ASC

AQUATIC SCIENCES CHRONICLE

2025 ISSUE 1

A new use for an old technology

Reverse osmosis membranes could revolutionize nanoplastic sampling in the Great Lakes

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Aquatic Sciences Chronicle

University of Wisconsin Aquatic Sciences Center
1975 Willow Drive
Madison, WI 53706-1177
608-263-3259
Email: **chronicle@aqua.wisc.edu**
Web: **seagrant.wisc.edu**, **wri.wisc.edu**

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

ASSISTANT DIRECTOR FOR COMMUNICATIONS
Andrew Savagian

EDITOR
Elizabeth A. White

WRITERS
Jenna Mertz, Anne Moser, Andrew Savagian, Bonnie Willison and Marie Zhuikov

CREATIVE MANAGER
Sarah Congdon

The University of Wisconsin Sea Grant Institute is part of a national network of 34 university-based programs funded through the National Sea Grant College Program, National Oceanic & Atmospheric Administration, U.S. Department of Commerce, and through matching contributions from participating states and the private sector.

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STAY CONNECTED

On the cover: Assistant Professor Qin (left) and Assistant Professor Wei (center) with graduate student Zhijie Wang, who is holding a membrane coupon used for microplastic collection.

FEATURED VIDEO

"There can be a lot of misconceptions about what the tribes are doing out here. What people need to know is that this is the most scrutinized fishing season, definitely in the country, if not in the world. Because every single fish that comes out during the spearing season is accounted for." Brad Kacizak, game warden with the Great Lakes Indian Fish and Wildlife Commission (GLIFWC)

Spearfishing with the St. Croix Chippewa Indians of Wisconsin

By BONNIE WILLISON

Spring spearfishing is a vital tradition for the Ojibwe people, serving as both a federally protected treaty right and a means of harvesting food for ceremonies and community sharing. Tribal Council Member Conrad St. John of the St. Croix Chippewa Indians of Wisconsin took Sea Grant's Gavin Dehnert and videographer Bonnie Willison out on the water to document the importance of spearfishing. Dehnert, emerging contaminants scientist with Wisconsin Sea Grant and the Water Resources Institute, has been working alongside Ojibwe tribes to test fish, wild rice and maple sap for PFAS contamination. ■

WATCH THE VIDEO

Spring fish harvest with the St. Croix Chippewa Indians of Wisconsin
go.wisc.edu/43m2j7

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Stay up to date with new videos about the program's research, outreach and education. **youtube.com/@SGIVideo**

New communications director returns to roots in science communication

By JENNA MERTZ

With a depth of experience in science communication and enthusiasm for Wisconsin's waters, Andrew Savagian stepped into his role as the Aquatic Sciences Center's assistant director for communications in January.

"I'm excited for and humbled by this opportunity," said Savagian. "We've got a great staff, and I've always been impressed with the work being done at both Sea Grant and the Water Resources Institute. I'm looking forward to being a part of that."

Savagian leads strategic communication efforts for both Wisconsin Sea Grant and the Water Resources Institute, heading a team of five communicators who write, edit, design, plan events, and create videos and podcasts to share the work of both programs.

"We are so excited to welcome Andrew to our team at the Aquatic Sciences Center and are looking forward to learning from him given his wealth of experience in communication on issues that are critical to our mission," said Christy Remucal, ASC interim director.

New Communications Associate Director Andrew Savagian with his family during the holidays last year: wife Jen, son Logan, daughter Sophia, and their black lab Maizey.

Savagian's latest role was managing internal communications at the Universities of Wisconsin, where he worked with staff across the state's 13 public universities on higher education issues. Before that, he spent over two decades at the Wisconsin Department of Natural Resources in various roles, including communications section chief.

"The environment, environmental communication, science communication – that's where my heart is," he said.

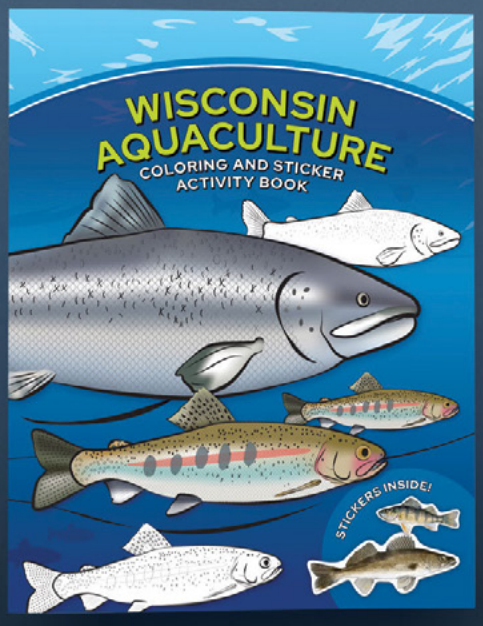
While at the DNR, Savagian was a point person for communicating about topics like sand mining, water pollution and per- and polyfluoroalkyl substances (PFAS). He cut his teeth communicating about efforts to clean up brownfields, which are properties contaminated by former industrial or commercial use. He pointed to several communities in Dane County that benefitted from the program.

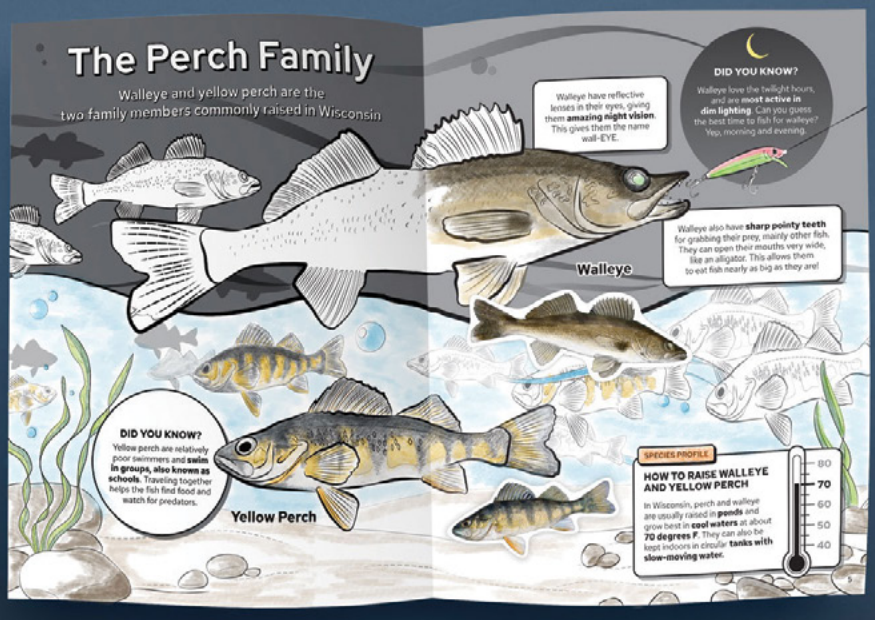
"If you look at some of the cities around Madison, such as Waunakee, Sun Prairie, you can see the changes to their downtowns. Some really great work was done to provide seed money to leverage additional public and private investment to clean the sites up and make those downtowns viable again," he said. "It was great to work with local communities."

After years of communicating complex and sometimes controversial environmental issues with the public, Savagian can attest to the truth behind the old dictum, know your audience. "You need to meet people where they are from a communication standpoint," he said. Using language the audience understands and sharing the message where they'll see it, all while maintaining scientific accuracy, is a balancing act. "That will always be a challenge in science communication, and I love that challenge."

And Savagian cares deeply about the topics he's been encountering at Sea Grant. A self-proclaimed "huge national and state park fan," he enjoys spending time outside with family, hiking, biking or paddling down one of Wisconsin's many waterways. He's eager to get back to the work of telling stories – no toe-dipping necessary.

"I'm ready to jump in with both feet," he said. ■





Chris Hartleb, director of the University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility.

Emma Hauser, aquaculture outreach specialist, Wisconsin Sea Grant and University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility.

Coloring and sticker book teaches kids about fish farming

By JENNA MERTZ

When Chris Hartleb, director of the University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility (NADF), was brainstorming ways to get kids excited about locally raised fish, he joked that a scratch-and-sniff sticker book might do the trick.

"Every single employee at NADF said, 'Do not make that as scratch and sniff.'"

While the fragrance of fish did not make the final cut, the stickers did. The final product, the "Wisconsin Aquaculture Coloring and Sticker Activity Book," features fish stickers as well as full-page illustrations of different aquaculture systems used to raise fish in Wisconsin.

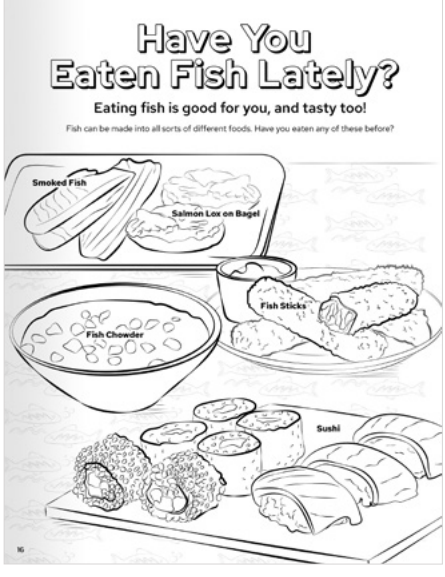
The Sea Grant-funded book is the first of its kind and is part of a study on how the Great Lakes aquaculture industry could expand through value-added products like fish dips, pre-seasoned fillets and ready-to-eat foods like fish sticks. Hartleb, who co-led the research team, said one goal of the coloring book was to raise awareness of aquaculture products for kids.

"We're trying to introduce them to the concept of farm-raised fish," Hartleb said. "Not all fish come from the ocean. A lot of fish are farmed."

The book illustrates different species raised in Wisconsin, such as walleye, yellow perch, Atlantic salmon, rainbow trout and tilapia, and provides overviews of the aquaculture systems used to raise them. Kids can then take the fish stickers and, in subsequent pages, "stock" them into the aquaculture systems that best suit the fish.

Emma Hauser, aquaculture outreach specialist at NADF and Wisconsin Sea Grant, helped develop content for the book.

"There's a lot of misconceptions about aquaculture. So, if you are teaching students earlier and earlier on about what aquaculture means in the United States or even more locally, like in their state, they grow up realizing what it is," she said.



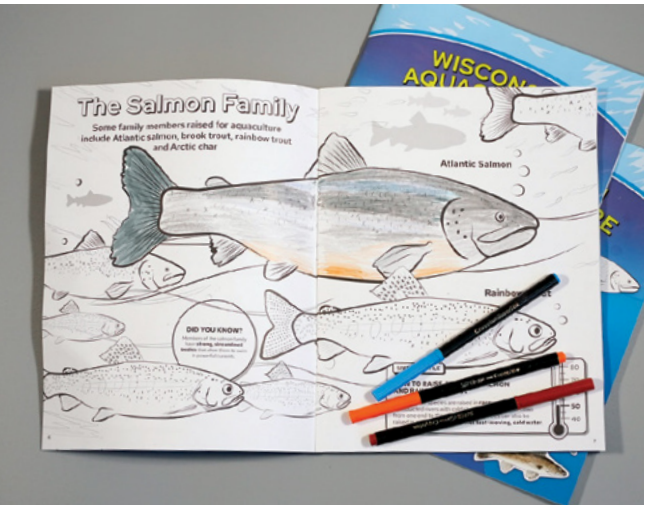
Balancing detail with design

As an outreach specialist, Hauser often gives tours at NADF and is used to explaining complex systems to different audiences. But developing a coloring and sticking book for kids? That was a new challenge.

"I don't write children's books, and it's really hard to take something that might be very specific and kind of hard to understand and build it in a way that children can understand and relate to," she said.

Enter Charlotte Easterling, a graphic designer and illustrator and the owner of Creative Vixen Design. She didn't know much about aquaculture, but NADF staff quickly brought her up to speed with a virtual tour of the facility.

"It was fascinating to learn all the different ways that this is done and seeing the technology," Easterling said. She worked with Hauser, Creative Manager Sarah Congdon and Editor Elizabeth White to tailor the content for a younger audience. The biggest challenge was getting the technical details right, like the positioning of the equipment or the plants in a pond.



As an artist, Easterling also had an eye toward stylistic consistency throughout the 16-page book.

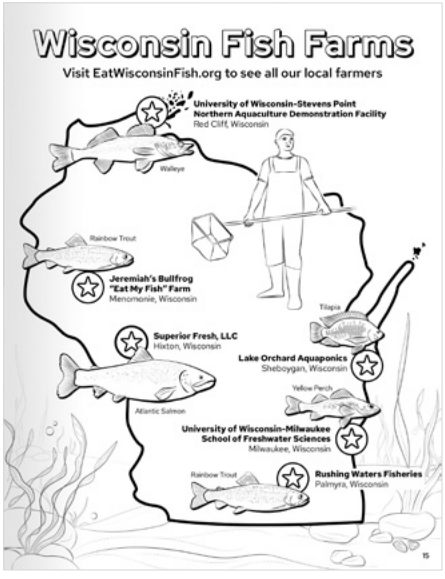
"Am I being too cartoony with this one compared to the realistic illustration we have of this fish over here? So, trying to just maintain a sense of style throughout that wouldn't feel like it was done by two different people," Easterling said.

Her favorite illustration is of the Atlantic salmon and rainbow trout, which are swimming in a circular tank with cold, fast-moving water. "It's a full-page spread, and it kind of has, like, the sparkly water up above," she said. "You can feel the movement."

Reeling in a future workforce

Hauser hopes that the book's fun illustrations and stickers also invite kids to see fish in their futures – not just on their plates, but as a possible career.

"One of the major bottlenecks to aquaculture expansion is finding an educated and skilled workforce," said Hauser. "A lot of students that might go into this for a career just don't really know about it."



The book features illustrations of real-life people who work in the industry and touches on the different skills farmers and other aquaculture professionals need. There's also a map showing the locations of fish farms across Wisconsin, which Hauser hopes will encourage folks to visit nearby farms and learn more about how they raise fish.

"A lot of our farmers are very open to tours and really want to show what they're doing," she said.

So far, the book has been a hit. Hauser hands out copies of the book to kids who visit NADF, but as she has learned, it's best to do so after the tour.

"The kids get very excited about it and want to take the stickers out and start putting them all over," she said. "We try to get them out of the facility before they start opening them."

Hartleb has also distributed the books at events, and he's noticed that it's not just kids who are interested. Parents have returned to his table to ask for copies for themselves.

"The whole process was a lot of fun, and so far, we've gotten great feedback and great response," he said. "I hope that continues."

To order or download a copy of the "Wisconsin Aquaculture Coloring and Sticker Activity Book," visit the website at **go.wisc.edu/gpkcit**. ■

Oil spills trigger natural pollutants in groundwater

By MARIE ZHUIKOV

Matt Ginder-Vogel, professor, Department of Civil and Environmental Engineering, UW–Madison.

Center: Ginder-Vogel and team are collecting water samples to see if past oil spills in the area have triggered the release of natural pollutants from the surrounding rock into the groundwater.

Right: Water samples from the groundwater monitoring wells.

A Pollution Domino Effect

We all know that oil spills pollute water. But what might be news is that they can also trigger the release of natural pollutants when the spills reach groundwater. This pollution domino effect is the topic of a current Water Resources Institute-funded study by Matt Ginder-Vogel at the University of Wisconsin–Madison with investigators Beth Parke from the University of Guelph and Jessica Meyer from the University of Iowa.

The team found the perfect real-world location for their two-year experiment in Cottage Grove, Wisconsin, which is about 12 miles east of Madison. This is the site of multiple past organic hydrocarbon (oil) spills from an organic solvent recycling plant. Parker and Meyer actually began studying the area decades ago, tracking the path of the oil pollution in the groundwater of the Tunnel City Aquifer to ensure it doesn't impact drinking water sources.

A Perfect Field Site

Ginder-Vogel, an associate professor with the UW–Madison's Department of Civil and Environmental Engineering, said he's been able to benefit from the hydrological data that Parker and Meyer have collected. Originally, he was interested in looking at radium as a natural aquifer pollutant. But he couldn't resist the opportunity to study and quantify how the hydrocarbon contaminants might impact radium and other natural pollutants found in the Tunnel City Aquifer, such as arsenic, uranium and strontium. In a previous study, he found that radium levels in the pollution plume were well below the U.S. drinking water standard but were elevated compared to normal background levels.

"It's just one of these natural experiments that groundwater geochemists like me get really excited about," said Ginder-Vogel. "It's rare to find a field site where someone really understands the hydrogeology like Beth and Jesse do and has some historical data on how the water's been moving around and some basic water chemistry data." This allowed Ginder-Vogel to ask bigger-picture geochemistry questions for this current project.

The Chemical Process

He described the chemical process by which hydrocarbons release natural pollutants as one where the oil, once it enters the aquifer, depletes the oxygen in the groundwater. "Once you get rid of the oxygen, you drive a whole cascade of geochemical reactions that can dissolve minerals." The minerals then enter the groundwater from the surrounding rock.

The team is collecting water samples from groundwater monitoring wells placed by Parker and Meyer. They'll also work with the Wisconsin Geological and Natural History Survey's core repository (rock cores) to find areas with interesting geochemistry in the aquifer. Then they'll design lab experiments to explore different conditions they notice in the field to figure out what variables control natural contaminant release into the water.

Protecting Groundwater

The results of this research will provide guidance to regulators and water quality managers on the sources of natural contaminants in the Tunnel City Aquifer, which flows under much of southern Wisconsin. In addition, there are other sites in the state where oil spills have occurred, so this research will be applicable to more than just the Cottage Grove area.

"The more we know about how naturally occurring contaminants get released from aquifers and how they move around, the more we'll be able to keep our groundwater safe for future generations," Ginder-Vogel said. ▪

A rock core from the Tunnel City Group, a rock unit that underlies much of southern Wisconsin.

Wisconsin Sea Grant says 'Bon Voyage!' to a communications legend

By ANDREW SAVAGIAN

This spring Wisconsin Sea Grant is sending off Senior Science Communicator Marie Zhuikov to a much-deserved retirement.

Zhuikov has spent the better part of the past three decades writing about Great Lakes water issues and Sea Grant education, outreach and research activities. During her 13 years at Wisconsin Sea Grant, she not only prolifically told wonderful stories about the people researching, educating and working to protect our fragile water ecosystems, she also worked on podcasts, wrote newsletter articles, took amazing photos and managed Sea Grant's "Unsalted" blog (**seagrant.wisc.edu/blog**). Zhuikov also worked tirelessly in collaboration with program scientists, outreach specialists and our staff to build water science literacy around the country.

"It is a bittersweet time for all of Marie's colleagues," said Wisconsin Sea Grant Interim Director Christy Remucal. "We are so happy for Marie and wish her well as she moves into this next exciting phase of her life, but we are also sad we won't have her wealth of science communication experience, unique perspective and warm presence anymore. We thank her for all that she's done for our Great Lakes – she will be greatly missed."

Prior to joining Wisconsin Sea Grant in 2012, Zhuikov worked for Minnesota Sea Grant for 15 years. During her time at Wisconsin Sea Grant, she received numerous awards from the Sea Grant Network for her work and also served a stint as a communications consultant on the U.S. Environmental Protection Agency's Board of Scientific Counselors under the Obama Administration. In her off-hours, Zhuikov authored a number of books, including "Eye of the Wolf" and "Meander North."

Congratulations Marie!

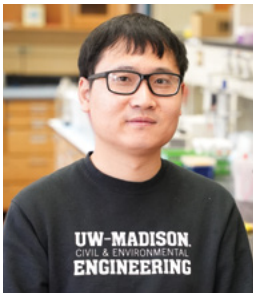
WISCONSIN SEA GRANT COVER STORY

A new use for an old technology

Reverse osmosis membranes could revolutionize nanoplastic sampling in the Great Lakes

By MARIE ZHUIKOV

Mohan Qin, assistant professor, Department of Civil and Environmental Engineering, UW–Madison.



Haoran Wei, assistant professor, Department of Civil and Environmental Engineering, UW–Madison.

The target is small. Very small. Researchers have shined the light on environmental dangers posed by microplastics – small pieces of plastic from clothing and packaging that pollute waterways. Now, however, they are also focusing on nanoplastics, which are even smaller plastic particles – invisible to the naked eye and even under a regular microscope, and smaller in diameter than a human hair.

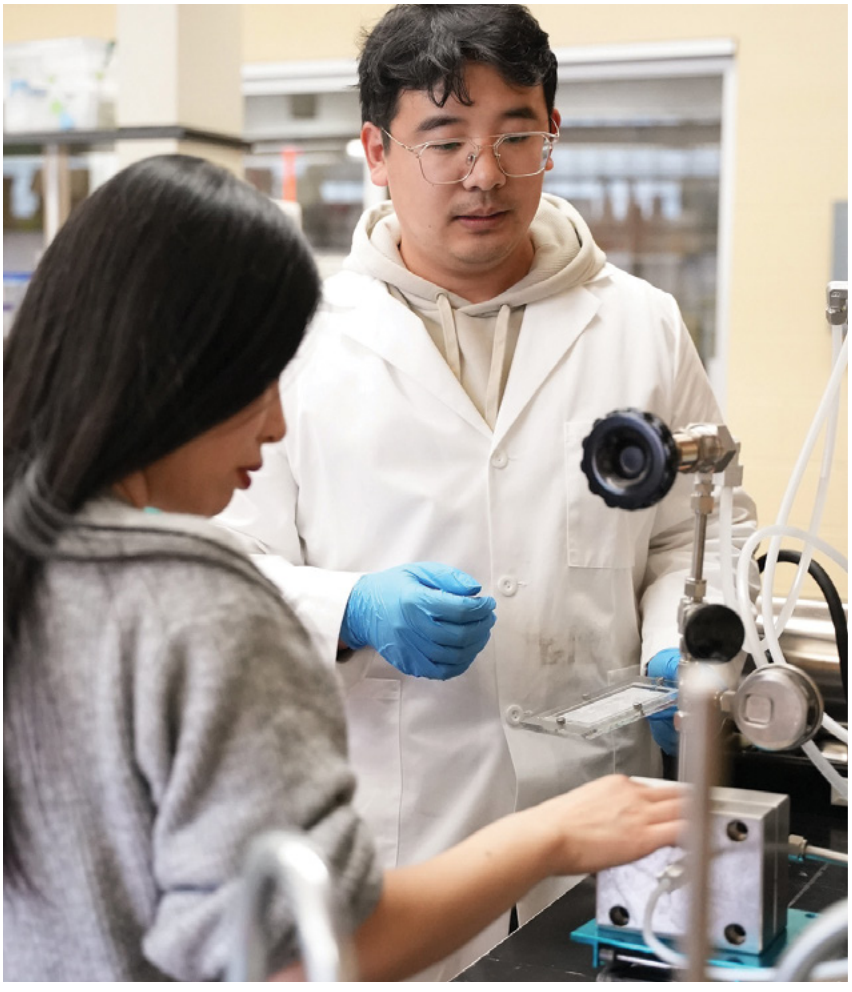
Linked to cardiovascular and respiratory diseases in people, nanoplastics continue to build up, largely unnoticed, in the world's bodies of water and inside people's bodies. They're everywhere. Researchers think nanoplastics may be more harmful than microplastics because, "The smaller their size is, the higher toxicity they have," said Haoran Wei, assistant professor in the department of civil and environmental engineering at the University of Wisconsin–Madison. "There's a higher surface area on nanoplastic particles, which can accumulate more toxic chemicals and other contaminants on their surfaces. They're small enough to get into living cells, so can directly harm creatures in the Great Lakes."

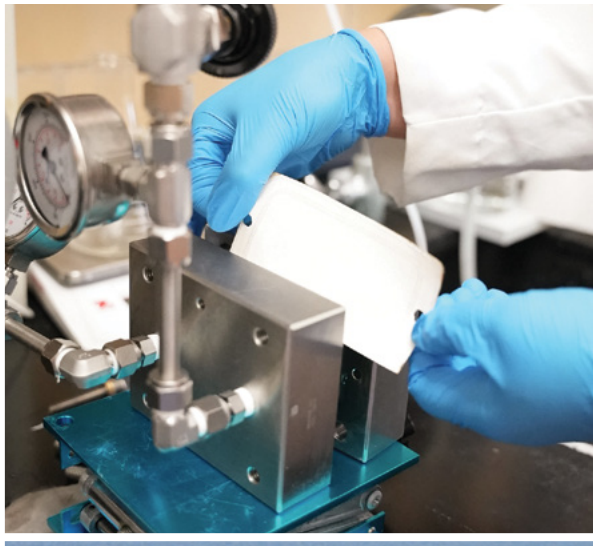
Unfortunately, the presence and distribution of nanoplastics in the Great Lakes is still largely unknown. One reason is that current sampling methods are onerous – requiring collection and transport of hundreds to thousands of gallons of water from the lakes into the lab for analysis.

There's got to be a better way, right? Thanks to Wisconsin Sea Grant funding, Wei and Mohan Qin, also an assistant professor at the department of civil and environmental engineering at UW–Madison, are working to solve the problem by looking at a new use for an old technology.

> Desalinization plants have long used semipermeable membranes to take salt out of seawater through reverse osmosis. The membranes, made of polymers, have tiny pores that allow pressurized water to flow through them but catch things like salt. They can also catch nanoplastics. Qin and Wei are developing a portable membrane filtration device that researchers can use on a ship to process large volumes of water out on the lake instead of bringing the water back to the lab. They'll collect the nanoplastics on a series of membranes and just bring those, or a concentrated water sample, back to the lab for analysis.

Sarah Janssen, a supervisory research chemist with the U.S. Geological Survey, is going to help Qin and Wei with the project this summer in coordination with the U.S. Environmental Protection Agency to collect



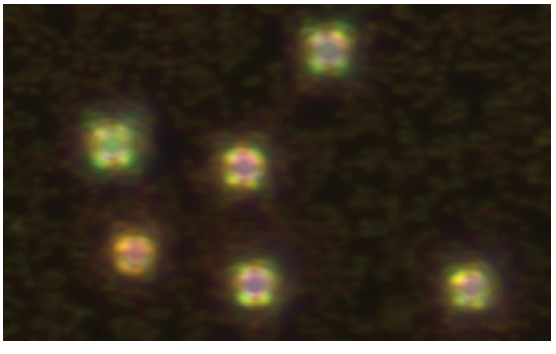


water samples on their Lake Explorer II research vessel from lakes Superior and Ontario. But before they head out on the ship, they'll test the membrane filter device with purified water in the lab and later with water from some local lakes, like Lake Mendota.

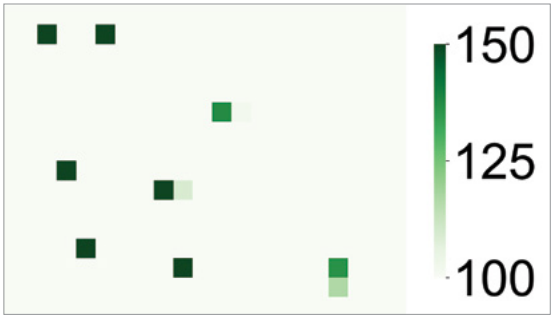
Wei said that if successful, their project will be the first to develop a sequential membrane filtration sampler that collects and concentrates nanoplastics from a large volume of lake water. "And we definitely will be the first ones to carry this filter on a boat in connection with nanoplastics," he said.

Qin and Wei will be helped by four college students and hope this method can be used by other agencies and water industries for microplastic and nanoplastic sampling. They also plan to work with Sea Grant's emerging contaminants scientist, Gavin Dehnert, to bring information about the project to Tribal communities and to participate in events like UW–Madison's Day at the Capitol. "All my students love Capitol Days," said Qin. "They will have the opportunity to work with people from the real world and talk about the problems researchers are working on."

This project is related to a microplastics and food web project that Wei leads which was recently funded by NOAA **go.wisc.edu/39263c**. He said the goal of that project is to figure out if microplastics and nanoplastics can get into the Great Lakes food web. "We want to see if they get biomagnified up the food chain," Wei said. "We're going to do a lot of analysis and bioaccumulation experiments." ■



Optical microscopic image.



Raman map of 1.5 µm microplastics. Raman mapping can identify and visualise microplastics/nanoplastics down to 100 nm.

Top left: Zhijie Wang, second year PhD student in Civil and Environmental Engineering, with a bench-scale crossflow reverse osmosis system.

Top right: Membrane coupon used for microplastic collection

Bottom right: Qin, Wei and Janssen will be collecting samples this summer on the EPA's Lake Explorer II research vessel. Photo: Will Van Dorp

Head to Tail Fish Showcase invites producers and consumers to think beyond the fillet

By JENNA MERTZ

All photos by Front Room Studios.

Above: GSGP Executive Director David Naftzger hands a participant an Icelandic energy drink made with fish collagen.

Right: Third Coast Provisions in Milwaukee offered a variety of non-filet dishes, including whitefish roe sliders, pickled herring kimbap, whitefish liver pate, buffalo walleye cheeks and whitefish chili.

Bottom right: Fish collagen-infused energy drinks and supplements from Iceland were on display.

In October, the Head to Tail Fish Showcase celebrated Great Lakes fish products – with not a fillet in sight.

The event aimed at elevating awareness of the Great Lakes St. Lawrence Governors & Premiers (GSGP) 100% Great Lakes Fish initiative, (**go.wisc.edu/13j834**) a project that seeks to find commercial uses for all parts of harvested Great Lakes fish. Typically, the fillet, which represents only 40% of the fish, is consumed while the remaining 60% is discarded or used in animal feed and fertilizers.

That fish waste, however, can be turned into pharmaceuticals and other high-value products like fish leather and collagen supplements.

"Our goal is to drive more value through the fishery, create more jobs, create rural economy development and really improve the sustainability of our fishery," said David Naftzger, executive director of GSGP.

Businesses who join the initiative pledge to use 100% of harvested fish by the end of 2025. So far, 30 Great Lakes commercial fishing and aquaculture operations have signed on, 11 of which are from Wisconsin.

"Wisconsin companies have been a real leader and helped to send a message to the rest of the region and to the rest of the fish value chain that there's raw material available. We want to see it used productively and we want to create some partnerships that can make that happen," said Naftzger.

The private event was held at the University of Wisconsin-Milwaukee School of Freshwater Sciences for an audience of media and business, academic and government partners. Representatives from UW-Milwaukee, the Wisconsin Economic Development Corporation, Wisconsin Department of Natural Resources and Wisconsin Coastal Management Program offered remarks in support of the program.

Wisconsin Sea Grant helped organize the event. Interim director Christy Remucal said that the initiative aligns well with the program's focus on sustainable fisheries and aquaculture and commitment to fostering academic, industry and government collaboration.

"I think the 100% Great Lakes Fish Initiative really encapsulates the mission of our work for sustainable resources," said Remucal. "We're really proud to be part of this partnership."

Above: The event also featured non-food items like fish leather, fertilizer and dog treats.

During the event, participants could try a variety of non-filet fish dishes prepared by Third Coast Provisions in Milwaukee. Restaurant co-owner Cameron Whyte said the team enjoyed finding creative ways to use different parts of the fish.

"They sent us some really cool products to try, and it was really kind of a fun opportunity for us to flex our culinary muscles and do something a little different," said Whyte.

Naftzger explained that the 100% Great Lakes Fish initiative is modeled after Iceland's efforts to use all parts of harvested cod. According to GSGP, over 90% is now used, and the value of products made from cod has risen from $12 to $4,000.

For Door County commercial fisherman Charlie Henriksen, who attended the event, the increase in value of Lake Michigan whitefish doesn't need to be dramatic for impacts to be felt.

"If six dollars of that trickles back to us, or even if the value of that fish doubles to us, it's a game changer," said Henriksen. "It makes our businesses viable, and it gives us a lot of hope." ■

Making fish leather with Wisconsin Sea Grant

Sea Grant's Titus Seilheimer and Sharon Moen learned to tan fish skin for leather recently as part of an effort to use all parts of harvested Great Lakes fish, which is part of Sea Grant's safe and sustainable seafood objectives. What's next for Wisconsin Sea Grant's fish leather team?

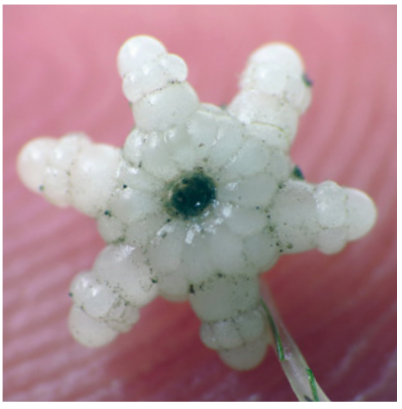
"I'm not there yet, but I'd love some whitefish leather pants! I just need to learn to sew," Seilheimer said. Moen anticipates incorporating fish leather into mosaics, jewelry and pretty much every conversation.

"Fish leather is strong and versatile," she said. "I'd be happy to make Titus's pants once we have enough leather."

The week-long workshop was sponsored by Great Lakes St. Lawrence Governors & Premiers (GSGP) 100% Great Lakes Fish initiative and conducted by Joe Manthei of Fiskur Leather.

WATCH THE VIDEO

Making fish leather with Wisconsin Sea Grant
go.wisc.edu/n27kca



LISTEN TO THE PODCAST

Listen to "Introduced" wherever you get your podcasts.
pod.link/1514628828

A starry stonewort by any other name....

By ANDREW SAVAGIAN

What do you think of when you hear the name spiny waterflea, one of the troublesome aquatic invasive species that inhabit our Great Lakes waters? Or Eurasian watermilfoil, rusty crayfish or the infamous zebra mussel?

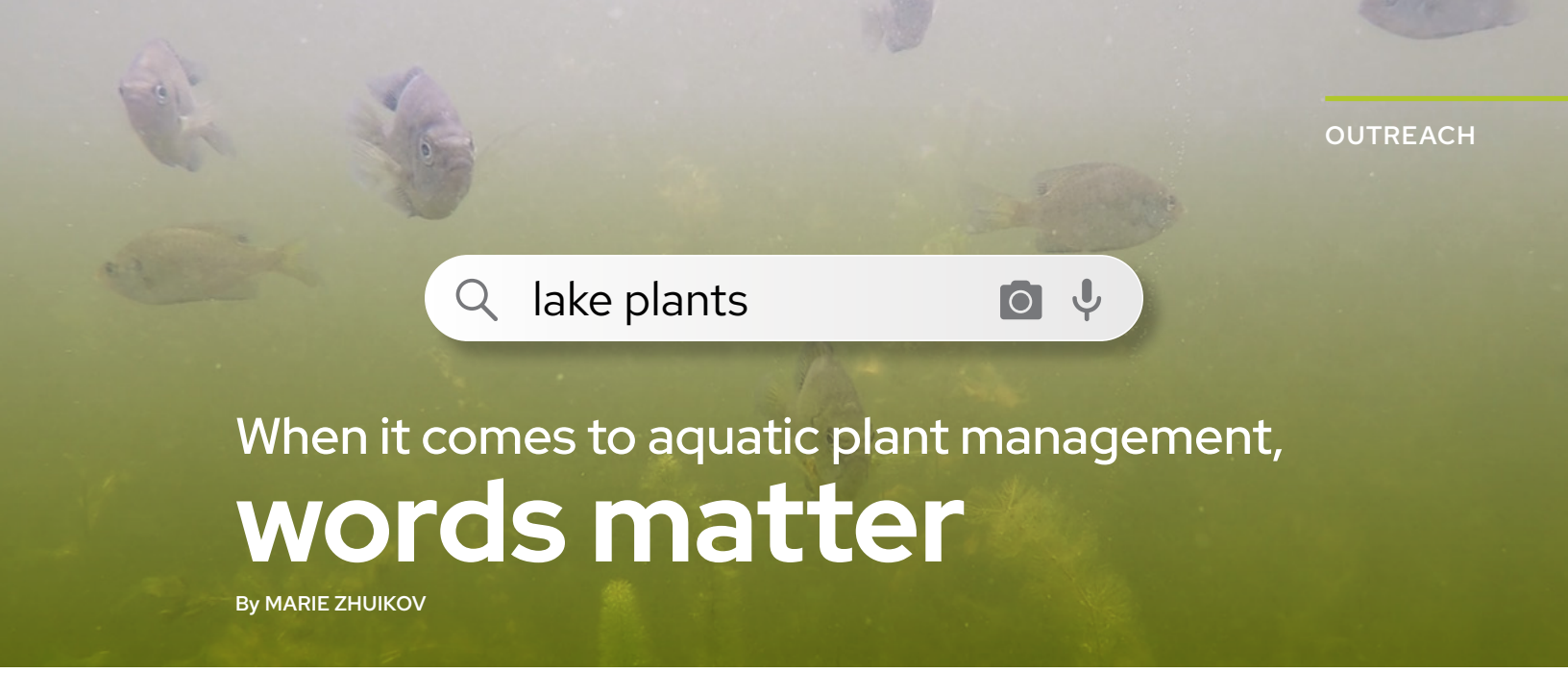
In the latest season of "Introduced," Wisconsin Sea Grant's award-winning podcast about aquatic invasive species, co-hosts Bonnie Willison and Jenna Mertz team up with Sea Grant Aquatic Invasive Species Outreach Specialist Tim Campbell to explore how humans respond the way they do to aquatic invasives, the names we give them and the metaphors that we use to describe these species as they continue to invade our watery ecosystems.

On the latest episode, listeners will hear about another uniquely named invasive, the starry stonewort, how one waterfront property owner contended with the state's first population in southeast Wisconsin and the ways all of us can work to keep invasives out of our lakes and rivers.

"Introduced" returned for a third season last November, and during this season's six episodes our co-hosts will feature stories of artists, students and scientists making sense of the ways that AIS impact Wisconsin's waters.

The podcast is produced by Wisconsin Sea Grant, with support from the Great Lakes Commission. ■

Top Left: Does this invasive macroalgae look like a lake killer to you? Top Right: The starry bulbil is starry stonewort's identifying feature. The bulbil can be used to grow new vegetation that is a clone of the parent. Bottom Right: Bret Shaw, a professor in the Department of Life Sciences Communications, sharing with the "Introduced" team how language and emotion can impact invasive species management decisions.



When it comes to aquatic plant management, words matter

By MARIE ZHUIKOV

People searching online for control options related to unwanted plants that grow in lakes and rivers use many different terms. Some call them "lake weeds," other call them "freshwater seaweed," still others "cabbage." Rarely do they search with terms that natural resource managers and scientists use, such as the plants' Latin names or the formal "submerged aquatic vegetation."

These are findings of a study on internet keyword search terms conducted by University of Wisconsin–Madison researchers that was recently published in the "Journal of Aquatic Plant Management." (go.wisc.edu/995r27)

State Funds for Management, Little for Education

The Wisconsin Department of Natural Resources estimates that $9.5 million is spent annually on aquatic plant management in the state. About $2 million of this is state funds; the rest is private dollars. Despite this, little funding or effort is dedicated to education specific to aquatic plant management.

> How people search for information about aquatic plants is critical for guiding professionals on best practices for educational programming and outreach. Such education could also steer people away from the ineffective and potentially harmful use of herbicides in lakes and toward more ecologically sound solutions.

The research team, composed of Wisconsin Sea Grant's Tim Campbell and Gavin Dehnert, UW–Madison Department of Life Sciences Communication and Division of Extension's Bret Shaw, and Luke Huffman, a Ph.D. student in UW–Madison's Nelson Institute for Environmental Studies, examined 113 search keywords related to aquatic plant management and recorded the top 10 websites that contained those words.

"We had 1,130 different websites that popped up," said Campbell, aquatic invasive species outreach specialist. "What we found across all the keywords was that commercial websites tended to rank higher than institutional and government websites or the mixed websites. Essentially, if you type in a keyword related to aquatic plant management, you're more likely to get a commercial website than you are a purely information source.

"People appear to be searching for things related to aquatic plant management in a more vernacular colloquial way. As they do that, they're getting more commercial websites about management, a lot of times, regarding herbicides, which could be why they default to herbicide use as a first choice. And so, the information that we're putting together, which covers many different management options really isn't reaching our target audience," Campbell said.

The research team urged scientists and invasive species program managers to include more generic terms like "lake plants" in their online content and other terms mentioned above so that search engines are more likely to display their content.

Know Your Audience

Campbell suggested that noncommercial managers, "Just think a little bit more about how we're writing the content and how that might map out to people looking for it. We probably all want our reports to be seen by our target audience. In this information environment, we need to be using the language of the people we're trying to reach."

The study was supported by the Wisconsin Department of Natural Resources and the Great Lakes Restoration Initiative.

The team has a follow-up study planned for this summer where they will produce two versions of aquatic plant management fact sheets – one with scientific language and the other with more colloquial terms – and then assess search engine results to see which one captures more internet traffic. ■

Above: Participants on a Coastal Hazards of Superior (CHAOS) field trip learning more about spotting signs of erosion at Shaefer Beach in Superior, Wis.

NOAA Sea Grant invests $4.25 million to further a resilient future

By MARIE ZHUIKOV

Amid extreme and frequent weather events and risks to coastal economies, families and communities, the need to address related challenges is critical. In response to this need, Congress appropriated funding to NOAA Sea Grant with the goal of strengthening resilience across coastal and Great Lakes communities. NOAA Sea Grant allocated $125,000 to each of the 34 Sea Grant programs in 2024, for a total of $4.25 million, to further build upon and extend coastal resilience work with communities. The funding is being used to enhance engagement, technical assistance, education and research investments to address climate and weather impacts in local communities. These investments will be instrumental in achieving more resilient communities and economies across the nation.

This essential funding will be leveraged by Sea Grant programs and combined with 50% match funding from collaborative partners to establish or expand projects that address resilience needs throughout the U.S. Funded projects include investments in hazard assessment and preparedness, nature-based solutions, local and regional resilience planning and implementation assistance, and increasing staff capacity to improve resilience education and engagement opportunities. Collaboration and co-production are pillars of Sea Grant's approach to working alongside communities and partners.

Members of the Washburn/Ashland Climate Champions team attend a coastal resilience adaptation workshop organized by the Northern Institute of Applied Climate Science.

With this funding, Wisconsin Sea Grant is supporting new staff with expertise in urban planning and sustainable design to address coastal adaptation and resilience issues. Wisconsin Sea Grant is also continuing leadership and technical support for existing coastal resilience networks in Wisconsin. These networks help counties, municipalities and state agencies share approaches to addressing coastal hazards.

For more information and to see what other programs are doing, read the national story at **seagrant.noaa.gov/sg-2024-resilience**. ■

Tackling Plastic Pollution
GUIDES FOR CHILDREN

Plastic has transformed our lives in so many ways, and it has also created an environmental challenge that can seem overwhelming. There are simple changes we can make to limit our use of plastic. If you have a young person in your life, these books will give them some great ideas.

The Adventures of a Plastic Bottle: A Story About Recycling by Alison Inches, illustrated by Peter Whitehead. First edition. New York: Little Simon, 2009.

Can I Recycle This? A Kid's Guide to Better Recycling and How to Reduce Single-Use Plastics by Jennie Romer, illustrated by Christie Young, Viking, 2023.

Kids vs. Plastic: Ditch the Straw and Find the Pollution Solution to Bottles, Bags, and Other Single-Use Plastics by Julie Beer. Washington, D.C: National Geographic, 2020.

The Last Straw: Kids vs. Plastics by Susan Hood. New York: Harper, an imprint of Harper Collins Publishers, 2021.

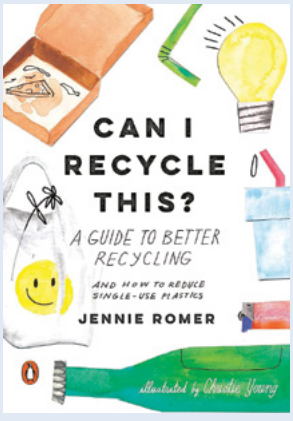
One Plastic Bag: Isatou Ceesay and the Recycling Women of the Gambia by Miranda Paul, Illustrated by Elizabeth Zunon. Minneapolis: Millbrook Press, 2015.

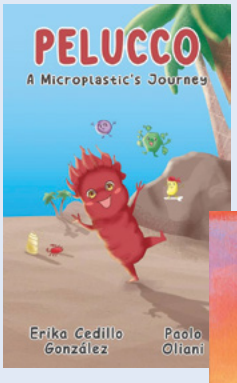
Pelucco: A Microplastic's Journey by Erika Cedillo González and Paolo Oliani. Independently published, 2024.

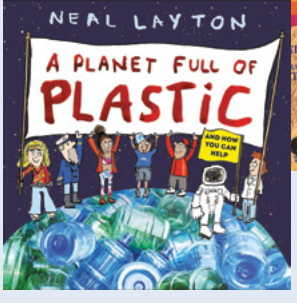
A Planet Full of Plastic by Neal Layton. London: Wren & Rook, 2019.

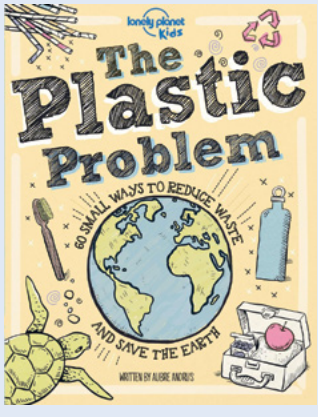
The Plastic Problem: 60 Small Ways to Reduce Waste and Save the Earth by Aubre Andrus, edited by Dynamo Limited, Lonely Planet Global Limited, 2020.

Zedalla Rescuing Oceans! by Joanna Jarc Robinson. Everyday Heroes, 2020.









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Email askwater@aqua.wisc.edu.

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UNIVERSITY OF WISCONSIN–MADISON

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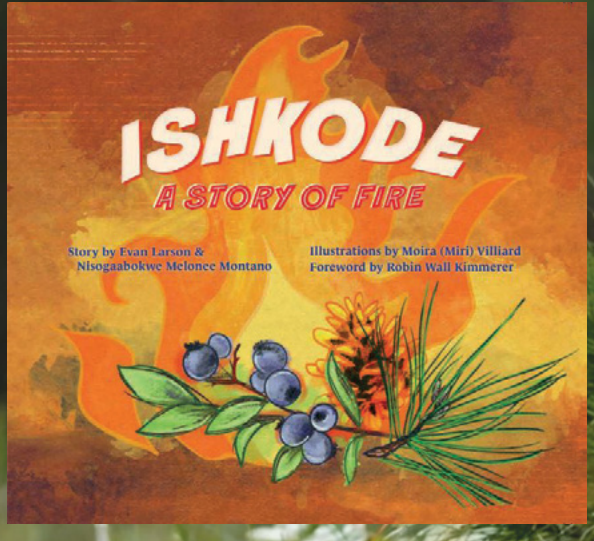
Aquatic Sciences Chronicle
a joint newsletter from UW Sea Grant and Water Resources Institutes

Sea Grant research project inspires children's book

"Ishkode: A Story of Fire" was authored by research project managers Evan Larson and Nisogaabokwe Melonee Montano with a forward by Robin Wall Kimmerer. It features illustrations by Moira Villiard and was published by Black Bears and Blueberries Publishing of Wisconsin.

Larson, a professor in the Department of Environmental Sciences and Society and a dendrochronologist with the University of Wisconsin–Platteville, said the book emerged from over a decade of collaboration among Great Lakes researchers and community members. It intertwines Indigenous and Western scientific knowledge to share a story of the deep, long-term relationships among people, fire and pines—and the wider web of life in Great Lakes ecosystems, including blueberries.

For more information about the Ishkode project, visit our website at **go.wisc.edu/v38j79**.



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