal in developing the Climate Expedition was always to adapt the panels and activities to other locations along the Great Lakes after a period of testing the materials at Stone Lab. A partnership with the Lake Erie Nature and Science Center (LENSC) and Bay Village Schools in Cleveland is now putting Ohio Sea Grant's education and outreach team on the path to accomplishing just that.

"A while ago, staff from the Lake Erie Nature and Science Center went up to Stone Lab for a meeting and saw the

kiosks, and felt that they were a good idea for their location as well," said Ohio Clean Marinas program manager Sarah Orlando. "The big hope with this pilot project is that we can eventually connect a number of climate education displays all across Ohio, and they all eventually tie back to Stone Lab in some way."

A $5,000 grant from the Bay Village Education Foundation – the largest grant in the history of this particular grant program – covered the graphic design changes needed to make all of the kiosk panels relevant to an audience away from Stone Lab, according to Orlando.

"The teacher who led the grant proposal is also purchasing weather equipment like barometers, anemometers and thermometers, so that the students can do their own data collection in regards to weather," Orlando added. "They're also going to get their own weather station in Bay Village that will link to Weather Underground, and then they can be a part of collecting data on weather and climate."

That weather data can be used by science classes at Bay Village Schools as early as this fall, but will also come in handy for a few other projects the group is planning to develop in the near future, pending some grant applications that are currently under review.

Bixler is acting as the main education point person for Ohio Sea Grant, while Orlando provided input from the outreach perspective until recently. That role has now been taken on by Ohio Sea Grant Extension Educator Scott Hardy, while education specialist Lyndsey Manzo is helping with grant proposals for future project phases. **T**L

For more information

Stone Lab's Lake Erie Science Field Trips: ***go.osu.edu/SLfieldtrips***
Lake Erie Nature & Science Center: ***lensc.org***
Bay Village Schools: ***bayvillageschools.com***

CLOSE TO HOME

Stone Lab students, staff spread the word about summer opportunities in their own backyard

by Lisa Aurand Rice, Ohio Sea Grant Communications

Outreach efforts on The Ohio State University Columbus campus are helping to ensure that out of sight doesn't mean out of mind when it comes to Stone Laboratory.

The physical distance – approximately two and a half hours of driving and a half-hour ferry ride – between main campus and Stone Lab poses a minor obstacle: how to make sure students know about the classes and research opportunities available to them on Gibraltar Island.

Student-to-student outreach events and a bevy of marketing efforts on campus, including a new display at Ohio State's Thompson Library, aim to make sure every Ohio State student is aware of the credit-earning and resume-building opportunities the lab has to offer.

Sue Bixler

When Education and Outreach Assistant Sue Bixler visited campus with the Stone Lab snakes, which always draw a crowd, students (from left to right Madelyn Strahan, Elaine Stingel and Scott Glassmeyer) assisted her, handling the snakes and encouraging those who stopped by the table to consider applying. Strahan, who took Evolution at Stone Lab in summer 2015 and was a student worker there, is president of Buckeye Friends of Stone Lab (BFOSL). "The original mission was the reason I joined: to have that contact and connection between Stone Lab and Ohio State," Strahan said.

Events such as the Ohio State Engagement Forum, held in the Ohio Union following the James F. Patterson Land-Grant University Lecture, increase Stone Lab's visibility on campus. University President Michael Drake stopped by the table — one of 120 in the room — to visit with the Stone Lab snakes.

A partnership with Ohio State's Recreation & Physical Activity Center allows Stone Lab to place poster displays there and reserve a table for Bixler, the Stone Lab snakes and the BFOSL students to hold outreach events. Tens of thousands of students visit the RPAC every week. The agreement also includes insertion of Stone Lab marketing materials into Ohio State's freshman orientation packets – 6,800 packets this summer.

Sue Bixler

BFOSL was created to be both an extension of the Friends of Stone Lab (FOSL) support group and the student face of Stone Lab on Ohio State's Columbus campus. In recent years, the club had been without an advisor and languished until fall 2015, when Ohio Sea Grant & Stone Laboratory Program Assistant Erin Monaco and Research Development and Grants Manager Kristen Fussell became co-advisors. One of the newly-revitalized club's first events was an overnight trip in early October to Gibraltar for a work project and science cruise. The six students — including two who had never been to Stone Lab before — had the chance to stand atop the roof of Cooke Castle.

Ohio Sea Grant and Stone Lab had the opportunity to fill a large case on the second floor of Ohio State's Thompson Library with an educational display about Gibraltar Island history and Stone Lab courses. The display was installed in early March 2016 and will remain in place until just before fall classes begin in August. Thompson Library has 2.5 million visitors each year; last year, 1.3 million people passed through its doors between January and the end of the summer.

Some items for the display were borrowed from the university's Museum of Biological Diversity. Specimens such as a Large Mouth Bass, a green heron and harebells were loaned by the museum's Fish Division, Herbarium and Division of Tetrapods with the aim of catching students' eyes as they study on the second floor of the library. The library is also a stop on summer orientation tours that include both students and parents, adding an extra punch of Stone Lab information along with the brochures included in the orientation packets students receive.

Former Ohio Sea Grant and Stone Lab student Elaine Stingel loaned part of her personal insect collection to the display. Books from the Stone Lab library are displayed, along with information about the courses they are used for. A Bowfin skull and preserved Burbot are among fish students may encounter during the Lake Erie Sport Fishing class.

*Information on Stone Lab courses and how to apply is always available at **stonelab.osu.edu**. Ohio State students are of course encouraged to join BFOSL if they'd like an opportunity to learn more about life at the lab.*

Fish tend to follow a rotating stripe pattern like the one in this round tank. This allows researchers to study how well fish can see in various water conditions – no movement means the water is too murky for them.

Watching Fish See

New Ohio Sea Grant research aims to improve Lake Erie's walleye fishery

by Christina Dierkes, Ohio Sea Grant Communications

No matter how useful it will eventually be, sometimes science just looks silly. In Dr. Suzanne Gray's lab at The Ohio State University, a fish in a cylindrical tank slowly swims in circles as it follows the black and white panel rotating around the outside of the glass.

Gray and her Ohio State collaborators, Dr. Jeremy Bruskotter and Eugene Braig, are studying how well fish can see both prey and predators underwater, and how that ability is influenced by changes in water clarity. They hope that the research will help Lake Erie fisheries adapt to algal blooms that reduce underwater visibility, which is important to visual hunters such as Walleye. Those important sport fish, along with prey fish like Emerald Shiners, are the current focus of the project.

"We wanted to integrate this really basic science – visual physiology – with the people who are out there catching the fish," Gray said. "Walleye fishing in Ohio is close to a $1.8 billion industry, and Walleye are going to be influenced in some way by changes to the visual environment that happen with the algal blooms in the late summer and fall."

PhD student Chelsey Nieman already completed a pilot study for the project at Stone Lab, working out details like setting up tanks for various experiments and taking care of the fish used in the study. Her two months at the lab were funded by Ohio Sea Grant's Small Grants Program, which provides up to $10,000 in research support to applicants.

"Chelsey will be the first graduate student working on this project," Gray said. "She actually has a Master's degree that is interdisciplinary, so it included fisheries, but also incorporated a social science component. So she's really excited about using her expertise for the citizen science work on this project as well."

That work will focus on Lake Erie charter boat captains who regularly take clients out to fish for the species of interest to the project. The researchers will use surveys and interviews to draw on the captains' expertise in selecting lures, based on years of fishing experience, and test those lures in the lab setting to provide science-based data for anecdotal knowledge of what lures work best for which fish under varying conditions.

"Our goal is to create a citizen science project associated with fishing success, with different colors or types of lures, under different turbidity conditions," Gray explained. "We've had a positive response from the fishermen, who want to do anything they can to understand the fishery better. Which makes sense; it's their livelihood and these blooms are potentially harmful to their business."

The project also received letters of support from the Ohio Department of Natural Resources' Sandusky Fisheries Research Unit, which helps manage fisheries in Lake Erie, and Ohio Sea Grant Extension, which educates the public about sustainable local fisheries. **TL**

For more information about this Ohio Sea Grant project, contact Dr. Suzanne Gray at ***gray.1030@osu.edu***.

Harmful Algal Bloom Research Initiative Awards $1.9 Million to Eight Ohio Universities

HABRI connects researchers from across the state of Ohio in projects that address harmful algal bloom problems in Lake Erie and inland waters. So far, nine universities and more than 20 partners are involved in these efforts.

Track Blooms From the Source

- HAB avoidance: Vertical movement of harmful algal blooms in Lake Erie
  Thomas Bridgeman, University of Toledo
- Seasonal quantification of toxic and nontoxic *Planktothrix* in Sandusky Bay by qPCR
  George Bullerjahn, Bowling Green State University
- Determining sources of phosphorus to western Lake Erie from field to lake
  Laura Johnson, Heidelberg University
- How quickly can target phosphorus reductions be met? Robust predictions from multiple watershed models
  Jay Martin, The Ohio State University
- Early season (March) phosphorus inventory of offshore waters of Lake Erie
  R. Mike McKay, Bowling Green State University
- An investigation of Central Basin harmful algal blooms
  Justin Chaffin, The Ohio State University

Produce Safe Drinking Water

- Optimization of carbon barriers for effective removal of dissolved cyanotoxins from Ohio's fresh water
  Soryong Chae, University of Cincinnati
- Evaluation of Optimal Algaecide Sources and Dosages for Ohio Drinking Water Sources
  Teresa Cutright, University of Akron
- Evaluating Home Point-of-Use Reverse Osmosis Membrane Systems for Cyanotoxin Removal
  Glenn Lipscomb, University of Toledo
- Kinetic Models for Oxidative Destruction of Cyanotoxins in Raw Drinking Water
  Allison MacKay, The Ohio State University

Protect Public Health

- Characterization of recreational exposures to cyanotoxins in western Lake Erie basin
  April Ames, University of Toledo
- A comprehensive approach for evaluation of acute toxin responses after microcystin ingestion
  Jiyoung Lee, The Ohio State University
- Development of the MMPB method for quantifying total microcystins in water and fish tissues
  Stuart Ludsin, The Ohio State University
- Discovery of Enzymes and Pathways Responsible for Microcystin Degradation
  Jason Huntley, University of Toledo

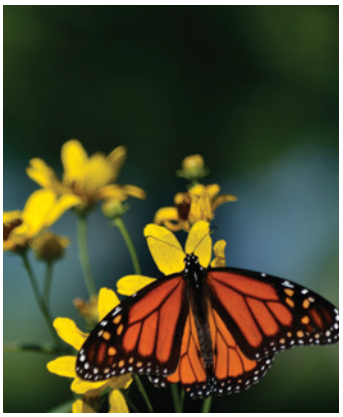
Administration

- Research Administration for the Harmful Algal Bloom Initiative
  Christopher Winslow, The Ohio State University

The 2015 annual report from the Harmful Algal Bloom Research Initiative to the Ohio Department of Higher Education is available online at ***go.osu.edu/habri***. Projects in this first round of funded research have already provided needed answers that help water treatment operators, regulators, farmers and legislators deal with harmful algal blooms in the present, better predict the situation for the coming years, and lay the foundation for longer-term mitigation and prevention activities.

The HABRI website also includes detailed project information for all current funded projects, based at nine Ohio universities, along with background information on harmful algal blooms (HABs).

Stone Lab Workshops Bring Intense Learning to the Public



Most summer classes at Stone Lab focus on students, ranging from high school to graduate. But the lab's education team also caters to the general public with workshops on fishing, photography and algal identification, among others.

Outdoor Photography

August 19-21, 2016

Spend a fun and exciting weekend on Gibraltar Island while learning to take your outdoor photography to the next level. You'll receive both one-on-one "real time" instruction in the field, as well as intensive classroom exploration sessions. In the exploration sessions, you will learn the steps that make the difference between ordinary snapshots and extraordinary photos. Minutes later you will be outside practicing those steps with the help of the workshop instructors. You will receive individual, practical coaching. Best of all, you will go home knowing how to create eye-catching images!

Fish-Sampling Techniques

September 24-25, 2016

This intensive workshop is designed to demonstrate the fish-sampling gears most commonly used by the Ohio Department of Natural Resources-Division of Wildlife (ODW) and Ohio Environmental Protection Agency (OEPA) for undergraduate students interested in seasonal agency work and fisheries biology professions. Stone Lab, ODW, and OEPA biologists provide hands-on experience with fyke nets, gill nets, trawls, and boat-based as well as wading electrofishing methods.

Algae Identification

August 10-11, 2016

Harmful algal blooms continue to be a problem for Lake Erie and its watershed, and resource managers have to be able to identify algal growth to determine how to best deal with a local problem. This hands-on lecture, laboratory and field workshop teaches collection, identification and control of local algae, along with the basics of their ecology. The workshop also offers Ohio EPA contact hours for resource managers wishing to obtain certifications.

See all available Stone Lab workshops at ***stonelab.osu.edu/courses/workshops*** to find the one that works for you. Any regular Stone Lab course can also be taken as a non-credit workshop and offers great professional development opportunities for resource managers.

by Lisa Aurand Rice,
Ohio Sea Grant Communications

A Global Impact

Stone Lab alum and Knauss Fellow Tony Murphy leaves his mark on STEM education

You might say that Tony Murphy's career took him around the GLOBE and back.

Murphy, a native of Ireland, came to The Ohio State University in 1992 to participate in the university's Science and Environmental Education Doctoral Program. As a graduate assistant to Dr. Rosanne Fortner — a longtime Stone Laboratory associate director and professor — Murphy soon found himself on Gibraltar Island, taking classes in climate change and environmental education and assisting his mentor.

"Just being out in that setting, it's pretty amazing to think you're in the middle of a Great Lake having this kind of learning experience," said Murphy. "It's pretty mind-blowing — at least, it was for me."

His connection to Stone Lab and Fortner, with whom he collaborated on National Science Foundation-funded curriculum development, drew his attention to NOAA's John A. Knauss Marine Policy Fellowship, which matches graduate students with "host" governmental programs in the Washington D.C. area. With Fortner's enthusiastic recommendation and an endorsement from Ohio Sea Grant, Murphy was accepted as a fellow (the first education student accepted to the program) and placed at GLOBE — Global Learning and Observations to Benefit the Environment — in January 1995.

GLOBE, an international K-12 science and education program (online at ***globe.gov***) run by a partnership overseen by NASA and the National Science Foundation with support from NOAA and the Department of State was announced on Earth Day in 1994 and launched one year later.

"It was a pretty incredible initiative to be involved in," Murphy said of GLOBE's early days. "There were 11 science protocols to be developed — a whole curriculum and a teacher's guide."

The fellowship lasted one year, after which he was offered a contract position for a year and a half. By the time he left GLOBE in July 1997, Murphy had risen to become assistant director of education for the organization.

His next two jobs, based at universities in Minnesota, focused on citizen science and preparing educators to teach STEM. All the while, he had remained connected with GLOBE and used the organization's resources at each of his jobs.

In 2012, Murphy was recruited to return to GLOBE, this time as its director. It had taken a lot longer than 80 days, but he was back at the organization that had begun his entire career trajectory.

"Being involved in GLOBE at the ground level and now coming back as the director is coming full circle for me," Murphy said. Worldwide nearly 30,000 schools and 24,500 teachers have participated in GLOBE activites, and GLOBE students have contributed more than 100 million measurements to the organization's database since 1995. The program remains on the cutting edge of technology, now using apps to help students collect and submit data. One focusing on clouds will be released later this year.

Educating the next generation about environmental science and climate change is imperative, Murphy said. "It's incumbent on us that (they get) an education that equips them to deal with the issues and challenges and successes in the future. Part of that is understanding how science and the environment connect together. We are a component of the environment; we're not separated from it. We need to understand that and learn how to live in the environment."

Murphy doubts he would be in his current position at GLOBE today if it weren't for the Knauss Fellowship that placed him there two decades ago.

"Rosanne was an incredible mentor and advisor to have. I'll always be thankful to her, to Ohio State and Ohio Sea Grant for giving me the opportunity to be part of the program." **FOSL**

Friends Of Stone Laboratory

Dear friends,

This is a housekeeping letter. First, we just finished our Spring Work Weekend and I want to thank everyone who participated and helped return Stone Lab to its summer operating condition! We had over 40 volunteers. This is a great event, and as I have said before it was my first intro to the lab!

Second I wanted to recognize everyone who helped last season on our new Transition Teams. The complete list never made it into the last Twineline so let me again thank Pete Ferron, Anna Giordano, Ben Piazza, Tracey Meilander, Sheila Lewicki, Ed Wiczulis, Sam Roman, Michelle & Joe Pennington, Steve Stadler, Amy Harpster, Anne Holzschuh, David Will, Angie Breckler, Stacia Eckenwiler, and last but certainly not least, my wife Pauline. Also thanks to interns Lois and Beth, and of course Robin, wow you guys really do good work!! We will continue the program this summer, usually at the weekend breaks between class sessions at the lab, so if you're interested please email me.

Third, the Board voted to make a few changes to the Bylaws. It's mostly boilerplate stuff but we will be publishing a notice, and the revised document, on our website. These changes need to be voted on by the general membership at our Annual Meeting, which will be held on Gibraltar Island immediately following the Open House on September 10. One of the changes is a reduction in the individual contribution necessary to become a Friend. It will now be $50, and $100 for a family (2 or more).

If you have not done so already please consider making a contribution to any of our 20+ endowments so that we may welcome you as a new or renewing Friend of Stone Lab. The donations page can be found on our website ***ohioseagrant.osu.edu/giving****. Have a great summer everyone!*

Sincerely,
Ken Scott
FOSL President

Winter Program Raises Funds for Stone Lab Scholarships

The 18th annual Friends of Stone Lab Winter Program and Silent Auction was held at a new venue this year, celebrating a new partnership with COSI Columbus and the PAST Foundation. Approximately 70 guests gathered February 10 just outside COSI's National Geographic Giant Screen Theater for appetizers, drinks and the silent auction before heading inside to the theater for the program.

The silent auction raised $1,481 for Stone Lab student scholarships and other lab needs.

Keynote speaker Josh Knights, executive director of The Nature Conservancy Ohio discussed "Using Science, Partnerships & Creativity to Solve Freshwater Problems." Harmful algal blooms and phosphorus loading were prominent topics, as Knights touched on how The Nature Conservancy and Ohio Sea Grant are working with other partners to help heal Lake Erie.

Other speakers included Dr. Caroline Whitacre, vice president for research at Ohio State, Ron Hendrick, then dean of the College of Food, Agricultural and Environmental Sciences (Hendrick has since left Ohio State), Ken Scott, president of the Friends of Stone Lab and Madelyn Strahan, president of the student club Buckeye Friends of Stone Lab.

Two Ohio State students who participated in the 2015 Research Experience for Undergraduates (REU) Scholarship Program were on hand to show off their summer projects. Ellen Warfield, an ichthyology REU and Thomas Rhodes, a limnology REU presented the findings of their five-week research.

Door prizes were given away, including a Stone Lab scholarship, which Stone Lab Interim Director Chris Winslow awarded to Ohio State student Austin Rechner. **FOSL**

Silent Auction Donors

Ohio Sea Grant and Stone Lab thank the following people and businesses for their donations to the 2016 Silent Auction.

Laura Fay
Tom and Beth Hall
Joni Wolfinger
Miller Ferries, Miller Boat Line
The Refectory
Ohio State Trademark & Licensing Services
Laura Finch
Karen Jennings
Michelle Pennington
Mohican Resort and Conference Center
Fred Snyder

FOSL

The Friends of Stone Laboratory (FOSL) began in 1981 as a support group to "bring Stone Laboratory into the 21st 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.

F.T. STONE LABORATORY FIELD STATION

The Ohio State University
PO Box 119, Put-in-Bay, OH 43456
419.285.1800, 614.247.6500, Fax 614.247.6578
stonelab.osu.edu

Dates to Remember

September 10, 2016
Stone Lab Open House

September 23-25, 2016
Buckeye Island Hop

FOSL Merchandise Sales Support REU Scholarships

Stone Lab students and alumni tend to wear their love for Gibraltar Island on their sleeves – both figuratively when they happily talk about their Stone Lab experience to anyone who asks, and literally through Stone Lab merchandise like T-shirts, hats and water bottles. But in addition to showing off that Stone Lab love, merchandise sales also benefit future students by funding scholarships like the Research Experience for Undergraduates (REU) Scholarship Program.

REU students spend the summer working with a Lake Erie researcher on an original research project while taking a five-week Stone Lab course. The research projects often lead to conference presentations or publications, and give students a chance to network and prepare for graduate school or science careers.

One REU scholarship each summer is paid for with FOSL funds, which include donations as well as revenue from Stone Lab gear purchased at the island, online, or at events like the annual Open House or the Winter Program.

Ohio Sea Grant and Stone Lab staff refresh the designs on a regular basis to make sure supporters have a wide range of styles to choose from – including some reworked vintage designs like this winter's microscope logo, which first appeared on Stone Lab shirts in the 1980s. The microscope will be available to students and guests this summer, along with a brand new design to be revealed soon!

Remember, proceeds from all merchandise sales, from T-shirts to water bottles, benefit future Stone Lab students and other FOSL causes, so be sure to shop the new designs next time you're up at the island. And if you know you won't make it there anytime soon, online and phone purchases can be made from the Stone Lab office (***dress.3@osu.edu***, 419-285-1800).

THE OHIO STATE UNIVERSITY

Friends of Stone Laboratory
Ohio Sea Grant College Program
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2020 VISION

In 1990, Jefferson Beck spent a summer at Stone Lab, studying botany and limnology. Today, he's a video producer for the NASA Goddard Space Flight Center, traveling the globe to bring some of the agency's amazing Earth science to the public in an engaging, creative format.

"My time at Stone Lab was truly formative and it has definitely factored in to my career," Jefferson said.

You can support the next generation of Stone Lab students in their quest to build equally great careers. Visit ***go.osu.edu/stonelabgift*** for more information.

OHSU-TL-1551