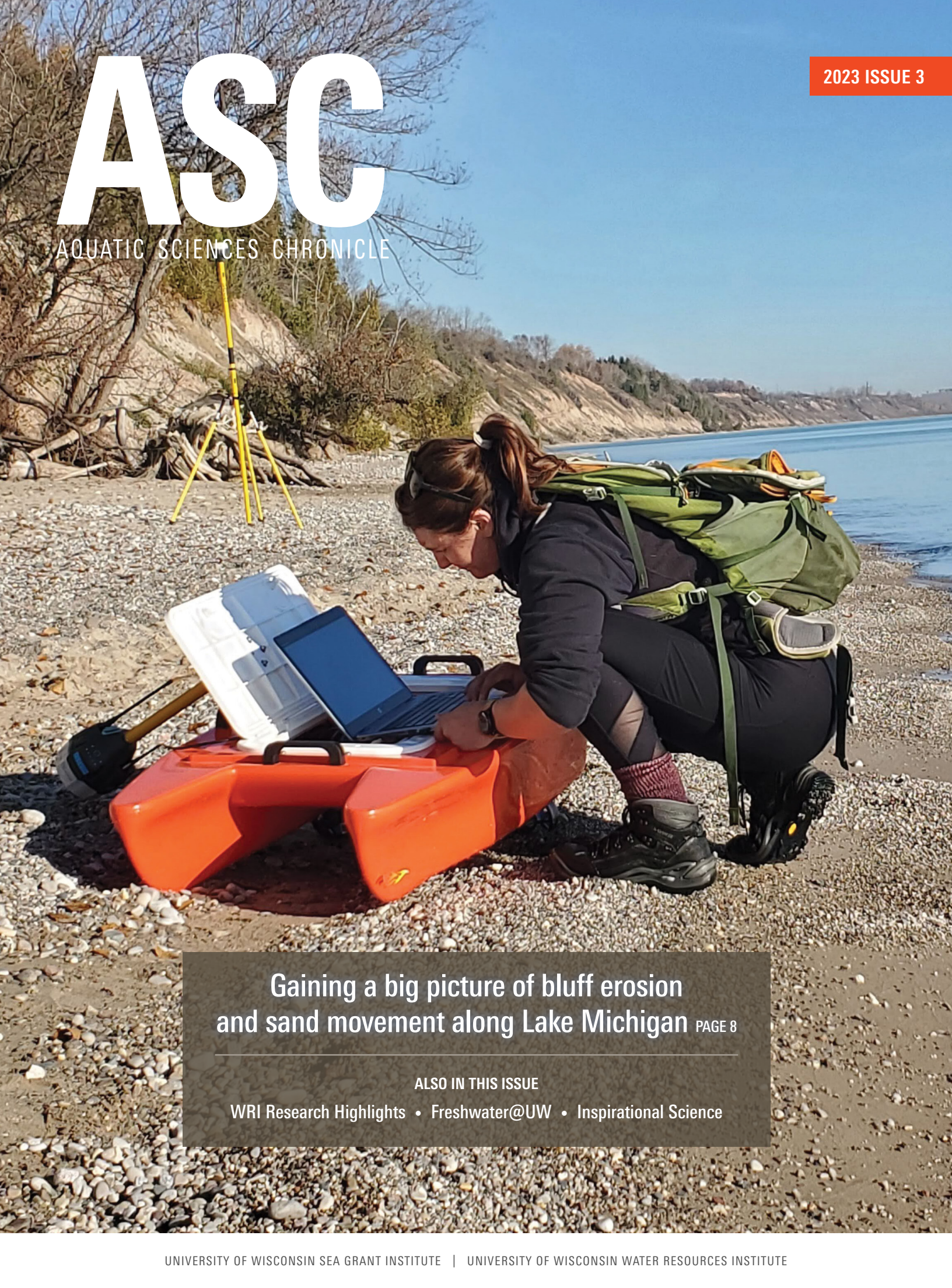


# ASC

AQUATIC SCIENCES CHRONICLE

2023 ISSUE 3



## Gaining a big picture of bluff erosion and sand movement along Lake Michigan

PAGE 8

ALSO IN THIS ISSUE

WRI Research Highlights • Freshwater@UW • Inspirational Science



## Aquatic Sciences Chronicle

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

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ON THE COVER: Chelsea Volpano uses a remote-controlled boat to measure lakebed elevation. She also conducts surveys using a GPS-connected staff. Image from Chelsea Volpano

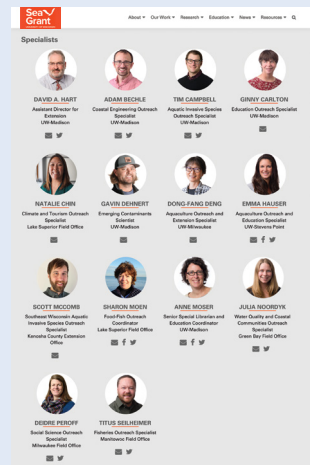
## FEATURED FACES

## About Us

By MOIRA HARRINGTON

Click on over to the Wisconsin Sea Grant staff directory at [go.wisc.edu/0989hn](http://go.wisc.edu/0989hn) to learn more about the people who make the program tick. It offers the most convenient portal to the individuals who, for example, could answer questions about research competitions, grant awards or any of the 12 outreach specialties our staff undertakes.

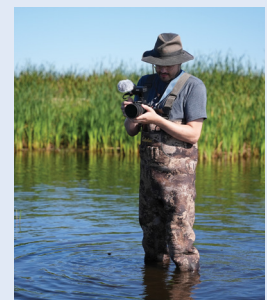
About those outreach professionals, the subpages for these varied and talented people outline their education, publications, contact information and more, including brief videos. Each video is a variation on the theme: what I do and why I love what I do.



Scott McComb meeting with lakefront property owners involved in a lake monitoring program. Image by Bonnie Willison, Wisconsin Sea Grant

One of the more recent videos ([go.wisc.edu/366dsx](http://go.wisc.edu/366dsx)) was produced by a summer outreach scholar, Jeremy Van Mill, who worked with the staff videographer on a profile of Aquatic Invasive Species Specialist Scott McComb. Van Mill also composed the music that accompanies gorgeous aerial shots of the Wisconsin River, which are interspersed with montages of McComb speaking with homeowners and students to educate on ways to prevent the spread of aquatic species. As McComb says in the video, he wants to engage people so they can "take action to protect something that they love," local lakes and rivers.

Although specific to aquatic invasive species, McComb's sentiment is similar to the passion all Sea Grant staff feel for their work and the contributions it makes to understanding and protecting coastal assets. ■



Jeremy Van Mill, summer outreach scholar, Wisconsin Sea Grant



### SUBSCRIBE TO THE WISCONSIN SEA GRANT YOUTUBE CHANNEL

Stay up to date with new videos about the program's research, outreach and education. [youtube.com/@SGIVideo](http://youtube.com/@SGIVideo)



Margaret Ellis at the 2023 Wequiock Creek Tobacco Blessing. Image by Daniel Meinhardt

## Margaret Ellis: Bringing a voice back to the land

By MARIE ZHUIKOV

Margaret Ellis is the latest person to fill the First Nations Graduate Assistantship with Wisconsin Sea Grant and the University of Wisconsin-Green Bay's Cofrin Center for Biodiversity. Ellis has all the qualifications that look good on paper, plus others that are just as meaningful.

Ellis has a master's in global Indigenous nations studies with an environmental focus from the University of Kansas and is working toward a Ph.D. in education at UW-Green Bay in First Nations entrepreneurial and small business operations.

*"I have the skills; I have the knowledge. My master's degree was years ago, but you know, I've continued to live my life in a certain way that reflects a responsibility to earth and water," Ellis said.*



Margaret Ellis handing off a gift basket to Stephanie Dodge, the former First Nations graduate assistant, at the 2023 Wequiock Creek Tobacco Blessing. Image by Daniel Meinhardt

She also has connections to the Wequiock Creek Natural Area, a 76-acre property with forests, wetlands and prairie she will work on along the lower bay shore area of Green Bay. The area is being restored and is culturally significant to the Oneida, Potawatomi, Ho-Chunk and Menominee nations. Ellis, a member of the Oneida Nation, has been visiting Wequiock Creek since she was a child.

"It was a free place to go and it was beautiful," she said. "There's a little waterfall there and so my family would always go there to picnic or just walk around. I was excited to find that connection to the project. I want to bring a voice back to that land and reconnect those nations with the Wequiock area."

In addition to continuing the tradition of organizing a spring tobacco blessing ([go.wisc.edu/b7gq78](https://go.wisc.edu/b7gq78)), Ellis will be helping the Cofrin Center develop interpretive signage and plant signage featuring Indigenous viewpoints and language. "It's really about supporting restoration efforts for the natural area and ensuring that the Indigenous knowledge and voice are represented by all the nations that once used the land," she said.

In between her degrees, Ellis co-founded Kenco Tribal Marketing Initiative, a full-service marketing and procurement agency serving tribal businesses, plus she owns Mirax, LLC, an apparel business for nonprofits and Native nations. For her Ph.D. dissertation research, she is building off this to create a small business model that is based on the Oneida Thanksgiving Address ([youtu.be/Olie1XDMV1o](https://youtu.be/Olie1XDMV1o)). Ellis explained that the address gives thanks to all the elements that are on Earth and in the cosmos – water, the sun, plants and the animals.



Margaret Ellis,  
First Nations  
graduate assistant,  
Wisconsin Sea Grant

*continued on page 15*



# WRI Research Highlights

By MOIRA HARRINGTON

On July 1, the University of Wisconsin Water Resources Institute provided funds for three new projects that will conclude at the end of June 2025. Two projects that kicked off last year are ongoing.



## **Risk From Pathogens and Exposure to Antibiotic Resistance Genes in Private Wells in Southwest Wisconsin** [NEW](#)

**Maureen Muldoon**, University of Wisconsin–Madison

Here are things that are true about the southwestern Wisconsin counties of Lafayette, Grant and Iowa: they are predominantly rural, people living there mostly get their drinking water from private wells and the water sources lie under fractured rock, which means septic systems and agricultural practices can more easily contaminate the water supply. This research team has recent findings of viral, bacterial and protozoan pathogens in 66 of the 138 private wells in the area, but the health risk associated with this contamination is unknown. That's in keeping with the broader lack of knowledge about the health risks associated with private well water. So, this project has three objectives: 1) quantify the health risks associated with 10 pathogens detected in wells, 2) evaluate well construction and geologic factors for pathogen contamination and 3) assess antibiotic resistance genes' co-occurrence with human and livestock fecal contamination.



## **An Experimental Investigation on the Leaching of Per- and Polyfluoroalkyl Substances (PFAS) From Contaminated Soil** [NEW](#)

**Shangping Xu**, University of Wisconsin-Milwaukee

The majority of people in Wisconsin get their drinking water from groundwater. This project will attempt to build an understanding of how what are known as “forever chemicals,” per- and polyfluoroalkyl substances (PFAS), might move through soil and into groundwater drinking water sources. The research team will collect soil core samples from several Wisconsin locations, including samples based on factors like soil type, properties and PFAS contamination history. They will apply collected rainwater to the soil cores at rates simulating natural conditions. The rainwater flow patterns will be monitored, and leachate will be collected to measure its volume and its PFAS concentrations. If different transport behavior of PFAS within soil cores collected from different sites is observed, the comparison of the soil physicochemical properties and hydrological patterns will provide clues to the key factors that control PFAS mobility within the vadose zone (where the land and the aquifer meet). This work may also yield knowledge of “high risk” and currently overlooked PFAS areas.





Find a wealth of information on more than 35 years of previous research projects and their findings at [wri.wisc.edu](http://wri.wisc.edu).

As part of a WRI-funded project, UW–Madison Professor Steve Loheide and Ph.D. student Eric Kastelic are studying groundwater flooding in Dane County at Crystal, Fish and Mud lakes. Image by Bonnie Willison, Wisconsin Sea Grant



## Long-Term Threat of Geogenic Contaminants to Water Quality and Quantity in the Midwestern Cambrian Ordovician Aquifer System [NEW](#)

**Matt Ginder-Vogel**, University of Wisconsin–Madison

The Cambrian Ordovician Aquifer System underlies most of Wisconsin. It's a system with naturally occurring contaminants—uranium, radium, arsenic and manganese. This project seeks to understand the sources and temporal trends of these contaminants because their variations complicate municipal water system management. The research team will identify six study sites, obtain well cuttings and/or core materials from the sites, quantify the presence and prevalence of potential contaminants and then construct models of how the contaminants move in the system. This will help water managers build and manage wells in a way that prevents water users from being exposed to contaminants.



## Aligning the Wisconsin Idea on Water: Interpreting Public Perspectives and Values

**Michael Cardiff**, University of Wisconsin–Madison

This project is documenting rural perspectives (attitudes, perception and values) related to groundwater issues and the variability of these perspectives within the state through “Wisconsin’s Waters Survey” — a community-sourced public survey to be delivered to a range of rural communities. Rural land covers most of the state, overlying the majority of groundwater, and the range of issues that may be important to the rural public is vast, from quality concerns such as nitrate and microbial contamination, to quantity concerns that include agricultural irrigation needs and impacts of groundwater to springs and streamflows.



## Biomanipulation of Groundwater Flooding

**Steve Loheide**, University of Wisconsin–Madison

This project is examining the causes of groundwater flooding, which leads to the loss of farmland and permanent inundation of homes. Such flooding can happen when extremely flat, internally or poorly drained landscapes get hit with a quantity of rain that doesn't otherwise drain away, infiltrate the soil without flooding or dissipate through the atmosphere. The research team is examining Dane and Columbia counties' flood records from the 1930s to the present to identify flood causes and how such factors may have changed through time. ■





# Freshwater@UW

Summer Research Opportunities Program

Left: Some of the summer research scholars gather near the water. Image by Jim Hurley, Wisconsin Sea Grant

Right: Sofia Mota Cichy at work in Christine Remucal's UW–Madison lab. Image by Jeremy Van Mill, Wisconsin Sea Grant

## What they did over their summer vacation

By MOIRA HARRINGTON

When summer stretches before many college undergraduates, they make plans: Spend time outdoors. Connect with friends. Catch up on screen time.

For the 31 undergraduates participating in the 2023 Freshwater@UW Summer Research Scholars Program, those plans were the same, with slight alterations. The time outdoors was spent collecting field samples from a body of water. The friends are new ones—made from the pool of program participants who hail from California to Alabama from Virginia to Wisconsin, and points in between. The screen time wasn't about beating "The Legend of Zelda: Tears of the Kingdom," but instead entering findings into a larger dataset to further aquatic science projects.

"I looked at many summer REU (research experiences for undergraduates) opportunities," Sofia Mota Cichy, chemistry major from the University of Michigan, said. "This one at Madison had the most in water chemistry and that's what I am interested in. I've never worked in a chemistry lab before and it's even better that it is an aquatic one." Mota Cichy was part of University of Wisconsin–Madison's Christine Remucal's lab studying magnesium oxide.

A second young woman also expressed her attraction to this opportunity because of its emphasis on water. Plus, said Jessica Alcorn a student at Northwest Missouri State, "I want to go to graduate school here in Madison." She worked under UW–Madison's Matt Ginder-Vogel, who does both surface and groundwater research.

These springboards from research to a new path in life were celebrated by an enthusiastic Marissa Jablonski at the orientation session for the students.

"Life will form you without you trying. You're on your way. You've shown up. You're leaning in."

Jablonski is the executive director of the Freshwater Collaborative of Wisconsin ([freshwater.wisc.edu](https://freshwater.wisc.edu)), one of the funding entities for the summer program, about which, Sea Grant Director Jim Hurley said, "It's been really positive to be able to expand our program because of support from the Freshwater Collaborative. Last year, we were a fledgling program of nine students." Hurley secured a nearly \$358,300 grant from the collaborative, resulting in this year's larger cohort.

No matter the size of the group, though, Hurley said the goal remains unchanged,

"The overall goal is to provide immersive student research experiences to enhance workforce development skills and allow undergraduates to consider the option of graduate studies in Wisconsin. Research experience as an undergraduate is an important component of a successful application for graduate school. In the job market, it also sets apart recent undergraduates who have addressed the changing needs of water-related fields."

*continued on page 11*



# Underrepresented groups in nature

By INDIA-BLEU NIEHOFF



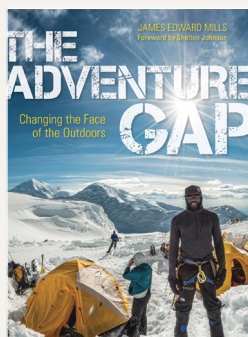
India-Bleu Niehoff, summer outreach scholar, Wisconsin Water Library

Access to nature is something that should be readily and freely available to all individuals. However, BIPOC and low-income individuals and communities have historically been restricted from accessing these resources and spaces. This is the result of a long history of discrimination in outdoor spaces, from the racist beliefs and actions of those spearheading conservation movements to the unspoken (but enforced) expectations of who is not only allowed but encouraged to spend time in nature. This history, and its implications, cannot (and shouldn't) be reduced to a few paragraphs or even a few resources, but here are a few places to start.

For the complete (and expanding) list of books, online resources and organizations, visit the Wisconsin Water Library blog: [go.wisc.edu/7qj972](http://go.wisc.edu/7qj972).

James Edward Mills' "The Adventure Gap" (right) tells the story of the first all-African American team to attempt to climb Mt. Denali.

Climbers at the 14,000-foot camp (below). Left to right, top row: Billy Long, Scott Briscoe, Tyrhee Moore, Stephen Shobe, Stephen Deberry, Ryan Mitchel. Bottom row: Erica Wynn, Rosemary Saal, Adina Scott. Image by Hudson Henry



## BOOKS

**The Adventure Gap: Changing the Face of the Outdoors** by James Edward Mills. Seattle: Mountaineers Books, 2014.

**Rooted in the Earth: Reclaiming the African American Environmental Heritage** by Dianne D. Glave. Chicago: Lawrence Hill Books, 2010.

**Black Faces, White Spaces: Reimagining the Relationship of African Americans to the Great Outdoors** by Carolyn Finney. Chapel Hill, North Carolina: The University of North Carolina Press, 2014.

## ONLINE RESOURCES

**Underrepresented groups in nature, specifically national parks** [daily.jstor.org/national-parks-are-for-everyone](http://daily.jstor.org/national-parks-are-for-everyone)

**Racial and economic disparities in access to nature** [americanprogress.org/article/the-nature-gap](http://americanprogress.org/article/the-nature-gap)

**Underrepresentation of ethnic groups in the fields of ecology and evolutionary biology** [link.springer.com/article/10.1007/s11218-019-09538-x](http://link.springer.com/article/10.1007/s11218-019-09538-x)

## ORGANIZATIONS

### Access Ability Wisconsin

Provides mobility devices to help Wisconsinites access nature. [accessabilitywi.org](http://accessabilitywi.org)

### Pride Outside

Dedicated to increasing the LGBTQ+ community's access to nature and the outdoors. [prideoutside.net](http://prideoutside.net)

### Latino Outdoors

Working to increase the representation of Latino communities in environmental spaces and conservation efforts. [latinooutdoors.org](http://latinooutdoors.org)

### Outdoor Afro

Provides resources and opportunities to encourage and support Black people not only engaging in nature but also taking a leadership role. [outdoorafro.org](http://outdoorafro.org)

### The BIPOC Birding Club of Wisconsin

Provides a community for BIPOC Wisconsin birders. [bipocbirdingclub.org](http://bipocbirdingclub.org)



Anyone in Wisconsin can borrow the books.  
Email [askwater@aqu.wisc.edu](mailto:askwater@aqu.wisc.edu).





## WISCONSIN SEA GRANT COVER STORY

# Gaining a big picture of bluff erosion and sand movement along Lake Michigan

By MARIE ZHUIKOV



Lucas Zoet, associate professor, University of Wisconsin-Madison Department of Geoscience

High water levels in Lake Michigan since 2013 have caused erosion rates that are faster than usual, especially in 2020, when lake levels set records. This has created an urgent need to know more about erosion processes along and in the lake.

Lucas Zoet with the University of Wisconsin-Madison Department of Geoscience and his research team are looking at bluff erosion and sediment movement at two Wisconsin sites along Lake Michigan in a holistic way to better understand erosion rates and where the eroding sediment goes. This information will help guide shore protection and bluff stabilization processes and preserve beaches for recreation.

The two study sites are located just south of Port Washington and at Point Beach State Forest, which is farther north, near Two Rivers. The researchers chose those sites because they offer good representations of different erosion processes. The Port Washington site sits on a bluff; the Point Beach State Forest site is composed of sand dunes.

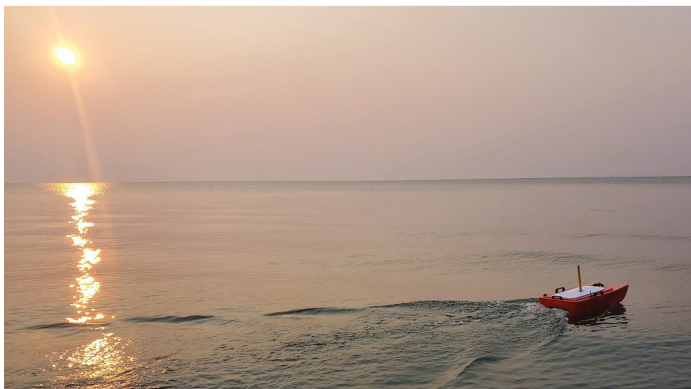
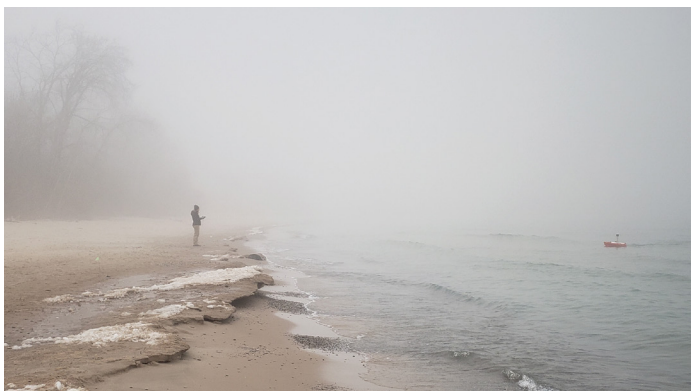
"The processes on these sites can be applied all over the place in Wisconsin," Zoet said. "Lots of the bluffs we have are generally similar to those at the Port Washington site, composed of a mix of glacial tills and various lake deposits that are interbedded.

So just understanding these processes at a base level, they should be generally applicable to more or less everywhere."

The project's holistic approach is unique. "The real strength of this project is that it doesn't break the whole system up into little chunks, like we study this part and then we don't know how it works because it's in isolation from this other part. Instead, we're trying to look at the whole continuous system, from what's happening onshore, to what's happening on the beach, to what's happening in the nearshore over multiple years. We can study this on a representative timescale. Not just in a week or a month, but over seasons, which we know is such a big player in the Great Lakes region," Zoet said.

Compared to the well-studied processes that happen on marine coastlines, winter is the season that makes erosion issues in the Great Lakes distinctive. Zoet said that cold weather impacts erosion differently.





Opposite: Still image from a drone video of a large landslide taken by Collin Roland, one of Zoet's graduate students. Watch drone video at [go.wisc.edu/an40rx](https://go.wisc.edu/an40rx).

Top left: The research team used a remote-controlled boat to measure the elevation of the lakebed along Lake Michigan. Image by Chelsea Volpano

Bottom left: The remote-controlled boat at work. Image by J. Elmo Rawling

Right: Chelsea Volpano with the research boat. She also conducts wading surveys using a GPS-connected staff. Image from Chelsea Volpano

"We have this season where the bluffs freeze solid, the shore ice forms — all these different components that drastically alter sediment transport. You don't see that if you're looking at beaches in North Carolina or Oregon," Zoet said.

To study the onshore section, Zoet, J. Elmo Rawling with the Wisconsin Geological and Natural History Survey and Ph.D. student Chelsea Volpano use drones and trail cams to gather data. To study the beach, Volpano conducts wading surveys. For these, Zoet said Volpano carries a staff with a GPS unit on it to measure lakebed elevation.

"She walks out into the water up to about her waist, about a meter deep and just does that over and over. So, with that, she can connect the onshore component to the offshore component for this continuous map that's called topobathy," Zoet said. This type of field work is uncommon. "She might be one of the only people to do these wading surveys in near-freezing waters, repeatedly throughout the years," Zoet added.

To study the nearshore area, the team uses a medium-sized remote-controlled boat that contains an instrument that measures the elevation of the lakebed for a full 3D map of the system. By repeating these measurements over time, the team can assess how the lakebed is changing and where the sediment is going.

One aspect of communicating the project involves Great Lakes Quests, [go.wisc.edu/gf62t3](https://go.wisc.edu/gf62t3). These are story maps compiled by Justin Hougham, UW–Madison,

and Sea Grant. The Port Washington site ([go.wisc.edu/297c55](https://go.wisc.edu/297c55)) is already part of the Quest database, but the Point Beach State Forest isn't, and will be added.

The project will also be communicated through public workshops for educators and property owners along Lake Michigan who are concerned about coastal erosion. "We'll do a walk of the terrain with them and we'll probably bring a couple of the instruments we use, like the drone and the remote-controlled boat," Zoet said. The first workshop is planned for September 2024.

Zoet has a long-standing working relationship with the College of Menominee Nation in Wisconsin. He's currently helping design the college's new geoscience program. Faculty members at the college plan to recommend students who could help work on the story maps for the project and computer mapping.

Summing up this multifaceted project, Zoet said, "In the end, I think we'll learn a lot about the processes, but we'll also learn a lot about how to better advise coastal managers, county managers and parks managers." ■

LISTEN TO THIS STORY 



Wisconsin Water News  
Episode 49  
The Big Picture  
on Bluff Erosion  
Along Lake Michigan  
[go.wisc.edu/hb4016](https://go.wisc.edu/hb4016)





**Deidre Peroff**  
social science  
outreach specialist,  
Wisconsin Sea Grant

## Milwaukee marine debris prevention program to expand

By MOIRA HARRINGTON | Images by BONNIE WILLISON

Wisconsin Sea Grant's successful marine debris prevention project in Milwaukee is continuing and will build on its success to spark similar awareness and action in a fellow Great Lakes city, Cleveland.

Marine debris is an increasing global problem that causes negative impacts in oceans, the Great Lakes and other waterways. Nearly 22 million pounds of plastics enter the Great Lakes each year, according to a Rochester Institute of Technology study.

In Milwaukee, this pollution affects Lake Michigan and local watersheds, which serve as a source of drinking water, offer recreation for residents and support ecosystems for wildlife and fish. With plastic pollution on the rise, the Lake Michigan freshwater ecosystem and the people surrounding it are at risk of negative health impacts that can be mitigated by increasing awareness of plastic pollution through youth education, actionable science and civic action. Similarly, plastic pollution is a problem in Lake Erie's ecosystem and for those who live, work and recreate in Cleveland.

In 2021, Wisconsin Sea Grant joined forces with Milwaukee Riverkeeper, a key player in an initiative called Plastic-Free MKE, to coordinate Milwaukee youth to lead civic engagement projects on how to reduce single-use plastics in their schools. As part of an initial grant received from the National Sea Grant Office's Marine Debris program, the groups created a plastics audit, shared a plastics education toolkit about how plastics affect water quality and human health and provided resources to students and teachers on how they can reduce plastic pollution in their homes and schools.

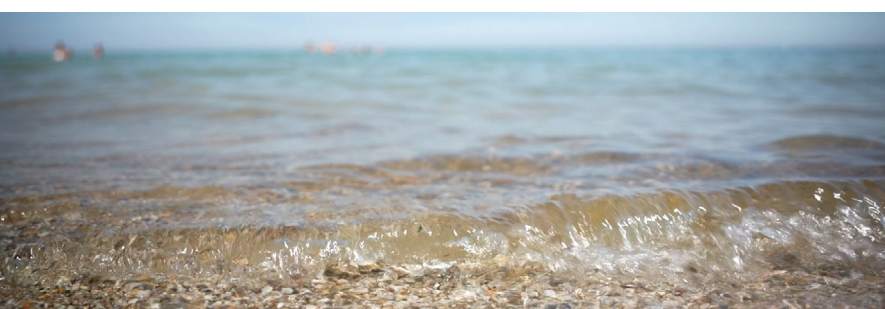
"We're excited to see Plastic-Free MKE be a model for other cities that have great intentions towards reducing single-use plastics but needed some support to be more organized to build a local coalition in their city," said Deidre Peroff, Wisconsin Sea Grant social scientist. "I look forward to continuing collaborating on this initiative in Milwaukee as well. We plan to continue our partnership with Milwaukee Public Schools to get more plastics education into classrooms and provide space for students to lead the effort."

Peroff said she and Milwaukee Riverkeeper will share their success from Plastic-Free MKE with businesses and individuals in Cleveland to encourage the reduction of single-use plastics, which ultimately protects the waters, wildlife and people's health.

This project was competitively selected. It was part of a competition through two opportunities supported by the federal Bipartisan Infrastructure Law and leveraging funds from the Inflation Reduction Act: The Marine Debris Challenge Competition and The Marine Debris Communication Action Coalitions. The laws are infusing a total of \$27 million nationwide, administered through the National Oceanic and Atmospheric Administration, to marine debris education, prevention, cleanup and research initiatives. In addition to the project in Wisconsin, another 18 community-based projects are being funded, along with 10 research projects. The Wisconsin project is funded at \$300,000 for two years. ■

Top: Milwaukee skyline.

Below: Lake Michigan shoreline.







Summer research scholar Avery Leigh takes water samples. Image by Jeremy Van Mill, Wisconsin Sea Grant

## What they did over their summer vacation

Expanding the number of participating students is one thing, another is the broadened involvement from professors, graduate students and others at organizations that acted as mentors for the students. There were 48 in all, including people on University of Wisconsin System campuses in Eau Claire, Green Bay, La Crosse, Madison, Milwaukee and Oshkosh. Also providing formative experiences were mentors from the U.S. Geological Survey, the Lake Superior National Estuarine Research Reserve, Wisconsin Shipwreck Coast National Marine Sanctuary and Wisconsin Maritime Museum.

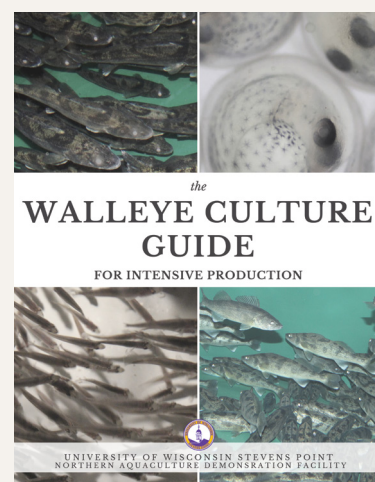
In application materials, the students expressed interest in pursuing research into topics such as pollution, climate change, molecular structures of water, public health and more. While the students worked across the state at labs and field sites, they had a standing invitation to gather each Thursday virtually — and in-person if they were in Madison — for weekly professional development sessions on topics like science communication, navigating graduate school and proposal writing.

They added these skills to their already prodigious ones in other areas that demonstrate well-rounded natures. At the orientation session, Alison Mikulyuk, summer research opportunity program coordinator, called out fun facts when she said among the group there was a proficient loon caller, a mushroom finder, dancers, an aspiring author, someone who graduated from high school as a 14-year-old, a boxer, a world-medalist baton twirler, two twins, competitive swimmers, a multi-instrumentalist, many who play instruments and several who speak more than one language.

Mikulyuk urged the undergraduates to enjoy those skills of others, and also capitalize on the people who possess them, “Learn from each other. Care for each other...Take advantage of personal and professional connections.” She continued, “I hope you will have a life-changing experience that propels you forward in your next decades.”

The program ran until Aug. 5, culminating in a poster session where students presented their summer’s worth of findings.

In addition to the Freshwater Collaborative of Wisconsin and Sea Grant, the summer program has support from the University of Wisconsin Water Resources Institute, Water@UW–Madison ([water.wisc.edu](http://water.wisc.edu)) and the UW–Madison Graduate School. ■



## New aquaculture guide helps fish farmers raise walleye for commercial production

By JENNA MERTZ

Good news for fans of the Friday fish fry: locally raised walleye may soon be coming to a plate near you.

This past spring, the University of Wisconsin–Stevens Point Northern Aquaculture Demonstration Facility (NADF) released the “Walleye Culture Guide” ([go.wisc.edu/1k1c5k](http://go.wisc.edu/1k1c5k)), a manual for fish farmers on how to raise walleye from eggs to market-size fish using indoor recirculating aquaculture systems.

According to lead author and Aquaculture Outreach Specialist Emma Hauser, the guide is the culmination of years of research and a great enthusiasm for the fish, especially in the upper Midwest where it’s enjoyed both as a game fish and one that’s good to eat.

“The facility has been raising walleye for probably the last 15 years now, and there’s been such a strong interest in raising the species indoors for food fish,” she said.

The 65-page guide features findings from Wisconsin Sea Grant-funded research investigating how to raise walleye using indoor tanks for commercial production. Projects explored different starter feeds for walleye, the optimal density of fish per tank, and more recently, how to manipulate light levels and water temperature to ensure they spawn year round.



A market-sized walleye raised at the UW–Stevens Point Northern Aquaculture Demonstration Facility. Image by Emma Hauser, Wisconsin Sea Grant

continued on page 15



# Inspirational Science

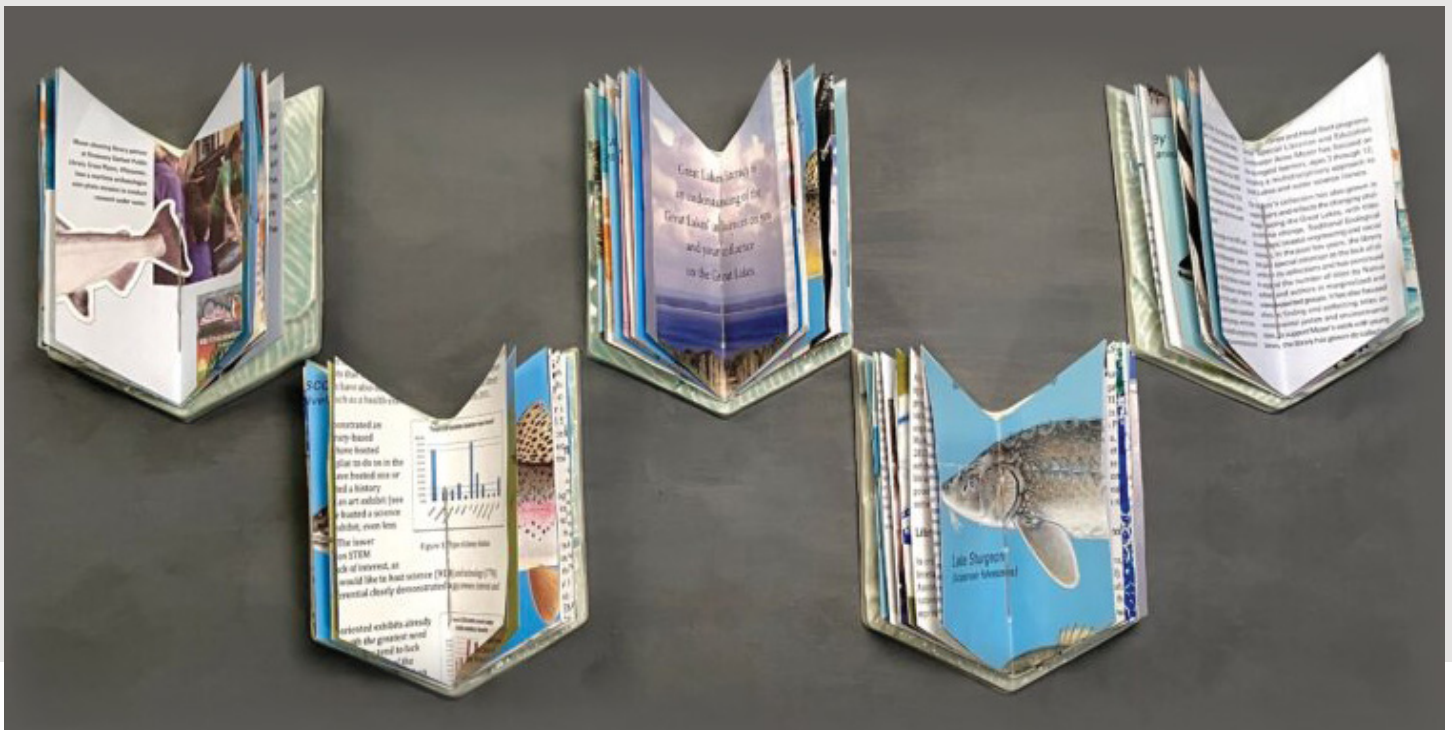
What happens when art takes its inspiration from science?

The Flow Project was created in 2021 by Julia Buskirk and Alexandra Lakind at the University of Wisconsin–Madison to answer that question. The project pairs University of Wisconsin undergraduate student artists with water professionals from across Wisconsin to create art inspired by water.

The collaboration is designed to highlight the diversity and quality of water research across the state and the intersections of art and science. This year's cohort produced more than 30 art pieces in a diverse range of media, including paintings, drawings, garments, sculptures, dance and music. ASC's

Anne Moser and Tim Campbell joined the project this year, and many other staff members have participated in previous years.

See [water.wisc.edu/the-flow-project](https://water.wisc.edu/the-flow-project) to view the online gallery for 2023 and the preceding two years.



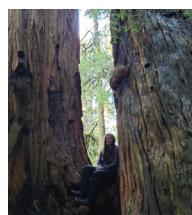
## Open Water

Ceramic, paper, hemp cord, beeswax, board, plant-based acrylic

Samantha Martinez



Anne Moser, senior special librarian at the Wisconsin Water Library, and Samantha Martinez, UW-Whitewater



## Open Water

Librarian Anne Moser is no stranger to projects that explore the connections between art and science. As the senior special librarian for the Wisconsin Water Library and an education coordinator for Wisconsin Sea Grant, she has curated or co-curated numerous art exhibits focused on plastics, maps, lake sturgeon and water and supported education projects that include displays of underwater photography.

But she had never been on the other side — an inspiration for an artist — until now.

Moser partnered with Samantha Martinez, an undergraduate student at the University of Wisconsin-Whitewater, on a project that resulted in Martinez's artwork titled "Open Water." Martinez describes the work like this:

"Five ceramic tiles were carved with a flowing water texture to represent

each of the Great Lakes. The tiles were bound with a variety of paper materials from Anne's workspace, including research papers, pamphlets and posters, art from public programming events, informational handouts for literary and scientific databases, USGS topographic maps and publications by Wisconsin Sea Grant. These materials reflect Anne's focus on the water library and highlight her work that intersects art, science and the humanities. This includes efforts in the expansion of the Wisconsin Water Library collection with resources about climate change, Traditional Knowledge, amplifying voices of marginalized and underrepresented groups and preservation of oral histories. The permanently open position of the books in this piece represents the radical accessibility of these carefully conserved and cataloged resources."



## 2022 FLOW PROJECT HIGHLIGHT

*Gift for Wequiock Creek* (right) is a hand-beaded leather tobacco pouch constructed as a gift for the community of people working together to ensure the care of the Wequiock Creek in Green Bay. The project was a partnership with undergraduate artist Ava Padilla; Julia Noordyk, ASC water quality specialist; and Stephanie Dodge, 2022 First Nations graduate assistant. [go.wisc.edu/nbcr83](https://go.wisc.edu/nbcr83)



### *Entanglement*

Copper with blue patina, enameled copper, fishing line, steel wire

Aneesha Zunker



**Tim Campbell**, aquatic invasive species specialist, Wisconsin Sea Grant, and **Aneesha Zunker**, UW-Green Bay



## Entanglement

Aquatic Invasive Species (AIS) Outreach Specialist Tim Campbell is aware of the power images have for communicating science. He turned to an artist to illustrate the ways in which AIS are described by managers in prevention efforts to see if some approaches are more successful than others ([go.wisc.edu/y4p5n7](https://go.wisc.edu/y4p5n7)). Like Moser, Campbell's work itself has never been the source of artistic inspiration before.

Campbell was paired with Aneesha Zunker, an undergraduate at UW-Green Bay. The pair spent time discussing how the word "invasive" in the phrase "aquatic invasive species" affects our perceptions, beliefs and behaviors. Language can play a role in determining how we perceive species that are



*Gift for Wequiock Creek*  
Ava Padilla, UW–Madison

ultimately just animals that have been misplaced in one way or another.

Zunker chose to trap all of the animals with fishing line in the webbed design she created because of the recurring thoughts she had regarding the "victim" or "villain" status we assigned them. She noted that while the nonnative species are each causing some level of harm to their environment, they only ended up here in the Great Lakes due to human behavior. She said, "I gained a strange sense of sympathy for these species that I formerly thought of as destructive. I wanted to direct my energy to efforts aimed towards educating others on this issue and creating sensible solutions to it." ■





James "Frizby" Grandt kneels next to one of the remotely operated vehicles he assembled.

# After 25 years, problem-solver-in-chief James "Frizby" Grandt retires

By JENNA MERTZ | Images by WISCONSIN SEA GRANT

Aquatic Sciences Center systems engineer James Grandt is a fixer.

"A lot of people don't like problems," said Grandt. "I like problems to solve. Give me something, I'll figure it out."

Grandt, nicknamed "Frizby" for his love of disc golf and freestyle disc, retired in August after 25 years of service to the Aquatic Sciences Center and 36 total years to the University of Wisconsin–Madison. An Air Force veteran and electrical and computer engineer by training, he has worked on and fielded questions about the many technologies that help us do our jobs, from computer hardware and software to data storage systems and research instrumentation.

Notable projects include updating the conference room in the program's main office to touch panel controls, supporting the Grandparents University outreach program ([uwalumni.com/grandparents-university/](http://uwalumni.com/grandparents-university/)) and helping create the web version of the popular Wisconsin Fish ID app ([seagrant.wisc.edu/fish-id/](http://seagrant.wisc.edu/fish-id/)).

Grandt also worked to bring Great Lakes science and technology to the public. He assembled remotely operated vehicles (known as ROVs) that both kids and adults use to take photos and video of underwater environments and a touchscreen kiosk about aquatic invasive species that now lives at the Wisconsin Maritime Museum.

In short, if it's got wires and goes through walls, if it's got buttons and beeps and boops, Grandt will take a crack at it.

"That's what I like about the job," he said. "I don't do the same thing every day. Always something different."

Prior to the Aquatic Sciences Center, Grandt worked with UW–Madison's Department of Geoscience as an instrumentation specialist and helped develop a 4-channel digital sonar system to estimate how much biomass — or as Grandt describes it, "fish food and fish" — floated in the water column. He participated in research cruises on the Great Lakes, Gulf Stream and Bay of Fundy. One harrowing trip found him aboard a naval research ship in the Atlantic Ocean.

"We had lost propulsion in the Gulf Stream, and a large tropical storm was somewhere in the Atlantic," said Grandt. Massive waves pounded the boat, stripping off equipment the crew had welded to the deck.

"Everything was gone when the storm was over. We rode it for 12 hours...but we survived."

Risky voyages have been a theme throughout his life. When Grandt was 15, he and a friend biked 1,200 miles roundtrip from their home in Edgerton, Wisconsin to Thunder Bay, Canada. No helmets, no panniers — just two 10-speed bikes with a little bag to hold their tent and basic supplies. They camped at campgrounds and waysides, alternating who called home each night. They made the whole trip in around 14 days.

So what's next? Grandt has plans for an active retirement, one filled with travel (Vietnam and Thailand are already on the list), spending time with grandkids and getting outside. He enjoys canoeing, fishing, skiing and hiking — and may even return to Thunder Bay with his childhood friend, this time with a helmet and an e-bike.

After decades of fixing our problems, Frizby will leave us with one he can't solve: we'll miss him. ■



Grandt with a ROVe Pack, an educational teaching kit that allows students to design their own simple ROV (remotely operated vehicle). Check out a ROVe Pack: [go.wisc.edu/5516oj](http://go.wisc.edu/5516oj)



continued from page 3



## Margaret Ellis: Bringing a voice back to the land

"I want to support small businesses in creating something that keeps those elements in mind. It's all about sustainability and conscious consumerism," Ellis said.

Through her business success, academic achievements and community grassroots efforts, Ellis achieved the National Center for American Indian Enterprise Development 40 Under 40 Award, which recognizes Native American citizens for outstanding leadership and community contributions.

Julia Noordyk, Wisconsin Sea Grant water quality and coastal communities specialist, is Ellis's supervisor. She's thrilled that Ellis accepted the position.

*"Margaret is such an impressive person. She has a lot of positive energy that she's willing to share. She's determined to bring the voices of Indigenous women to the table and integrate business practices that protect water resources. I am hopeful that through this position, Sea Grant can help support her academic and professional goals," Noordyk said.*

When Ellis posted an announcement about her Sea Grant graduate assistantship on social media. She said, "The post just went crazy! I had so many shares, comments and likes. It made me think it's a sign that I'm in the right place." ■

## Reconnecting Menominee students with their roots in the bay of Green Bay

Margaret Ellis, First Nations graduate assistant with Wisconsin Sea Grant and the UW-Green Bay Cofrin Center for Biodiversity, reflects on an archaeological dig that connected Indigenous youth to their past at Point au Sable this past spring.

**READ MORE IN OUR BLOG**  
[go.wisc.edu/y1q828](https://go.wisc.edu/y1q828)



Menominee Indian High School students helped uncover the past on Point au Sable in Green Bay. Image by Margaret Ellis.

continued from page 11

## New aquaculture guide helps fish farmers raise walleye for commercial production

The process of raising walleye indoors, however, is a tricky one. NADF research program manager and coauthor Tyler Firkus noted that walleye physiology presents a unique challenge.

"When walleye hatch, they're the size of your eyelash and are very, very delicate," said Firkus. "It's really difficult to provide the right conditions for them to thrive and begin accepting a commercial feed, where those issues are easier to overcome with Atlantic salmon or rainbow trout."

The guide explains the procedures NADF has been refining over the past 15 years to navigate such challenges and features photos and diagrams of protocols, equipment and fish at different life stages. Firkus hopes the visuals make the information more accessible to fish farmers and easier to understand.

"One of the big problems is that a lot of the information that farmers would need to raise walleye is in difficult-to-access or difficult-to-read academic journals," said Firkus. "And while that's a great avenue for disseminating this work to the academic community, for the average fish farmer, that's not the most effective mode of transferring that science."

Prospective walleye producers can also consult NADF's video series, the "Walleye Culture Video Manual," to learn how to perform the basics of raising walleye indoors, like cleaning tanks and hatching fish. The video series and the guide complement each other: one demonstrates the nuts and bolts of walleye aquaculture, and the other provides the details.

Both the manual and video series are free and available to the public. Said Firkus, "What I hope is that [fish farmers] who are on the edge of deciding what species to raise can decide to go for walleye with a bit more confidence because they have this wonderful guide."

Walleye continues to be a species with substantial aquaculture potential as a food fish due to well-established markets, high value and fast growth when raised indoors in water reuse systems. Currently, most of the walleye consumed in the Midwest is imported from Canada. With the help of this guide, restaurants and dining tables across the country could soon feature walleye raised a little closer to home.

Said Hauser, "To be able to raise fresh, locally produced walleye to market is a major benefit not only to consumers but to our local fish farmers." ■





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## Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and Water Resources Institutes

### Spotlight on manoomin

Explore reports, videos, story maps and other resources to delve into the cultural and ecological significance of North America's native grain, manoomin, otherwise known as wild rice. Wisconsin Sea Grant and partners, including Indigenous nations, are working to understand its locations and stressors to then move toward widespread restoration of manoomin. Also, brand-new public exhibit materials will be making their way through the Midwest for events starting this fall.

[go.wisc.edu/xbs354](https://go.wisc.edu/xbs354)

Bonnie Willison, Wisconsin Sea Grant