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Bonnie Willison / Wisconsin Sea Grant

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Online shipwreck game educates players



pbswisconsineducation.org/emerald

A free online video game for children about a Great Lakes shipwreck is now available. "The Legend of the Lost Emerald" is a point-and-click adventure game designed for players grades 4-6. It was developed by the University of Wisconsin-Madison's Field Day Lab in partnership with Wisconsin Sea Grant, PBS Wisconsin Education and the Wisconsin Historical Society. Teacher fellows offered insights at every step of the game's development. Funding was provided by PBS Wisconsin Education with additional help from the Wisconsin Coastal Management Program and Sea Grant.



PBS Wisconsin Education

Players must use critical thinking and historical inquiry skills to find the wreck as they step into the shoes of Jules, a maritime archaeologist, with help from a cast of diverse family members. Players dive underwater to gather clues, build evidence and uncover the real treasure – stories of shipwrecks inspired by Great Lakes history. It takes two classroom sessions to complete (about two hours).

"The goal of the game is to connect students with the maritime history in their own state – to go beyond the story of the Titanic," said Anne Moser, senior special librarian and education coordinator for Wisconsin Sea Grant. "It includes topics like lake ecology, maritime archaeology, trade and commerce." —MEZ

“Introduced” podcast wins national award

The Association of Natural Resource Extension Professionals (ANREP) recently announced the winners of its 2022 national awards competition. Bonnie Willison, digital storyteller; Sydney Widell, a University of Wisconsin-Madison graduate student in freshwater and marines sciences and formerly an undergraduate employee of Sea Grant; Titus Seilheimer, fisheries specialist; and Tim Campbell, aquatic invasive species specialist, won a gold award for their work on the podcast series “Introduced.”

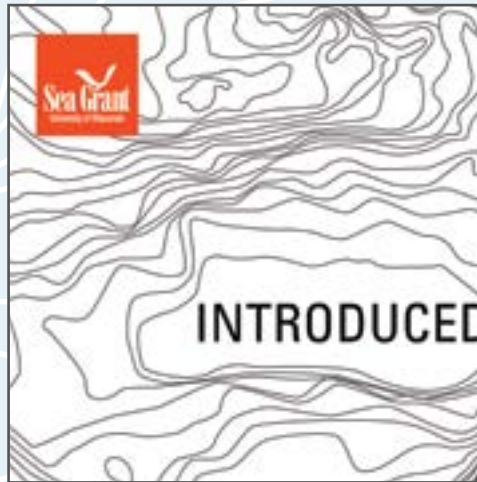
“Introduced” spans two seasons with 18 episodes that explore stories of aquatic invasive species in Wisconsin, like rusty crayfish, purple loosestrife and spiny waterfleas.

some AIS topics and highlight voices and stories that could help us understand the complexity of those issues,” Campbell said. He appears in seven episodes and provided overall consultation on the series.

Seilheimer, too, welcomed the opportunity to participate — offering advice on the podcast series’ direction and featuring in four episodes. “Podcasts are an innovative way to reach all kinds of audiences with the kind of prevention messages we want to share. Everyone can play a role in conserving our natural environments.”

Co-hosts Willison and Widell interviewed more than 60 people for the series. The guests included

Sydney Widell, left, and Bonnie Willison, creators and co-hosts of the “Introduced” podcast. For “Introduced” and other Sea Grant podcasts, go to seagrant.wisc.edu/audio.



“Creating this podcast was personally satisfying. It was the first time I’d done podcasting and the easy on-air rapport I had with Sydney made it all the more rewarding,” Willison said. “We learned a lot about the changes that invasive species bring to our cherished lakes, streams and wetlands, and we talked to many inspiring people who are devoted to protecting our waters.”


Willison also credits Campbell and Seilheimer for making the podcast so effective and educational.

“When I heard Bonnie was going to lend her considerable talents to a new podcast series and that series would focus on aquatic invasive species, I was excited for the opportunity to dive deeper into

resource managers, recreational fishers and researchers, as well as people from nongovernmental organizations and private businesses.

The ANREP awards honor natural resource programs and people. The organization is a national association for cooperative extension service professionals working in environmental education, fisheries, forestry, wood sciences, range, recreation, waste management, water, wildlife, energy and related disciplines at the county, area, state or national level.

Listen to the series at go.wisc.edu/91007i-MH



Christy Remucal on right, UW-Madison Department of Civil and Environmental Engineering, with Sarah Balgooyen, postdoctoral co-investigator.

Rivers Deliver PFAS to Great Lakes

The world's largest source of fresh water, the Great Lakes, provides drinking water to more than 40 million people in the U.S. and Canada. In the first study of its kind, researchers at the University of Wisconsin-Madison College of Engineering have demonstrated that tributary rivers feeding Lake Michigan play an important role in bringing the human-made group of chemicals known as per- and polyfluoroalkyl substances (PFAS) to the Great Lakes system.

Christy Remucal with the Department of Civil and Environmental Engineering and postdoctoral co-investigator Sarah Balgooyen quantified 10 PFAS chemicals known as perfluoroalkyl acids (PFAAs), in the water and sediment of 41 tributaries to Green Bay of Lake Michigan.

The study was published in the Feb. 10, 2022, edition of the [ACS ES&T Water Journal](#). It was funded by a grant from the Wisconsin Sea Grant College Program.

"Tributary PFAS loading to the Great Lakes is poorly understood," Remucal said. "The role of sediments

Our study is bringing some much-needed answers to all of the Great Lakes communities because it's an interconnected water system.



as a PFAS source or sink is also largely unknown. Our study is bringing some much-needed answers to not only the people who live around the bay of Green Bay, but also to all of the Great Lakes communities because it's an interconnected water system. These findings could also be extrapolated to understand the conditions surrounding thousands of other tributaries that flow into the five lakes."

PFAAs are found in common household items like cookware, cleaning agents and fabric treated with repellants, as well as in firefighting foams. In the study area, the Fox, Menominee and Peshtigo rivers contribute two-thirds of the total tributary PFAA loading to Green Bay despite their relatively low concentrations and despite the current regulatory focus on sites with high PFAA concentrations. The sources of the chemicals in the study tributaries are likely linked to a firefighting foam manufacturer, other industrial activity and airports, which use firefighting foam on runways.

In addition to the tributary discharge, the work showed that tributary sediments can contribute to

PFAA concentrations via a releasing process known as desorption. Contaminated riverbed sediments may act as a PFAA source even if water concentrations are reduced by pollution mitigation.

"Understandably, there is a heightened interest in the levels of PFAS in drinking water. PFAS have been linked to a number of ill human health effects, including cancer," Balgooyen said. "I'm grateful for the opportunity to share my research. It certainly leads to a clearer understanding and, hopefully, can provide some guidance on contamination cleanup."

The research will also inform the Wisconsin PFAS Action Council, of which Remucal is a member as the University of Wisconsin System representative. She is joined by representatives from 17 state agencies. The group has identified eight PFAS priority themes, including one on sampling and one on research and knowledge.

Online resources include a recorded talk about PFAS at go.wisc.edu/c39324 and a video about this project at go.wisc.edu/7d9p9c. —MH

Sarah Balgooyen in the lab. Remucal and Balgooyen tested the water and sediment of 41 tributaries to Green Bay, Lake Michigan.

Thinking Through the Lens of the Great Lakes

Teacher mentor program connects teachers and students

Any time you have a shared outdoor experience it helps build relationships and a positive sense of community.

Teachers with a passion for the Great Lakes are sharing their expertise with other teachers across the region in a program that benefits the educators and their students. The mentor program, organized by the Center for Great Lakes Literacy (CGLL), is funded through the Great Lakes Restoration Initiative.

Wisconsin is home to five teacher mentor/mentee pairs. They're organized by Anne Moser, senior special librarian and education coordinator for Wisconsin Sea Grant. She explained that this is the first formal year of the program and that it's growing.

"The teachers we chose for mentoring are really dynamic Great Lakes educators," Moser said. "They're so committed to bringing place-based education to their students and then sharing that love for Great Lakes literacy with either colleagues in their school or with their wider community."

The mentors were chosen from a pool of teachers who had participated in past CGLL programs. Moser explained these teachers are always, "thinking through the lens of the Great Lakes. Whatever they're teaching, they're drawing on their knowledge of the watershed."



The program kicked off in June 2021 with a two-day workshop where the mentors and mentees got to know each other better and plan which activities they wanted to work on. A check-in this past fall included a professional learning opportunity, featuring a presentation by Jackson Parr, the J. Philip Keillor Flood Resilience-Wisconsin Sea Grant Fellow who is working with communities on flooding issues. In January of 2022, the teachers were introduced to the Watershed Game, an interactive, educational tool that helps people understand the connection between land use and water quality.

One of the mentors is Kelly Koller, technology integration specialist at Bay View Middle School in Green Bay. She actually has two mentees: Mona Forbes, an eighth-grade science teacher, and Chandra Johnson, a special education teacher.

Koller first became involved in mentoring when she applied to one of the CGLL summer professional learning workshops aboard the Denis Sullivan sailing ship in 2019. That experience showed her the value of such relationships. For her current mentoring connection, she's working with Forbes and Johnson to provide their students with opportunities like raising brown trout in the school library and growing wild rice plants.

Koller works in the library and thought the fish would be a great addition. "We didn't have any pieces of student engagement that were living. Everything is books and decorations, and I thought fish would be an addition that would capture students' interest."

Koller organized the fish rearing through [Trout in the Classroom](#), a program offered by Trout Unlimited. By raising the fish from egg stage to adult, the students gain knowledge about the fish and the environment where they live. The goal is to release the trout into a local stream, under



the guidance of the Wisconsin Department of Natural Resources.

The wild rice project is being done in conjunction with the University of Wisconsin-Green Bay, which provided the seeds and equipment. The goal is to plant the rice in a wetland the university is working to restore.

Koller explained she did the heavy lifting to get the projects started so that the weight of organizing didn't all fall on the mentee teacher's shoulders, since they had enough challenges already teaching during a pandemic. To orient Johnson's students to the fish's environment, she organized a boat trip on Green Bay, Lake Michigan, through Hands on Deck, a local nonprofit.

"So, even before the students started putting together our trout tank and receiving the trout eggs, they were learning about the Great Lakes through being on one of them. Any time you have a shared outdoor experience it helps build relationships and a positive sense of community," Koller said.

After navigating two months of start-up challenges, Koller received the agency permissions needed to house the tank. Johnson's students set up the tank and then Forbes's students took over once the eggs arrived. Three middle schoolers have shown impressive dedication: Mercedes Bryfczynski, Sandra Thompson and Emily Jarmuskiewicz.

"They do all the water measurements on their own. They take the pH level, the ammonia level, they change out water daily. They've been just wonderful about the caretaking involved with the trout and seeing them grow," Koller said.

Despite a rough start one weekend after the automatic feeder malfunctioned and a third of the larval trout died, the students said the experience of caring for the fish has made them more interested in nature.

"I've been having a little bit more fun in science, learning about the fish," said Bryfczynski. She also

said that seeing the tank sparks interest from other students in the library. "We've had people come in and ask us questions about the fish, like how big they're going to get or how old they're going to live, and what we do with the tank."

Jarmuskiewicz said that learning about the fish's life cycle has sparked her interest in biology. Thompson has also enjoyed watching the fish grow under their care.

When asked if they are excited to release the fish into the wild, the girls all replied with a resounding, "Yes!"

"We hope that they'll be healthy because they grew up healthy with us, and that they'll stay healthy in the river once we release them," Bryfczynski said.

At the end of the school year, Moser said the mentor/mentees and their students will gather together for a student showcase. This will offer the students an opportunity to present their project and receive feedback from other students across Wisconsin and Minnesota. In summer, mentor/mentee pairs will be invited to their own summit where they can provide the CGLL network feedback about their experiences. The goal of both events is to build a community of educators passionate about Great Lakes literacy and to build a community of youth who will be future stewards of the Great Lakes watershed.

"It's been an exciting year, even as we have had to navigate the challenges of a global pandemic. To work with such passionate and resilient educators has been a gift," Moser said.

A new mentor/mentee cohort will be formed in the fall of 2022. Please contact Anne Moser at akmoser@aquawisc.edu if you are interested in learning more. — MEZ

A student at Bay View Middle School in Green Bay feeds young brown trout (opposite page). The trout live in their tank in the library of the middle school (top), and a student tends to the wild rice (bottom).





Making a Promising Soil Treatment for Nitrate Even Better

Applying biochar to vegetative treatment areas could reduce nitrate contamination by more than 40%.

Hardwood, left, sand corn stover pellet biochar.

Joe Sanford with the University of Wisconsin-Platteville has spent his academic career getting his hands dirty. The assistant professor of soil and crop science has been studying uses for biochar, a form of charcoal that's made by burning wood and plant byproducts (pine chips or dried corn plants) under low oxygen conditions.

For his new project, funded by the University of Wisconsin Water Resources Institute, Sanford is building on findings in scientific literature and his

own research in the field at the U.S. Dairy Forage Research Center at Prairie du Sac. He found that biochar, when used to amend the soil, offered a 40% reduction in the amount of nitrogen in water runoff from corn silage bunkers used on farms for storage. (The silage is used to feed animals during winter.) Farmers typically treat silage bunker runoff by letting it flow through strips of vegetation that promote infiltration into the soil. These are called vegetative treatment areas (VTA). The biochar is added to the soil of these VTAs. Sanford is studying ways to make this 40% reduction even better.

Nitrate is the most common pollutant in private wells in Wisconsin, with 10% of wells statewide reporting concentrations that exceed Environmental Protection Agency standards. The percentage of polluted wells rises threefold in highly agricultural parts of the state. Nitrate contamination in groundwater is a major concern in rural communities and poses a significant human health risk — it can cause blue baby syndrome (methemoglobinemia), for example.

Sanford found a farmer willing to help him with his two-year project, which is called “Assessment of biochar application to reduce nitrate leaching through agricultural vegetative treatment areas.” Whenever it rains, Sanford goes to the farm and collects some silage bunker runoff.

He brings it back to the lab and then applies the runoff to columns of soil 65 cm tall that have had biochar incorporated into them at different depths. Sanford and his team collect the leachate that runs through the fiberglass mesh at the bottom of the soil columns and analyze it for nitrogen concentration. He plans to apply runoff water to the soil columns every two weeks for a total of 60 weeks.

“Our idea when we began the project was how to apply biochar to the surface of these vegetative treatment systems so that farmers could just come along with some sort of tillage equipment to incorporate it into the soil and reseed the area,” Sanford said. “The different depths we’re looking at are actually different tillage equipment depths. You have a shallow tillage (15 cm) and then a deeper conventional tillage (30 cm).”

Another thing Sanford is looking at is whether the type of biomass used to make the biochar makes a difference. He’ll be comparing the use of biochar made from hardwood waste and corn waste (corn stover). He’ll also evaluate the nitrate leaching differences between biochar produced at high and low temperatures.

How long might the beneficial effects of biochar in the soil last? Sanford said biochar should work for “a considerable amount of time.” But he’d like to investigate that further in a different study. “Can we just reapply and re-till it in or do we need to remove the soil and bring in new material?”

Sanford said many farmers who have spent time and effort to install VTAs will be interested in the study’s results. The findings could also be applicable for other systems where nitrogen leachate causes concerns, such as septic systems. He also said it could possibly treat runoff laden with PFAS.

Planned outreach products for this project include a fact sheet and presentations. “The goal is to put together some material on paper that’s directed toward agricultural producers on how they could possibly use this and also to give some presentations to sustainability groups around the state on our results so that they have an idea of what their options are and what we’re up to,” Sanford said.—MEZ

Experimental soil columns (below). These 65-cm columns of soil have biochar incorporated at different depths.



Joe Sanford/UW-Platteville

Looking Forward to Coordinating CHAOS

Ever since she was a child, Sarah Brown has been interested in what makes people tick. She pursued that interest and intends to make good use of it in her role as a J. Philip Keillor Wisconsin Coastal Management-Sea Grant Fellow for Lake Superior.

“My dad was a wildlife biologist for the state of Illinois,” Brown said. “When he came home from work and had any complaints, it was never about natural resources. It was always about people. So, I always had an interest in why people do what they do. That led to my interest in the social sciences.”



CHAOS coordinator is the most awesome job title you can have.

Brown majored in psychology at Southern Illinois University Carbondale and then continued in a master’s program in human dimensions of natural resources at the University of Missouri. Her thesis was on motivations and perceptions held by Missouri landowners with conservation easements on their properties.

As graduation neared, she applied for a variety of jobs, but nothing seemed the right fit. She widened her search to include internships and fellowships because it seemed, “like a natural next step after grad school and into the workforce,” Brown said.

The one-year Keillor fellowship caught her eye for two reasons. “I felt like it gave me an opportunity to apply my social science skills to a natural resources issue by working with the CHAOS community of practice. Also, I’ve traveled many times with my

family to northern Wisconsin and Duluth. That was a big attractor.”

CHAOS stands for the [Coastal Hazards of Superior](#). It’s a group composed of local community leaders, managers, researchers and communicators who focus on issues affecting the Wisconsin and Minnesota coastlines of Lake Superior. These issues include erosion, shoreline planning, nutrient runoff pollution, flooding and community resilience.

“Being the CHAOS coordinator is the most awesome job title you can have!” Brown said. “I’m

hoping through this role I can fold in social science methodology to benefit the future progression of this community of practice, whether it’s finding out where it needs to go next or what it’s going to be next, or just figuring out what community members want. I also want experience working alongside a state agency and to improve my skills in meeting facilitation and project coordination.”

The state agency Brown will be working with is the Wisconsin Department of Administration’s Coastal Management Program along with Sea Grant, the Lake Superior National Estuarine Research Reserve (Reserve) and the University of Wisconsin-Madison’s Division of Extension. She is stationed in the Reserve’s office in Superior. You can email Brown at sarah.brown@wisconsin.gov – MEZ

Sarah Brown, CHAOS coordinator, this page. Opposite page, Lydia Salus, Sea Grant fellow, (top) and a house in Ozaukee County that is desperately in need of calming.

Bringing CALM to Communities Facing Coastal Hazards

Lydia Salus grew up about 20 miles from Lake Michigan, in a Wisconsin village graced with Mammoth Spring, where water seeps through cracks on top of the shallow aquifer that underlies much of Waukesha County.

Since her formative years, water has been a part of Salus' life. As an undergraduate, Salus worked on a project to facilitate fish passage through urban culverts. She got a master's degree in water resources management with a focus on hydrology from the University of Wisconsin-Madison with the intention of becoming a hydrologist devoted to ecological restoration.

Although that career in restoration shifted in 2018 when she signed on as an assistant to the Southeastern Wisconsin Coastal Resiliency Project, Salus remains tied to water. Right now, her connection is through an initiative to increase coastal resilience on Wisconsin's Lake Michigan shoreline.

The project builds on the previous one, which assisted people in Kenosha, Racine, Milwaukee and Ozaukee counties in responding to rising lake levels — offering information on how to stabilize bluffs, address erosion and protect infrastructure.

It was also notable for encouraging conversation and cooperation among the whole mix of lakefront property owners — between private property holders and municipalities, counties, state agencies and federal partners.

Termed Collaborative Action for Lake Michigan (CALM) Coastal Resilience, the new project



places Salus at Sea Grant. The Wisconsin Coastal Management Program and State Cartographer's Office are the other members of this three-way partnership that, according to Salus, increases capacity to reach and serve communities.

"The Southeastern Wisconsin Resiliency project was a really good start for taking a regional approach to addressing hazards. Hazards don't just go away," she said. "That earlier project was good at building momentum in those communities, so then we just wanted to expand that up the coast to other communities and share that momentum with them."

CALM is funded by what Salus termed "an exciting grant; a competitive grant for something called a project of special merit" from the National Oceanic and Atmospheric Administration and which was awarded to the Wisconsin Coastal Management Program. It will strive for three outcomes:

- Increasing collaboration across all stakeholders.
- Developing, revising or adopting local ordinances, plans or policies that are going to help build resilience in coastal communities.
- Fostering regional prioritization of hazards that need to be addressed so that when opportunities for collaborative action are available, community leaders are ready to capitalize.

CALM is a nearly \$250,000 18-month undertaking that kicked off in October 2021 and will conclude in March 2023, making it, as Salus said, "A quick turnaround, but we already have a good framework to build off of. I think it's a little bit easier to implement because we have something that we know worked (with the Southeastern Wisconsin Coastal Resiliency Project)."

More than 80 stakeholders attended the first, full network meeting in March. Presentations featured topics including coastal data needs, resiliency resources, infrastructure funding, upcoming trainings, and more, demonstrating the types of resources and opportunities Salus wants to share with the community over the next 12 months. Salus will continue to provide opportunities for Wisconsin Lake Michigan coastal communities to collaborate about coastal challenges and solutions, share case studies and tools..."



We want to expand... to other communities and share that momentum with them.

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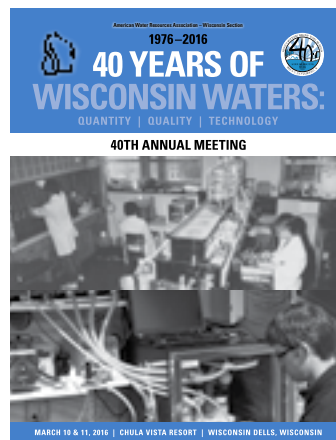
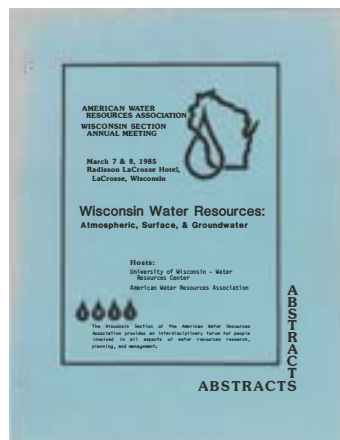
AWRA Proceedings Library Complete

As one of the longest running and most successful American Water Resources Association (AWRA) chapters in the country, the Wisconsin chapter has hosted an annual conference dating back to 1977. This collection of conference proceedings represents an important piece of Wisconsin’s water resources legacy. To preserve and improve discoverability for this important collection, Mike Parsen and Brad Gottschalk of the Wisconsin Geological and Natural History Survey collaborated with Anne Moser and Maya Reinfeldt of the Wisconsin Water Library to create a permanent digital repository. Housed in [MINDS@UW](https://minds.uw.edu), the collection now includes digital copies of the proceedings from 1978

to today in the online catalog at the University of Wisconsin-Madison. Thanks to longtime Wisconsin AWRA member Maureen Muldoon, who generously donated her collection of paper programs, the team filled in historical gaps where needed.

The team is still on the hunt for the 1977 (Stevens Point) and 1979 (Oshkosh) programs to complete this legacy project. Please notify Anne Moser (akmoser@aquawisc.edu) should you come across one or both of these.

Access the full collection:
go.wisc.edu/awra-wisconsin.



Bringing CALM to Communities Facing Coastal Hazards

>> *continued from page 11*

The types of folks involved are those housed in state and federal agencies, local and state elected officials, coastal engineers and landscape professionals, municipal technical staff members, people from academic institutions, sewerage districts and regional planning commissions.

Salus said she is feeling excited by the chance to bring together so many people through a process that embraces stakeholder-driven prioritization.

“I really like that term because we have built into the project the process of getting feedback from the communities. We are starting off with a survey of their needs, so we are then presenting tools and resources and bringing in speakers that are going to be helpful to them.”

Salus is also feeling personally energized by this initiative, saying she appreciates the “unique challenge that balances the human-environment interaction.

PFAS in Wisconsin: Setting a Research Agenda Report Now Available

In 2021, Sea Grant and the Water Resources Institute teamed up with the Wisconsin State Laboratory of Hygiene to host a virtual meeting of more than 50 state agency personnel and academics from the University of Wisconsin System. The main goal of the workshop was to identify knowledge gaps and energize opportunities for collaboration to move forward with a Wisconsin per- and polyfluoroalkyl substances (PFAS) research agenda. PFAS, man-made chemicals, are found in many products and used for a variety of purposes. PFAS can last in the environment for long periods of time and can pose health risks to people.

Amy Schultz, environment researcher for the University of Wisconsin-Madison-based Survey of the Health of Wisconsin, summed it up for most participants when she said points of collaboration “span all the worlds. And, collaboration is necessary.”

All the worlds she referred to were the four areas around which the workshop had been formatted:

- Environmental contamination by PFAS. PFAS have been found in surface and groundwater, rain, air, soil, fish and wildlife.

- How PFAS move and persist in the environment. There are 80 known sites of contamination in the state, but there are almost certainly more.
- How PFAS should be dealt with once discovered. There was uniform agreement among workshop attendees that there needs to be a way to sequester PFAS, but how? PFAS can also be removed from water and disposed of under proper conditions, but this can be expensive and may not be a long-term solution.
- The effects of PFAS on people. Studies have shown PFAS can increase cholesterol levels, decrease the efficacy of vaccines and — for pregnant women — cross the placenta. PFAS have been linked to cancer, osteoarthritis, ulcerative colitis and thyroid disease.

Gavin Dehnert, Sea Grant’s emerging contaminants scientist, organized the meeting and wrote a report based on the presentations and discussion. Find the report at go.wisc.edu/5w3989. Contact Dehnert at dehnert2@wisc.edu for further information. — MH



There are naturally occurring processes on the lake that wouldn’t necessarily cause issues if we didn’t have a built environment along the lake, if we didn’t have people living there.” She said she looks forward to the applied science that can address these coastal hazards that are certainly not going to disappear. Visit wicoastalresilience.org for more information. —MH

The CALM project builds on the Southeastern Wisconsin Resiliency project, expanding to include more communities.



Maadagindan!

Great Lakes and Ojibwe Culture Book Group for Young People

Less than 1% of children's books feature Native American or Indigenous characters, according to a 2021 Cooperative Children's Book Center study.

Wisconsin Water Librarian Anne Moser — partnering with Hannah Arbuckle and Jenny Van Sickle of the Great Lakes Indian Fish and Wildlife Commission ([GLIFWC](#)) and intern Morgan Coleman — created a book group for teachers, parents and librarians who want to seek out these books and share them with young readers.

The club is called Maadagindan! (Start Reading!) Literature for Young People About the Great Lakes and Ojibwe Culture; it meets monthly online and is open to anyone who wants to join.

The group has had four monthly book discussions, and the number of attendees has been growing steadily. The books discussed include "Growing Up Ojibwe," written cooperatively by GLIFWC staff members; "The Sacred Harvest: Ojibway Wild Rice Gathering," by Gordon Regguinti; "The Birchbark House," by Louise Erdrich; and "The Water Walker," by Joanne Robertson. Each month's discussion included an Ojibwe guest who shared wisdom and stories based on the theme of the book. Past guests include Hannah Arbuckle, Kathleen Smith, Michael Waasegiizhig Price and Joanne Robertson.

Wisconsin Water Library summer 2022 intern Maya Reinfeldt is planning a fall season of the book club. She hopes to build upon the work done by Moser and Coleman by locating and bringing awareness to additional children's books by Anishinaabe authors, focusing on relevant themes such as water protection, climate change, and the value and protection of Indigenous knowledge. Reinfeldt hopes that through the book club's outreach, more classrooms will take steps to respectfully incorporate Indigenous voices, stories and teachings in the curriculum, teaching children who already love to read how to appreciate another invaluable perspective.

She said, "I hope the book club can provide not only a space for non-Indigenous people to learn from and about Anishinaabe authors, but also a safe and comfortable forum for Anishinaabe (and other Indigenous) people, be they guest speakers or attendees, to explore their own cultural backgrounds within the context of children's literature."

For information and discussion questions for the books the group has read or to sign up for the fall sessions, visit the website at go.wisc.edu/Maadagindan.



Dive Deep Into Great Lakes Shipwrecks

The most famous shipwreck in the world is undoubtedly the RMS Titanic, memorialized in film and literature. But stories of the shipwrecks in our freshwater system are equally captivating. Explore Wisconsin's rich maritime history by diving into these selected reads about a few of the shipwrecks found in the waters of the Great Lakes. Our history is filled with adventure and catastrophe, weather phenomena and phenomenal characters.

29 Missing: The True and Tragic Story of the Disappearance of the SS Edmund Fitzgerald by Andrew Kantar. East Lansing, Mich.: Lancaster: Michigan State University Press; Gazelle, 2000.

Door Peninsula Shipwrecks by Jon Paul Van Harpen. Charleston, SC: Arcadia, 2006.

The Edmund Fitzgerald: The Song of the Bell by Kathy-Jo Wargin and Gisbert Van Frankenhuyzen. Ann Arbor: Sleeping Bear Press, 2015.

The Historic Christmas Tree Ship: a True Story of Faith, Hope and Love by Rochelle Pennington. Cleveland, Tenn.: Pathways Press, 2004.

Many a Midnight Ship: True Stories of Great Lakes Shipwrecks by Mark Bourrie. Toronto: Key Porter Books, 2005.

Mighty Fitz: the Sinking of the Edmund Fitzgerald by Michael Schumacher. Minneapolis: University of Minnesota Press, 2012.

Shipwrecks of the Great Lakes: Tales of Courage — and Cowardice by Cheryl MacDonald. Toronto: James Lorimer & Company Ltd., Publishers, 2011.

Stories from the Wreckage: a Great Lakes Maritime History Inspired by Shipwrecks by John Odin Jensen. Madison, Wis.: Wisconsin Historical Society Press, 2019.

Don't miss the wisconsinshipwrecks.org website.

Anyone in Wisconsin can borrow the above books and more. Just email askwater@aqu.wisc.edu.

When we took the reading from the **DO meter**, we found the water was **hypoxic**.



Limit Jargon

Our tests indicated that the water was hypoxic, meaning it had very low oxygen.



New science communication toolkit available

Looking for help communicating about science to a nonscientist audience? A new publication is available to help students and researchers. Written by Amy Lentz, a graduate of the University of Wisconsin-Milwaukee's School of Freshwater Sciences professional master's program, and edited by Wisconsin Sea Grant Social Science Outreach Specialist Deidre Peroff, this free, downloadable "Science Communications Toolkit" offers tips to help make science more understandable to audiences such as elected officials, possible employers, grade-school students and reporters.

In addition, the publication contains suggestions for developing effective graphs, PowerPoint slides and social media messages. Funding was provided by Wisconsin Sea Grant in partnership with the University of Wisconsin-Green Bay in Manitowoc and the Southeastern Wisconsin Watersheds Trust Inc.

Take a look at go.wisc.edu/s9lk7m and make your science stand out.—MEZ

OUTREACH



ASC

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

Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and Water Resources Institutes

Two Years, 12 Research Projects, Dozens of Outreach Initiatives

It's a small package—a publication sized 7 x 7—but it packs in a lot of information. The 2022-24 Project and People Directory includes details about the 12 Sea Grant research projects to take place during these two years, as well as the 49 outreach initiatives. Download a copy at go.wisc.edu/4v31o1 or get in touch, (608) 262-0905, and we will mail you a hard copy.



Sara Stathas

Check Online for Calendar Updates

Uncertainty surrounding transmission of COVID-19 due to variants means many large water-science meetings remain in flux.

Check the websites of organizations you are interested in for updates regarding scheduling. For the latest on Sea Grant and University of Wisconsin Water Resources Institute functions and other news, visit seagrant.wisc.edu or wri.wisc.edu or follow our social media channels.