

SPRING > SUMMER 2019

# TWINE LINE

Ohio Sea Grant + Stone Laboratory

## Teaching Teachers

*Ohio Sea Grant  
education expands  
Lake Erie knowledge  
across the region*

page > **12**





## LAB NOTES

Ohio Sea Grant  
by the Numbers

> Within the  
last four years:



**20,922**

PROFESSIONALS  
EDUCATED AND TRAINED

to help them advance their  
careers or keep their jobs



**115,334**

P-12 STUDENTS REACHED

through Sea Grant-trained  
educators or directly by its  
education programs

**169,613**

ATTENDEES

at public and  
professional  
presentations



**17,518**

FISHERMEN, SEAFOOD  
PROCESSORS, AND  
AQUACULTURE INDUSTRY  
PERSONNEL

who modify their practices  
using knowledge gained as a  
result of program activities

**18**

COMMUNITIES  
EMPOWERED

through training and tools  
to protect themselves from  
storm floods and other  
coastal hazards

**5,982**

ACRES OF  
COASTAL HABITAT

have been protected, enhanced  
or restored as a result of  
Ohio Sea Grant activities



MOBILIZED

**4,947**  
hours



OF VOLUNTEER TIME

**175**

PARTNERS

dedicated to help  
expand Ohio Sea  
Grant's impact in Ohio



**292**  
PRODUCTS



developed by Ohio Sea Grant  
and Stone Lab were used to  
advance environmental literacy  
and workforce development



**88**

COMMUNITIES IMPLEMENTED

sustainable economic and environmental  
development practices and policies

**154,263**



PEOPLE WERE ENGAGED

IN SUPPORTED INFORMAL EDUCATION PROGRAMS



## DEPARTMENTS

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**04** TAKING CARE OF  
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HELPS BUSINESSES

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Ohio Sea Grant teacher education expands Lake Erie knowledge into classrooms across the region

STORY BY  
**CHRISTINA  
DIERKES**



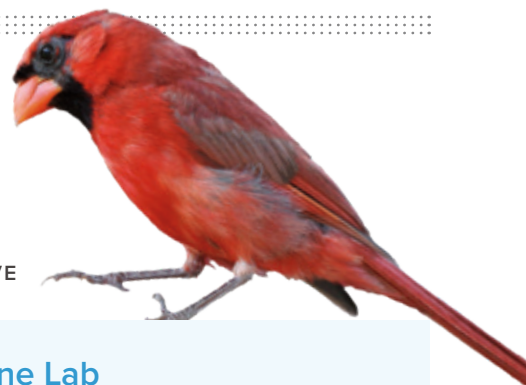
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## ABOUT TWINE LINE

**TWINE LINE** (ISSN 1064-6418) is published four times a year by the Ohio Sea Grant College Program. Subscription price is \$10.00 per year (four issues). Please contact the office to obtain permission before reprinting articles or graphics. The opinions expressed are those of the authors only. Ohio Sea Grant is a statewide program that supports greater knowledge and stewardship of Lake Erie and the Great Lakes. It is part of the NOAA Sea Grant College Program (NOAA grant NA16RG2252, project M/P-2), which includes 34 state programs. Support of Ohio Sea Grant is provided by NOAA National Sea Grant, the State of Ohio, The Ohio State University, and participating universities, agencies, and businesses.

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**DESIGN:** Ullman Design, [www.ullmandesign.com](http://www.ullmandesign.com)

> A current list of Ohio Sea Grant staff and Extension Agents can be found online at [ohioseagrant.osu.edu](http://ohioseagrant.osu.edu).



## Stone Lab Workshops for Educators

Stone Lab's three-day and one-week workshops are specifically designed for teachers and other educators wanting to learn new skills they can apply in their classroom or informal education setting. Topics range from integrating technology into earth science and environmental education to the geology that surrounds Lake Erie.

LEARN MORE

[go.osu.edu/SLworkshops](http://go.osu.edu/SLworkshops)

## Taking Care of Business

### Ohio Sea Grant Extension Helps Local Governments Support Business Communities

By Christina Dierkes

**F**rom the ice cream shop on the corner to the factory by the highway, local businesses help their communities survive and thrive. But sometimes there can be a lack of communication between the owners who may not be aware of available resources to grow their businesses and the local government representatives who make decisions that impact their economies.

That's where economic development and leadership specialist Joe Lucente comes in. He runs business retention and expansion (BR&E) programs for local governments and business communities that want to ensure they're doing what they can to help grow their local economy and provide employment opportunities for their residents.

Addressing those needs could include everything from adding more streetlights or snowplows to finding low-interest loans or grants that help businesses grow. Often the businesses also struggle to find qualified employees, and partnerships with local job centers and community colleges can help train residents for those open positions.

"This whole thing is about building relationships between government and the business community," Lucente said. "It's the small to medium-sized companies in all the communities that we work in that create up to 80 percent of most jobs in that community. That's why it's so important to have this process, to let businesses know that they can turn to their local government to help with their needs."

Small and medium-sized companies create up to

**80%**  
**OF JOBS**  
**IN OHIO**  
**COMMUNITIES**



And those local businesses can have a big impact on a community. A 2015 BR&E survey in Oregon, a coastal city of 20,000 people just east of Toledo, offers a good example of how impactful the business community can be when it has the resources and guidance it needs. Firms there were planning to add between 16 and 19 new full-time equivalent jobs, and based on income tax rates and pay scales, those jobs would translate to an additional \$11,000 to \$13,000 in income tax revenue for the city and add \$491,000 to \$583,000 in personal income for the local economy.

In addition, the surveyed businesses planned to retain between 428 and 857 full-time equivalent jobs, which translate to between \$296,000 and \$592,000 in income tax and between \$13 million and \$26 million in personal income for the community.

"And of course we don't just do a survey and call it a day," Lucente added. "We also use the information that's provided in the survey to help the community form an action plan" and make sure those planned jobs become reality.

In Oregon, that ended up having to take a back seat due to staff changes at the Oregon Economic Development Foundation that prevented them from following up on the original survey. With a new executive director in place, Lucente was able to approach the foundation again to launch a new survey and plan to take action on the updated results.

"In the short term, we'll be identifying immediate concerns and looking at community services that need improvement," said Sommer Vriezelaar, the foundation's executive director. "Ultimately, we want to address such complex issues as the skills of the local workforce and the competitiveness of local businesses."

The new survey will also give Vriezelaar and her team the chance to connect with the business owners and the rest of the community, and touch base on any additional needs they might have.

"I was on board because it gives me the opportunity to meet all these businesses," she said. "And if they do need anything, they have a face they can go to, a phone number to call. I can help them figure out what their needs are - do they want to expand, is there another place I can put them if there is a need? The survey is a high priority with my group."

In addition to the Oregon Economic Development Foundation, sponsors for the new survey include the Eastern Maumee Bay Chamber of Commerce, OSU Extension in Lucas County, and Ohio Sea Grant. Businesses are asked to respond by the end of May, and results will become available in the fall of 2019. ●







**“ This whole thing is about building relationships between government and the business community.”**

**JOE LUCENTE**



The number of jobs Oregon businesses plan to retain translates to



**\$13-\$26  
MILLION**

**IN PERSONAL INCOME FOR THE  
LOCAL COMMUNITY**

#### › SUSTAINABLE ECONOMIES

*(Above) Coastal communities often rely on Lake Erie for some of their income, so sustainable development is key to maintaining that relationship.*

#### › INDUSTRY JOBS

*(Above right) Business surveys can uncover important needs local governments can address, such as job training for local residents that could make them more suited to available local jobs.*

#### › VISITORS WELCOME

*(Right) Tourism in Lucas County, where Oregon is located, has an economic impact of \$350 million each year. Supporting businesses is an important part of maintaining and growing that impact.*







## › VACATION LEARNING

Stone Lab's Aquatic Visitors Center brings easily accessible learning to 10,000 island vacationers each year, from tours of the historic fish hatchery to an introduction to Lake Erie fishing.

## Something for All Ages

Stone Lab Tours Bring Science and Knowledge to South Bass Island Visitors

By Christina Dierkes

S

ummers on South Bass Island are busy... really busy. More than 800,000 guests visit the island and the town of Put-in-Bay every year as part of their summer vacations, and Ohio Sea Grant and Stone Lab are ready to add just a touch of Lake Erie science and history to the memories tourists take back home.

"Visitors to Put-in-Bay should definitely plan a trip to at least one of our facilities this summer," said Dr. Kristin Stanford, Stone Lab's education and outreach coordinator. "Whether visiting the South Bass Island Lighthouse, Aquatic Visitors Center or Gibraltar Island, guests of all ages can enjoy a little bit of history, a little bit of science and a whole lot of beautiful island scenery."

Across the bay from downtown, Gibraltar Island and Stone Lab welcome visitors during weekly tours that cover the island and its history, including Perry's Lookout, where Commodore Perry first spotted the British fleet during the War of 1812, and Cooke Castle, a 15-room Victorian home built by Civil War financier Jay Cooke in 1865.



“Whether visiting the South Bass Island Lighthouse, Aquatic Visitors Center or Gibraltar Island, **guests of all ages** can enjoy a little bit of **history**, a little bit of **science** and a whole lot of **beautiful island scenery**.”

DR. KRISTIN STANFORD

At the Aquatic Visitors Center (AVC), a historic fish hatchery turned nature education center in downtown Put-in-Bay, 12,000 visitors learn about Lake Erie issues every year. Displays and hands-on interactive stations introduce guests to the history of the hatchery, Lake Erie critters from tiny plankton to large sportfish, and current issues facing the lake, such as harmful algal blooms. Aquaria filled with native and invasive fish offer a first-hand look at what lives under the lake surface, and Stone Lab staff are on hand to lead the free tours and answer visitor questions.

Kids under 16 can also borrow fishing gear at the AVC and fish off the dock outside for free. Many catch their very first fish there during a visit and the experience is often a stepping-stone towards wanting to learn more about Lake Erie and its inhabitants.

"Fishing is a really easy way to get people to pay attention to Lake Erie," said Tory Gabriel, Ohio Sea Grant's Extension lead. "A lot of times kids get their first fishing experience at one of our events." And even if they don't become avid anglers later on, it's a memory that tends to stick with these kids.



At the other end of the island, the South Bass Island Lighthouse introduces visitors to the history of the building, which was constructed in 1897 and served as a working lighthouse until 1962, and to some of the issues affecting Lake Erie today. Tours, including a chance to climb the lighthouse tower, are offered the second Saturday of most months during the summer (September tours are on the first Saturday), and the grounds are open daily during daylight hours.

"We guarantee if it is your first visit, it will not be your last," Stanford said. ●



#### ► HISTORY AND SCIENCE ON THE ISLANDS

Between the Aquatic Visitors Center (above), the South Bass Island Lighthouse (top right) and Gibraltar Island, Ohio Sea Grant and Stone Lab offer a number of Lake Erie learning opportunities to the more than 800,000 tourists who visit Put-in-Bay every year.

## To the Birds

The *Ohio Lake Erie Birding Trail Guidebook*, first published in 2013 and now in its second edition, continues to take new and experienced birders on a self-guided tour of Ohio birding spots. The book includes 88 birding locations, located all along the Lake Erie shoreline from Ashtabula to Toledo, along with commonly sighted species, park amenities and online resources for visitors.

Seven separate loops — centered on Oak Openings, the western Lake Erie marshes, the Lake Erie Islands, Sandusky Bay, Huron/Lorain, the Cleveland area and Ashtabula — guide birders through a day trip or a weekend of birding, or they can select their own preferred spots to visit.

Created as a complement to the Ohio Department of Natural Resources Division of Wildlife and Ohio Sea Grant website [lakeerieohiobirding.info](http://lakeerieohiobirding.info), the guide helps bring birders to less well-known birding locations that may not have benefited from the contribution birding makes to Ohio's economy before.

"The Buckeye State boasts a rich and abundant diversity of birdlife," says Kendra Wecker, chief of ODNR Wildlife. "We are fortunate that Ohio's 'North Shore' sits at the convergence of two major flyways: the Mississippi and the Atlantic. Our Lake Erie shoreline is a magnet for hundreds of avian species, especially in the spring and fall but also throughout the year. Birders will not be disappointed when traversing the hundreds of miles of Lake Erie shoreline, the *Ohio Lake Erie Birding Trail Guidebook* in hand, while discovering what the North Shore has to offer. Whether birders choose to enjoy just one loop or all seven, the guidebook will get you there." ●



**GET YOUR  
BIRDING GUIDE  
THROUGH  
OHIO SEA GRANT**

*The guide is available through Ohio Sea Grant for \$15 per book and wholesale at \$250 per case of 20, plus shipping and handling costs.*

**Contact the Ohio Sea Grant office at 614-247-6266 with orders or questions.**



## Climate Team

Collaborative effort brings climate curriculum to region

### ► CLIMATE EDUCATION

*The addition of the Climate Walk into the Stone Lab Field Trip Program has reached thousands of students and tourists since its start in 2013, who learn about climate issues through educational kiosks around the island.*

# W

hen Ohio Sea Grant received a grant from NOAA to add more climate information into its programming in 2011, the program had no idea how far it could go.

"We had these great components—updated climate science lessons for classroom teachers, a successful climate webinar series educating thousands, and a survey outlining what our stakeholders

wanted in terms of climate information," said Jill Jentes Banicki, Ohio Sea Grant's assistant director for communications. "But we wanted to also develop something that could help informal educators in parks or nature centers teach about climate."

Stone Lab with its field trip program was the perfect spot to test a new tool and with the combined creativity of Sea Grant education & outreach specialists Sue Bixler, Angela Greene and Lyndsey Manzo and communications' Christina Dierkes, the Stone Lab Climate Walk was born.

The Climate Walk is a seven-stop journey across Stone Lab's Gibraltar Island where students learn how climate change will affect things that are local and relevant to them. Topics range from how climate change will alter resident bird and tree ranges to how water levels will rise in the Great Lakes.

Designed to link physical features around the island to climate change topics, the idea of the walk was to not create new climate learning concepts, but to use existing ones.

"We realized as we began to discuss what topics to include, we could do something innovative," said Manzo. "We could build the Walk's content using NOAA's *Climate Literacy Principles* and show how those seven principles can guide place-based education in an informal educational setting."

**energy strategies**

Short-term strategies involve switching from carbon-intensive to renewable energy sources. Long-term strategies involve innovative research into alternative energies and a fundamental change in the way humans use energy.

**how can climate change be reduced by alternative energy?**

A combination of strategies is needed to reduce greenhouse gas emissions. The most immediate need is conservation of fossil fuels (oil, gas, and coal), which we rely on for transportation, heating, and electricity.

**Lake Erie Nature & Science Center Geothermal System**

The Center's geothermal system heats and cools the facility using the Earth's underground temperature which stays fairly consistent all year. Through the use of 42 wells located near the Center, approximately 2,500 gallons of water circulates to and from the building through a closed loop pipe system. The depth of the wells at 100 to 300 feet below ground provides a water temperature of approximately 55 degrees. Fourteen water-to-air heat pump units and a compressor system work together to heat or cool the building utilizing the temperature difference between the building air and the underground wells.

Logos: Ohio State University, Sea Grant, Lake Erie Nature & Science Center, BY School, and others.

**energy strategies**

Short-term strategies involve switching from carbon-intensive to renewable energy sources. Long-term strategies involve innovative research into alternative energies and a fundamental change in the way humans use energy.

**how can climate change be reduced by solar energy?**

A combination of strategies is needed to reduce greenhouse gas emissions. The most immediate need is conservation of fossil fuels (oil, gas, and coal), which we rely on for transportation, heating, and electricity.

**STEP 1** Silicon on the solar panel absorbs sunlight.

**STEP 2** Electrons are excited and move around the panel with little resistance.

**STEP 3** When an electron reaches the junction in the solar panels, it is either accelerated across it, or repelled by it.

**STEP 4** The free electrons only flow in one direction, from one side of the junction to the other, doing a current through the external circuit, creating electricity.

**STEP 5** The electric current then goes to an inverter, which converts the current from DC (direct current) to AC (alternating current).

**STEP 6** The system is then connected to the main electric grid.

**Stone Lab**

Stone Lab is using photovoltaic solar panels to create electricity, using renewable energy from the sun. This south-facing structure has a ceiling of 100 crystalline solar panels. The power generated here directly feeds the island during the summer, and supplements power for the research building across the bay during the winter months.

Look at the household electric meter on the panel to see how many kilowatts of power have been produced since its construction in 2012! During a sunny day, the panel can generate up to **12 kilowatts of electricity**.

QR code: scan to learn more

Logos: Ohio State University, Sea Grant, and others.



“We have learned through our decades-long partnership with Sea Grant that any time we can model something that Ohio Sea Grant Education creates, we will.”

CATHERINE TIMKO  
LAKE ERIE NATURE AND SCIENCE CENTER

The principles themselves provide the basic information a person should know to be climate literate and what a teacher should teach to meet standards in their climate science curriculum.

With a traveling set of the Climate Walk panels in hand, the Sea Grant educators began introducing the climate tools to hundreds of formal and informal educators across the region through workshops, conferences and webinars. From partnered webinars with teacher stipends to presentations at a National Science Teachers Association conference, Sea Grant disseminated its updated climate curriculum lessons and the Climate Walk broadly to educators nationwide.

Two of those educators were Catherine Timko, Cleveland's Lake Erie Nature and Science Center's (LENSC) executive director and Char Shryock, Bay Village City Schools' director of curriculum and instruction.

“We've learned through our decades-long partnership with Sea Grant that any time we can model something that Ohio Sea Grant Education creates, we will,” explained Timko. “So when Ohio Sea Grant's Sarah Orlando and Sue Bixler showed us the Climate Walk, we instantly knew we needed to incorporate those panels into our program.”

Thanks to a Bay Village Education Foundation grant in 2015, Bay Village created a pilot

program of the Climate Walk that also supplied weather stations throughout the schools for real-time data collection.

Three additional grants from the Ohio Environmental Education Fund, the Gund Foundation and The Cleveland Foundation brought in teacher training in the form of a Climate Literacy Academy: for the past two years, Bay Village Schools has trained 30 teachers from grades 3-11 on the climate concepts so they can bring the Climate Walk panels and supplemental lessons into their classrooms.

In addition, the grant funding provided support for the Lake Erie Nature and Science Center to incorporate the Climate Walk into its informal education center, adjusting the Walk into wall wraps and adding an interactive module. Expected to be completed later this year, LENSNC plans to use the exhibits to integrate climate in all areas of its programming to help educate its 165,000 yearly visitors from kids to adults about climate change.

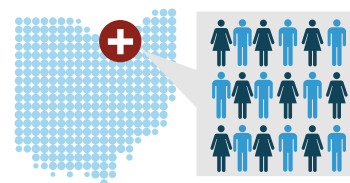
“What has been so great about this project is that we did what Sea Grant does so well—bringing in all areas of our program to create the most effective tools to educate our stakeholders,” concluded Bixler. “If we can help those kids on our field trips or in the schools become more informed decision makers based on the science they learn today, we will have done our jobs as educators.” ●



The Lake Erie Nature and Science Center in Cleveland will be bringing

STONE LAB'S CLIMATE  
WALK TO ITS

165,000  
VISITORS THIS YEAR



LEARN MORE

For more about the climate curriculum visit [go.osu.edu/SeaGrantEd](https://go.osu.edu/SeaGrantEd)

For more about Stone Lab's field trip program and the Climate Walk, visit [go.osu.edu/fieldtrips](https://go.osu.edu/fieldtrips)



## Power Up

Solar energy powers Stone Lab education curriculum

S

olar energy is a visible presence at Stone Lab, The Ohio State University's island campus on Lake Erie. Solar panels on the roof of the lab building and on a pavilion near Gibraltar Island's southwestern tip create up to a quarter of the lab's electricity needs during the spring and summer, and solar thermal tubes on the Dining Hall roof provide for all of the building's hot water needs.

But of course, using solar energy doesn't stop there for Stone Lab and Ohio Sea Grant staff. Instead, they've expanded on the basics of what the technology provides – electricity and heat – and developed Ohio Sea Grant's Solar Technology Curriculum, which takes advantage of the presence of the solar arrays by offering a complete set of lessons on solar energy that teachers can download and use with their students.

Eric Romich, an OSU Extension field specialist who focuses on energy education, uses some of the lessons, as well as an online dashboard that provides real-time data generated from Stone Lab's solar arrays, to help his students make a connection between solar technologies and how they function depending on their location and design.

Students can use the real-world data with curriculum lessons and activities to better understand how the panels' energy production is influenced by the natural environment, according to Romich, who also helped develop the curriculum along with Stone Lab educators Lyndsey Manzo, Angela Greene and Sue Bixler and Ohio Sea Grant's assistant director Dr. Kristen Fussell.

"It has been interesting to see how solar energy has become a topic of interest with the general public and the younger generation," Romich added. "It's important to help students understand how skills they are learning in school apply to the real world. This curriculum helps students connect the dots between the STEM skills they learn in the classroom and the design and development of solar panels they are now seeing installed all throughout Ohio."

That connection is made with a wide variety of instructional strategies, including teacher-created labs, opportunities to collect live data from an internet dashboard, as well as a solar toy dissection lab enabling students to discover how solar-powered objects function. The content and labs are also available on an instructional technology platform called Nearpod that adds a high level of engagement and interactivity to the learning.

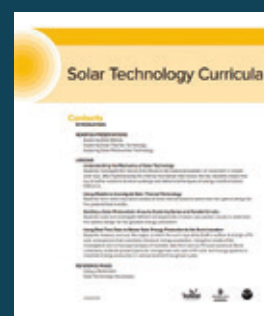
Greene, who took the lead on the development of the Nearpod lessons, also teaches a Stone Lab workshop for educators who want to use Nearpod and the solar lessons in their classroom. "The 50 teachers who have participated in our solar workshops have come from a variety of educational settings, and we try to show them the most effective way our solar materials can help their learners," she explained.

Development was funded by the Sustainability Institute at Ohio State with support from the Ohio State President and Provost's Council on Sustainability (PPCS), the Ohio State Office of Research, and the Friends of Stone Laboratory. ●

*Taylor Day, a student communications assistant at the Sustainability Institute at Ohio State, contributed to this story.*

### › ALTERNATIVE METHODS

Stone Lab buildings are powered using solar panels on the roof and on a nearby pavilion.



LEARN MORE

The solar curriculum is available at [go.osu.edu/SeaGrantEd](http://go.osu.edu/SeaGrantEd)



Development was funded by the Ohio State Office of Energy and Environment with support from the Ohio State President's and Provost's Council on Sustainability (PPCS), the Ohio State Office of Research, and the Friends of Stone Laboratory (FOSL).





*“What an amazing experience we had with the Hydrolab! We collected data in the Rocky River in the Cleveland Metroparks which meant that we got to team up with Mark Warman. The students loved feeling like ‘real’ scientists, as they collected data on the water that we use for our daily needs.”*

SHARI INSLEY



*“The Greatest of the Great workshop at Stone Lab helped me to become much more focused and deliberate in making real world connections with my students. It has provided a wide variety of resources to help me incorporate Great Lakes literacy principles into the various classes I teach, such as chemistry, physics, and Science 8 as well as in my environmental science class.”*

DONNA MELLER



*“The results of our AP Environmental science grasshopper mark and recapture study indicate that we have between 490 and 500 individuals in the back field.”*

ADAM PHILPOTT



## CONNECT WITH US

Keep up with current classes, research and events on social media.



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Read more stories on our Facebook and Twitter pages.



REBECCA DOBSON

When I was offered the chance to attend a workshop at Stone Lab, I said “Heck Yeah!” What fun we had! And the insights and activities we gained for use in the classroom have been invaluable. I ended up creating an entire unit around the Great Lakes Literacy Principles for my 8th grade STEM class. We built models of the lakes, windmills, studied eagles, the water cycle, watersheds and are moving on to investigating invasive species and plastics. I love that it coheres so many important topics around a natural wonder in their own backyard. Next year I hope to get them to the lake for a field trip. I am so grateful I was invited to Stone Lab. Thank you Lyndsey, Angie and all my new friends!



# TEACHING TEACHERS

BY CHRISTINA DIERKES

*Ohio Sea Grant teacher education expands Lake Erie knowledge into classrooms across the region*



Ohio Sea Grant has a long tradition of developing curriculum for teachers and other educators. Its first formally funded research project was an education project, and giving teachers effective ways to help their students learn about the Great Lakes has continued to be a cornerstone of Sea Grant's mission ever since.

#### ► SHIPBOARD SCIENCE

*(Above) Teachers Donna Meller and Marla Miller aboard the U.S. EPA's Lake Guardian research vessel.*





These days, Ohio Sea Grant educators Lyndsey Manzo and Angela Greene have a hand in a wide range of professional learning for teachers, from developing curriculum and teaching Stone Lab workshops to accompanying teachers from across the Great Lakes region in shipboard science workshops aboard the U.S. EPA's *Lake Guardian* research vessel.

In 2017 and 2018, Manzo and Greene used funding from the Center for Great Lakes Literacy (CGLL) to more purposefully integrate some of these different experiences and help teachers better apply lessons learned to their classroom or other education setting. Teachers who attended the 2017 shipboard science workshop were invited back to Stone Lab the next year, along with a colleague who hadn't had the *Lake Guardian* experience, for a week of intensive collaboration on integrating Great Lakes knowledge, modern pedagogy and Ohio Sea Grant curriculum into their workplace.

According to teacher feedback, working with a partner was key to the success of this professional learning

workshop. In addition to continued accountability to each other after the workshop ended, many participants reported that having knowledgeable support and someone to share ideas with helped them integrate learned strategies and content into their job much more easily than if they had gone back to work without that potential for collaboration. The partnered approach was so successful, in fact, that Manzo and Greene will repeat it with five teachers from this summer's Lake Erie Shipboard Science Workshop.

"The *Lake Guardian* experience allowed me to really focus on being a researcher and reignite that passion for why I went into teaching science," said Donna Meller, a science teacher at Pettisville High School. "That experience exposed us to some of the resources available out there, but the week we got to spend with Lyndsey and Angie at Stone Lab the next year allowed us to focus on how to take that experience and the resources and identify where it fits into the curriculum that we're teaching. It also helped us develop more background beyond what we had learned in that weeklong experience on the ship."

*"Anytime that we can see value and real-world application, that's huge, whatever the topic I'm teaching."*

DONNA MELLER

MORE THAN **300** TEACHERS USE THE CLEVELAND MUSEUM OF NATURAL HISTORY'S LENDING LIBRARY

which now includes curriculum materials and other resources provided by Ohio Sea Grant

#### > LEARNING THROUGH EXPERIENCE

Opportunities like the shipboard science workshop provide different experiences and help teachers better apply lessons learned to their classroom or other education setting.







## EXTENSION EDUCATOR BECOMES TEACHER AT SEA

Ohio Sea Grant Extension Educator Jill Bartolotta has been selected for NOAA's Teacher at Sea Program.

"NOAA's Teacher at Sea Program gives teachers the professional opportunity of a lifetime with a chance to participate in cutting edge science, on the ocean, working side-by-side with world-renowned scientists," says Jennifer Hammond, the program's director. "Teachers describe this authentic research experience as transformative and one that allows them to bring new knowledge and excitement back to their classrooms."

Now in its 29th year, the program has provided nearly 800 teachers the opportunity to gain first-hand experience participating in science at sea. This year, NOAA received applications from nearly 300 teachers, and chose 19 to participate in research cruises. These educators are able to enrich their curricula with the depth of understanding they gain by living and working side-by-side with scientists studying the marine environment.

NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources.



### ➤ HANDS-ON LEARNING

*Skye Powers-Kaminski and Becca Varadan, education specialists at the Cleveland Museum of Natural History, deploy plankton nets during a science cruise at Ohio State's Stone Lab. Photo: Lyndsey Manzo*

With that focused approach, teachers were well equipped to apply what they had learned when they returned to the classroom in the fall. "I immediately used *How well do you know the Great Lakes?*," said Marla Miller, who teaches math at Pettisville High School. "I incorporate the lesson into metric measurement of length, mass and volume. At the same time, I introduce the importance of the Great Lakes to all of us."

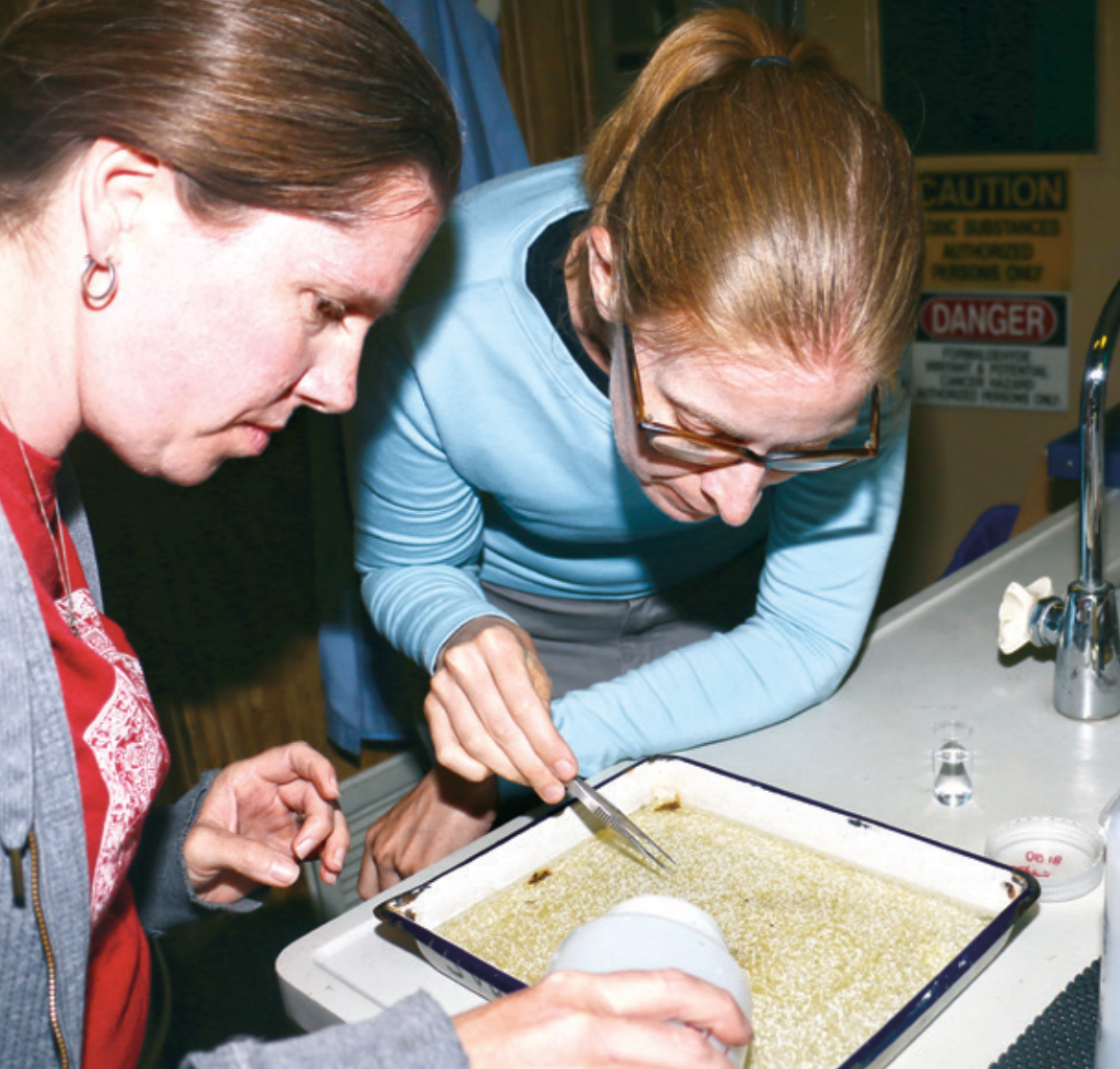
Manzo and Greene bring plenty of Great Lakes knowledge to the workshops they teach, but they also offer a look at the teaching techniques behind each lesson to help educators better apply the curriculum and other resources to their settings. Their approach is grounded in educational research, and it comes across in the impact teachers report back in their classrooms.

"It's not just what you teach, but how you teach," Manzo said. "We are constantly modeling these effective and engaging strategies with the teachers as they are our students. And we really focus on the pedagogy piece, as well as the content to make sure teachers know how to teach about the Great Lakes."

For Skye Powers-Kaminski and Becca Varadan, who work in the Educator Resource Center at the Cleveland Museum of Natural History, that approach is informing a long-term professional development program for about 35 teachers in grades 3 to 5. Between Powers-Kaminski's experience on the *Lake Guardian* and their shared time at Stone Lab during the Greatest of the Great workshop, "so much of this has just inspired us to make a lot of changes to how we've done things," Varadan said.

"We're using some of Lyndsey and Angela's models and things like the integration plan and educational technology as we go through a long-term sustained PD program for the coming year," said Varadan, the museum's manager of educator engagement. "It's based on the concept of biodiversity, and I'm sure it won't all be centered on the Great Lakes and Lake Erie, but we're definitely going to be using some of the activities."





➤ **HANDS-ON LEARNING**  
 (Left) Powers-Kaminski and Marta Johnson work through a water sample containing larval fish and zooplankton during their time on the R/V Lake Guardian.

Photo: Justin Selden

(Below) Daily hands-on experience with the HydroLab, a portable water quality tool, during Stone Lab educator workshops helps teachers become efficient users and lets them easily integrate its use into their classroom later. Hydrolabs are available through the LimnoLoan program from Illinois-Indiana Sea Grant.

Photo: Donna Meller

They also shared what they learned with other museum educators, including those who work directly with students. Through a presentation to the museum's education team and one-on-one work with some of the other educators, they were able to pass what they had learned along to colleagues, who in turn used it with hundreds of students in the museum's homeschool programs and field trip programs.

"It all correlates with the museum's mission so well," said Powers-Kaminski, a curriculum specialist at the museum. "What was really nice about (Sea Grant's) Greatest of the Great workshop was that, this past fall, we knew that we were having an exhibit called Lake Erie on Edge, and we already knew there was some programming being built around that for students. So when we went to Greatest of the Great, one of the things we put in our application was 'give us everything you've got because we will take this and share it as part of that exhibit.'"

Materials also made it into the museum's lending library, where teachers from surrounding schools – many of them in underserved communities – can check out materials for their classrooms that cover everything from taxidermied animal specimens to Teaching Totes, thematic kits that include lesson plans, hands-on experiences and other materials on a specific topic. Powers-Kaminski incorporated a number of Ohio Sea Grant curricula and other resources from the workshop into Lake Erie kits for the more than 300 teachers that use the library.







*“We can’t reach every student at Stone Lab, but we can reach their teachers who then can go back to the classroom.”*

LYNDSEY MANZO



One thing Meller, Powers-Kaminski and Varadan all come back to in their work is a focus on real-world learning, helping students connect the concepts they learn in the classroom to their environment, and a more personal investment in the health of Lake Erie and the Great Lakes.

“Anytime that we can see value and real-world application, that’s huge, whatever the topic I’m teaching,” Meller said. “Even though our school system is not that far away from Lake Erie, the number of students that have been exposed to the Great Lakes has been very limited. So that makes me realize that I need to make sure that they understand the value of that resource and that no matter whether they live in a farm setting or they just live in a rural community, that everyone has an impact on the Great Lakes, and everyone is involved in decisions that ultimately can impact them.”

Powers-Kaminski and Varadan were able to drive that real-world connection home as part of a Meaningful Watershed Educational Experience (MWEE) grant from Michigan State University that was open to them because of Powers-Kaminski’s time on the *Lake Guardian*. Working with naturalists at Mentor Marsh, which is curated by the Cleveland Museum of Natural History, they brought about 40 fifth-graders from St. Mary of the Assumption School to the marsh during the City Nature Challenge, where cities across the globe compete for most nature observations logged into the iNaturalist app.







# 40

STUDENTS

VISITED MENTOR MARSH  
AS PART OF THE CITY  
NATURE CHALLENGE

*giving kids a hands-on look at the nature  
they can find just beyond their back yard*

## EDUCATION OPPORTUNITIES



### CENTER FOR GREAT LAKES LITERACY RESOURCES ENHANCE STONE LAB WORKSHOPS

Since 2014, 65 Great Lakes educators have participated in long-term, immersive Ohio Sea Grant and Stone Lab professional development supported by the Center for Great

Lakes Literacy (CGLL). Collectively, these educators have used the resources, lessons and skills they acquired at Stone Lab with 5,572 K-12 students and 4,460 learners in informal settings like parks and science centers.

"We took them out to the marsh for a day and did a bunch of experiential stations, and along with that, we were documenting everything that we saw, taking pictures of it, recording it, and then we uploaded that to iNaturalist so that those would count towards the City Nature Challenge competition," Powers-Kaminski said. "We were able to document over 100 plants and animals just that day."

"That school is actually located very close to the Mentor Marsh area, so what was really great was that, for these kids, it was personal," added Varadan. "It really held their attention because they live around there, they can actually see some of those things from their back yard, so it was really a beautiful thing to see them take interest in what was happening."

And that's really the end goal of Ohio Sea Grant and Stone Lab's professional learning efforts, be it a teacher workshop on Gibraltar Island or curriculum to send out into the world. Every time just a few people pick up those lessons and run with them like Meller, Miller, Powers-Kaminski and Varadan have done, those efforts reach so many more students than concentrated work by just Sea Grant staff ever could.

"We can't reach every student at Stone Lab, but we can reach their teachers who then can go back to the classroom," Manzo said. "So if we can improve Great Lakes literacy within our teachers and they can take that awareness and that compassion and respect for that resource, they can convey our message and pass it along." ●

#### ► SHARING KNOWLEDGE

(Above left) Students from St. Mary of the Assumption School collect macroinvertebrate samples from a vernal pool at Mentor Marsh State Nature Preserve. (Left) Skye Powers-Kaminski, Becca Varadan and Alan Ma (CMNH Educators) lead St. Mary of the Assumption School students in a sharing and reflection session of their MWEE/CNC experience.

Photos: Ashley Hall



LEARN MORE

Stone Lab's educator workshops:  
[go.osu.edu/SLworkshops](http://go.osu.edu/SLworkshops)

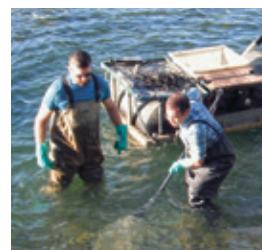
Ohio Sea Grant curricula and other  
educator resources:  
[go.osu.edu/SeaGrantEd](http://go.osu.edu/SeaGrantEd)



### TAKING PROGRAMS GLOBAL WITH ITUNES U

Ohio Sea Grant's first iTunes U course, covering climate change impacts on the Great Lakes region, has reached more than 77,000 people worldwide. The Climate Change Impacts on the Great Lakes course provides an overview of the latest research about how a changing climate will affect different aspects of daily life in the Great Lakes, with topics ranging from public health and infrastructure to policy and education.

The full set of presentations and supporting materials is available at  
[go.osu.edu/itunesclimate](http://go.osu.edu/itunesclimate)



### STONE LAB WORKSHOPS BRING LAKE ERIE KNOWLEDGE TO BUSY PROFESSIONALS

Stone Lab's one- to three-day workshops are specifically designed for working professionals and job seekers wanting to learn new skills that are in demand at agencies, in

schools and in industry. Topics range from fish sampling and algae identification to professional development opportunities for teachers and other educators.

Find the workshop that's right for you at  
[go.osu.edu/SLworkshops](http://go.osu.edu/SLworkshops)





# Student

## SPOTLIGHT >>

*“It’s an experience unlike any other.”*

ANTHONY TAMBINI

## Putting the “Nature” Back in Nature Scientist

By Joy Snow

**A**nthony Tambini had never been to the Lake Erie islands, but that didn’t stop him from signing up for a thirteen-week stay on Gibraltar Island, home of The Ohio State University’s Stone Laboratory. Less than two weeks after receiving an associate’s degree from Columbus State Community College, the Forestry, Fisheries and Wildlife major at Ohio State left for his temporary home in the western basin of Lake Erie, where he would spend the next three months working, learning and having the time of his life.

“It was awesome,” he said. “There are all kinds of opportunities people don’t even know about – and I get to do them for credit!” Anthony took two classes at Stone Lab, a one-week course on Lake Erie sportfishing and a five-week evolution course, but that didn’t mean he just sat around for the rest of the time he was there. For the other seven weeks he was on the island, Anthony was a student employee, doing anything and everything needed to keep an island lab running, from working in the dining hall and doing grounds keeping to teaching kids how to fish and educating guests at the Aquatic Visitors Center.

Even while out of class, Anthony was still learning. Gibraltar isn’t a large island. It’s common to run into professors while just going about your

day or eating lunch in the dining hall, and they’re always happy to talk about their research with anyone interested. “It’s easier to have a casual conversation,” he said. “I got to talk with researchers I was familiar with from my own studies and learn more about their work. Someone I met even helped me get a spot in Dr. Suzanne Gray’s lab back on campus.”

Anthony spent his time at Stone Lab working hard, and he couldn’t have enjoyed it more. “My goal is to never have a desk job. Stone Lab showed me I’m in the right field,” he said. One of the biggest draws for Stone Lab is the focus on engagement and hands-on science. In class and at work, that meant catching salamanders, banding birds and spending whole days on a boat, but even when relaxing he was still surrounded by top scientists, fellow students and one of the most unique areas in America. “I’ve yet to find a better place to study than my hammock,” Anthony said.

It seems like one summer wasn’t enough, though, since he’ll be returning to Stone Lab this summer for another three full months, working on the island and taking two four-week classes, taxonomy of aquatic invertebrates and taxonomy of fishes. On top of the science itself, Anthony is looking forward to reconnecting with his Stone Lab friends and enjoying bonfires out on the island. “It’s an experience unlike any other,” he said. “Absolutely glorious.” ●





# On the Island



DETAILS ONLINE

[ohioseagrant.osu.edu/visit](http://ohioseagrant.osu.edu/visit)



## STONE LAB / EVENTS

### 1 > STONE LAB OPEN HOUSE

Have you ever been curious about the Lake Erie science that takes place at Stone Lab? Do you want to take a peek inside Cooke Castle or meet a native snake? Are you maybe just looking for an excuse to get to the island before the weather turns? You can do all of that and more at the 2019 Friends of Stone Lab (FOSL) Open House from 11 a.m. to 4 p.m. Saturday, September 7.

*Learn more at [go.osu.edu/SLOpenhouse](http://go.osu.edu/SLOpenhouse)*

### 2 > BUCKEYE ISLAND HOP

Save the date for the 2019 Buckeye Island Hop, held October 18-20 and sponsored by the Friends of Stone Lab (FOSL). The annual event gives alumni and friends of Ohio State a chance to spend a weekend on the Lake Erie Islands, take part in an outdoor volunteer project, and meet likeminded people.

*Registrations will open this summer at [go.osu.edu/islandhop](http://go.osu.edu/islandhop)*

### 3 > HARMFUL ALGAL BLOOM FORECAST 2019

Ohio Sea Grant and Stone Lab will once again host NOAA's Harmful Algal Bloom Forecast for Western Lake Erie on July 11 from 11 a.m. to 1 p.m. In addition to the official forecast, a panel of experts will discuss spring nutrient loading and recent HABs research. Follow #HABsforecast on Twitter for updates, or to ask questions of the expert panel.

*To register for the webinar, visit [go.osu.edu/habsforecast](http://go.osu.edu/habsforecast)*

## TRY SOMETHING NEW



Aquatic Visitors Center  
[go.osu.edu/avc](http://go.osu.edu/avc)



Gibraltar Island Tours  
[go.osu.edu/gibtours](http://go.osu.edu/gibtours)



South Bass Island Lighthouse  
[go.osu.edu/lighthouse](http://go.osu.edu/lighthouse)



Special Events  
[ohioseagrant.osu.edu/news](http://ohioseagrant.osu.edu/news)



**ANTHONY TAMBINI '20**

Forestry Fisheries  
and Wildlife major  
The Ohio State University





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## REAL-WORLD PERSPECTIVE

Rachel Ewald liked the idea of taking the ecology class her minor required in five weeks instead of 16. But what really drew the biology and animal science student at the University of Findlay to Stone Lab was the hands-on experience courses at Ohio State's island campus offer.

"We spent nearly 50 percent of our class time outside, which I really enjoyed. It also helped us apply concepts from a more real-world perspective. ... Our class all got along really well, and they were all such a fun and great group of people to learn and work with."



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[go.osu.edu/donate](https://go.osu.edu/donate)