



# ASC

## Aquatic Sciences Chronicle

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UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE UNIVERSITY OF WISCONSIN WATER RESOURCES INSTITUTE

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### WATER RESOURCES RESEARCH

# Tracking Toxins in Tunnel City



Jay Zambito

**A**mong Wisconsin geologists, they're known as the Wonewoc Formation and Tunnel City Group—rock units named for places in Wisconsin where they are well exposed and were first described. These rocks underlie almost half of the state.

But these porous rock units present in areas of west and central Wisconsin could also be a potential source of groundwater contaminants, including an extensive list of elements that includes everything from aluminum, arsenic and cadmium to cobalt, copper and lead.

With the support of funding from the Water Resources Institute, a team of University of Wisconsin-Extension researchers is taking the first of many steps to determine whether these formations are, in fact, a possible contamination source. They're starting at the very beginning, creating a set of baseline data that details the mineral and chemical composition of the rocks.

“Wells in part of western Wisconsin drawing water from near the intersection of these formations sometimes have water chemistry that is not

Rock formations that underlie almost half of the state could be source of groundwater contaminants. Above: a typical rock formation in the Tunnel City Group.

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University of Wisconsin Aquatic Sciences Center  
1975 Willow Drive  
Madison, WI 53706-1177

Telephone: (608) 263-3259  
Email: [chronicle@aqua.wisc.edu](mailto:chronicle@aqua.wisc.edu)

The Aquatic Sciences Center is the administrative home of the **University of Wisconsin Sea Grant Institute** & the **University of Wisconsin Water Resources Institute**.

**Communications Manager**  
Moira Harrington

**Editor**  
Elizabeth A. White

**Writers**  
Aaron R. Conklin, Moira Harrington,  
Anne Moser and Marie Zhuikov

**Designer**  
Yael Gen

**Circulation Manager**  
Linda Campbell

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## FEATURED SOCIAL MEDIA + WEB

# Revisiting the Sea Grant Fish ID Website and App

A bare-bones checklist on what to pack for a trip to that favorite fishing spot:

1. pole
2. tackle
3. Internet

Internet is not a typo for "net." In fact, for two people who recently contacted Sea Grant, the Internet might even be at the top of the list. That's because with a link, [seagrant.wisc.edu/fishid](http://seagrant.wisc.edu/fishid), anglers can check what kind of fish is in their aluminum-handled net.

Two years ago, Sea Grant packaged and offered a photo gallery featuring all 174 fish found in Wisconsin waters. The

gallery allows users to search by fish name, similar fish in the family or physical features—shape; distinctive aspects; pattern; and type of fins, mouth, scales, spine, tail or coloring. Each entry depicts the fish, sometimes from several angles, and offers a short write-up about fish features.

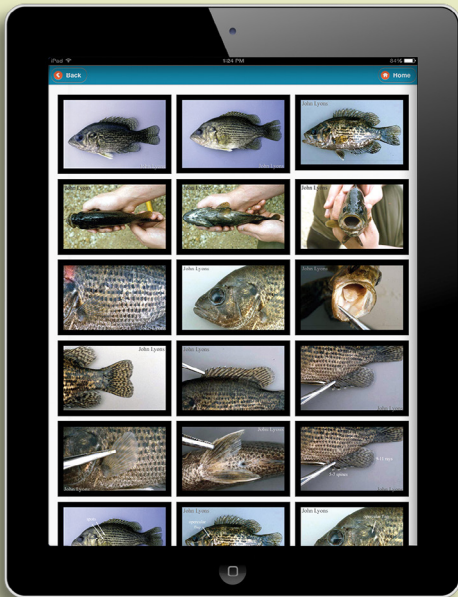
No Internet connection at that fishing hole? The tools can also be downloaded on an application fashioned for use on an Android or Apple phone.

In the years since the material has been available, the app has been downloaded more than 12,500 times. It's got a fan base, too, if comments by Steve King of La Crosse are any measure. He recently wrote to say, "What an awesome app. I have been a catch-and-release fisherman for years only knowing the common ones. This app really should make knowing what is what a breeze. My 5-year-old and I have been getting a little more serious and I wanted to try and help him identify what we are catching. Thanks tons."

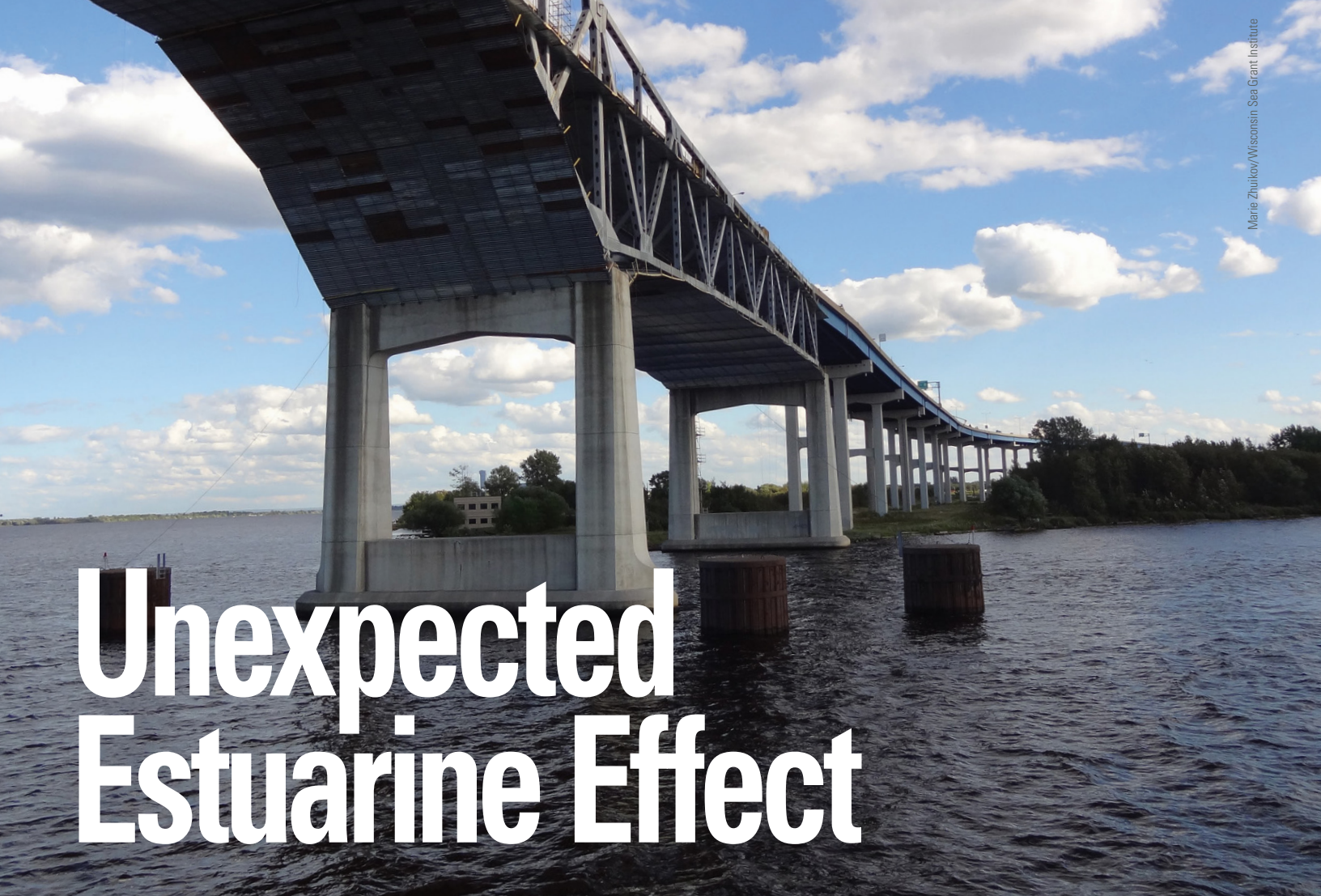
The website, too, has generated praise. Rhonda Mendel, an aquatic entomologist, wrote to thank Sea Grant for the fish id website and called it one of the most user-friendly she has ever accessed. Mendel said the site helps her do her job with an environmental consulting firm with offices in Ohio and Tennessee.

The fish ID site owes much to Wisconsin Department of Natural Resources (DNR) Biologist John Lyons. Lyons captured the photos and provided the information accompanying them. The overall project is a partnership of the DNR, the University of Wisconsin-Madison Center for Limnology and Sea Grant.

A related resource is a glossary of fish biology. That can be found at [bit.ly/13BsvGX](http://bit.ly/13BsvGX).



## SEA GRANT RESEARCH



Marie Zhuikov/Wisconsin Sea Grant Institute

# Unexpected Estuarine Effect

University of Wisconsin-Madison researcher Emily Stanley knew estuaries on the ocean coasts removed nitrogen from the water as it moved from the land into the ocean—this fact of ecosystem chemistry has been known for a long time—but she was startled to learn that the St. Louis River Estuary apparently hadn't gotten the message. Instead of only removing the nitrogen from the water coming off the land, the St. Louis River Estuary also removes the nitrogen from the Lake Superior water that enters the estuary.

A joint Wisconsin/Minnesota Sea Grant-funded research project on the St. Louis River Estuary has revealed the surprising result. The two-year study, which involved several researchers, looked into nutrient levels and water chemistry in the estuary. When it comes to nitrogen removal in the water, the estuary seems to be working backwards.

Robert Sterner, director of the University of Minnesota Duluth's Large Lakes Observatory, said

that estuaries cleanse nitrogen from water by converting one type of nitrogen (nitrate) into another, less harmful type of nitrogen (dinitrogen). Without this function, the oceans and lakes would become "over fertilized" with nitrate, which can lead to many environmental problems, such as the harmful algal blooms that plagued Toledo last year and rendered drinking water toxic.

"Nitrate is in high concentration in Lake Superior for reasons we don't understand," Sterner said. "The estuary here is performing a lot of the same services as ocean estuaries but in a completely backwards way."

Lake Superior water gets into the estuary through natural reversals in the flow of water in the St. Louis Bay due to wind and weather. The cleansed water is then released back into the lake when the flow reverses again and goes back to "normal."

Stanley said that this flip-flop behavior is most pronounced during late spring and summer, when water flow is low. "A lot more nitrate starts

The over-achieving St. Louis River Estuary appears to remove nitrogen from water coming off the land—like most estuaries—yet it also removes nitrogen from Lake Superior.

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## Actionable Science Making Science Matter

Providing good, unbiased science to the public and policy makers of the state and Great Lakes region is an important responsibility of Sea Grant, and as part of that effort, we are increasing the impact of our projects by encouraging outreach and communication —“actionable science.” To read and learn more about this push, the library has built a collection of relevant books. For more titles on actionable science, visit our website: [go.wisc.edu/x1glev](http://go.wisc.edu/x1glev).

### AM I MAKING MYSELF CLEAR?

By Cornelia Dean. Cambridge, Mass.: Harvard University Press, 2009.

New York Times science writer Cornelia Dean has written a guidebook for scientists on talking to the public. It aims to show scientists how to speak to the public, handle the media and describe their work to a lay audience on paper, online and over the airwaves.

### A FIELD GUIDE FOR SCIENCE WRITERS

Edited by Deborah Blum, Mary Knudson, Robin Marantz Henig. New York: Oxford University Press, 2nd edition, 2006.

Scientists must transform the jargon-laden language and arcane concepts of the science world into something the rest of us can understand and even appreciate. This book is a report by more than 30 science writers from a variety of disciplines on what is entailed in their writing fields.

### DON'T BE SUCH A SCIENTIST—TALKING SUBSTANCE IN THE AGE OF STYLE

By Randy Olson. Washington, DC: Island Press, 2009.

Written by a marine biologist turned filmmaker, the book presents a model for the effective communication of technical information to broad audiences.

### EXPLAINING RESEARCH—HOW TO REACH KEY AUDIENCES TO ADVANCE YOUR WORK

By Dennis Meredith. New York: Oxford University Press, 2010.

A comprehensive communications guidebook for scientists, engineers and physicians. The author maps out how scientists can use sophisticated tools and techniques to disseminate their discoveries to important audiences.

### THE CRAFT OF SCIENTIFIC PRESENTATIONS: CRITICAL STEPS TO SUCCEED AND CRITICAL ERRORS TO AVOID

By Michael Alley. New York: Springer, 2nd edition, 2013.

The author presents scores of examples from contemporary and historical scientific presentations to show what makes an effective oral presentation.

If you wish to see more books on this topic, visit our website: [go.wisc.edu/7889ve](http://go.wisc.edu/7889ve)

Anyone in Wisconsin can borrow these books. Just email [askwater@aquawisc.edu](mailto:askwater@aquawisc.edu).

## Clark Collects Statewide Award

Coastal Engineer Gene Clark received the 2015 University of Wisconsin Regents Academic Staff Excellence Award on June 5. There are nearly 40,000 employees of the UW System and most of them are academic staff members so Clark's award was both competitively earned and a prestigious recognition on behalf of a large segment of the university community.

In conveying the recognition, Regent President Michael J. Falbo said, “This award signifies the high regard with which you are held by your colleagues, your institution, the UW System and the Board of Regents.”

At the award ceremony, Regent Janice Mueller noted that contributions such as Clark's strengthen and invigorate the system. Here, Clark is pictured with Rebecca Blank, chancellor of the University of Wisconsin-Madison, Clark's home institution although he is based at the University of Wisconsin-Superior.



Moira Harrington

Wisconsin Sea Grant's Social Science Outreach Specialist Jane Harrison may have left Wisconsin, but at least she didn't leave the Sea Grant family.



## See Jane Leave

Harrison left in July to take a position with North Carolina Sea Grant.

Harrison was Wisconsin Sea Grant's first social scientist, and her interest in the balance between economic development and the sustainable use of natural resources brought her to projects that quantified the value of improved natural resources. In Milwaukee County, Harrison found that residents are willing to pay \$6.7 million annually to avoid beach closures caused by poor water quality. In the Sheboygan River area, she conducted multiple studies that revealed the economic impacts of watershed restoration.

“It's important for policy makers to know how much Wisconsin residents value their natural resources,” Harrison said. “And coastal residents should understand how ecosystem change affects economic sectors like the fishing industry, and influences property values and recreation decisions.”

Harrison also coordinated a team of social scientists to evaluate the National Weather Service Central Region's new severe storm communication tool. The tool consists of specific impact-based warnings, such as “tornadic winds could throw automobiles into the air,” in order to disseminate a clear and consistent message to the public. However, Harrison found that different regions of the country viewed the warnings differently—North Dakotans, for example, don't share the concern that Kansans have about tornadoes.

This interest in seeking out different perspectives has been a major factor in her success. When she started with Sea Grant three years ago, she said, “One of the key questions I think social science can help frame is ‘Where are people coming

from?’ It's always in the back of my mind—how can we approach people where they are?”

When Kathy Kline, Sea Grant education outreach specialist, wanted to develop a campaign to encourage Wisconsin residents to purchase more locally produced fish, she turned to Harrison to find out what those local consumers already knew and what stood between them and putting local fish on their plates.

**“It's important for policy makers to know how much Wisconsin residents value their natural resources.”**

“Jane's expertise was exactly what we needed to launch our Eat Wisconsin Fish campaign,” said Kline. “She carefully analyzed our survey results so that we could understand how best to craft our message, and then she used focus groups to really hone the outreach materials we developed to target our audience.”

Harrison's ability to work with people also came into play as she built connections with stakeholders, researchers and students. She worked with groups as diverse as beach cleanup volunteers, anglers, Milwaukee County Parks and the World Environmental Economics Congress—just to name a few.

David Hart, assistant director for extension, praised Harrison's ability to work with many different groups and her unique perspective as a social scientist. “It's been a great experience working with Jane. She has been an enormous asset both to Wisconsin Sea Grant and the Milwaukee area.”

For her part, Harrison is sad to be leaving Wisconsin, but looking forward to a considerably warmer winter and new saltwater challenges. “I feel fortunate to have had this opportunity to work with Wisconsin Sea Grant and to be able to continue being part of the Sea Grant family,” Harrison said.

—EAW



# Tracking Toxins in Tunnel City

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**“We really don’t have a good idea whether these elements can make their way into the water.”**

**JAY ZAMBITO**

Bedrock geologist and professor with UW-Extension’s Wisconsin Geological and Natural History Survey

ideal,” said Jay Zambito, a bedrock geologist and professor with UW-Extension’s Wisconsin Geological and Natural History Survey and the principal investigator on the project. “We sometimes find elements above advisory levels.”

To gauge the rock composition, Zambito and his colleague, hydrogeologist Mike Parsen, are collecting and studying rock samples. They’re beginning with drill core, pristine rock materials collected from the subsurface across Wisconsin. Fortuitously, Wisconsin’s Geological and Natural History Survey curates and maintains an extensive library of drill cores. The collection contains cores from approximately 2,000 wells, as well as rock cuttings from another 11,000 water wells from across Wisconsin. This includes many samples from the Tunnel City and Wonewoc rock units.

Having those samples available saves a ton of time—and a ton of cash.

“It costs about \$60-100 per foot to collect new drill core,” said Zambito, who noted that the estimated value of the drill core archive is between \$120-140 million, though most is unique and irreplaceable. “Given the scope of this project, we’d be looking at spending approximately \$2 million to collect these samples.”

Instead, they can get right to the research. Using an X-ray fluorescence analyzer, Zambito and Parsen will be able to quickly scan the cores and identify the elemental composition of the rock formations. Follow-up analyses will then be used to determine the minerals that contain these elements.

“This is a perfect example of a core being used for a different purpose than it was initially intended,” said Parsen.

Simple, right? Not quite: Just because an element is in a rock formation doesn’t mean it can leach into groundwater. A variety of environmental factors, including temperature,

pH, oxygen levels, and whether the elements are incorporated within stable or unstable minerals, influences the process through which minerals can break down and constituent elements go into solution.

“We really don’t have a good idea whether these elements can make their way into the water,” explained Zambito. “That’s a subject for a subsequent study, after we figure out what elements and minerals are present.”

In addition to drill cores, Zambito and Parsen will collect and analyze other samples, including extracted rock from industrial sand mining operations and outcrops along the sides of highways.

Eventually, the results of Zambito and Parsen’s work could have the potential to inform policy decisions about where and how wells in west and central Wisconsin that tap into the Tunnel City and Wonewoc rock units for water will be drilled and managed. Zambito pointed to an earlier WRI-funded study as a possible predictor, in which researchers determined that an interval of sulfide minerals found in the subsurface in the Green Bay area were breaking down and unleashing arsenic into the groundwater. The solution in that case could also be the solution in this case concerning the Tunnel City and Wonewoc rock units—casing-off groundwater wells so that water is not drawn from any possible horizons of problematic minerals.

“We would anticipate seeing geological layers that may contain lower or higher concentrations of problematic element-bearing minerals,” said Parsen. “The question becomes, how are we handling them? What’s the long-term policy?”

“Once we have that baseline data set, we’ll have a better idea about how to move forward in testing potential rock-to-groundwater geochemical pathways,” agreed Zambito. “This is really the first step.” —ARC



## SEA GRANT RESEARCH

# Unexpected Estuarine Effect

continued from page 3

coming in from the lake then when the water flow is low, and the estuary is basically cleaning that up,” she said.

Why is there so much nitrogen in Lake Superior? That’s a mystery that Sterner has been investigating for years. Conventional knowledge attributes a buildup of nitrogen to deposition from the sky and from the combustion of fossil fuels, but that’s not true for Lake Superior. Sterner says it seems to be a natural process where nitrate is formed in the lake itself and in its sediment. Levels of nitrate in the lake have been climbing for the past century.

The St. Louis River is the first estuary in the Great Lakes or Lake Superior found to function in

this manner. Sterner hopes to quantify the amount of nitrogen that the estuary removes from the lake water, but that will require more research.

Water chemistry sampling for this project included June of 2012, when an unprecedented flood occurred in the St. Louis River Estuary. Stanley said she was impressed by how the estuary seemed to handle the deluge “in stride” from a water chemistry standpoint. “Although some effects of the flood kept going into the summer, by and large, the estuary was very resilient.”

Jacques Finlay with the University of Minnesota was another co-investigator on this project. —MEZ





## St. Louis River Speaker Series Offered Diverse Topics

From community efforts to make the St. Louis River more “hip,” to the finer points of water chemistry, to celebrations of the river through poetry and photography, this season’s monthly River Talk series offered a range of topics. The audience doubled during this second year of the talks, reaching more than 240 people at nine events in local cafes and learning centers. Those people wanted to learn about the St. Louis River Estuary, which runs into Lake Superior along the Wisconsin-Minnesota border.

The series was organized by Wisconsin Sea Grant and the Lake Superior National Estuarine Research Reserve. To revisit the series, check out blog posts at [uwiscseagrant.tumblr.com/search/river+talks](http://uwiscseagrant.tumblr.com/search/river+talks). Plans for more talks are in the works for the next season.



## Voter Elects to Become Debut WRI Fellow

Groundwater brought Carolyn Voter to Wisconsin, and groundwater is what’s kept her here. It’s also the centerpiece of her latest career step: Voter, a graduate student at the University of Wisconsin-Madison, is the first Water Resources Institute (WRI) policy fellow.

The newly created position will be shared with and housed within the structure of the Wisconsin Department of Natural Resources (DNR). Voter will be charged with analyzing statistical data, compiling information and creating the annual report the state Groundwater Coordinating Council (GCC) submits to the state legislature detailing the results of groundwater research funded by WRI, DNR and other state agencies.

“Interagency cooperation is the cornerstone for groundwater protection in Wisconsin,” said Mary Ellen Vollbrecht, the DNR’s groundwater section chief for the Bureau of Drinking Water and Groundwater. “The new Water Resources fellowship builds on that base. Carolyn’s background and energy are sure to get the fellowship off to a strong start. DNR appreciates this initiative of the Water Resources Institute and will strive to maximize the benefits to all agencies—and all Wisconsin water consumers.”

Jennifer Hauxwell, WRI’s assistant director for research and student engagement, agreed.

“Carolyn has a strong background in hydrology and familiarity with the Groundwater Coordinating Council’s Joint Solicitation for groundwater research,” Hauxwell said. “She



also brings great enthusiasm and positivity toward tackling the difficult challenge of both understanding and protecting a hidden resource—our groundwater.”

Voter, who was born in New Jersey and received her undergraduate degree from Bucknell University in Pennsylvania, was inspired by stream restoration work she became involved with there and was drawn to Wisconsin in part because of UW-Madison’s interdisciplinary hydro-ecology research programs. As a Ph.D. student, Voter worked on multiple WRI-funded research projects with UW-Madison Professor of Engineering Steven Loheide, including a project that examined the ways in which urban design impacted an area’s water budget.

“I’m excited about the policy angle,” said Voter of her new position and duties. “I’ve had a lot of consulting experience, but I haven’t had a chance to do much policy.”

Voter already knows several of the issues that will be an integral part of the challenges associated with maintaining or enhancing the quality and quantity of the state’s groundwater resources—chemical and biological contaminants and dozens of factors that affect water supply and demand.

“An important part of what I’ll be doing is figuring out how to communicate science to non-scientists,” she said.

Voter began work in her new position in July. In her off hours, Voter likes to run, spend time with her dog and check off activities on her “Madison bucket list.” —ARC

## By the Numbers, Sea Grant Has Busy Year

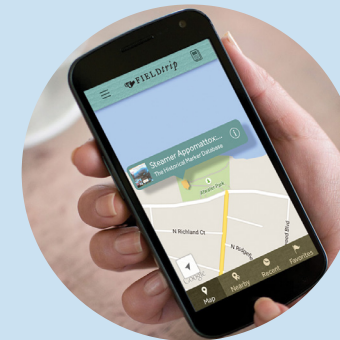
Each year, Sea Grant bins various types of information and provides it to the National Sea Grant Office as a measure of accountability and outcomes to be shared with the general public as well as federal funders.

Some examples of the 2014 report reflect Wisconsin’s efforts to meet coastal needs through science, promote the sustainable use of Great Lakes assets and train the next generation of water scientists:

- 86 acres of coastal habitat protected, enhanced or restored
- 11,559 fishermen who modified their practices using knowledge gained in fisheries sustainability
- 111 communities that implemented hazard resiliency practices to prepare for, respond to or minimize coastal hazardous events
- Seven jobs created
- Two businesses created
- 5,063 jobs retained
- 55 businesses retained
- Support for 136 students—undergraduate, graduate and Ph.D.
- Support that contributed to 23 degrees (Bachelor’s, Masters and a doctorate)
- 27 Sea Grant-supported students who become employed in a job related to their degree within two years of graduation

## Field Trip

If you’re a fan of using Google’s popular Field Trip app to augment your vacations and road trips with hidden and unexpected sights, rejoice: Field Trip now includes the sites and attractions featured on Sea Grant’s popular [wisconsinshipwrecks.org](http://wisconsinshipwrecks.org) website. Now, when you’re near areas of the Lake Michigan and Lake Superior coastal waters where the remains of historic schooners lie, cards detailing



the ship’s location, statistics and history will pop up on your Apple or Android smartphone. The app is also keyed to offer information on other Great Lakes maritime attractions such as lighthouses, museums and parks.

Sea Grant Web Developer Rich Dellinger spent months migrating the GPS information to Google’s servers. “This is another great way to let people know they are near our state’s rich maritime history, when they might have otherwise missed it,” he said.



## Christmas in May Beach Safety Equipment Distributed Statewide

Gene Clark, Wisconsin Sea Grant coastal engineer, and Todd Brieby from the Wisconsin Coastal Management Program played Santa to local beach managers this spring. They distributed piles of new water safety and emergency rescue equipment like ring buoys and life jackets to 42 beaches in Wisconsin as part of the Be Current Smart water safety campaign.

In addition to the equipment, the campaign, which is designed to raise awareness about the dangers of rip currents and other dangerous currents around piers and other structures, includes water safety tips tailored to Wisconsin and additional states in the region. It also includes animations targeted for children and video news release footage with interviews from the U.S. Coast Guard, county sheriffs and park officials.

“Many of the Wisconsin beaches that received equipment don’t have lifeguards or safety equipment that’s available to the public,” said Clark. “Rescues are often dependent on the response time of emergency personnel. Having equipment at these beaches increases the chances for a successful rescue.”

The Be Current Smart campaign is led by the Michigan, Illinois-Indiana and Wisconsin Sea Grant programs in partnership with Minnesota and Ohio Sea Grant, and is funded by the National Oceanic and Atmospheric Administration’s Coastal Storms Program. Other partners include the National Weather Service, the Wisconsin Coastal Management Program, the Wisconsin Department of Natural Resources and the University of Wisconsin-Oshkosh.

Safety campaign partners supported the production of new beach sign templates, publications, curriculum, diagrams and descriptions of the types of dangerous currents. All materials are free and available for beach communities, park staff, educators and others and can be found on the Be Current Smart website: [currentsmart.org](http://currentsmart.org).

“Beachgoers can take simple steps to ensure a fun, safe day in the water,” said Brieby. “Parents have an important role in keeping a close watch on young children and making sure they wear life jackets.” —MEZ

Pictured above are Gene Clark; Sara Hudson, director of the City of Ashland Parks Department; and Todd Brieby. Photo by Marie Zhuikov





## A Long Trawl

At least one day each week since the beginning of February, Sea Grant's Titus Seilheimer has hopped aboard the mid-sized fishing boat *Peter Paul* and headed out onto the always beautiful and sometimes treacherous waters of Lake Michigan, there to trawl for whitefish.

No, he hasn't taken up fishing for a living.

He's counting bycatch rates.

Seilheimer's working with a Lake Michigan commercial fisherman on a study to determine whether using trawl nets to collect whitefish—a practice currently not allowed under state law—can be done effectively without adversely affecting key non-target species such as salmon, trout and walleye. The boat is trawling in a limited area expressly approved for trawling study by the Wisconsin Department of Natural Resources (DNR).

Commercial fishers are extremely interested in adding trawl nets to their tool arsenal. Currently, state law allows trawling only for smelt and limits whitefish harvest to gill and trap nets, a limitation that shortens their fishing season by several months each year. Net season now runs from April to October.

"With trawling, these fishers would be able to go out when they want to, when they need to," explained Seilheimer.

But first, the effects have to be carefully studied, and that's where Seilheimer comes in.

Among ocean fisheries, trawling can be considered controversial, as the nets occasionally destroy coral reefs and fish habitat. On the Great Lakes, the concerns have more to do with the impact on non-target fish species. Back in the 1980s, the state allowed commercial fisheries to trawl for alewife and smelt. Smelt is still allowed, but both types of trawling resulted in "substantial" bycatch of key fish species, particularly lake trout, said David Boyarski, the DNR's northern Lake Michigan fisheries supervisor.

"There was also a high mortality associated with that bycatch," he added.

The mortality was so high in fact, that in 1991, the DNR instituted a rule that required trawlers to

use a diverter attachment that redirected larger fish out of the net.

Seilheimer and Steven Kulpa, the Two Rivers-based fisherman Seilheimer is working with on this study, are acutely aware of the bycatch issue—it's why they're trying to measure and document it in relation to more modern trawl nets available today.

"Every time we have new fishing gear, it's important to gauge the impact," Seilheimer said.

So far, the only bycatch to make an appearance has been small numbers of lake trout and whitefish sized too small to qualify for commercial sale. Seilheimer has been tagging the trout to track the fish's survival rates after catch.

"The trout tend to do well coming out of the net," he said. "We've already spoken to other local fishers and sport anglers about being on the lookout for tagged fish."

Because whitefish tend to occupy easily identifiable depths in the waters of Lake Michigan, a significant part of the study involves trawling at variable targeted depths between 100 and 300-plus feet. In addition to counting bycatch, Seilheimer is also recording the water temperature, speed and distance of each trawl.

"It'll be a lot of data," he said.

The data capture is only the first step in the process of bringing whitefish trawling to the waters of Lake Michigan.

"This study doesn't commit us to any future action to allow trawling or to modify commercial fishing laws," noted the DNR's Boyarski. Any changes to commercial fishing rules would involve public hearings and the approvals of the state's Natural Resources Board.

But even if the study doesn't result in a policy change, it will still have been valuable from a scientific standpoint.

"We catch the fish, we count the fish," Seilheimer said. "These are real numbers."

Seilheimer will continue to trawl with the crew of the *Peter Paul* through the end of the year.—ARC

## Children Connect With the Outdoors Through Great Lakes Multicultural Earth Partnership

According to staff at the University of Wisconsin-Madison Arboretum, children are spending more time indoors in front of a screen and less time outside. This contributes to shaping children who are out of touch with the environment, science and their own communities.

To counteract this "nature deficit-disorder," the arboretum created the Great Lakes Multicultural Earth Partnership, which Sea Grant has helped fund for the past several years along with other organizations. For the past few summers, teams of teachers have attended institutes to learn how to use the Earth Partnership curriculum and create restoration projects that can involve students and citizen volunteers.

In northwest Wisconsin, the focus was on indigenous coastal education. In southeast Wisconsin the program built partnerships with Latino communities, schools and organizations. This summer,

more than 50 teachers, environmental educators, university students, faculty, natural resources professionals and citizens have been trained. Previous efforts involved more than 800 students in projects like water monitoring, installing rain gardens, beach cleanups, invasive species management and community art murals. The students also developed public outreach materials to inform citizens about ways to reduce stormwater impacts.

"Place-based education is a powerful way to connect learning with places that teachers and students interact with every day: their schools and surrounding communities," said Kathy Kline, Sea Grant education specialist. "Wisconsin Sea Grant is proud to support projects like the Great Lakes Multicultural Earth Partnership that show teachers how to engage their students in restoration projects that support the health of our Great Lakes ecosystem."



## Sea Grant Capitalizes on Fertile Ground (Water) for Limnology Learners

Limnology is the study of lakes, and the University of Wisconsin-Madison has long been credited as the birthplace of limnology. Limnology has also long been a source of fascination for learners of all ages. Each summer, Sea Grant capitalizes on both the interest in and the fertile ground (water) of limnology when it conducts a College for Kids course for middle-schoolers—for three weeks, with a new group of children each week. Then, there's the popular Grandparents University, pairing children and their grandparents for a week's "major."

Through the programs, Sea Grant educational staff members Kathy Kline and Anne Moser have a blast. They get learners out onto Lake Mendota for

water and lake-bottom sampling. In classrooms, they coordinate activities related to identifying freshwater fish and aquatic invasive species and driving remotely operated vehicles.

Program participants also have a blast. As Mary Possin, student services coordinator for the College of Engineering at UW-Madison, said, "Our participant evaluations for Grandparents University (GPU) were exceptional this year...I attribute much of this to the enthusiasm and really creative hands-on learning Kathy and Anne have brought to the program. We're lucky to have Wisconsin Sea Grant's involvement in GPU."

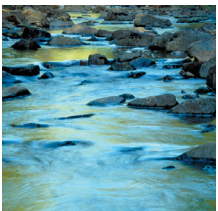




University of Wisconsin Aquatic Sciences Center  
1975 Willow Drive  
Madison, WI 53706-1177

# Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources



## CALENDAR OF EVENTS

**OCT. 21 – 24, 2015**  
**Midwest Environmental Education Conference**  
Madison, Wis.  
[meeconference.org](http://meeconference.org)

**OCT. 28 – 30, 2015**  
**Lake Michigan State of the Lake and Great Lakes Beach Association Conference**  
Acme, Mich.  
[1.usa.gov/1GYPxLI](http://1.usa.gov/1GYPxLI)

**NOV. 1 – 5, 2015**  
**Geological Society of America Annual Meeting**  
Baltimore  
[community.geosociety.org/gsa2015](http://community.geosociety.org/gsa2015)

**NOV. 4 – 6, 2015**  
**Wisconsin Association for Floodplain, Stormwater and Coastal Management Conference**  
Pewaukee, Wis.  
[wafscm.org/annual-conference](http://wafscm.org/annual-conference)

**NOV. 16 – 19, 2015**  
**2015 AWRA Annual Water Resources Conference**  
Denver  
[awra.org/meetings/Denver2015/](http://awra.org/meetings/Denver2015/)



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