2014 volume 2

Aquatic Sciences Chronicle

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

INSIDE:



Bacteria Hunter



Farewell, Phil



Sturgeon Bowl Winners

SEA GRANT RESEARCH

Researchers Identify New Burbot Spawning Behavior

t's a winter's night on Lake Michigan. Underwater in the shallows, the eel-like and lowly burbot gather in a brown writhing mass to spawn. With their serpentine bodies and dangly chin barbels, it's not a pretty picture, but the activity ensures the species' survival as one of the top predators in the food chain, along with lake trout.









The only species of cod living entirely in fresh water recently yielded spawning secrets, with

implications for resource

managers who track the

fish's interactions with

sculpin and lake trout.

Wisconsin Sea Grant scientists have discovered that burbot also spawn in deep reefs later in the season than previously known. Their findings, recently published in *Transactions of the American Fisheries Society*, add a fifth spawning behavior to those already identified for burbot.

Burbot, known in Latin as *Lota lota* from the French word for codfish, are the only species of cod that live entirely in fresh water. Also known as eelpout, lawyer and lingcod, the burbot is prized for its delicate white meat. A popular restaurant on Washington Island off the Door Peninsula, KK Fiske, draws patrons from as far away as Chicago by offering "fresh lawyers" throughout the year prepared fried, boiled, broiled and shish kebabed. However, just as many anglers are put off by the burbot's eel-like appearance and penchant for wrapping its tail around their arms as they try to unhook it.

For the study, conducted in 2007 and 2008, researchers collected burbot larvae in lakes Superior, Michigan and Huron during spring and summer. While burbot are known to spawn in landlocked lakes and Great Lakes tributaries in winter (January to March), and in rocky shallow waters of

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Aquatic Sciences Chronicle

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FEATURED SOCIAL MEDIA + WEB

New Podcast Series Explores What's Below and Around Us

seagrant.wisc.edu/podcasts

Aquifers and watersheds—these geological features lie at the heart of hydrology and water resource conservation, yet they both can seem like somewhat amorphous concepts to many people. Where are they? Where do they start and where do they end? This brand-new podcast series, supported jointly by the Water Resources Institute and Sea Grant, presents clear and entertaining information that answers fundamental questions about these hydrologic regions that are so important to the culture and commerce of our state.



Audio Specialist Chis Bocast in the field.



AQUIFERS AND

WATERSHEDS

The series features experts from numerous disciplines ranging from soil science to dendrochronology, who explain in plain words the foundational ideas underlying the science and practice of hydrology. Episodes like "Streams, Snails and Invasive Species" take the listener out into the field to hear all the sounds of the work and enthusiasm of researchers who are finding solutions to key water-related questions and critical resource management problems across Wisconsin

"I seek topics for our podcast series that appeal to my own sense of curiosity about science and the natural world. I've always wanted to dig deeper into some of the 'nuts and bolts' concepts of hydrology to enhance my own knowledge, and I'm sure many listeners must feel the same way," said Audio Specialist Chris Bocast. "I try to keep our productions both informative and fun to listen to. I know I certainly get a lot of enjoyment going to so many various sites, all across Wisconsin, to capture the interviews and location audio that I use to put these series together."

Visit bit.ly/1e5a1jQ to play or to download for later listening



TRACKING ANTIBIOTIC-RESISTANT BACTERIA THROUGH THE SUBSURFACE SYSTEM — AND INTO WELLS AND ONTO BEACHES.

ike a detective chasing a quick-moving fugitive across Backed by grants from the University of Wisconsin Water wide and varied terrain, Shangping Xu has spent the Resources Institute (WRI), Xu has spent the last four years last decade doggedly pursuing his quarry. While Xu, an looking for the answer. In a previous WRI-funded research associate professor of geosciences at UW-Milwaukee, project, Xu's lab identified the molecular mechanism that isn't tracking a criminal, he is tracking something that's potenaffects the transport of antibiotic-resistant E.coli through tially harmful to all of us: the progress of antibiotic-resistant groundwater in saturated quartz sands and the vadose zone, bacteria through the subsurface system. the subterranean zone in which groundwater remains at atmo-

In Wisconsin, many private wells are contaminated by bacspheric pressure. teria, and manure has long been suspected as the primary Xu's team zeroed in on a specific protein on the outer memsource. Previously, it was believed that manure-derived bacbrane of bacteria called ToIC. Bacteria that heavily express teria simply decayed where they were shed—or, in the case the protein are not only highly resistant to commonly used of famers and fertilization, where the manure was spread. antibiotics but can also speed quickly through a sandy aquifer However, closer study of manure revealed that not only can because the protein alters key surface properties such as the number of bacteria increase more than 10 times over 24 hydrophobicity-the ability to combine with or dissolve in hours, but many of them are resistant to commonly used antiwater—of the bacterial cells. As a result, instead of attaching biotics like tetracycline. Researchers also found that when and being immobilized by the surface of the sand, the bacteria the resistant bacteria seeped into the groundwater, they could remain in the water and travel with the flow. travel farther and faster than anyone expected. Xu's latest WRI project focuses on one of the few areas he

"The antibiotic resistance may be surprising to the public, but not to scientists," said Xu. "But why does antibiotic-resistant bacteria travel faster? We're fascinated by this question."

hunt: Bacterium

has yet to study—the fractured dolomite zone, specifically, the

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SEA GRANT INSTITUTE OWNER RESOURCES INSTITUTE

wisconsin'swaterlibrary



Science Is Fun!

Water Library staff love working with children ages three and up, teaching them water-science concepts through literacy and experimentation. We have taught about buoyancy, clouds and animal blubber, to name just a few. Here are suggestions for some great experiments. And do try this at home!

THE EVERYTHING KIDS' EASY SCIENCE EXPERIMENTS BOOK: EXPLORE THE WORLD OF SCIENCE THROUGH QUICK AND FUN EXPERIMENTS!

By J. Elizabeth Mills. Avon, Mass.: Adams Media, 2010. Why is the sky blue? What makes a balloon float? You can discover the answers to these questions and more in this volume filled with science experiments suitable for the classroom or home.

KID'S BOOK OF SIMPLE EVERYDAY SCIENCE

By Kelly Doudna. Minneapolis: Scarletta, 2013. This book of 40 experiments starts off with an important message: Do you want to be a scientist? You can do it. It includes a list of essentials, a pictorial spread of required materials, a five-step introduction to the scientific method and safety information.

PICTURE-PERFECT SCIENCE LESSONS— EXPANDED 2ND EDITION: USING CHILDREN'S BOOKS TO GUIDE INQUIRY, 3-6

By the National Science Teachers Association. Arlington, Va.: NSTA, 2010.

The Picture-Perfect Science Lessons series combines science and reading in a natural way and provides easy-to-grasp background information in physical science, life science, and Earth and space sciences. The classroom-tested lessons clearly identify the appropriate National Science Education Standards and embed carefully selected reading strategies.

SCIENCE IS SIMPLE

By Peggy Ashbrook. Beltsville, Md.: Gryphon House, 2003. "Science Is Simple" contains 250 activities spanning 39 kidpleasing science concepts. From magnets to bubbles, insects to volcanoes, there are experiments to interest each and every child.

Anyone in Wisconsin can check these books out from Wisconsin's Water Library. Please send an email to **askwater@aqua.wisc.edu**.

For more science-related fun for kids, visit these websites:

sesamestreet.org/parents/topicsandactivities/toolkits/stem kids.nationalgeographic.com/kids/activities/funscience/

programpeoplenews

Through Word or Deed, Get to Know Our Outreach Staff

There's a diverse and talented cast of 10 outreach staff members at the Aquatic Sciences Center. Get to know them a bit better by reading their Web pages through the staff directory tab at seagrant.wisc.edu. Most pages also feature a biographical or topical video.



You might be struck by the fact that:

- They've got their fingers on the pulse of coastal needs. Last year, they presented at a total of 145 meetings, conferences and workshops, reaching 9,014 people.
- There are four Ph.D.s in the group and the rest have master's degrees.
- In the last year, they coordinated 395 volunteer hours.
- They reached 6,252 K-12 students over the past 12 months.

Their expertise includes aquatic invasive species, fisheries, education, aquaculture, coastal engineering, coastal hazards, coastal storms, water quality, habitat restoration, geographic information systems and social science.

Protect the Places You Play!

Getting members of the public involved in raising awareness about not inadvertently transporting aquatic invasive species like guagga mussels and milfoil isn't always easy. Getting them to film brief videos about the topic might be easier. Over the month of June, UW Sea Grant is teaming up with the Wisconsin Invasive Species Council to host a video contest. Participants are encouraged to use Vine, a social media plug-in that lets users film six-second videos on smartphones and tablets, to create their own "Protect the Places You Play" themed videos and share them on Sea Grant's Facebook page. As the example filmed by Sea Grant staffers shows, creativity is highly encouraged. Check out the rules at **seagrant**. wisc.edu/ISAM.

Great Lakes BIOTIC Symposium

Sometimes, they sneak in through a bucket of live bait. Sometimes, they're on ice in the back of a truck, destined for sale at an illicit market. And sometimes, they're released into the environment by a pet owner looking to shed some responsibility. But however they arrive in their new destination, invasive species can be utterly destructive, upsetting natural food webs and creating expensive headaches in their new homes. On June 3 and 4. Sea Grant Outreach Specialist Tim Campbell is teaming up with the Great Lakes Sea Grant Network to stage the Great Lakes Briefs on Invasive Organisms Traded in Commerce (BIOTIC) Symposium in Milwaukee. The event is designed to review current efforts and identify gaps in the research and management of invasive species like the red swamp crayfish, snakehead and parrot feather. Learn more at seagrant.wisc.edu/OIT.



White Paper

As part of an ongoing Great Lakes Sea Grant Network project, Titus Seilheimer, the fisheries outreach specialist for Wisconsin Sea Grant, is compiling a white paper that will list all the current Asian carp projects underway by Great Lakes and Mississippi River basin researchers. The overarching goal is to develop an education and outreach program that the network's Asian Carp Coordinating Committee can use to help educate legislators and the public on the voracious and prolific filter-feeding fish and the environmental threat it poses.

Seilheimer is focusing on talking to experts about the gaps that may exist in the current Asian Carp research landscape—and which topics need to be focused on next. "It looks like early life history is coming out as very important to understanding the carp phenomenon," he said. "Identifying the cues that cause the carp to spawn could be very key in identifying ways to short-circuit their advance."

Social Science Reaches the Summit

Jane Harrison, Wisconsin Sea Grant's social scientist, was part of a quiet revolution that occurred during the 4th Annual St. Louis River Estuary Summit meeting in February at UW-Superior. The two-day summit brought together more than 200 scientists, natural resource managers, industry members, students and community members to share the latest information about the estuary, which is a designated area of concern.

For the first time, a large chunk of one of the days was devoted to social science instead of the typical natural science presentations. Harrison was part of a panel of five social scientists, which included Minnesota Sea Grant's Hilarie Sorensen and UW-Milwaukee student Katie Williams. They provided an overview of social science methods and projects to summit-goers and answered questions at the end of the two-hour session. They demonstrated how social science can be used to address natural resource management issues and how it can help scientists understand the current state of public knowledge and societal values regarding their projects.

Websites Share the Glories of a Wisconsin Summer on the Beach

With the thickest ice cover in 35 years on lakes Michigan and Superior finally receded and yielding the coastline to the glories of a Wisconsin summer, it's a good time to remind those planning a trip to Milwaukee County beaches or to Park Point Beach in Duluth of a handy Web-based daily beach report.

 $\label{eq:main_state} Milw county beaches. or g \ \text{and} \ parkpoint beach.$

org collect and share a wide range of beach information such as rip current forecasts, water quality, harmful algal blooms, wave heights, water temperature and weather data. Live-cams also give a birds-eye and real-time view of the beach action.

The websites are part of a project funded by the federal Great Lakes Restoration Initiative and involve the Sea Grant programs in Wisconsin, Minnesota and Michigan. The Milwaukee County Parks Department is also a partner in Milwaukee.





Grant in 2013. "Phil looked at my research background and saw potential there. I'm now making a place for myself in Wisconsin's aquatic community." "Phil is Wisconsin Sea Grant to a lot of people," Campbell said. "When I first started here, I had a lot of people ask me, own.

Lakes Panel on Aquatic Nuisance Species. It's the first project that connected him to shippers and carriers, two groups that recognized their ships' ballast waters represented a potential vector for AIS spread-but also had some concerns of their 'Are you the new Phil Moy?' Phil did so much stuff for us-I "They were concerned about biologists developing policies usually told them I'm not even half of a new Phil." that could hurt their business," said Moy. "Something had to Moy was born in Washington, D.C., where his father be done, but you couldn't expect immediate compliance."

worked for the National Institutes of Health and his mother was a teacher. Moy's family moved to the Midwest, where, after getting a degree from Southern Illinois University, he ended up working with the Illinois Natural History Survey

His closing touch for Sea Grant has been helming a project and the Corps before migrating to Sea Grant. designed to teach national fishing tournament organizers ways "I really liked the Great Lakes," Moy said. "Big waters, big they can help prevent the spread of AIS. Working with Great Lakes Sea Grant programs and tournament heavy hitters like fisheries and big problems." Moy enjoyed a lot of success, but his proudest triumph came Cabela's and The Bass Federation, Moy has reached one of the in 2002, when he recruited Babe Winkelman, the famous TV constituencies best placed to make a difference.

and Barriers Define Moy's Tenure

hose who meet and work with Phil Moy are often struck by his height, his piercing stare and his occasionally blunt demeanor. In the 15 years he's worked with Wisconsin Sea Grant, first as a fisheries specialist in the organization's Manitowoc office, then as outreach coordinator and assistant director for research, few reached out to create as many partnerships and build as many bridges as Moy.

Moy left Sea Grant in May to take a job with Smith-Root, Inc., a Vancouver, Wash.-based company that designs, among other things, the technology that powers the electrical barrier currently working to keep the invasive Asian carp out of the Chicago Area Waterway System and the Great Lakes. It's an appropriate career move. Moy spent time in the early 1990s working with the U.S. Army Corps of Engineers, the governmental agency charged with monitoring the barrier and solving the carp problem. With Smith-Root, he'll work to link academic researchers with the products his company produces.

Controlling aquatic invasive species (AIS)-please don't call them "invasives," said Moy-has been the centerpiece of Moy's time with Sea Grant. For his first field assignment, then Advisory Services Director Al Miller sent him to West Bend, Wisconsin, to untangle an expert-related territorial dispute that had resulted in Minnesota Sea Grant Aquatic Invasive Species Program Coordinator Doug Jensen being invited to address a Wisconsin group on the burgeoning invasion of zebra mussels into state lakes.

Moy recalled accosting Jensen in the parking lot afterward.

"I've got to tell you, Doug-you're never to come back to Wisconsin," Moy said. "Now, let's go have a beer." The he gave me my first 'real' job," said Seilheimer, who joined Sea



two would spend the next decade-plus working together on countless AIS projects.

It's that dry sense of humor that many people will recognize. Moy was also easily the most-traveled member of the Sea Grant staff, racking up the miles as he visited four countries (US, Canada, Ireland, Norway), two provinces (Ontario, Quebec), 33 states and Washington, D.C., talking about invasive species and fisheries issues-and leading to a popular "Where's Phil?" series on social media.

Moy presided over the selection and hiring of a new wave of young and up-and-coming outreach specialists: Tim Campbell (aquatic invasive species), Titus Seilheimer (fisheries), Julia Noordyk (coastal communities) and Jane Harrison (the organization's first social scientist).

"Phil will always have an important place in my life because





angler, to partner with Sea Grant, using Winkelman's celebrity "It's really about recognizing the species du jour-identiand reach to further the fight against the spread of aquatic fying what's going to grab people's attention" said Moy. "The round goby doesn't clog pipes or cut your feet when you walk invasive species. "It was really about reaching out to a different group of on the beach. Carp are big, and they jump out of the water, people on invasive species," recalled Moy of the project. "This hurt people and break things." was a big deal. At the time, Babe was touting Eurasian water-Aquatic Sciences Director Jim Hurley said, "With Phil's milfoil as good fish habitat. By the time we were done talking departure, a lot of Sea Grant history departs. We are grateful to him, he had done a complete about-face." for his contributions to a more sustainable Great Lakes basin The 30-second ad Winkelman produced with Sea Grant through his years with us. It's good to know that he'll bring achieved a massive reach by any historical standards: More his deep knowledge of complex ecosystems to a company that than 17 million people viewed it. When it came time to report addresses such issues around the globe."

the project's impact to NOAA, Moy found that the reporting system wouldn't recognize a figure that high.

"We blew it up," he said.

Moy's also proud of the work he did in bringing constituencies together to create a new ballast water policy for the Great

UNIVERSITY OF WISCONSIN

Instead, Moy helped the groups hammer out some formative ballast-water guidelines the state of New York eventually put into place.

> "Big waters, big fisheries," said Phil Moy about the Great Lakes. During his time on them, he built many bridges to people and organizations to foster sustainability.

For his part, Moy said, "I'll miss you guys. There are good people here," but that he plans to do what he did in the Midwest-get to know an area's history and ecology and then apply it for company projects around the world.

All the better to keep building bridges, and barriers.—ARC

SEA GRANT RESEARCH

Burbot Research



continued from page 1

the Great Lakes, researchers found burbot larvae at deep reefs in the middle of Lake Michigan and offshore areas of Lake Huron in June through

Burbot live on rocky bottoms, that some popuwhich can't be reached with traditional trawl methods.

August, signifying lations of burbot spawn later and deeper than previously understood. John Janssen, professor of fish-

eries ecology at UW-Milwaukee, said the finding was accidental. "We were working on collecting bloater larvae, and we were surprised by the number of burbot we collected on the midlake reef. We were also surprised that we were seeing them in late June. They were really tiny, which means they were just born. This implies there's a concentration of burbot on those mid-lake reefs."

Janssen explained that although midlake reefs are deep in the water and away from sunlight, they offer plenty of food for young fish due to their topography and the currents that collect around them. "The abrupt topography concentrates zooplankton. They swim against the current and get deflected upward. Or larger zooplankton, like





David Jude (third from left) and other researchers were collecting bloater larvae and made an unexpected discovery: large numbers of small burbot on a midlake reef. It indicated spawning in a surprising location.

Mysis, will try to migrate down to their preferred depth and the reef stops them." This concentrates the food that young fish need to survive.

Janssen said these findings will help fisheries managers in their quest to manage on an ecosystem basis. "Burbot interact with many other fish. They like to eat a lot of sculpins, which are eaten by lake trout, and sculpins eat lake trout eggs. Knowing more about when and how burbot spawn adds more information to figure out the interactions between species."

The findings could also help with efforts to count burbot. Janssen said that current census efforts rely on trawl nets over soft-bottomed areas of Lake Michigan. "We know now that burbot live on rocky bottoms, which can't be reached with traditional trawl methods. In terms of understanding how the Lake Michigan ecosystem works, we could go down with a submersible to ground-truth what's happening with the burbot population," Janssen said.

Another question Janssen would like to explore is from where the burbot that spawn midlake originate. "Are they born in streams and then drift out midlake and eventually spawn? Or were they born on the reef, or somewhere in between? That's a big question that we could probably answer."

For more information on burbot, visit eatwisconsinfish.org. and scroll down to "burbot." -MEZ

WATER RESOURCES RESEARCH

Tracking Bacterium

continued from page 3

area ranging from Green Bay to Milwaukee along the Lake Michigan shoreline. Here, Xu explained, sandy topsoil lies atop dolomite, and bacteria traveling through the soil can spread within the dolomite system. Xu and his colleagues went out to quarries to cut out and collect dolomite samples, then injected the antibiotic-resistant bacteria into the rocky material to see how much of it was immobilized and how much passed through unencumbered.

"This is not commonly done," says Xu of the lab work. "And it's actually quite challenging."

While results aren't yet final, preliminary findings suggest the transport behavior of bacteria within the dolomite shares the same pattern as within quartz sands and the vadose zone.

"It seems dolomite has no positive charge to immobilize the bacteria," said Xu. "They'll travel right through with little retardation."

Xu's findings could have health implications for the safety of water in farmland wells.

"When farmers spread manure, it can spread beyond where they've placed it, and a farmer's well is typically not far from the field," explained Xu. "Because we now know that antibioticresistant bacteria travel fast and even longer distances than we originally thought, if you're seeing bacteria in the well, it's even more likely to be antibiotic-resistant."

The ultimate goal, of course, is the creation of a system to track the bacteria, the way law enforcement officials track criminals on house arrest.

"Once we fully understand the process, we'll be able to do source tracking, to point to where we know exactly where the contaminated bacteria are coming from," Xu said. "If contamination is a one-time episode, it's no big deal. But in this case, there's a continuous supply of contamination."

The findings from Xu's lab are also applicable to beach sands. At this point, Xu's research can dovetail with the beach health monitoring research work of UW-Milwaukee's Dr. Sandra McLellan, work that's funded by the University of Wisconsin Sea Grant Institute, WRI's sister institute in the UW Aquatic Sciences Center. —ARC

(from left) Esther Gland Sophia Koch, Team Captain Claire Arneson Tana O'Keefe and Tyler O'Keefe represented Wisconsin at the National Ocean Sciences Bowl in Seattle this spring



Spring Valley High School Springs at Chance to Savor Science

Captures State Championship in Marine Science at Lake Sturgeon Bowl

from Spring Valley in Pierce County, Wisconsin, emerged victorious in the 2014 Lake Sturgeon Bowl. The bowl is the state qualifying round for the National Ocean Sciences Bowl (NOSB). It was the second year in a row they captured the top spot, once again wresting the crown from the traditionally strong Marshfield High School, which had won every other competition going all the way back to 2001.

"Our kids work hard to prepare every year. For a long time, we were intimidated by Marshfield's mystique," said Coach Michele Huppert, a National Board Certified Science Teacher for both middle and high schoolers. "The past two years, we've been more relaxed when we play, just working

In February, a team of five high school students hard to prepare, doing our best, and seeing how it turns out."

> Turns out, the team heads to the national competition in Seattle where Wisconsin enjoys a stellar legacy, having won four times. Despite the team's elimination in the third round of the bowl, Huppert noted, "It is difficult to overstate the benefits of the NOSB to all my students. From college-readiness and scientific field experience to big-picture thinking and inspiration to pursue STEM and water-science careers, NOSB has an enormous positive impact."

> Wisconsin Sea Grant is a longtime supporter of the Lake Sturgeon Bowl, providing volunteers, team and coach training, research materials and funding.

Attack Packs: Making Invaders Real

Ask just about any teacher, and he or she will tell you can wreak in our lakes if left uncontrolled could be even hands-on, experiential learning tops lectures and readgreater. That's why educating the public—and the next ing assignments any day of the week. That's a big part generation of lake and river users—is so important. of the reason Sea Grant has Attack Packs available for "Combatting invasive species is one of the top priori-Wisconsin educators to borrow and use with their scities of the Great Lakes Restoration Initiative, which proence-minded students. vided funding for the Attack Packs," said Kathy Kline,

What's an Attack Pack, you ask? It's an attractively Sea Grant education outreach specialist. "By making the designed backpack, packed to the zipper with informapacks available for free checkout, we hope to educate as tion on aquatic invasive species (AIS), from the threats many students as possible about the importance of stopthey pose to our Great Lakes environments and strateping the spread of invasive species." gies to stop their spread. Each pack includes examples of Kline, Wisconsin Water Librarian Anne Moser and AIS famous invaders like zebra mussels and rusty crayfish, Outreach Specialist Tim Campbell frequently use the preserved and encased in easy-to-handle acrylic blocks. Attack Pack in presentations and public talks to student There are handy fact sheets and a USB flash drive filled groups. Wisconsin residents can borrow an Attack Pack for with lesson plans developed by the Great Lakes Sea free from Wisconsin's Water Grant Network. Of course, the most visceral and pop-Library. Visit seagrant. ular piece of the pack: An actual sea lamprey, preserved to ensure its disturbing, slimy effect. wisc.edu/attackpack.

Erin Hunter, a science teacher at East High School in Madison, borrowed an Attack Pack last fall for the limnology/oceanography course she teaches to 10th through 12th graders. She found the pack's contents especially useful for her unit on invasive species in the Great Lakes.

"I liked that the pack was easy to use, and that I could show off examples of various species to the kids," said Hunter, who also adapted her curriculum to include invaders that trouble lakes in her home county. "They liked it because some of the organisms were bigger or 'grosser' than they had thought, and it made them real for the students in a way that showing them pictures on the Internet wouldn't have."

It's that "making it real" part that gets to the core of what the Attack Packs are all about. Preventing the spread of AIS costs millions of dollars each year. The potential water-quality and food-web devastation AIS



When a story ran in the Aquatic Sciences Chronicle last fall about a tree ring study being conducted by Evan Larson, a Water Resources Institute researcher out of the University of Wisconsin-Platteville, Terri Liebmann took note.

Kayla Boebel visits the Liebmann property in Iowa County to core an ancient oak tree, a process that does not harm the tree

The study involved taking core samples from more The trees on the family property are ancient-287 than 400 old oak trees to look for clues to past climate years, to be exact. Historically, it's when Wisconsin-not conditions. even a state-was an outpost in France's flourishing fur Liebmann, Wisconsin Sea Grant Administrative trade. As these oak saplings grew, elsewhere in the world Manager, knew just where to find some oaks. Her hus-Spain was in the process of recapturing Gibralter and band's family owns 250 acres in southwest Wisconsin, in Johann Sebastian Bach was making a name for himself the area of the study, and she invited the research team as a composer.

over for a look. The researchers came once to scout the location and twice to core the trees. They weren't able to trees on their land were the oldest in the study, but finish, so the team will be coming out a fourth time for that the researchers have since discovered older ones. more coring.

to core, and they told me a lot about the different soil types on the property." Liebmann also learned that oaks sometimes leak red sap when cored. "That shocked me, but the researchers said it wasn't abnormal and that the coring wasn't hurting the trees."

Liebmann said that at the time they were cored, the "Knowing that the area was so old was cool. We were "It was really interesting," she said. "I got to learn how happy to be part of the study, as I'm sure everyone else was who participated."

To see a video on this research project, visit seagrant.wisc.edu/videos.



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Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources



CALENDAR OF EVENTS

JULY 28-AUG. 1, 2014

Conference on Ecological and Ecosystem Restoration New Orleans *bit.ly/115D8Zh*

AUG. 6, 2014

Sea Grant and Water Resources at the State Fair West Allis, Wis. wistatefair.com/wp

AUG. 13 AND 14, 2014

Wisconsin Association of Environmental Educators Conference Stevens Point, Wis. bit.ly/1gaMjeC

AUG. 17-21, 2014

144th Annual Meeting of the American Fisheries Society Quebec City *afs2014.org*

SEPT. 9-11, 2014 10th Annual Great Lakes Restoration Conference Grand Rapids, Mich. *conference.healthylakes.org*



The 2014-16 Directory of Projects and People provides a run-down on Sea Grant's planned research, education and outreach activities. It includes detailed project descriptions, contact information for the investigators, Sea Grant resources and a list of participating institution and agencies.

This last category is notable because although the directory spells out planned work, collaboration is the hallmark of Sea Grant's outreach and education efforts. It is through exploring new themes and pursuits with partners that even more innovation and solutions for the sustainable use of the Great Lakes emerge.

Get a copy of the directory by visiting **aqua.wisc. edu/publications**. It is downloadable and contains embedded hotlinks. It can also be mailed out in hardcopy form upon request.

