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Aquatic Sciences Chronicle

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

INSIDE:



President Hurley



Water Weaves Stories



Underground Risks



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Underwater Treasure

Tracking the Goodrich Line

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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

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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

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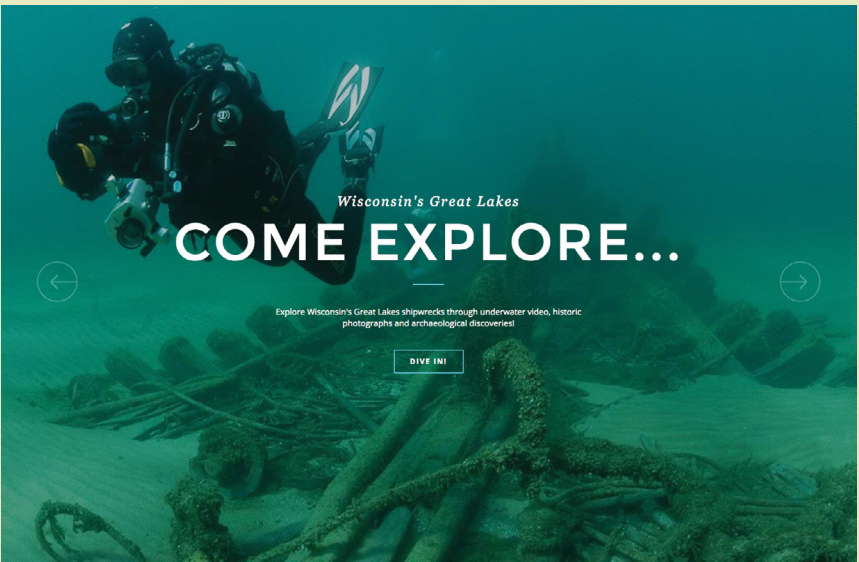
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FEATURED WEBSITE

Dive Into Wisconsin Shipwrecks

wisconsinshipwrecks.org

If you want to explore the amazing shipwrecks found in the Great Lakes without ever setting foot in the water — or even leaving your chair — the Wisconsin Shipwrecks website is for you. It’s also the perfect starting place for real-world on-land adventures in search of historic markers, lighthouses, waterfront parks, maritime trails, geocaches and more. (For more information about maritime trails and geocaches, see “New Ways to Explore Old Ships — Maritime Trails and Geocaches” on page 11.)



Wisconsin Sea Grant and the Wisconsin Historical Society (WHS) have collaborated on the site, which offers details on 760 lakes Superior and Michigan shipwrecks. Information on the ships’ construction, service history, final voyage and location are searchable, as are any relevant videos and photos. Other shipwrecks that may be in the area are also spelled out, and nearby attractions are searchable by location and category.

The “learn” section of the site provides visitors with information about underwater archeology, the value of studying shipwrecks and how the studies are undertaken, field reports, a calendar of shipwreck-related events, a glossary of ship terms and a list of archival newspaper stories about the waters and their wrecks.

Each boating season, the WHS deploys 30 mooring buoys at wrecks that allow people to tie up directly above the site while protecting the shipwreck from inadvertent anchor damage and providing a safe point of ascent and descent for divers. Find buoy information at the site.

SEA GRANT RESEARCH COVER STORY

Underwater Treasure

Lake Michigan Shipwreck Exploration Yields Historically Significant Discovery

In the late 1800s to early 1900s, Midwesterners who needed to travel across the region or wanted to get away from the pollution of the cities had something in common with grain and lumber magnates. To get where they wanted to go, each had to rely on the steamers and tug-boats of the Goodrich Transit Co. Goodrich kept regular year-round passenger steamer schedules to Lake Michigan’s coastal communities and was also involved in cross-lake freight transport contracted through the railroads.

Several Goodrich boats ended their maritime careers as shipwrecks, abandoned on the bottom of Lake Michigan. Now, with the support of Wisconsin Sea Grant, Tamara Thomsen and Caitlin Zant, maritime archaeologists with the Wisconsin State Historical Society, are using the *Atlanta* and the *Arctic*, a pair of Goodrich wrecks, to chronicle the history of this important shipping company. And, more importantly, educate a new generation of maritime archaeologists.

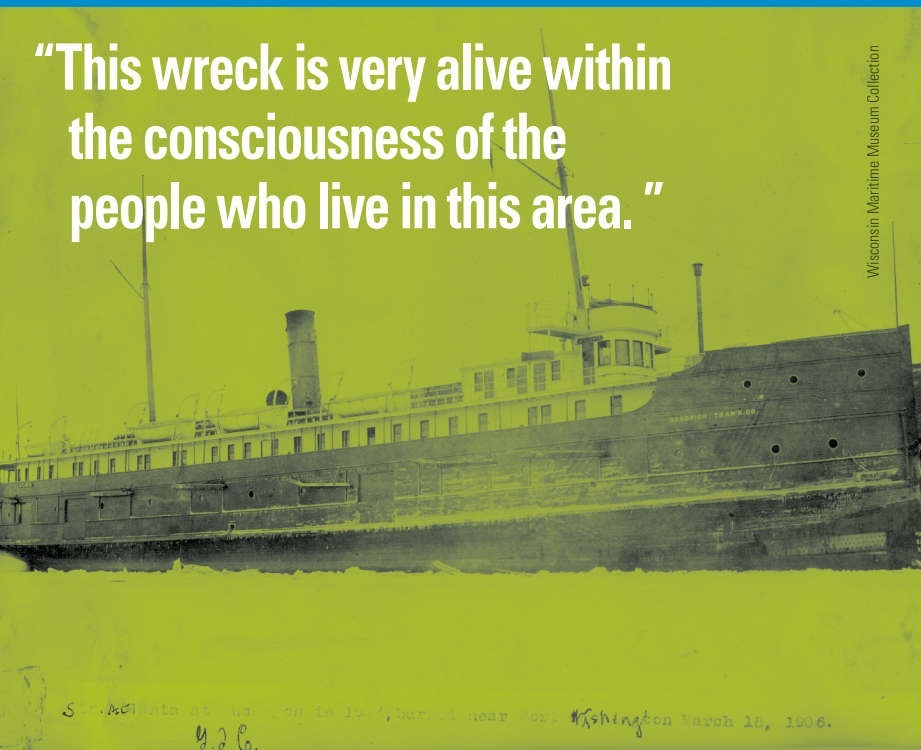
“In choosing these ships, we wanted to choose something that was in relatively shallow water, was relatively intact, but not so fully intact that you couldn’t learn something from them,” said Zant.

The project began last summer. Zant and Thomsen helped lead a field school of maritime archaeology students from East Carolina University in a dive survey of the *Atlanta*, a wooden cargo schooner that sank in a shallow 15 feet of water 11 miles south of Sheboygan in 1906 after catching fire during its fateful final voyage.

Because the ship was allowed to burn to the waterline, it created a situation in which less-flammable items on the ship fell through the decks.

“You have this amalgamation of different bits and pieces that would otherwise have been found in other places in the ship,” explained Zant.

“This wreck is very alive within the consciousness of the people who live in this area.”



That amalgamation included everything from rolls of carpet to pieces of the stuffing box, the padded area that connected the *Atlanta*’s propeller shaft to the boiler mechanism. But what intrigued the dive team most — and doubled as the most historically significant discovery — was the *Atlanta*’s unique double-steel truss framing.

“When wooden vessels got that big, they had to find ways to make sure the vessel didn’t sag in the middle,” said Thomsen. “The *Atlanta* has this 200-foot hogging truss that went along the entire interior. It was reinforced when the ship’s stern was rebuilt.”

The dive team battled several obstacles to complete the survey, including foggy weather and boat problems — the boat that the students brought from North Carolina broke its propeller on the first day, necessitating some scrambling.

Their efforts have already paid dividends. In early March, the application to add the *Atlanta*

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Dive Deep Into a Great Read

Shipwrecks hold a special place in the hearts of many in the Great Lakes region. Stories of souls lost and ships gone missing are tales that captivate the young and old. Pick up a book and read these riveting accounts.

LOST & FOUND: LEGENDARY LAKE MICHIGAN SHIPWRECKS

V. O. van Heest. Holland, Mich: In-Depth Editions, 2012.

The author and explorer takes readers back in time to experience the careers and tragic sinking of these ships, then beneath the lake to participate in triumphant discovery and exciting exploration.

MIGHTY FITZ: THE SINKING OF THE EDMUND FITZGERALD

Michael Schumacher. Minneapolis: University of Minnesota Press, 2012.

This book was published 30 years following the most notorious shipwreck on America's inland waters, an in-depth account of the 1975 sinking of the *Edmund Fitzgerald* during a storm on Lake Superior.

SHIPWRECKED: REFLECTIONS OF THE SOLE SURVIVOR

Dennis Hale. Rock Creek, Ohio: D.N. Hale, 2010.

Known as the sole survivor of the steamer *Daniel J. Morrell*, which sank on Lake Huron in late November 1966, Dennis Hale shares his life's story. He relates not only the sad story of the shipwreck and its aftermath but also his troubled childhood and his life as reckless young man in search of a sense of family.

SHIPWRECKS: EXPLORING SUNKEN CITIES BENEATH THE SEA

Mary M. Cerullo. New York: Dutton Children's Books, Penguin, 2009.

This is the tale of two shipwrecks – separated by 200 miles and two centuries. The author begins with underwater explorations, one a search for fabled gold, the other for families lost at sea. Find out what underwater explorers discovered in these cities beneath the sea.

TITANIC: A FRESH LOOK AT THE EVIDENCE BY A FORMER CHIEF INSPECTOR OF MARINE ACCIDENTS

John S. Lang. Lanham, Md.: Rowman & Littlefield Publishers, 2012.

Lang examines the events of April 1912 from a completely new perspective — the standards of a 21st century accident investigation, using instinct to determine exactly what happened a century ago.

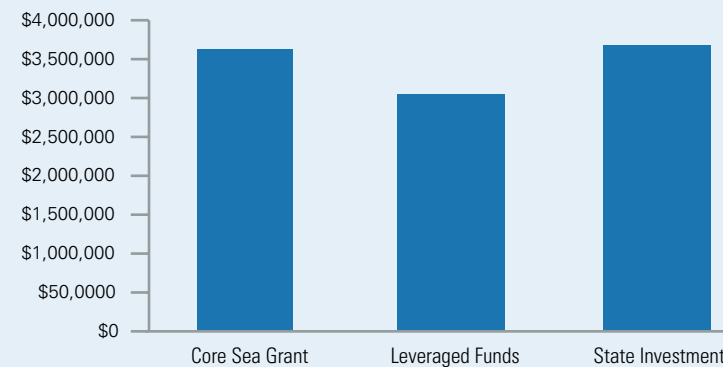
Please visit the Water Library at waterlibrary.aqua.wisc.edu for more information.

Anyone in Wisconsin can borrow these books. Just email askwater@aqua.wisc.edu.

By the Numbers

Wisconsin Sea Grant is a locally focused, federal-state partnership supporting research, education and outreach. For **49 years**, it has been fostering the sustainable use of Wisconsin's Great Lakes. **95%** of federal funds are invested in trusted, objective, science-based programming.

\$6,739,565 in leveraged funds
185% return on federal investment



From Discovery to Application: Science Transferred

Each year, Wisconsin issues **1.5 million** recreational fishing licenses.

Those anglers add **\$2.1 billion** to the economy. Fish, however, have been dying due to an invasive virus known as viral hemorrhagic septicemia. Sea Grant-funded scientists have developed rapid, non-lethal tests for the virus, protecting the fishery and preserving recreational angler economic contributions.



Bryce Richter/UW-Madison



“... the elimination of federal funding... would threaten the survival of most of the Sea Grant programs — including Wisconsin’s.”

Hurley Leads Sea Grant Association

As of Jan. 1, Wisconsin Sea Grant Director Jim Hurley made the official transition from president-elect of the Sea Grant Association (SGA), a role he has held since 2015, to president, a role he will hold for the next two years.

Hurley assumes the presidency of the 33-member organization at a critical time in the program's history. In March, President Donald Trump's preliminary budget called for the elimination of federal funding to Sea Grant. The loss of such funding would threaten the survival of most of the Sea Grant programs — including Wisconsin's.

Shortly after the budget news was announced, Hurley traveled to Washington to meet with the other directors to develop a strategic response and begin meeting with members of Congress. Unlike the National Sea Grant Office and the National Sea Grant Advisory Board (the other two branches of the Sea Grant Network) the SGA is permitted to lobby Congress on issues of program authorization and appropriation.

“I’m following in the footsteps of some great leaders,” said Hurley of his new role. “And I’m working with some amazing people.”

Hurley said he's proud of and confident about Sea Grant's critical role in supporting state and coastal economies.

“The term ‘resilience’ is one where Sea Grant can show that it's a major player, whether it's economic resilience, coastal resilience or resilience to change,” said Hurley. “Here in Wisconsin, three years ago there were record low water levels in Lake Michigan. Today we're at near-record highs. The issues of resiliency may be different in Wisconsin, but they're all based on the same type of principles, and the national Sea Grant program can play a big part in response. We have people on the ground already. They're in the coastal areas. They're trusted. They respond to the stakeholder needs. In coastal areas, Sea Grant is the go-to partner because we have a proven track record of success.”—ARC

Wisconsin Sea Grant Director and President of the National Sea Grant Association Jim Hurley. For more Wisconsin Sea Grant facts and figures visit go.wisc.edu/seagrantrnumbers.

BY THE NUMBERS ALL FIGURES 2014-16 EXCEPT AS INDICATED



Nearly
\$6.2 million*
in economic impacts

5,101

jobs created or sustained

66

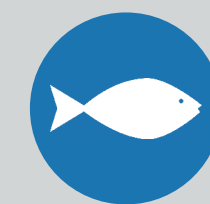
businesses created or sustained

760

acres of habitat restored

11,869

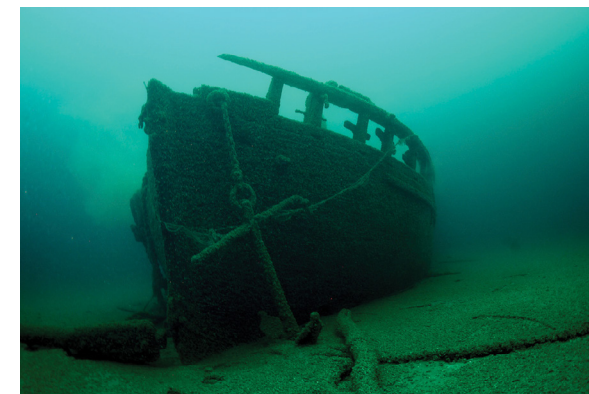
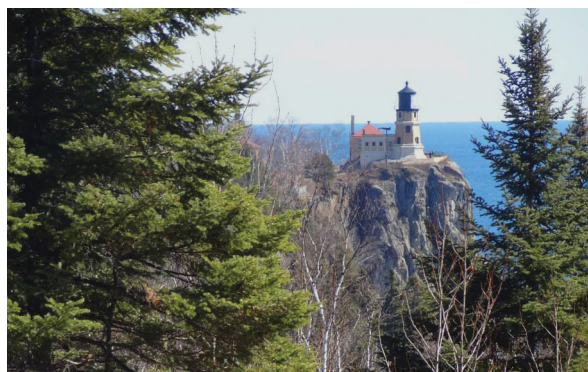
fishermen or aquaculture industry professionals assisted



119

communities that adopted practices to prepare for hazardous events

*2015 figure



Creative Care Guide Master Trainer and Project Manager Angela Fingard (left) said through the TimeSlips project those with memory issues have a role as a water storyteller.

“Water is a great way to talk about stories for that past narrative, a great way to get to creative stories.”

Sea Grant Sparks Creative Storytelling for Those With Memory Loss

Four photographs — a lighthouse atop a rocky Lake Superior promontory, a vessel steaming across Lake Michigan, a ghostly shipwreck and mustachioed gentlemen in old-timey clothes — are now in the hands of families across Wisconsin who are affected by memory loss.

The photos are part of the latest project of the acclaimed Milwaukee-based TimeSlips non-profit organization, which lives its philosophy: Creativity can happen at all ages and stages of life. TimeSlips trains caregivers to work with elders who have cognitive challenges to express themselves through creative storytelling using prompts — photographs, suggested projects and guided questions such as, What do you think is happening in this photo? What sounds do you hear? What do you want to name these people? What happens next?

Wisconsin Sea Grant contributed these photos and suggested prompts for the new Wisconsin Creative Care Guide (go.wisc.edu/866u3z). Other iconic Wisconsin activities and locations show up in the guide — cheese making and fishing, and Circus World Museum in Baraboo, West Bend’s Museum of Wisconsin Art and the Madison Children’s Museum.

Wisconsin Creative Care Guide Master Trainer and Project Manager Angela Fingard said it was

important to include imagery from Sea Grant and shipwrecks in the 71-page guide.

“Lake Michigan — all water, in fact — is such an important part of our state, for work and play. Water is a great way to talk about stories for that past narrative, a great way to get to creative stories.”

Sea Grant has had a 20-plus-year partnership with the Wisconsin Historical Society, funding shipwreck exploration, which leads to documentation, information sharing and preservation of the state’s maritime past.

Tamara Thomsen, maritime archeologist, said, “This is an exciting project. I’m glad we could contribute our photographs to it. Wisconsin has more shipwrecks listed on the National Register of Historic Places because our state has made a commitment to this part of our past. For those with Alzheimer’s disease or other memory loss, they too may have had a past that involved water or boats, maybe even diving and shipwrecks. I’m glad we can help bring those memories and stories into the present through storytelling.”

The Wisconsin Creative Care Guide is being used in 50 skilled nursing homes across Wisconsin.

“We really worked to access all of Wisconsin with the Creative Care Guide,” Fingard said, noting that 35 of those 50 facilities are outside of the southeastern part of the state. “We really are in every size city in Wisconsin.”

Although TimeSlips has built up a corps of certified facilitators in 12 countries and 42 states through its 20 years of existence, this latest project is purposely Wisconsin-centric.

“These are focused only on Wisconsin. They are images provided that are telling a Wisconsin story. We wanted images that could be recognized by anyone, whether a caregiver or a community member. We wanted a common language for looking at the same image.”

Fingard outlined how that common language pays off in this effort, and with other TimeSlips projects. “We work hard to give those with memory issues a role in life — such as being a storyteller. So often, they can be looked at as only a patient, a resident or a person in need. These stories are a way for them to give back. It’s empowering.”

The project is also empowering activities directors in the selected nursing homes. She said each has two employees in activities participating. “We have trained 100 people but they can share with staff and volunteers so that hundreds if not thousands will be trained through the project.”

TimeSlips’ Founder and Director Anne Basting was named a recipient of the prestigious MacArthur Fellowship award in fall 2016. That, too, is a boon to the activities staff.

“The work they do may not be viewed as important as it is. When they see a leader in their field get

recognition it really helps buoy them so they can say, ‘See, this is really important,’ ” Fingard said.

There has been other value from the MacArthur recognition.

“TimeSlips had wide breadth already. The award gave further credibility to what’s been done. When you’re talking with a caregiver it can focus so much on the physical or the pharmacological. The non-pharmacological — TimeSlips — can work very well as a supplement.” She said the MacArthur award, “Opens doors a little bit quicker. It drew caregivers’ attention to it (TimeSlips).”

The Creative Care Wisconsin Guide and the Creative Communities of Care training for these 50 skilled nursing homes in the state has received support from the Wisconsin Department of Health Services, Division of Quality Improvement in Long-Term Care and the National Endowment for the Arts.

Fingard said TimeSlips is always looking to make connections with wider communities. “Creating a story is one mechanism for engagement. Another is community celebration. We invite the greater community to be involved. Museums, libraries and other community organizations are great places to share these stories or to share photos to then create stories from,” Fingard said. She urged people to contact TimeSlips through info@timeslips.org to get involved. —MH

A Heritage Tourism Destination

Local support continues to grow for the proposed Lake Michigan national marine sanctuary.

Titus Seilheimer, Sea Grant fisheries specialist, said, “Four public meetings were held in March 2017, and I heard many positive comments about the proposed sanctuary. The National Oceanic and Atmospheric Administration received hundreds of comments during the public comment period, which ended March 31. NOAA will now review the comments and make any needed changes, with input from the relevant state agencies.”

Russ Green, University of Wisconsin-Sheboygan, is the regional coordinator for the proposed sanctuary. Before that, he worked as the research coordinator and deputy superintendent for the only other Great Lakes marine sanctuary, in Alpena, Mich.

Marine sanctuaries are designed to protect natural and cultural marine resources because healthy water environments are the basis for thriving recreation, tourism and commercial activities in coastal communities. Green explained there are 13 sanctuaries spread out on the U.S. ocean coasts, Hawaii and American Samoa, along with two National Marine Monuments.

Although the sanctuary is not designated yet, the planning process has Green working closely

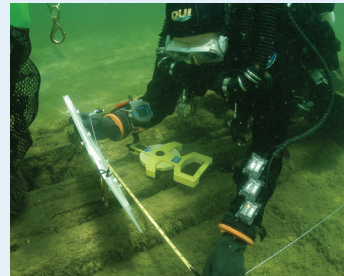
with Manitowoc, Sheboygan and Ozaukee counties, which are within the proposed boundaries. Kewaunee County is also included in an alternative assessment.

“The region has all the pieces you’d want in a marine sanctuary,” Green said. “It has a great breadth of history with nearly 40 shipwrecks, and the communities really rallied together to leverage the idea to support heritage tourism and local economies. It’s very much a partnership.”

With the Wisconsin Coastal Management Program and Sea Grant, Green has submitted a grant to a NOAA program called Preserve America to produce a GIS-driven website that would feature an interactive story map of the sanctuary.

“The site would provide a one-stop-shop for people who want to learn what they can do at the sanctuary, such as kayaking and diving, as well as many shore-side attractions. We want something that all the communities can use to market heritage tourism. The proposal is very representative of the future work we want to do with our NOAA, state and community partners,” Green said.

Visit sanctuaries.noaa.gov/wisconsin.



Calling the Bluff

Property owners whose houses occupy bluffs along the coasts of Lake Michigan spent a harrowing summer in 2016, as rising lake levels exacerbated bluff and shoreline erosion issues, putting their homes and garages at serious risk. Working with the Wisconsin Coastal Management Program and the Graham Institute at the University of Michigan, a team of Wisconsin Sea Grant staffers held a series of public meetings in Lake Michigan communities to collect homeowners’ concerns on the issue. The team included Assistant Director for Extension David Hart, Coastal Engineer Gene Clark, Social Scientist Deidre Peroff and Keillor Coastal Management Fellow Adam Bechle.

Preliminary results of this integrated assessment have been developed into a series of potential response options homeowners and local officials can consider, depending on the severity of their own situation and their communities’ guidelines. The possible options range in scope from structural

(creating a revetment or improving groundwater drainage) to community-based (increasing education and outreach on bluff erosion, using data tools) to policy-based (sediment studies in property permitting, easing approvals on offshore structures). As the discussion continues throughout 2017, Hart expects the number of possible options to grow even larger, as more stakeholders and experts weigh in with concerns. A full report on the project is expected before the end of the year.

“Our ultimate goal in this is to develop a wide-ranging series of recommendations and create a community of practice that can serve as an example for other Great Lakes communities who are struggling with bluff erosion issues,” said Hart. “The water levels in the Great Lakes are going to continue to fluctuate from year to year, and this is a problem that’s unlikely to go away anytime soon.”

—ARC

Underground Risks

Increased Dissolution May Increase Groundwater Contaminants

Call it nature’s sense of irony, Wisconsin edition: The natural process that gives the Badger State’s groundwater its clear taste and beneficial health effects is the same thing that could be putting it at risk for harmful contamination.

We’re talking about the way in which acidity from carbon dioxide present naturally in soil can be amplified by acidity from external sources like agricultural fertilizer to increase rock dissolution. In areas of the state where the groundwater aquifer includes glacial deposits of carbonate rock and granite — think central and northeastern Wisconsin — that increased dissolution can result in the release of calcium and magnesium, a pair of elements with human health benefits. But could that same dissolution also be leading to increased dissolution of uranium, a known kidney toxin, into the groundwater supply?

Amy Nitka, a research specialist with the UW-Stevens Point Center for Watershed Science and Education, and Paul McGinley, a UW-Stevens Point professor of water resources, have teamed up to measure the relationship between levels of nitrate and uranium using samples taken from several groups of monitoring wells in Portage, Waupaca and Shawano counties. Their work is supported by the Water Resources Institute.

“We have historical data for uranium in Wisconsin,” explained Nitka, whose research background is in environmental chemistry. “It does have health concerns associated with it, but it’s not something a homeowner would typically test for. Are there areas that are likely to be more susceptible to uranium contamination?”

UW-Stevens Point water resources students Andrew Wick and Nick Salewski have collected water and soil samples, and the research team is in the process of evaluating them in the lab.

Nitka and McGinley agree that it’s unlikely their research will determine a direct one-to-one



relationship between an increase in nitrate and an increase in uranium. So far, the levels of uranium concentration the team has measured haven’t exceeded the state’s 30 micrograms/liter standard, but that doesn’t mean they’re not worth tracking.

“The development of a groundwater’s chemistry depends on a combination of factors, so we do not expect a very simple correlation,” said McGinley. “But nitrate is a contaminant that already has implications for human health and groundwater quality. If we do have increased rock dissolution occurring, would the concentrations of these other substances be something we’d have to worry about? You might also have to use a different type of treatment if you had to remove two contaminants instead of just one.”

In fact, the eventual results of Nitka and McGinley’s project, expected sometime later this year, could open the door for similar studies focused on other groundwater contaminants also released through rock dissolution. That list could include everything from molybdenum and strontium to cobalt and chromium.

“If nitrate is impacting these other elements of concern, that’s another reason we’d want to keep an eye on it,” said Nitka. —ARC

UW-Stevens Point water resources students Andrew Wick and Nick Salewski collect water and soil samples in monitoring wells.

Underwater Treasure

Tamara Thomsen/Wisconsin Historical Society

>> continued from page 3

Caitlin Zant and Tamara Thomsen of the Wisconsin State Historical Society are training the next generation of maritime archaeologists while also chronicling the wrecks of the *Atlanta* and *Arctic*.

to the Wisconsin Register of Historic Places was approved; depending on how long the process takes to unwind, it could be added to the national register later this year. Thomsen also created six maritime history-related geocache sites, split between Sheboygan and Port Washington. (For more information about the geocache sites, see “New Ways to Explore Old Ships — Maritime Trails and Geocaches” on page 11.)

Because the *Atlanta* burned within clear sight of shore, many of the longtime residents of the area — including one local homeowner who had a framed display of newspaper clippings and recovered artifacts from the ship in his living room — were very familiar with its location and the details of its demise. That homeowner allowed the dive team to use his shoreline as an access point to the wreck, one of several instances where the community engaged with Zant and Thomsen’s work.

“This wreck is very alive within the consciousness of the people who live in this area,” Thomsen said. “It hasn’t been removed from their memory at all.”

This summer, Thomsen and Zant will be leading a different breed of dive students through a survey of the *Arctic*, a tugboat icebreaker that helped keep the waters clear for the *Atlanta* (and other ships) for nearly 45 years before it was abandoned by Goodrich Transit in 1930. This time, they’ll be working with archaeology hobbyists, divers affiliated with the Wisconsin Underwater Archaeology Association and the Great Lakes Shipwrecks Preservation Society.

“We’re training people to help us do what we do — full-fledged dive surveys — or do their own projects,” said Thomsen. “We want to be sure they have the best tools and skills to record these vessels.”

The *Arctic* could prove to be an interesting challenge. Maritime archaeologists believe they know the location of the *Arctic*’s stern, but the fate of its bow has remained a mystery. This summer, a local diver convinced Zant and Thomsen to examine what he believed was the wreck of an old schooner north of Manitowoc.

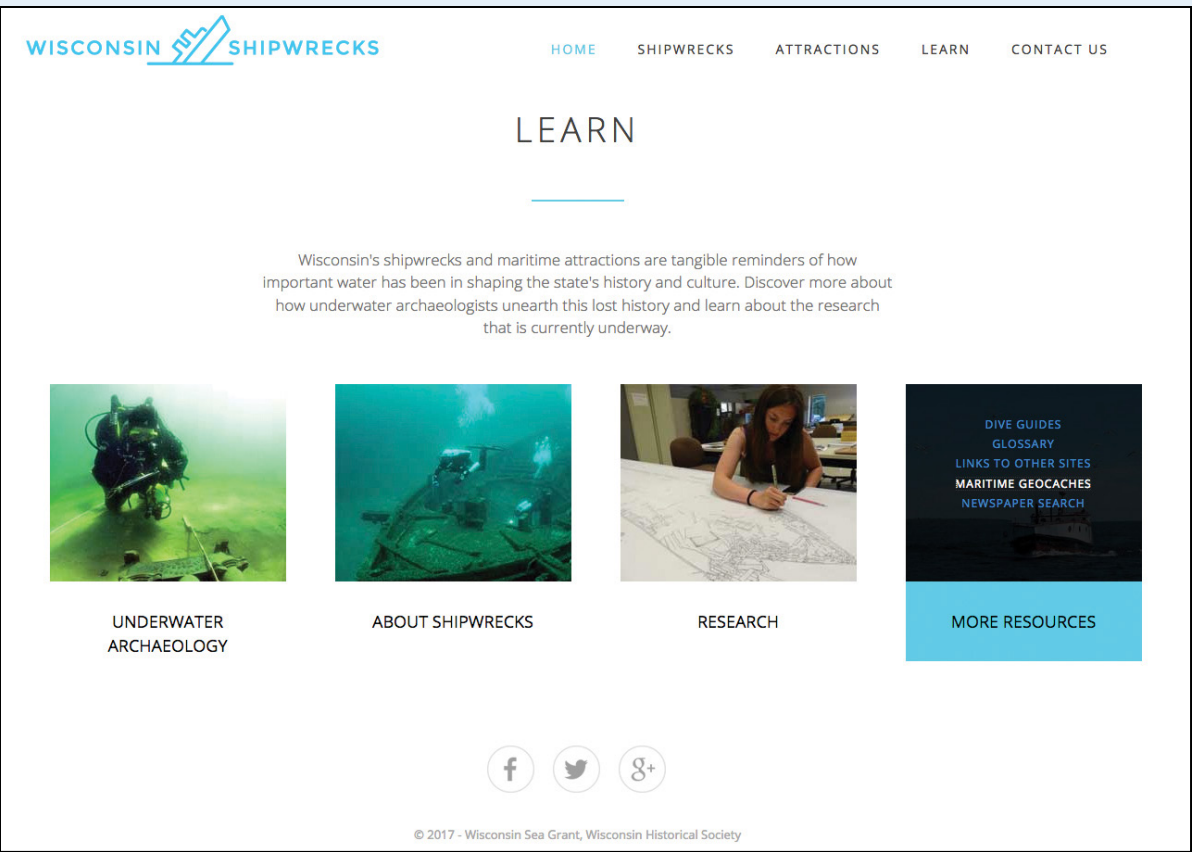
“We got down there, and my first thought was, this is not anything like any schooner I have ever seen,” said Thomsen. “This thing was a tank.”

The bow was heavily reinforced, like it was specifically designed for riding up on and breaking ice.

If the wreck is, in fact, the other half of the *Arctic*, it gives the students the opportunity to do some investigative archaeology, to match the pieces and the framing of the two parts to make a complete picture. The bow of the wreck is turned in a different location than the stern, but that could be the result of storms moving it approximately a quarter-mile up the coast.

Thomsen and Zant won’t bring students out to survey until August, but they’re already excited by what they’re likely to find — and the mystery they may solve in the process.

“This is a step farther than what we normally do with our field school,” said Zant. “The students can collect data from the site and really focus on the detail.” —ARC



New Ways to Explore Old Ships — Maritime Trails and Geocaches

The Wisconsin Maritime Trail features interpretative signs, websites, museums, waterfront parks and marked shipwreck moorings. The trails also document, preserve and protect the state’s submerged archaeological sites. Historic markers are featured on the wisconsinshipwrecks.org site under “attractions.”

New in 2017 is a marker for the wooden three-masted schooner *Grace Channon*, near Oak Creek and in Lake Michigan. The vessel featured a special hull known as a canaller. Canallers were developed on the Great Lakes and designed to transit the Welland Canal (the canal that bypasses Niagara Falls) while carrying the maximum amount of cargo through the locks with only inches to spare.

The Welland Canal allowed grain harvested from farmlands in the Midwest to be transported from ports on Lake Michigan to ports on Lake Ontario. Vessels returning to Lake Michigan were loaded

with coal, used for heating Midwestern cities and powering factories.

Another ship struck the *Grace Channon* in August 1877. It went down in only five minutes and took the life of a seven-year-old passenger traveling to Chicago with his father and brother.

In addition to the maritime trail, geocaching, a high-tech version of orienteering that relies on a hand-held GPS instead of a compass, provides another way to explore the state’s maritime history. Geocachers begin at a known location and use clues to decipher coordinates of subsequent waypoints such as anchors, buildings, historic markers or other maritime artifacts, ultimately finding a hidden container or cache.

The Wisconsin Historical Society has created geocaches in multiple coastal communities. Select “maritime geocaches” in the resources section at wisconsinshipwrecks.org/learn.

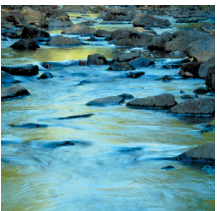
OUTREACH



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

AUG. 20-24, 2017

147th Annual Meeting of the American Fisheries Society

Tampa, Fla.

afsannualmeeting.fisheries.org

AUG. 27-31, 2017

StormCon

Bellevue, Wash.

stormcon.com

OCT. 17-19, 2017

Great Lakes Restoration Conference

Buffalo, N.Y.

healthylakes.org

OCT. 18 – 21, 2017

**North American Association
for Environmental Education**

San Juan, Puerto Rico

naaee.org



SMOKE, PLANK, BAKE, FREEZE

You have fish. We have recipes and fact sheets to prepare and preserve it. Visit **eatwisconsinfish.org** and tempt the taste buds with seared Arctic char with lemon-almond sauce, chowder, stuffed salmon and more. Fact sheets detail the steps to plank, can, freeze, pickle and smoke fish.

