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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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Golden Anniversary

SEA GRANT RESEARCH



Photo: Linda Wheeler/TravelWisconsin.com

Passing the torch

NATIONAL PARK SERVICE TAKES OVER SEA CAVES WATCH PROJECT

The beautiful and popular sea caves along the Apostle Islands National Lakeshore have been made less deadly for the foreseeable future now that a public safety project designed to prevent kayaking tragedies has been transferred to the National Park Service from Sea Grant and other partners.

SeaCavesWatch.org is a real-time wave observation system that provides webcam photos and wave height, water temperature and wind speed data to kayakers, who can access the website before venturing out on Lake Superior to the sea caves.

“Since SeaCavesWatch.org went online, it’s contributed to a reduction in mishaps in the park,” said Dick Carver with the Friends of the Apostle Islands. “We went from four kayaker deaths in a five-year-period to none in the past five years.”

The Sea Caves Watch project has become so crucial for safety at the Apostle Islands National Lakeshore that the National Park Service has adopted it as part of its regular work plan.

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John Karl/Wisconsin Sea Grant

Beauty Contained
PREVENTING INVASIVE SPECIES FROM
ESCAPING WATER GARDENS

go.wisc.edu/t151ao

Contractors looking to construct the perfect water garden for their customers want to build a backyard paradise, not an environmental hazard. And sellers of plants and animals for those gardens want them to stay in the gardens, not escape and cause trouble.

But trouble can result if both groups aren’t cautious about how they build water gardens and the types of fish and plants they choose to populate them. Common invasive species like goldfish and koi, as well as plants like parrotfeather and purple loosestrife, can disrupt the environment if they’re released deliberately or escape accidentally through unexpected flooding.

Now there’s an easy-to-access resource to help contractors and store owners avoid problems when building water gardens. “Beauty Contained: Preventing Invasive Species from Escaping Water Gardens,” a 12-minute video co-created by Wisconsin and Illinois-Indiana Sea Grant through a Great Lakes Restoration Initiative grant, offers important tips and resources to businesses that deal with water gardens.

“Aquatic invasive plants negatively impact our lakes and rivers, and millions of dollars each year are spent controlling these problematic plants,” said Tim Campbell, Wisconsin Sea Grant’s invasive species outreach specialist. “This is a case where a little information can make a big difference. If this video helps prevent even a single release or escape, it’s more than worth it.”

The video, produced by Wisconsin Sea Grant, identifies several types of risky invasive plants sometimes found for sale in stores—think hydrilla, water hyacinth and phragmites—and points viewers to key resources, like the website **takeaim.org**, that can help identify them and suggest non-invasive alternatives. The video also provides specific instructions for nursery and pet store operators to clean, store and prepare fish and plants for sale to prevent the spread of pathogens and unwanted hitchhikers. Water garden designers, meanwhile, are instructed to be careful to not place gardens in proximity to existing bodies of water, as flooding could facilitate plant and fish escapes.

“Beauty Contained” is available to view on Wisconsin Sea Grant’s YouTube channel [youtube.com/user/UWASC](https://www.youtube.com/user/UWASC). DVD copies can also be requested by contacting Wisconsin Sea Grant at tim@aqua.wisc.edu.

WATER RESOURCES RESEARCH

On the
(Hot) Spot

DENITRIFICATION HOT SPOTS COULD PREVENT
GROUNDWATER POLLUTION

Healthy streams perform an important service by removing excess nitrates in the water; and this happens much more effectively in some locations than others. Researchers are evaluating which factors favor this function. Miranda Quist (left) and Sarah Gorsuch (right), both undergraduate students in the department of biology at UW Oshkosh, at work on the project.



In thousands of streams across the state of Wisconsin, there are points where groundwater bubbles up from beneath the underlying sediment, triggering chemical reactions at a microbiological level.

One of those reactions is especially important to the health and quality of the stream water—in certain places, anaerobic bacteria in the sediments drive a critical process called denitrification, consuming nitrates in the water and converting them to nitrogen gas.

This is a big deal for the Central Sands Region of Wisconsin, where levels of nitrate in the surface and groundwater tend to be higher than elsewhere in the state. And it’s here that Robert Stelzer, TRISS Professor of Biology at UW-Oshkosh, has trained his scientific eye. Backed by funding from the University of Wisconsin Water Resources Institute (WRI), Stelzer is studying streams to characterize the phenomenon and develop a predictive model.

“We’re focusing on where hotspots of denitrification and nitrate retention occur in the landscape,” said Stelzer. “It’s clear it doesn’t happen uniformly—the question is, can we predict where they will occur?”

Three of the biggest factors that will likely determine denitrification hotspot location are sediment type, the speed of groundwater moving through the sediments and the extent of groundwater-surface water interaction. Fine sediment with lots of organic carbon makes for a great hotspot. Conversely, groundwater-surface water interactions are eliminated or less important in urban streams with concrete bottoms, streams with bedrock slabs, or streams with lots of clay particles.

Stelzer’s research team, which includes Thad Scott (University of Arkansas), is focusing on several streams in central Wisconsin. The rate of groundwater movement is measured using piezometers (small wells) at 20-25 locations in each stream, and the team measures denitrification in the field using MIMS (membrane inlet mass spectrometry). The collected data will determine whether the location chosen is a hot or cold spot for denitrification and nitrate retention. Preliminary results show that hot and cold spots can be very



Stories of a Mighty Fish

The story of the lake sturgeon, an ancient fish native to the Great Lakes region, is a fascinating one that includes science, conservation, art and a community of fisher folk who care deeply about its survival. These interdisciplinary aspects of its story of survival make it a great fish tale. After you visit the story map maps.aqua.wisc.edu/storymaps/peopleofthesturgeon/ journal of the book *People of the Sturgeon* (see column at right), continue reading about the mighty lake sturgeon in these books, available for check out from Wisconsin Water Library.

BIOLOGY, CONSERVATION AND SUSTAINABLE DEVELOPMENT OF STURGEONS

Edited by Ramón Carmona, et al. [Dordrecht]: Springer, 2009.

A compilation of data on the basic biology and culture of selected sturgeon species. The book covers taxonomy, biology, aquaculture, recovery and conservation of the species around the world.

THE GREAT LAKE STURGEON

Edited by Nancy Auer and Dave Dempsey. East Lansing: Michigan State University Press, 2013.

This collected volume captures many aspects of the remarkable Great Lakes sturgeon, including its history, biology, folklore, environmental science and the policies for its protection.

MYSTERIES OF THE GREAT LAKES (DVD)

Produced and directed by David Lickley; written by Stephen Low. Toronto, Ontario: Science North Productions, 2009.

Through the study of the lake sturgeon, a biologist works to answer two critical questions: What is the secret of the lake sturgeon's longevity and how do we save this creature and, ultimately, the Great Lakes? The video highlights the need for preservation and conservation, and showcases the amazing geography, ecology, science and history of one of the largest freshwater resources in the world.

PEOPLE OF THE STURGEON: WISCONSIN'S LOVE AFFAIR WITH AN ANCIENT FISH

By Kathleen Schmitt Kline, Ronald M. Bruch and Frederick P. Binkowski; with photographs by Bob Rashid. Madison, Wis: Wisconsin Historical Society Press, 2009.

People of the Sturgeon chronicles is the history of the cultures surrounding lake sturgeon in Wisconsin's Lake Winnebago region, as told by a fascinating collection of photos, artifacts and a few good fish tales.

THE PHILOSOPHER FISH: STURGEON, CAVIAR, AND THE GEOGRAPHY OF DESIRE

By Richard Adams Carey. New York: Counterpoint, 2005.

A very engaging chronicle of a threatened fish and the lives and livelihoods of the people that depend upon it around the world.

Anyone in Wisconsin can borrow these books.

Just email askwater@aqua.wisc.edu.

Sturgeon Story Comes Alive

It's already possible to read *The People of the Sturgeon*, the popular look at Wisconsin's rich historical relationship with the colorful, prehistoric fish written by former Wisconsin Department of Natural Resources Warden Ron Bruch and Wisconsin Sea Grant's Kathy Kline and Fred Binkowski. You can also listen to it as an audiobook.

Now there's a third, interactive way to experience this rich and interesting history. Wisconsin Water Librarian Anne Moser, David Hart, Wisconsin Sea Grant's assistant director for extension, and UW-Madison undergraduate research scholar Rachel Berglund teamed up to produce an interactive, GIS-based story map that draws upon and augments the book's original content. Users who visit maps.aqua.wisc.edu/storymaps/peopleofthesturgeon/ will be able to view photographer Bob Rashid's breathtaking images

and read excerpts from the book, but they'll also be able to click to listen to interviews with some of the book's key contributors, as well as interact with maps that show, for instance, the locations of dams that disrupted the natural spawning habits of the sturgeon and threatened their survival. One additional map shows the current locations of healthy sturgeon populations.

"The *People of the Sturgeon* has been an ideal book for story map technology," said Moser. "The story of sturgeon is very connected to place and comes with a tremendous amount of related content—interviews, photographs and other source materials. Using a story map allows us to share a wealth of information that couldn't be included in the book."

More sturgeon resources available at Wisconsin Water Library. (See column at left).



Bob Rashid

River Talks Series Resumes

When the St. Louis River talks, people listen. More than 240 people attended the informal monthly series of talks by river managers and researchers last season. This year, a new sponsor is joining Wisconsin Sea Grant and the Lake Superior National Estuarine Research Reserve—Minnesota Sea Grant. The hour-long discussions will take place either in Superior or Duluth on the last Wednesday of the month, with a "bonus" talk in conjunction with the St. Louis River Science Summit in February.

For the full schedule, please visit go.wisc.edu/h7s8a3.



Virtually Real-Time Beach Conditions

Longing for those glorious summer days on Great Lakes beaches? Sadly, Wisconsin Sea Grant's Virtual Beach website (go.wisc.edu/b3egh3) doesn't give you the feel of sun on your skin and the sound of the waves. However, it does give beach managers access to an advanced statistical modeling tool known as "Virtual Beach" and a wealth of online hydro-meteorological data available through the Great Lakes Observing System.

Developed collaboratively by the U.S. Environmental Protection Agency, U.S Geological Survey and Wisconsin Department of Natural Resources, Virtual Beach allows beach managers to quickly and accurately predict when bacteria levels warrant posting swim advisories.

Beach managers know it as "now-casting" and have discovered the ways it's faster and more efficient than relying solely on collecting and testing water samples to estimate beach water quality.

Jon Gabrielse, who is responsible for monitoring water quality at Sheboygan County's beaches, said he's noticed the positive effects of Virtual Beach. Last month, there was an instance at General King Beach in Sheboygan in which Virtual Beach correctly predicted levels of *E.coli*—the bacteria typically used to measure beach health—exceeding state standards, allowing Gabrielse

to issue an advisory that morning, rather than waiting until the next day for lab results. The system also accurately predicted non-exceedances at two popular nearby beaches, keeping them open when they might otherwise have been closed.

"Without Virtual Beach, it was always a day late," said Gabrielse, who works for Cardinal Environmental, a local firm that has been monitoring water quality for the county for many years. "You'd put a warning sign up on Tuesday when it should have gone up on Monday. And then by the time you put the sign up, the beach conditions had improved and the warning was unnecessary."

Gabrielse also noted that Virtual Beach has translated into a sizable reduction in time-intensive field work. Daily water sampling activities have been reduced to a more manageable once or twice a week.

"The big plus is the real-time data we receive with Virtual Beach," he said. "That's invaluable."

Wisconsin Sea Grant's Virtual Beach website explains the benefits of Virtual Beach and provides a series of training modules, links to online data and other resources to bring new users up to speed.



Monofilament Mania

With all the work going on to restore habitat in the St. Louis River Estuary, organizations would be remiss if they didn't also address a man-made killer that lurks there—monofilament fishing line. And that's just what the St. Louis River Alliance of Duluth, Minn., is doing.

Wildlife can get caught in discarded or lost fishing line, sometimes leading to deaths. This spring, the Alliance began a program to install monofilament recycling bins at public boat landings along the estuary in Duluth and Superior, Wis. They sent out a call for cooperation and support to several local organizations and organized adult and youth groups to participate in an "Adopt-A-Bin" program.

Wisconsin Sea Grant heeded the call by offering six bins that were donated by the NOAA Marine Debris Program a few years ago. Made of wide white PVC pipe tubing with a curved opening on top, the bins look more like small ship smokestacks than boxes. Bill Majewski with the Alliance outfitted the tubes with a special wooden door that keeps birds from using the bins for nesting and deters people from throwing trash inside. The organization also created "Reel in and Recycle" stickers to let boat landing visitors know what the bins are for.

The donated bins were installed by Jill DiDomenico of the Alliance and her homegrown work crew (her children) in Superior. Anglers will notice them at Loon's Foot Landing, Arrowhead Pier, Billings Park, Barker's Island at the public boat launch, the dock by the Wisconsin Sea Grant/Lake Superior Reserve office, and the fishing pier along the Osaugie Trail on the mainland across from the office.

If you find discarded fishing line at any of these sites, please look for the bin and do your part to keep the estuary clean!

Jill DiDomenico of the St. Louis River Alliance and her work crew installed six monofilament recycling bins in Superior.



Marie Zhukov/Wisconsin Sea Grant

ST. LOUIS RIVER ALLIANCE

Put Your Aquaculture Farm Here

Would-be Wisconsin aquaculturists, here's a double shot of good news: A pair of recently launched websites could help you site your new operation in a location that's primed for success.

Both are the result of work by Chris Hartleb, a professor of fisheries biology at UW-Stevens Point and an aquaculture outreach specialist with Wisconsin Sea Grant. The first go.wisc.edu/0g3298 will focus on pond-culture aquaculture farms, while the second go.wisc.edu/2o8u1v will target raceway/flow-through aquaculture operations. The idea grew out of a student research project that compiled GIS data to identify Wisconsin locations that had ideal conditions for particular types of aquaculture.

Hartleb and his design team modeled the new sites after Google Maps to increase ease of use. Potential farmers can simply type in an address and zoom in to get more information about a particular location. Sites are shaded as suitable or not suitable, based on key factors such as the site's clay content and the shape of the land, as well as the surrounding water quality and its ability to transport key nutrients to the fish. The location of existing aquaculture farms are also part of the websites' database, so there's no worry about picking a site that's already occupied.

Hartleb believes Wisconsin is the first state to launch websites that cover the entire state, and while he emphasizes that they're only meant to be used as a reference—farmers will also need to perform their own site investigation and water/soil quality tests—the interest in the resource is obviously high.

“People who knew we were working on this kept asking me, ‘When can I get this information?’” said Hartleb. “I hope businesses and economic development groups can use these sites as an initial springboard to whatever they're hoping to establish.”



David Navala

There Is No Normal

As part of the Eat Wisconsin Fish campaign (eatwisconsinfish.org), Wisconsin Sea Grant writer Marie Zhuikov sat down with Jessica Resac of Halvorson Fisheries.

Why should people buy Wisconsin fish?

JR: The Lake Superior fish that we catch at Halvorson Fisheries in Bayfield, Wis., is extremely clean and fresh. It's caught daily, processed the same day and goes out to local restaurants and consumers the same day.

What is your job and the biggest challenge you face doing it?

JR: I wear many hats at Halvorson Fisheries. I actually go out on the boats to catch the fish. I help with the filleting process. I help in the fish market. I mend gear and make new nets. I do some of the paperwork and a lot of the computer work associated with federal and state rules, regulations and laws.

When did you know you wanted to pursue a career in fisheries?

JR: I took the summer off from graduate school in 2003. Mark Halvorson asked me to come to Cornucopia, Wis., to help on the fishing boats. I never knew it would be so much hard work and long hours. I've left several times to do something different. I returned within a month or so each time. I finally took a position in a hospital lab in December of 2014. Every day I am off from lab, I go fishing or work at the fisheries, sometimes both jobs in one day. Hard work and being on the lake are rewarding, and I just can't give it up.

What part of your job did you least expect to be doing?

JR: The federal and state laws and all the rules, regulations, fees and paperwork/computer work that is required for a commercial fishery that processes and sells fish. Other things I never thought I'd have to do are state of Wisconsin Department of Natural Resources commercial fish reports, boat licensing, commercial licenses, temperature logs, filleting logs, fish sold logs, wholesale reports, HACCP plans for everything we do. I never expected so much paperwork!

What is one interesting thing you've learned about the fish itself?

JR: Fish are totally unpredictable. So many people ask what a “normal” day's catch is. There is no normal. Every day is different. Some days you'll get a lot, some days you won't. It's never the same. Ever. That goes for whitefish, trout and herring. It would be very interesting to know the fish migration pattern. But I'm glad we don't. I guess the mystery of where the fish are makes the job more interesting.

What is one thing you would like consumers to know about how your fish are harvested or raised?

JR: They are NOT caught on hook and line! We use gill nets or live-trap nets to fish. The gear is designed to either let the smaller fish through the webbing or we hand-grade the fish and throw the

small ones back. We also lift our nets every day, so the fish are alive and can be thrown back to swim away. We also process fish fillets every day, especially in the warmer months of spring and summer. So when customers ask us how fresh the fish is, I like to say, “You won't get fresher fish unless you've caught it yourself.”

When someone asks you if your fish (fisheries) is sustainable, how do you reply?

JR: Yes. Wisconsin state laws shut down the fishery during certain times of the year so the fish can spawn. We are totally on-board with that. You don't want to put yourself out of a job, after all. We have a limit on how much lake trout we can catch and also size limits. Lake trout is the only “sport fish” we can keep.

What is your connection to Sea Grant?

JR: I have received the Minnesota and Wisconsin Sea Grant newsletters for years now because of my interest in the Great Lakes fisheries. When the “Eat Wisconsin Fish” promotions came out in 2014, I sent away to receive the promotional materials. We were all delighted and surprised to see the Halvorson boats in the promotional flyer. We had no idea!

Interview has been condensed and edited.



Matt Jones

PASSING THE TORCH

continued from page 1

Professor Chin Wu is using experience gained from the project to develop webcams and wave sensors for three other locations to help detect and forecast rip currents.

The mainland sea caves can be dangerous because of the possibility for high waves and the sheer cliffs, which make it impossible for kayakers to get out of the water if they get into trouble.

“There’s a misconception that because the caves are close to shore, they’re safe,” said Tam Hofman, ranger at Meyers Beach. “But conditions can change quickly out on the lake, especially near the rock cliffs and caves, and you can’t always see that from the launch site.”

In recognition that **SeaCavesWatch.org** was crucial to operations at the caves in both summer and winter, the National Park Service changed its status as a “project” to a regular part of its work plan. The park will be aided by the original partners—Chin Wu, a civil and environmental engineering professor at the University of Wisconsin-Madison, and Gene Clark, a coastal engineer with Wisconsin Sea Grant—who recently finalized a memorandum of understanding outlining their roles in Bayfield at the lakeshore headquarters.

“The original focus was summer wave conditions, but with the addition of the

webcam, the system emerged as a vitally important year-round tool,” said Bob Krumenaker, Apostle Islands National Lakeshore superintendent, “especially in winter 2014, when record visitation to the ice-covered caves made international news.”

“It’s changed our park protocols,” he continues. “We’ve made a commitment to the system and plan to continue it in the long-term. Before our staff go out the caves or before we open the caves to the public in the winter, our motto is, ‘check the camera first!’”

“The goal was to make people using the caves feel safe,” said Wu. “It’s been gratifying to be part of a project that’s had an impact and has made a difference.”

Wu is also using what he’s learned for webcam and wave sensor installations in three other locations to help detect and forecast rip currents. The locations are Milwaukee; Port Washington, Wis.; and Park Point in Duluth, Minn. The images and data will be available on infosportwashington.cee.wisc.edu/index.html.

The original project was funded by the National Oceanic and Atmospheric Administration, the Wisconsin Coastal Management Program and the Friends of the Apostle Islands, with support by the city of Bayfield. The National Park Service was involved in the project from the onset and provided significant in-kind support.

Under the new agreement, Wisconsin Sea Grant will provide coastal engineering expertise as needed and public outreach and communications for the project. The University of Wisconsin-Madison will provide technical assistance for equipment operation and website maintenance. The National Park Service will deploy and retrieve the underwater wave pressure gage and cable seasonally, provide basic equipment maintenance and provide wireless service funding. The Friends of the Apostle Islands will provide funding for project activities and travel, and the Wisconsin Coastal Management Program and the city of Bayfield will provide advice and public awareness support. The agreement is effective for five years.—MEZ

WATER RESOURCES RESEARCH

On the (Hot) Spot

continued from page 3

close to one another, which can make identifying them challenging.

Organic matter—fallen leaves and branches—is another source that would promote hotspots, as the carbon released during decay provides energy for the microbes involved in denitrification. Recognizing that could be useful to stream and watershed managers looking to promote denitrification in their streams.

“One of the broader goals of our work is to assess the importance of denitrification as an ecosystem service in a landscape,” said Stelzer. “Healthy streams can remove a lot of nitrate, but the natural processes can’t remove it all, particularly in landscapes that are overloaded. What

would the deterioration of healthy stream systems do? Nitrate levels in groundwater and surface would likely be even higher with the reduction of the ecosystem service of denitrification that streams provide.”

In a previous WRI research project, Stelzer showed that, on a small scale, adding organic matter to stream sediments promoted denitrification. It’s unclear if the scale could be increased to a level that would be useful to stream system managers, but the possibility is definitely there. So is the notion that hotspots could be reproduced in a stream that didn’t naturally have them.

“Placing a lot of organic matter in a stream artificially would be expensive,” noted Stelzer. “And there might also be unintended effects we might not anticipate. Maintaining healthy streams,

which includes promoting natural inputs of leaves and wood, is probably a more cost-effective way to manage elevated nutrient concentrations in groundwater and surface water.”

One of the goals of the project is to develop a model that would predict where denitrification hotspots occur in shallow groundwater associated with streams. Stelzer’s team also plans to do a spatial analysis that would result in maps of the hot and cold spots in select Wisconsin streams, as a visualization tool. Given the importance of elevated nitrate in ecosystems (negative effects can extend from local to areas far downstream), the model and tools developed could be extremely useful for predicting where groundwater-surface water interactions can maintain or improve water quality.—ARC

St. Louis River Estuary Website Wins Award

A website (stlouisriverestuary.org) that blends personal stories with scientific information about the St. Louis River Estuary in Minnesota and Wisconsin earned an outstanding programming award from the Great Lakes Sea Grant Network in September.

“Although the website project was led by Wisconsin and Minnesota Sea Grant-funded researchers, many local partners in both states helped develop it,” said David Hart, assistant director for extension with Wisconsin Sea Grant.

The site was recognized for its unique combination of science and storytelling, and tools that help educators, students, natural resource managers, business owners and policy makers better understand how coastal Great Lakes ecosystems work.

“Whether people come to the site because of an interest in the estuary or the people who live there, they are likely to leave having learned about other elements of the site,” said Cindy Hagley, environmental quality extension educator for Minnesota Sea Grant.

The goal of stlouisriverestuary.org is to enhance geographic awareness and stewardship of the estuary. Local people active in different aspects—such as shipping, fishing, recreation, ricing, restoration and the community—give their perspectives of the estuary in stories. The science information on the site is based on research into environmental stressors to the area. Site visitors can also challenge themselves with “GeoQuests”—iPhone-based games and geocaches that highlight key places and issues in the estuary, or they can use the “deep map” to explore area ecology and history.

The website and tools have been shared with dozens of educators and hundreds of students from regional schools through workshops by Sea Grant programs and the Lake Superior National Estuarine Research Reserve.

The project was made possible with funding and services from the Minnesota Pollution Control Agency, the Wisconsin Department of Natural Resources, Leech Lake Tribal College, the University of Wisconsin-Superior, Southern Oregon University and the U.S. Environmental Protection Agency’s Mid-Continent Ecology Division. Red Pebble Web Design provided web design services and The Ohio State University provided project evaluation services.—MEZ

New Groundwater Research on Quantity, Quality and Management

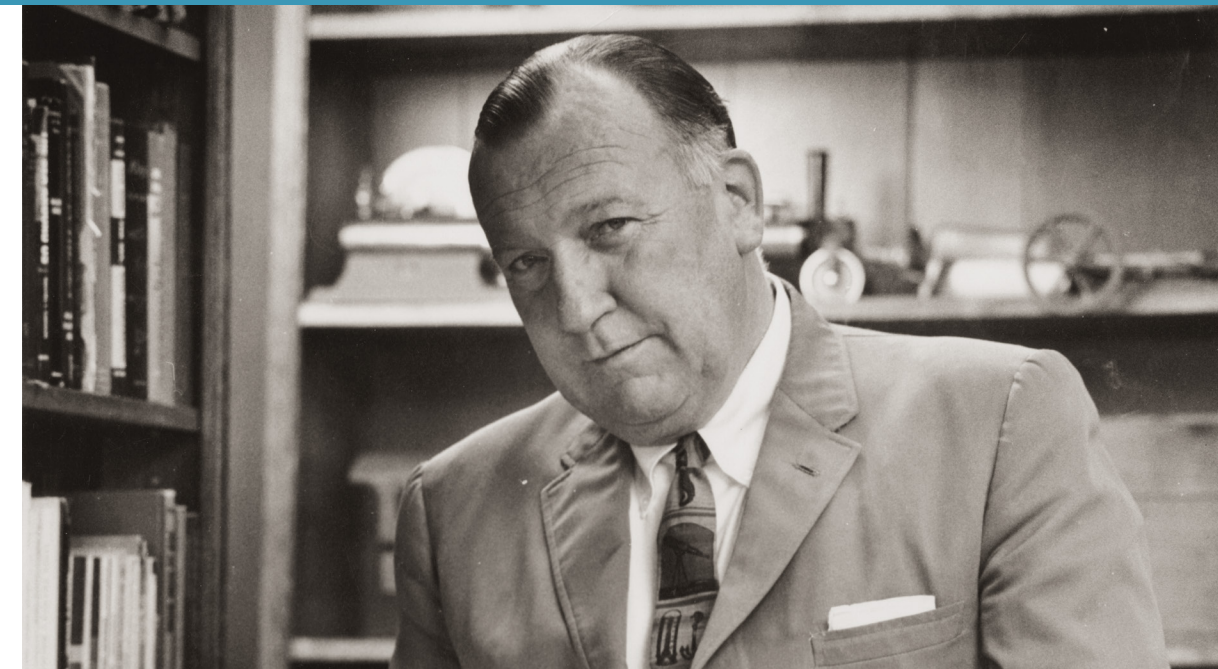
The University of Wisconsin Water Resources Institute (WRI) is funding five new groundwater research projects, which got underway in mid-summer.

“These efforts are key to our understanding, and ultimate responsible stewardship, of the impressive water resources we have within our state,” said Jennifer Hauxwell, WRI’s assistant director for research. “We began the funding cycle last year with a call for proposals that attracted 15 research plans. The suite of submitted proposals represented an incredible array of ideas from an impressive group of scientists from institutions around the state. We then had a rigorous review process that relied on reviews of the proposals from experts around the world as well as our Groundwater Research Advisory Council. In the end, we will invest about \$248,000 for the projects that will be undertaken from July 2015 to 2017.”

Hauxwell noted these project details:

- Preliminary data suggest the rocks of the two Wisconsin underground areas are a natural source for groundwater contamination across west and central Wisconsin, contributing high levels of aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, vanadium and zinc that are above the advised levels for consumption, and additionally, lowering groundwater pH. The study to assess these elements is led by Jay Zambito, Michael Parsen and Patrick McLaughlin of the Wisconsin Geological and Natural History Survey, a part of the University of Wisconsin-Extension.

- A UW-Madison researcher, Jean Bahr, will pair with a counterpart at the Wisconsin Geological and Natural History Survey, Madeline Gotkowitz, to examine the long-term effects of municipal well pumping on groundwater chemistry induced by changes in flow paths and mixing between aquifers. Mixing water of different ages and chemistry creates environments that may allow for mobilization of undesirable trace elements.
- Daniel Noguera with UW-Madison and Marc Anderson of UW-Milwaukee will work to develop a sensor that can immediately detect and measure phosphorous and arsenic in groundwater. Those elements are detrimental in drinking water and this tool would greatly improve monitoring capabilities.
- Kenneth Genskow with UW-Madison and Kenneth Bradbury, UW-Extension, will explore the means to engage key stakeholders in making sometimes controversial decisions such as high-capacity well permitting or projects like mines or landfills.
- Robert Stelzer, UW-Oshkosh, will investigate how groundwater and surface water come together and what conditions in those locations are favorable for microbes to play a role in removing nitrate from water. (See page 3.)



Athelstan Spilhaus Papers, The Dolph Briscoe Center for American History, The University of Texas at Austin

Golden Work by the Sea Grant College Program

seagrant.noaa.gov

In 1963, Athelstan Spilhaus was enroute to the annual meeting of the American Fisheries Society in Minneapolis. In the back of a cab, he was hastily composing the remarks he would deliver in less than an hour to the assembled group of fisheries researchers and managers.

As dean of the University of Minnesota’s Institute of Technology, he was more than familiar with the land grant college model—research know-how taken off campuses and shared with those who could use the scientifically validated tools and ideas. Under pressure to come up with his talk, he was suddenly inspired—why not propose the same framework as a land grant college except apply it to the nation’s oceans and Great Lakes?

Thanks to lobbying by the tenacious and well-connected Spilhaus and support from Washington

heavyweight Sen. Claiborne Pell, the idea gained traction. In 1966, Congress enacted the Sea Grant College. That makes 2016 the 50th anniversary of

the academic, government and industry partnership that was designed to “provide for the understanding and wise use of ocean, coastal and Great Lakes resources and the environment.”

There are now 33 Sea Grant programs that support work in every state that has a coastline, along with Puerto Rico and Guam. For the coming year, in each of these programs, celebrations will take place. There is a strong record on behalf of coastal ecosystems and economies to commemorate. One way to view a good representation of the record is to visit the National Sea Grant website 1.usa.gov/1ViKgHx. Some would say the impacts and accomplishments on those pages are golden.



Groundbreaking groundwater research at WRI from left: Measuring arsenic in drinking water; groundwater and surface water denitrification research; engaging stakeholders about landfill decisions; studying rock formations that could be a source of groundwater contaminants.

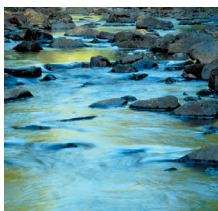




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Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources



CALENDAR OF EVENTS

JAN. 27, 2016

The River Talks
Superior, Wis.
seagrants.wisc.edu

FEB. 6, 2016

Lake Sturgeon Bowl
Milwaukee
glwi.uwm.edu/sturgeonbowl

FEB. 21- 26, 2016

**Association for the Sciences of Limnology and Oceanography,
Ocean Sciences**
New Orleans
osm.agu.org/2016

MARCH 10 AND 11, 2016

**American Water Resources Association
Wisconsin Section Meeting**
Wisconsin Dells, Wis.
state.awra.org/wisconsin/2016meeting



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