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**Aquatic Sciences Chronicle**  
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UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE UNIVERSITY OF WISCONSIN WATER RESOURCES INSTITUTE

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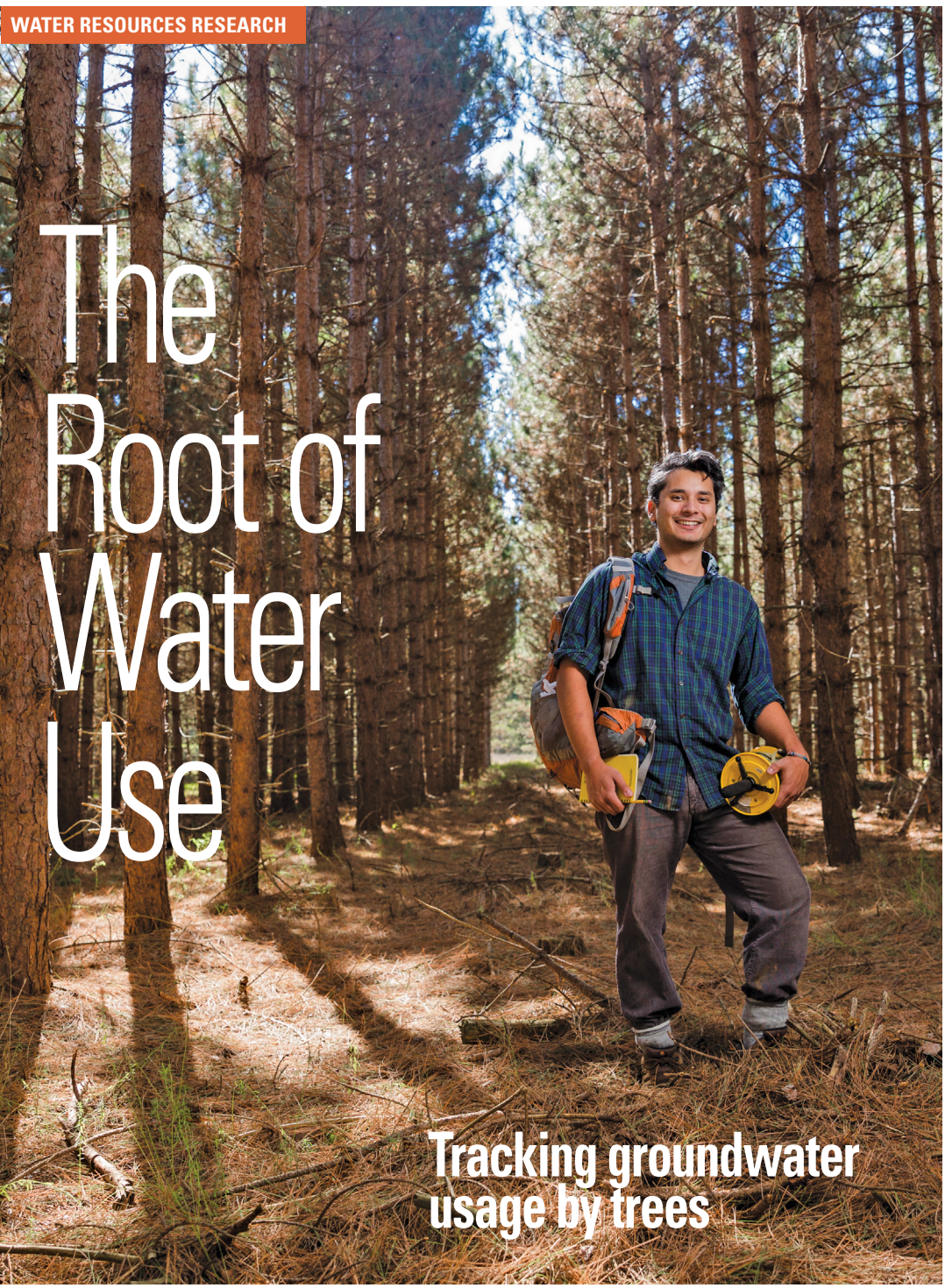


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University of Wisconsin Aquatic Sciences Center  
1975 Willow Drive  
Madison, WI 53706-1177

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

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

**Assistant Director for Communications**  
Moira Harrington

**Editor**  
Elizabeth A. White

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

**Designer**  
Yael Gen

**Circulation Manager**  
Linda Campbell

**University of Wisconsin Sea Grant Institute** is part of a national network of 33 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. [seagrant.wisc.edu](http://seagrant.wisc.edu)

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FEATURED WEBSITE

Just Add Water...  
Teaching Tool Focuses  
on Engineering  
[go.wisc.edu/ROVe](http://go.wisc.edu/ROVe)

Wisconsin Sea Grant educators have a new tool for middle-school teachers and students. All it takes is a coat hanger, water and some thought.

The Remotely Operated Vehicle Engineering Pack, or ROVe Pack for short, has students working in teams to build underwater ROVs out of hangers and figure out how to keep them underwater with the correct neutral buoyancy.

The pack is the brainchild of Lynn Kurth, a science teacher for Prairie River Middle School in Merrill, Wis., Sea Grant Education Specialist Kathy Kline and Water Librarian Anne Moser. It contains a build-your-own-ROV kit, an inflatable pool and a teacher’s guide. All teachers need to provide is water for the pool.

“What’s neat about the pack is that it focuses on the E of STEM education — the engineering part,” said Moser. (STEM stands for science, technology, engineering and math.) “Teachers don’t have access to a lot of engineering curricula that they can use.”

Wisconsin residents can borrow an ROVe Pack for free from the Wisconsin Water Library at UW-Madison. The pack will be delivered to a local library via the Library Delivery Network of Wisconsin.

The ROVe Packs were created by Sea Grant as part of a grant from the Wisconsin Environmental Education Board. For more information, visit [go.wisc.edu/ROVe](http://go.wisc.edu/ROVe).



WATER RESOURCES RESEARCH COVER STORY



Sara Starnas

The  
Root of  
Water Use

WRI researchers track groundwater usage  
by trees in key Wisconsin regions

So let’s say you’re putting together your monthly budget. You account for all existing resources, deposits and expenses. But there’s one significant problem: You’ve forgotten to include your electric bill.

Just as that household budget would be inaccurate, so too is the groundwater budget in certain areas of Wisconsin where a potentially significant user of the state’s groundwater resources — its forests of copious trees — is often forgotten.

“When managing groundwater it’s critical that you account for all users, but currently, we don’t have good estimates of direct groundwater use by forests,” said Steve Loheide, a UW-Madison associate professor of civil and environmental engineering. “Having an idea of how much groundwater they’re using is, to put it mildly, important.”

Supported by funding from the University of Wisconsin Water Resources Institute, Loheide and graduate student Dominick Ciruzzi are trying to

address the question of how much groundwater is being used by trees — and how the changing levels of available groundwater may be affecting the trees’ growth over time.

The project is focused on two specific areas of the state: the temperate highland forests of Wisconsin’s Northwoods near Minocqua and forests in the Central Sands region, both of which feature sandy soil that can’t retain water as effectively as other soil types do. In this study, the Northwoods will serve as the baseline that will help researchers understand what’s going on in the Central Sands region, an area that’s recently seen an increase in groundwater use by high-capacity wells.

Like most plants, trees survive on shallow soil moisture, only resorting to using groundwater when they don’t have enough soil moisture available, i.e., years with low precipitation. To gauge how much groundwater trees and forests are using, Ciruzzi, who’s been based at the Trout Lake Research

Wisconsin’s forests use groundwater. Unfortunately, we don’t have good measurements of how much they use, and that’s necessary information for allocating groundwater resources.

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# Aquaculture's Next Big Thing?

WISCONSIN SEA GRANT RESEARCHERS HONE IN ON WALLEYE, SAUGEYE

**M**ore than 1,000 walleye live in the six sets of circular water tanks at the UW-Stevens Point Aquaponics Innovation Center in Montello, Wis. They swim in near-total darkness, their environment protected by several sets of pitch-black curtains.

“Walleye are sunset and nighttime feeders,” explained Chris Hartleb, UW-Stevens Point pro-

in less than a year at each of the three densities. We even had some fish up to two pounds.”

Better still, Fischer’s NADF operation and systems experienced no significant issues with maintaining water quality, a common problem that can derail an aquaculture operation. Now, like Hartleb, he’s raising walleye as well, in six specialized dual-drain, cornell-style tanks connected to a more traditional recirculating aquaculture system with a fluidized sand biofilter.

In a burgeoning industry where, as John Pade, the co-founder of Nelson & Pade Inc., a partner on the project, likes to say, “enthusiasm often exceeds knowledge,” Hartleb and Fischer’s research could

fessor of aquaculture and the caretaker of this walleye colony. “This way, they can feed 24 hours a day. Plus, they’re very skittish fish — it takes almost nothing to startle them.”

There’s good reason to keep them calm. These fish are a key part of a two-year aquaculture research project funded by Sea Grant designed to compare the production of walleye, a native Wisconsin fish, and saugeye, a natural hybrid of walleye and sauger, in a recirculating aquaculture system and a closed aquaponics system.

As it reaches the midway point, the project, headed by Hartleb and Greg Fischer, facility operations manager of UW-Stevens Point’s Northern Aquaculture Demonstration Facility (NADF) near Bayfield, Wis., is looking more promising by the fish tank. Both Fischer and Hartleb spent the last year raising saugeye in tanks with low (30kg/m<sup>3</sup>), medium (60kg/m<sup>3</sup>) and high (90 kg/m<sup>3</sup>) densities at each facility.

“The saugeyes grew really well,” said Fischer. “We reached our target goal of growing a one-pound fish

be critical to showing a way forward with a new species for Wisconsin aquaculture.

“That’s the question — economically, how does this fit in?” Fischer asked. “That’s the big puzzle. Can you do this at a commercial scale? At NADF, we have been investigating and working on walleyes and their hybrids for food fish use for almost 10 years now, and this research is critical to move this species forward for sustainable U.S. aquaculture.”

Currently, nearly 90 percent of the aquaculture industry in the United States is focused on tilapia. While there are ways in which that makes sense — the fish grows well in high-density tanks and sometimes returns a good price at market — there are also ways in which it doesn’t.

“As a biologist, it’s scary,” said Hartleb. “What if a disease wipes out tilapia fry at nurseries?”

In fact, there are only three nurseries in the United States that provide tilapia fingerlings to aquaculture/aquaponics operations, and two of them are in the Southwest, not far from Mexico, which experienced a major outbreak of the lethal tilapia lake virus earlier this year.



Tyler Firkus, a graduate student, holds a saugeye. The fish can fetch up to \$16 a pound.

**“We need a private industry partner to step up to the plate on this aspect of providing biosecure, feed-trained, intensively reared fingerlings to support the industry.”**

— CHRIS HARTLEB  
UW-STEVENS POINT PROFESSOR OF AQUACULTURE

Walleye offers its own economic advantage. One-pound fillets typically fetch anywhere from \$14-16. And as Hartleb is in the process of showing, walleye can be the cornerstone of a successful aquaponics operation. At the Aquaponics Innovation Center in Montello, Hartleb is raising walleye at the same low, medium and high density as the saugeye. The water containing the fish waste is drained, filtered and oxygenated, then pumped into tanks to provide nutrients to a wide variety of greens, from multiple types of lettuce to kale. Hartleb has even taken a stab at growing broccoli.

So far, the results are encouraging. Walleye in the low-density tanks grew the best, growing as large as a pound and a half. In the medium-density tanks, 93 percent of the fish reached one pound. The high-density tank was somewhat less successful — 70 percent of the fish did not reach a pound.

Given the dual thrust of an aquaponics operation, that’s not necessarily bad news.

“If you find the lowest density is best, why wouldn’t you grow more plants?” Hartleb asked.

With another year to go on the project, a significant amount of data analysis remains, and a few

bottlenecks will need to be resolved before walleye and saugeye can truly go mainstream. The biggest one is the lack of a nursery provider. If a new start-up wants to begin raising walleye and saugeye, they need fingerlings. Walleye fingerlings are typically grown for stocking in lakes, not fueling startups, and UW-Stevens Point NADF doesn’t yet produce enough saugeye fry to become a regional supplier.

“We need a private industry partner to step up to the plate on this aspect of providing biosecure, feed-trained, intensively reared fingerlings to support the industry. We know how to do this successfully and can help with training and setup,” said Fischer.

That’s where the education and outreach piece of the project comes in.

“We have the know-how. We have the tools. We can teach anyone,” said Hartleb.

Fischer agrees, “If we can resolve some of these questions and continuing working with and educating interested fish farmers, I’m confident that walleye and hybrids will be the next big thing for Wisconsin aquaculture.”—ARC



## On Our Minds: Flooding

The hurricane season of 2017 brought record-breaking storms, and the risk of flooding continues to rise in many parts of the country. Be prepared and learn more — these titles and others are available from the library.

### DESIGN FOR FLOODING: ARCHITECTURE, LANDSCAPE, AND URBAN DESIGN FOR RESILIENCE TO FLOODING AND CLIMATE CHANGE

By Donald Watson. Hoboken, N.J.: John Wiley & Sons, 2011. *Design for Flooding* presents best practices and lessons to create buildings and communities that are more resilient in the face of severe weather, climate change and rising sea levels. This book is for architects, urban planners and urban designers, as well as water resources engineers and landscape architects.

### FLOOD HAZARDS: IMPACTS AND RESPONSES FOR THE BUILT ENVIRONMENT

Edited by Jessica Lamond, et al. Boca Raton, Fla: CRC Press, 2012.

Flood risk can unite or divide communities, and the responses to potential risk can range from denial to perfect adaptation. Drawing on the experience of communities and experts, this book offers guidance on managing urban flooding and flood risk.

### FUTURE FLOODING AND COASTAL EROSION RISKS

Edited by Colin R. Thorne, Edward P. Evans and Edmund C. Penning-Rowse. London: Thomas Telford, 2007.

*Future Flooding* describes increasing flooding and coastal erosion risks in the United Kingdom and presents an examination of the integrated measures necessary to manage future increases in risk through sustainable methods.

### THE FLOODS OF 1993: THE WISCONSIN EXPERIENCE

By the Wisconsin Department of Natural Resources, Bureau of Water Regulation and Zoning. Madison, Wis.: Wisconsin Department of Natural Resources, 1993.

This overview of the 1993 Midwest floods provides a detailed look at the causes and effects.

### URBAN FLOOD MANAGEMENT

By Chris Zevenbergen, et al. Boca Raton, Fla.: CRC Press, 2011.

This textbook integrates hydrology, sociology, architecture, urban design, construction and water resources engineering. The subject is approached from an international perspective and includes case studies, exercises, expert advice and literature recommendations.

Please visit the Water Library at [waterlibrary.aqua.wisc.edu](http://waterlibrary.aqua.wisc.edu) for more information or to learn about this important topic.

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

# Watershed Program Journeys Into New Territory

Deidre Peroff, Wisconsin Sea Grant's social scientist, helped evaluate a summer program designed to connect middle-school children in Milwaukee with their Lake Michigan watershed. Journeys Into the Watershed – Making Connections, was led by the Milwaukee Metropolitan Sewerage District (MMSD) and left a number of “firsts” on national and local levels in its wake.

Funded by a grant through the National Marine Sanctuary Foundation, the program is the first effort to link National Oceanic and Atmospheric Administration programs with local Community Learning Centers supported by the U.S. Department of Education.

On the local level, the watershed program marked the first time the MMSD had worked with Community Learning Centers in Milwaukee. In addition to Sea Grant, other program partners included Wehr Nature Center, Upham Woods Outdoor Learning Center, Urban Ecology Center, Milwaukee Public Schools Recreation Department and the University of Wisconsin-Milwaukee School of Freshwater Sciences.

“We were one of 17 entities in the country to receive grants from the National Marine Sanctuary Foundation to pilot this new program,” said Kate Morgan, outreach program coordinator for MMSD.

The MMSD worked with two of Milwaukee Public School District's community learning centers, offering a seven-week experience for 90 students and about 10 staff members to explore their local watershed using new tools and technology to determine the health of the environment. They visited wetlands, a river and the shores of Lake Michigan. They also visited MMSD facilities to learn about the wastewater treatment process.

Morgan sought out Peroff because she knew of Peroff's evaluation expertise and interest in environmental education.

## The biggest change was in knowledge about the watershed, which changed 100 percent for both the students and the educators.

Peroff assessed the pre- and post-program knowledge and attitudes of both students and teachers through surveys. But she also went above and beyond the normal call of duty.

“I tried to go at least once a week to help out with the field trips and learn about the partners,” Peroff said. “I wanted to see what the students were learning so that I could better judge their changes in attitude and knowledge.”

The biggest change she found was in knowledge about the watershed, which changed 100 percent for both the students and the educators. They could now successfully answer questions about what kinds of animals live in the water, what kinds of technology can be used to test the health of the water and whether they live in a watershed.

“They were really surprised that they drink water that comes out of Lake Michigan. They didn't know that before,” Peroff said.

Morgan would like to do more summer programming. “The kids were excited to participate and use the tools and technology that we brought to the program,” she said. “We became very close with these kids and they with us. We not only delivered an engaging program, we developed relationships.” — MEZ

Some of the 90 middle-school students who participated in the seven-week watershed education program in Milwaukee (below).



Deidre Peroff / Wisconsin Sea Grant





Gene Clark / Wisconsin Sea Grant

## Sea Grant Helps Speed up Erosion Solutions for Mt. Pleasant Residents

Lake Michigan water levels rose four feet from 2013 to 2016, and the high water levels eroded coastal bluffs and beaches. Mt. Pleasant, Wis., was a community particularly hard-hit, with one homeowner moving a house and another tearing down the garage before it toppled into the lake. At least a dozen other garages and public utilities were also endangered.

Concerned residents looked for help, and they needed it fast, before the next storm struck and waves did further damage. In response, Gov. Scott Walker asked the Wisconsin Emergency Management (WEM) agency to hold public meetings in 2016 with residents and local officials to discuss the issue and what measures could be taken.

Among those presenting at the two meetings was Wisconsin Sea Grant's Coastal Engineer Gene Clark. Along with representatives from WEM, the Wisconsin Department of Natural Resources (DNR), the U.S. Army Corps of Engineers, the Wisconsin Coastal Management Program and the University of Wisconsin-Madison, Clark helped explain why the erosion was happening and provided information and resources to the homeowners to help them determine the next steps to protect their properties.

Usually, people who want to take measures to control coastal erosion need to wait a minimum of 30 days before their plans and permits are approved by the DNR. However, before the second meeting, Clark and Martye Griffin with the DNR were able to figure out a way to speed up the process.

"My main work was helping Martye develop a temporary permit that could be issued in 48 hours so that

property owners didn't have to wait for 30 days or more," Clark said. "The measures allowed under the temporary permit weren't going to be a cure-all, but at least they were going to slow things down so that homeowners could then get an expert working to design a long-term fix. It gave them hope that they could do something."

The simplified permit allowed homeowners to place protective rocks at the base of their bluffs to slow down the erosion, with the caveat that they would work with a professional contractor within the next year or two on a final solution. However, it couldn't be just any old rock, and the rock couldn't simply be dumped over the side; it needed to be carefully placed on the bluff. Clark helped the DNR work out those details.

Clark estimates that four out of a dozen homeowners who attended the meetings used the quick permit to save their property. Clark is also working with a group of 14 homeowners in Mequon, Wis., who are facing similar problems. An infusion of \$840,000 from the National Oceanic and Atmospheric Administration will have many of the same partners working together on Lake Michigan erosion solutions over the next three years.

Eventually, the U.S. Army Corps will get a plan in place for a fix in Mt. Pleasant, but that process alone will probably take two years, Clark said, and then several years after that before protective structures are built.

"I'm really glad we were able to help these folks," Clark said. "They were in a dire situation, with a vertical bluff face that wasn't stable at all. It wasn't going to last much longer." — MEZ

## Ducking AIS

Last fall, Tim Campbell aimed his aquatic invasive species (AIS) prevention messages at a new audience: Wisconsin's waterfowl hunters.

"We're really good at reaching our target audience of recreational boaters," said Campbell, an outreach specialist with Wisconsin Sea Grant. "What that also means is we're great at reaching boaters from Memorial Day to Labor Day."

That's a good and important thing, since those boaters represent the most common way aquatic invasive species and plants — from zebra mussels and spiny water fleas to Eurasian milfoil and starry stonewort — can move from one lake to another, facilitating their dangerous and expensive spread.

But anglers and recreational boaters aren't the only ones with the potential to move invasive species. Waterfowl hunters, who tend to come out en masse on Wisconsin's waters in the months of September and October, when summer boat inspectors have typically gone home for the season, also have unique equipment that presents its own set of risks. Decoys, waders, boots and hunting dogs can all be vectors for AIS. According to Campbell, every Wisconsin hunting season sees at least a handful of hunters using non-native — and dangerously invasive — phragmites plants as part of their duck blind material.

In 2014, Wisconsin AIS Partnership representatives conducted behavior surveys among more than 400 Wisconsin waterfowl hunters to get a better sense of how they like to hunt and how much they know about preventing AIS. Among the things they discovered: At least 50 percent of them hunt in more than one body of water.

"Most hunters are aware that AIS is an issue," said Campbell. "There was a portion for whom it didn't yet click that it also applied to where they were hunting."

The behavior surveys indicated hunters would be willing to scrub and dry their equipment after use and before taking it to a second body of water.

"Basically, most are willing to do anything short of using chemicals," said Campbell.

Reaching the waterfowl hunters with the classic clean, drain, dry message presents challenges. Unlike recreational boaters who often begin their fishing trips from easily accessible public boat launches, waterfowl hunt-

## At least 50 percent of waterfowl hunters hunt in more than one body of water.



Chris Hamerla



Brad Stekart

ers tend to hunt in scattershot locations. Campbell turned to wardens and the water guards with the Wisconsin Department of Natural Resources who were more familiar with the hunting hotspots.

Campbell said becoming more responsive to waterfowl hunters' habits is likely to be part of making sure the AIS message is delivered successfully — for instance, recognizing that hunters may be likely to take a hunting trip in the middle of the week rather than on a weekend to take advantage of ideal weather, or that they're likely to be at access points at different times than recreational boaters. Last year, as part of

a UW-Extension-led pilot project,

watercraft inspectors learned that talking to hunters as they came off the water at the end of a trip rather than the beginning led to better interactions.

"Having street cred also helps," he noted. "Being able to identify a few ducks can go a long ways toward making a connection and sharing our message. Luckily partners with those skills will actually be at the access points." — ARC

## River Talk Series Enters Fifth Year

The popular talks about the St. Louis River Estuary are entering their fifth season of bringing science out of the university and into the community. The evening monthly talks in Superior, Wis., are the result of a partnership between the Wisconsin

and Minnesota Sea Grant programs and the Lake Superior National Estuarine Research Reserve. They are all taking place in the reserve's new interpretive center on Barker's Island, called the Estuarium. For the full schedule, please visit [go.wisc.edu/9mj8ex](http://go.wisc.edu/9mj8ex).

Kate Angel, Wisconsin Coastal Management Agency



## New Initiative Will Build Resiliency in Lake Michigan Coastal Communities

Adam Bechle, far left, examining vulnerable lakefront property. He is joined by Nick Adams, a UW-Madison graduate student, and Sea Grant's Coastal Engineer Gene Clark, right.

Wisconsin Sea Grant will play a big role in a new \$840,000 grant from the National Oceanic and Atmospheric Administration Coastal Resilience Grants Program to the Wisconsin Coastal Management Program. It is among the partners on a new, three-year multi-faceted project to protect Lake Michigan shoreline homes, beaches and harbors.

The effort builds on prior Sea Grant work in Kenosha, Racine, Milwaukee and Ozaukee counties, which are dotted with natural and man-made features susceptible to damage from erosion, fluctuating water levels and coastal storms with pounding surf and high winds.

"This infusion of nearly \$1 million in federal money recognizes the importance of the Great Lakes to our nation's economy and the unique coastal challenges the region faces. For example, our current above-average lake levels combined with high-energy storm waves have increased erosion of the coast. Private property owners and local officials need to be able to protect assets — homes, garages, sheds and yards, as well as public features important to commerce and tourism, such as harbors, beaches and other lakefront recreational spots," said Adam Bechle, the former J. Philip Keillor Fellow, a position supported by Sea Grant and the Wisconsin Coastal Management Program. Bechle was the primary architect of the successful grant application during the time of his fellowship earlier this year.

Four coastal counties, 22 coastal municipalities and various state and local organizations will be the focus of the work.

The new grant will allow partners — the University of Wisconsin-Madison Department of Civil and Environmental Engineering and the Southeastern

Wisconsin Regional Planning Commission — to complete a number of tasks.

"Lake Michigan communities are vibrant places, but also face challenges when the lake's waters rise and fall, weakening natural physical structures and threatening man-made ones," said Mike Friis, director of the Wisconsin Coastal Management Program. "We have some outstanding partners with deep expertise in areas that will benefit southeastern Wisconsin. For many years, we have collaborated with the organizations who are now partners on this grant — whether it's setting up rip current and dangerous wave warning systems, advising towns on how to better build or repair marina infrastructure or preventing beach erosion. We have been successful in improving the quality of life in our state and boosting economic potential. This grant offers yet another way to continue some very well-started efforts."

The new efforts also build on work from the summer and fall of 2016 when Sea Grant conducted five public meetings with southeastern Wisconsin residents and local officials about higher water levels that cause bluff collapse, putting homes and other property at risk of sliding into the lake. At the meetings, Sea Grant staff identified more than 60 action items to address the effects of rising Lake Michigan water levels.

"Across the nation, a core part of Sea Grant's service to coastal communities is ensuring resiliency, both economic and as a matter of practical applications. The effectiveness of these efforts is evidenced by how many of the federal awards involve Sea Grant's expertise," said Sea Grant Director Jim Hurley. "I am pleased that is the case here in Wisconsin as well." —MH

# The Root of Water Use

continued from page 3 >>

Station near Minocqua since 2015, plans to monitor wells — 10 in the Central Sands region and 15 near Trout Lake — to examine and measure the size of daily fluctuations in the water table. The bigger the fluctuations, the more groundwater is being used by the trees.

While using wells to track water-table fluctuations covers the present, Loheide and Ciruzzi's sights are set higher. Another aspect of the project looks to tie current groundwater use to the trees' past groundwater use. Ciruzzi is also collecting cores from the trees in both regions — cores so small they can be stored in drinking straws — and measuring the growth rings. When the growth rate is low, it's an indicator of a dry year and deep groundwater.

"We want to use the growth rings, the chronology held within the trees themselves, to tell us how pro-

"In an area where the water table depth has changed, for whatever reason, changing climate, or well pumping, we would expect you'd see more variability in the growth rates recorded in the tree rings," said Loheide.

Loheide and Ciruzzi are aware that analyzing the data will be complicated, as will compiling a coherent story from the data and the long-term historical record, particularly given that groundwater levels and tree growth are constantly changing in space and time.

"Shallow groundwater is a real buffering resource for these trees," said Ciruzzi, who noted that early evidence suggests that both climate and groundwater pumping are having an impact on groundwater history in the region. "That relationship definitely exists in the Central Sands region."

Graduate student Dominick Ciruzzi collects a core sample from a tree to measure the growth rings.

Sara Stathas



ductive those trees were in the past," said Loheide. "We want to use that as a historic archive of how much water they were using. If we can link it with the trees' water usage and growth now under current conditions, we can reconstruct a record of what was happening in the past."

Loheide and Ciruzzi's hypothesis is straightforward: In areas where the groundwater is shallow and close to the surface (3-8 feet), trees will be able to access it and grow consistently and productively. In areas where the groundwater is deeper, the tree growth rates will vary more significantly.

Ultimately, the team's research could affect forest management strategies, influencing where future forests are planted and where existing forests might be maintained or removed. It's also likely to have an impact on the ways in which managers and local farmers allocate groundwater resources.

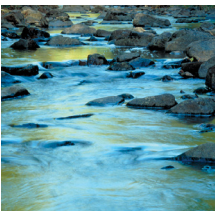
"The effects really go two ways," explained Loheide. "There's the effect that the forests are having on the groundwater system by using it and changing water levels on their own, and then there's the effect changing water levels are having on the forest." —ARC



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

# Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources



## CALENDAR OF EVENTS

**FEB. 3, 2018**

**Lake Sturgeon Bowl**

Milwaukee

[uwm.edu/freshwater/community-outreach/sturgeon-bowl](http://uwm.edu/freshwater/community-outreach/sturgeon-bowl)

**FEB. 19 – 22, 2018**

**Aquaculture America 2018**

Las Vegas

[was.org/meetings/pdf/AA2018RegBro.pdf](http://was.org/meetings/pdf/AA2018RegBro.pdf)

**FEB. 11 – 16, 2018**

**Association for the Sciences of Limnology and Oceanography, Ocean Sciences**

Portland, Oregon

[osm.agu.org/2018/#](http://osm.agu.org/2018/#)

**FEB. 20 – 22, 2018**

**Wisconsin Wetlands Association's Conference**

Oconomowoc, Wis.

[conference.wisconsinwetlands.org](http://conference.wisconsinwetlands.org)

**MARCH 8 AND 9, 2018**

**American Water Resources Association**

**Wisconsin Section Annual Meeting**

Appleton, Wis.

[state.awra.org/wisconsin](http://state.awra.org/wisconsin)

## You Can't Water Down Giving

There's probably a list of organizations that hold meaning for you. As 2017 comes to a close, perhaps you are considering gifts to those organizations. Please consider adding Wisconsin Sea Grant and the University of Wisconsin Water Resources Institute to that list. Such a charitable donation is anything but watered down because you are playing a direct role in supporting research, education and outreach to promote the sustainable use of Wisconsin's waters. Visit [go.wisc.edu/n6xjc2](http://go.wisc.edu/n6xjc2) for an online form or contact Moira Harrington at (608) 263-5371 or [moira@wisc.edu](mailto:moira@wisc.edu) to learn more.

