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

INSIDE:


Tony Goldberg

SEA GRANT RESEARCH

Researchers Are on the Hunt for Faster, Cheaper VHS Test

Anna Wilson, a UW–Madison graduate student, is working to develop and validate the VHS test as part of her master's thesis in collaboration with Kathy Kurth at the Wisconsin Veterinary Diagnostic Laboratory, UW–Madison, and others.

Wisconsin's Little Lake Butte des Morts has the dubious distinction of being the site four years ago of the state's first inland outbreak of viral hemorrhagic septicemia (VHS), a deadly fish disease. Going forward, the lake may become distinctive for a more positive reason. That's because some Sea Grant-funded scientists are on the hunt for a faster, cheaper VHS test, and they've returned to that same area to puzzle it out.

"Our main goal is to develop an antibody test that lets us know whether the VHS virus was present in a fish population that won't require any fish to be killed," said Tony Goldberg, a UW–Madison Veterinary School epidemiologist and one of the principal investigators. "That's especially important for valuable and large game fish like musky and walleye."

VHS does not affect people or pets, but it can infect at least 25 species of fish and cause them to bleed to death. VHS has been detected in a variety of species in Wisconsin's Lake Michigan waters and in lake herring from Wisconsin waters of Lake Superior. It doesn't appear other inland waters have suffered from VHS, but concerns about future spread remain.

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Aquatic Sciences Chronicle

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

Telephone: (608) 263-3259
E-mail: *chronicle@aqua.wisc.edu*

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Communications Manager
Moira Harrington

Editor
Elizabeth A. White

Writers
Carolyn Rumery Betz, Aaron Conklin, Moira Harrington, John Karl, Anne Moser

Designer
Amy Kittleson

Circulation Manager
Linda Campbell

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FEATURED VIDEO

TOUR A HISTORIC SHIPWRECK from your computer

Documenting the vessel: With support from Wisconsin Sea Grant, maritime archaeologists from the Wisconsin Historical Society and volunteers conduct a survey of the Northerner *in July 2009. The vessel has since been listed on the National and the State Register of Historic Places.*

Photo by Tamara Thomsen, Wisconsin Historical Society.

Check out a historic Lake Michigan shipwreck without getting wet. A video about the *Northerner*, narrated by Keith Meverden, maritime archaeologist at the Wisconsin Historical Society, is now available at *youtube.com/watch?v=oHpMw-Umkyg*.

The largely intact vessel sits upright on the bottom, about five miles southeast of Port Washington, Wis.

In November 1863, the *Northerner* was loading lumber in Amsterdam, Wis., when a storm came up. The waves repeatedly pounded the bottom of the ship. The crew hurriedly finished loading her and sailed out on the lake. Once there, they realized that her hull had been damaged, and she was taking on water.

The crippled vessel sailed into Port Washington, Wis., where the crew unloaded most of her timber. A tow tug then set out with her for Milwaukee, where she was to be repaired. However, the pumps couldn't keep up with the flooding, and she capsized.

The entire crew was safely transferred onto the tug, but later searches for the vessel came up empty-handed. She was rediscovered in the early 1970s by recreational divers. Today, she makes an excellent dive — or good video watching.

programpeople news

Sea Grant Rides a Wave of Gratitude for Rip Current Awareness Award From Surfers' Group

With a wet suit, longboard and a lot of determination, surfers ride the waves of Lake Michigan in the peak months of September through January. Some of these hardy souls also organize an annual international surfing event known as the Dairyland Surf Classic in Sheboygan, Wis.

Those organizers awarded their 2011 commemoration to the Great Lakes Sea Grant Network for awareness-raising about water safety, rip currents in particular.

One summer a few years ago, five children in the Sheboygan area drowned, and the city wanted to increase its efforts to promote beach safety. Dairyland's Lee Williams made a call to the Wisconsin Sea Grant office asking for help. Within two days, Williams received rip current warning signs and other materials. He took them to the mayor's office, and soon the city pledged $70,000 to construct five stainless steel emergency call boxes along the Sheboygan shoreline.

SUCKER MIGRATION
Harbinger of Climate Change

How do birds know when to fly south in the winter? How do fish know when to migrate upstream to spawn? The relationship between periodic biological phenomenon and climate, known as phenology, is taking on a new dimension these days. While environmental triggers like the number of daylight hours remain steady, Wisconsin's climate is changing. Migration patterns of birds and fish may change in response to the warmer nights and winters, increased springtime precipitation, and more frequent intense rain events that Wisconsin is experiencing.

Peter McIntyre, a new faculty member at the University of Wisconsin–Madison, and his doctoral student Evan Childress are using funds from Wisconsin's Water Resources Institute to better understand how climate change is altering fish migration patterns in streams that flow to the Great Lakes. McIntyre and Childress are particularly interested in learning whether it is flow or temperature that provides the cues to fish that it's time to spawn.

Suckers, an important food source for large sport fish, usually start to move when the days are warm and the water is clear but before the trees have leafed out. The eggs and excrement they deposit as they move upstream serve as an important source of nutrients that fertilize the growth of the plants and insects living in spawning streams. If peak migration of suckers shifts, their interactions with migrating sturgeon, pike, walleye and redhorse would also be affected. In fact, changing the timing of the nutrient inputs from suckers could alter the dynamics of the entire stream ecosystem.

McIntyre and Childress, based at the Center for Limnology, are also collaborating with the U.S. Geological Survey and the Wisconsin Department of Natural Resources (WDNR) to understand future stream flows under various climate change scenarios. Putting together detailed data on the fish migrations with the latest climate forecasts will allow them to forecast migration patterns under predicted climate conditions, including the fact that Great Lakes water temperatures appear to be changing faster than air temperatures.

Childress is engaging the public with his research by tapping into a network of citizen volunteers on 22 tributaries to Lake Michigan. The WDNR/UW-Extension's Water Action Volunteers devote about 15 minutes daily at a consistent time each day for three to five weeks looking for suckers to move upstream. The purposeful watching and documenting of the suckers' arrival is awe-inspiring, according to Childress. The whole bottom of a little stream may be chock-full of fish.

Coggin Heeringa, is one such citizen scientist based at Crossroads at Big Creek, a 115-acre nature preserve in Sturgeon Bay, Wis. She used school groups, scouts and weekend visitors to count fish and take other water measurements.

"Suckers are an easy sell," said Heeringa. "One second-grader told me that the sucker run is better than fireworks." She hopes to take part in the monitoring again in 2012 during the second year of the project.

Using citizen volunteers to document local changes may help more people understand that climate change is a local issue.

"We're downscaling climate change to their backyard," Childress said, "Understanding that in my local stream, the fish are going to be affected by climate change — that is huge."

McIntyre noted that work with citizen volunteers has mutual benefits. "We could not collect data from so many places by ourselves, so our volunteers are essential contributors to the research effort as well as new ambassadors for native migratory fishes." —CRB

White Sucker photo by Brian Gratwicke, wikipedia.org. Crossroads photo by Coggin Heeringa.

Ballard Wins 2011 Weston Scholarship

Kathryn (Kate) Ballard, a UW–Madison senior, is the recipient of the 2011 Carl J. Weston Memorial Scholarship. The Weston scholarship, established in 1995, is given annually to an undergraduate student who is involved in a Wisconsin Sea Grant-supported project.

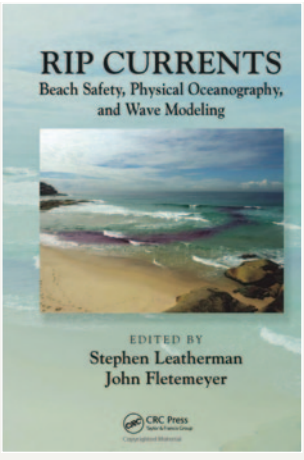
Ballard, a statistics major, has been working with Sea Grant's David Hart since 2009 on a variety of projects, including the Wisconsin Coastal Guide, improving access to Great Lakes mapping data and coastal hazards efforts supporting the Great Lakes Observing System.

"When Kate first started, I quickly realized that she could handle more advanced responsibilities so I have assigned her more challenging projects with each passing semester," Hart said.

Ballard presented the results of one of her projects at the International Association for Great Lakes Research meeting in May 2011 in Duluth, Minn. The project aims to generate a better understanding of Great Lakes waves through models and observations.

"As a statistics major working at the Sea Grant Institute, I began to think about a future career that could combine statistics and geographic information systems (GIS) skills and apply it to the physical sciences," said Ballard. "I can see myself in graduate school or a post-college career that uses statistics and GIS to tackle problems of weather, water resources and their interaction."

Photo by Moira Harrington/UW Aquatic Sciences Center.



OUTREACH

Clark Contributes to Rip Currents Book

Coastal Engineering Specialist Gene Clark contributed to a chapter in the recently published book "Rip Currents: Beach Safety, Physical Oceanography, and Wave Modeling."

"We are heading into some very wintry weather in Wisconsin right now, but those sunny days on the beach aren't too far into the future. With our chapter specifically focusing on the Great Lakes rip currents, and by contributing to a book edited by some nationally renowned experts, I am pleased to work toward ensuring a safe experience," Clark said.

The book is available at *crcpress.com/product/isbn/9781439838969*.

ANDERS ANDREN RETIRES

DIRECTOR RETIRES AFTER TWO DECADES OF LEADERSHIP

When he took the reins, much of the focus was fisheries. Now that he's letting them go — after heading the University of Wisconsin Sea Grant Institute and the Water Resources Institute for a spectacular and defining tenure — Anders Andren can say the direction and scope of the organization he's headed has expanded to encompass the entirety of the Great Lakes, Wisconsin's inland waters, its groundwater and beyond.

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Photo by Jay Salvo/UW Aquatic Sciences Center

Photo provided by UW Aquatic Sciences Center.

Anders Andren

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In September, Andren, 67, made official his intentions to retire from the position he's held for the last two-plus decades. He'll remain as director of the UW Aquatic Sciences Center (the administrative home for UW Sea Grant and the Water Resources Institute) at least until August of 2012, remaining closely involved in the effort to locate and train his successor.

Andren, who was born and raised in Finland and Sweden, is justifiably proud of the things he's accomplished during his term. Under his direction, UW Sea Grant enjoyed more successes than waves hitting a Lake Superior beach on a windy fall day: Andren led the effort to reorganize the National Sea Grant College Program into focused thematic research areas such as fisheries, aquaculture and contaminants, an effort that helped create a clearer identity for the national program. He crafted a research proposal review process that's been adopted by many other Sea Grant programs. A self-confessed IT junkie, Andren also invested resources early and often in information technology. UW Sea Grant was the first Sea Grant program to field its own website (way back on Mosaic, the late-90s dinosaur forerunner to NetScape) and also developed iPro and iPropose, its own in-house programs for researchers to submit and update grant proposals for both Sea Grant and the Water Resources Institute. Despite being among the smaller entities on the UW–Madison campus, the center also maintains its own separate IT infrastructure.

But perhaps the biggest key to Andren's long-term success has been his ability to build talented coalitions, both inside and outside the organization, both locally and nationally. At the most recent Sea Grant Association meeting in Baltimore, one fellow Sea Grant director dubbed him "a sage."

Photos provided by UW Aquatic Sciences Center.

HE SUCCESSFULLY STRADDLED BOTH UNIVERSES — ACADEMICS AND REAL-WORLD RESOURCE ALLOCATION.

Right: Andren with Thomas W. Bober. Together they edited the proceedings of six international conferences on silver in the environment.

Leon Cammen, the current director of the National Sea Grant College Program (NGSCP), vividly recalls the leadership Andren displayed during the difficult stretch the national program endured in the mid-1990s. At the time, Andren was heading the Sea Grant Association.

"We were in the process of re-organizing, and struggling to maintain our funding levels," remembered Cammen, who served as UW Sea Grant's program officer for more than two decades. "He worked with everyone in the network and brought them all together. That was the start of making us a better place."

It's the same type of firm hand Andren showed again in 2001, when he served on the NSGCP's national committee for allocation of funding. As any program director knows, the distribution of grant dollars is often the minefield that trips up a research program. Cammen recalled the ways in which Andren was able to balance stakeholder needs without alienating anyone.

"It took some real leadership to navigate those waters," he said, describing UW Sea Grant as a top-flight science and research program. "Due to Anders, we were able to pull through that and come out with a solution that lasted a decade."

Researchers agree with Cammen's assessment.

"Anders was excellent at recruiting the right people for the right job, as well as managing how and who gets funding. He knew the system well enough to juggle it all," said Jim Kitchell, an UW–Madison emeritus professor of limnology and self-described "old horse" who's been a recipient of UW Sea Grant research funding since 1974.

Kitchell said he believes that while other programs often focused on research strictly for the sake of publication, UW Sea Grant under Andren was adept at recruiting and maintaining researchers who were interested in research that translated quickly into real-world application.

"He has built and sustained a team spirit that's both productive and collaborative," said Kitchell. "He successfully straddled both universes — academics and real-world resource allocation."

Andren's earliest affiliation with Sea Grant came in 1975, when he was first recruited to the UW faculty from the Oak Ridge National Laboratory (ORNL). One of the members of Andren's interview panel was none other than Bob Ragotzkie, the then-director of UW Sea Grant. During the process, Ragotzkie urged Andren to develop and submit a proposal to UW Sea Grant so he'd have funding ready and waiting for him when he arrived on campus. That proposal — a study of the key role of the atmosphere in delivering toxic substances to the Great Lakes — ended up being one of Andren's career highlights. It also developed the connection that would re-shape his academic and professional career path.

In 1988, Andren edged closer to Sea Grant, becoming the associate director of the UW's Water Resources Institute (which at this time was still a separate entity; in 1999, it would merge with the UW Sea Grant Institute to form the UW Aquatic Sciences Center, a unique state-federal partnership that maximizes aquatic research in a single, cost-effective model). It was there that he began to learn about grant administration, one of several skills that would come in handy a few years later, when Ragotzkie approached him again, this time to offer him the position of associate director of UW Sea Grant.

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Andren Retires

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"I thought, you know, this really nailed down the Wisconsin Idea, with a specific focus on the Great Lakes and water issues," recalled Andren, who fortuitously also holds a Ph.D in chemical oceanography. "It was a neat type of concept and I wanted to be part of it."

Almost immediately, he began shifting the program's focus to mirror and respond to new threats facing the Great Lakes.

"When I became involved with Sea Grant, I would venture that about 70–80 percent of the funding went to fisheries — understanding fisheries and, perhaps, some work down the food chain to phytoplankton," said Andren. "This was the time when our awareness of contaminants in nature really blossomed and became a national issue."

Andren, who had done his Ph.D work on the role of the Mississippi in delivering mercury to the Gulf of Mexico, had spent plenty of his time at ORNL developing and honing analytical techniques to measure contaminants in the environment. That left him well-positioned to build on the framework and research diversification Ragotzkie had created as new topics emerged in the Great Lakes region.

In the late 1980s to the 90s, in what Andren calls a "watershed moment," UW Sea Grant-funded researchers began looking intently at the risks environmental contaminants like mercury, lead, copper and cadmium posed to human populations, especially in the Great Lakes. Their findings led to major remediation efforts and policy changes regarding the measurement and controls of environmental toxins.

Andren is proud of the environmental impacts that have been effected under his tenure. But they're not the only things that make him smile as he recalls his successful career.

"In terms of my time here, probably one of the most satisfying aspects of that is that we have been able to attract top-notch talent, in administration, outreach and communication, information technology," said Andren. "We have probably the best and brightest of all the programs, which is reflected in the fact that we get reviewed very highly every year."

Andren knows that's what he'll miss most — interacting with his co-workers in the UW program and the talented people in the international Sea Grant and water resources universe.

"I've gotten to know people in every single coastal state and have become really good friends with most of them," he said. "I can travel to any coastal state in the U.S., and I have a lot of friends there. A lot of these folks are very talented, and you just learn a lot about what's going on. That has been a real benefit."

The biggest challenge facing Andren's successor won't be a surprise to anyone working in the Sea Grant and water resources area — maintaining an adequate level of funding at a time when resources are shrinking almost daily. Under Andren, the programs were able to increase state funding and, in the case of Sea Grant, amass an impressive record of landing targeted national dollars.

Andren will maintain an office on the UW campus and has applied for emeritus status; he hopes to remain active in the Sea Grant community, whether that means helping other programs review grant applications or composing some proposals of his own. He's mulling over becoming involved in some international eco-philanthropy projects in Africa and Central and South America.

And, now that he'll have some free time, he's looking forward to pursuing his other passion: music. This talented composer and guitarist — he collects guitars, composes MIDI-based music on his computer and occasionally channels Elvis Presley — still harbors secret aspirations of having his own band. Perhaps he'll resurrect the Not-So-Muddy Waters Band, a group of musically minded Sea Granters he co-formed with former Communications Director Steve Wittman during a Sea Grant Week in Madison.

Whatever life brings his way, he's ending his tenure with a big smile on his sometimes stoic Scandinavian face.

"Quite frankly, I've always thought this job was one of the best on campus," said Andren. "You can do research, you can teach, and you can have a strong impact on aquatic sciences in the Great Lakes. We've had a really good run at it." — ARC

Top photo by Bob Rashid. Right photo provided by UW Aquatic Sciences Center.

ON THE HUNT FOR FASTER, CHEAPER VHS TEST

continued from page 1

Anna Wilson evaluates samples at the Wisconsin Veterinary Diagnostic Laboratory on the UW–Madison campus.

Top and right photos: Wisconsin Veterinary Diagnostic Laboratory, top right photo: Tony Goldberg.

Goldberg and his fellow researchers have collaborated with Wisconsin Department of Natural Resources (WDNR) fish crews to collect blood and organs from freshwater drum. They want to learn whether the VHS virus is still active in Lake Winnebago and to understand when in a calendar year the virus poses the biggest threat to fish. Such predictive abilities could offer a new way to monitor and manage VHS throughout all of Wisconsin's waters and would be of interest to resource managers around the Great Lakes basin, country and world.

The presence of antibodies in the drum indicates whether the fish were exposed to the virus, survived and subsequently developed an immune response. By sampling drum in early spring, before VHS typically emerges, and once in late spring, after the virus typically emerges, the researchers can track the infection status of Lake Winnebago drum over the transmission season each year. These new data, in combination with the WDNR's long-term records of Lake Winnebago watershed drum, will be used to make statistical predictions about when and where VHS is most likely to occur in the future.

Goldberg suspects the infection may occur in waves, as new fish enter the fishery, or as the immunity wanes in older fish that survived the initial infection. "We think it could be like mumps in humans, with new waves starting as immunity wears off."

Sue Marcquenski of the WDNR said the test is also expected to help yield more accurate results regarding the true distribution and prevalence of the virus. The current test can only detect the presence of the virus when it is active. The new test will detect antibodies to the virus, which means the fish were infected at some time in the past and survived the infection.

Anna Wilson, a UW–Madison graduate student, will develop and validate the VHS test as part of her master's thesis in collaboration with Kathy Kurth at the Wisconsin Veterinary Diagnostic Laboratory, UW–Madison.

Kendall Kamke, senior WDNR fish biologist, noted that although there have been no obvious ongoing effects of VHS on the drum population or on other species in Lake Winnebago, the test will be a good tool. "There's nothing I could point to and think it might be related to VHS," he said. "But if they can give us a test that will allow us to avoid killing fish and something that could predict the threat level based on XYZ criteria,that would be the silver lining." —MFH

Unfold a map…online!

Much has changed in the world of maps and mapping. Cartography has moved online, and the tools used to make maps changed from parchment and compasses to GPS and Google Earth. The Water Library collection includes many books to help both the layperson and the professional keep up with this rapidly changing field.

PLACING HISTORY: HOW MAPS, SPATIAL DATA, AND GIS ARE CHANGING HISTORICAL SCHOLARSHIP

Edited by Anne Kelly Knowles; digital supplement edited by Amy Hillier. Redlands, Ca.: ESRI Press, 2008.
The authors use case studies and essays on key issues involving historical GIS to highlight the unprecedented range of tools to visualize historical information in a geographical context.

GIS CARTOGRAPHY: A GUIDE TO EFFECTIVE MAP DESIGN

By Gretchen Peterson. Boca Raton, Fla.: CRC Press, 2009.
This book covers all facets of map creation — from classic cartographic standards such as colors and fonts to data specific mapping techniques and recommendations for novel design approaches.

COASTAL INFORMATICS: WEB ATLAS DESIGN AND IMPLEMENTATION

By Dawn Wright, Ned Dwyer and Valerie Cummins. Hershey, Penn.: Information Science Reference, 2010.
This book examines state-of-the-art developments in coastal informatics such as data portals, metadata vocabularies and ontologies, metadata creation and extraction and geographic and information management systems. Particular emphasis is placed on Internet map servers and Web-based geographical information and analysis.

RETHINKING THE POWER OF MAPS

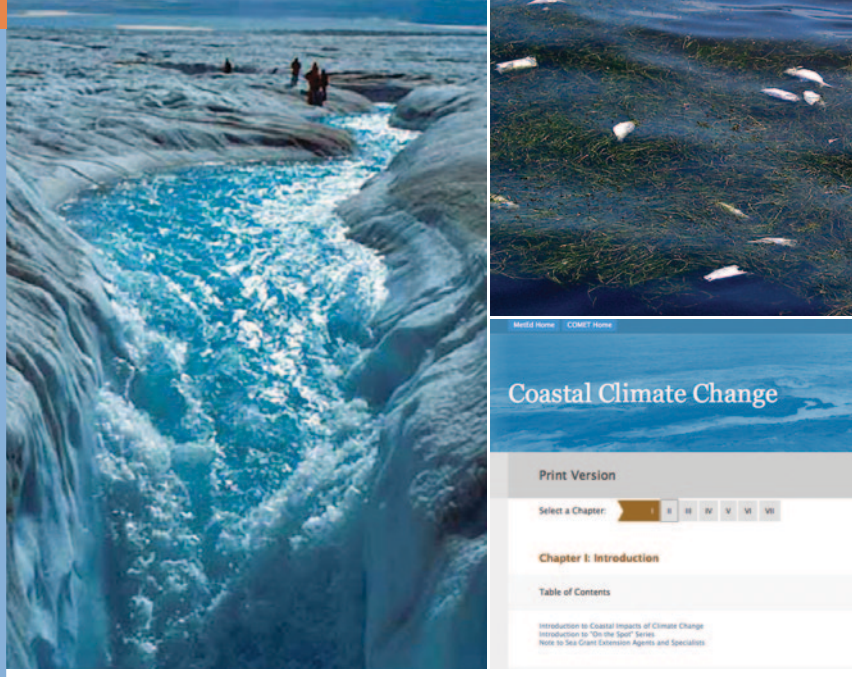
By Denis Wood. New York: Guilford Press, 2010.
A contemporary follow-up to the groundbreaking "Power of Maps," this book takes a fresh look at what maps do, whose interests they serve and how they can be used in surprising, creative and radical ways.

CARTOGRAPHY: VISUALIZATION OF SPATIAL DATA

By Menno-Jan Kraak and Ferjan Ormeling. New York: Guilford Press, 2011.
Providing a comprehensive account of the acquisition of data, map design, topographic and statistical mapping, this book ends with examples of advanced mapping environments.

Please visit the Water Library at *aqua.wisc.edu/waterlibrary* for more information. If you wish to see more books on this topic, visit our mapping recommended reading list at *aqua.wisc.edu/waterlibrary/Default.aspx?tabid=381*.

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



Images from the Coastal Climate Change website.

Log on and Learn About Climate Change

When it comes to climate change, many U.S. citizens can slip into maybe-somewhere-else-and-probably-later thinking. It is quite the opposite for those charged with talking about and/or developing adaptation strategies. For them, it is a here-and-now world of urgency.

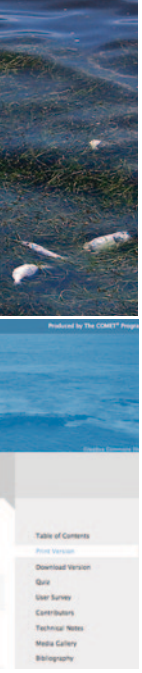
Communicators and extension educators — and those civic leaders and resource managers who live and work in coastal areas — face ever-increasing responsibilities to communicate and address the many and complex facets of coastal climate change.

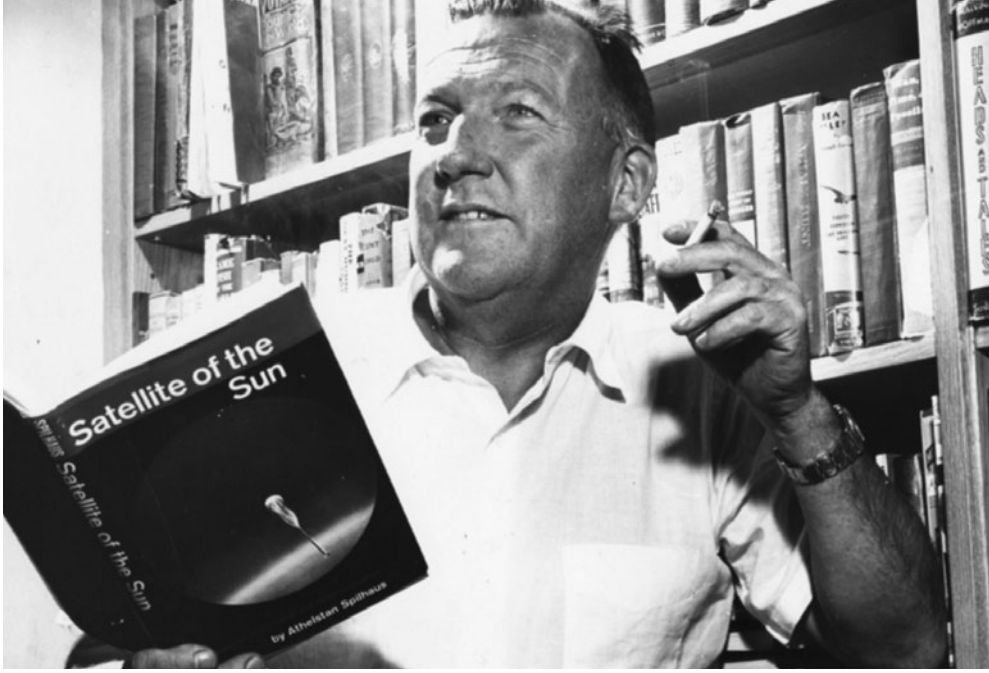
A multimedia self-guided education series accessible at *meted.ucar.edu/climate/coastalclimate* could help to ease a bit of that pressure.

Anonymous user feedback has been positive. Here are two quotes. "The module is well-written, straightforward and provides concrete examples and take-aways that will be very helpful in communicating with the public and various stakeholder groups." "A nicely packaged overview of climate change as it applies to our coastal communities."

The material was posted in May. Since then, 832 users have logged on to learn about:

- Downscaling climate models
- Working with state and local governments
- Preparing the coasts from the perspective of sustainable development
- Working toward hazard-resilient coasts
- Ensuring safe and sustainable fisheries in the face of climate change
- Ensuring healthy coastal ecosystems in the face of climate change





Left: Spilhaus (standing, right) with Press Secretary James Hagerty, Dr. S. Douglas Cornell and Dr. J. Wallace Joyce during President Eisenhower's announcement of plans for the building and launching of the world's first man-made satellite. Right: Spilhaus holding a copy of one of his five books.

- Mitigation, adaption and costs of building resiliency
- Impacts on inland lakes

The modules were developed cooperatively by the University Corporation for Atmospheric Research's COMET® program, the National Oceanic and Atmospheric Administration's Climate Program Office's Sectoral Applications Research Program, and many Sea Grant programs and their university partners under the leadership of Wisconsin Sea Grant.

A user must register to learn from the modules. It is, however, a free and easy process.

Athelstan Spilhaus—Father of Sea Grant

If not for the man named Athelstan, you might not be reading this publication. Literally thousands of critical aquatic science research projects might never have happened. And the National Sea Grant College program — and by extension, University of Wisconsin Sea Grant — might never have existed.

It's been 45 years since President Lyndon Johnson signed the bill that brought the National Sea Grant College program into existence in 1966. The actual idea, however, was suggested two years earlier by a South African writer/ oceanographer/geophysicist named Athelstan Frederick Spilhaus. He is and was the true "Father of Sea Grant."

Spilhaus would have turned 100 this November, and he's due to get a little historical love. Sharon Moen, communications manager for Minnesota Sea Grant, is busily penning "With Tomorrow in Mind: Athelstan Spilhaus (Dreamer of Satellites, Cities and Sea Grant)" a history of Spilhaus and the formation of the national program.

"I completely understand why Walter Cronkite said that Athelstan Spilhaus was the most interesting person he had interviewed," said Moen. "Beyond coming up with the Sea Grant concept and then tirelessly pushing for it to become a reality, Dr. Spilhaus was a sharp-thinking, wildly creative, unusually productive individual, literally until the day he died."

Moen hopes to have her book completed and published in time for the 2012 meeting of the American Fisheries Society in Minneapolis and St. Paul. The last time the AFS met in the Twin Cities — a mere 49 years ago — Spilhaus delivered the Sea Grant speech that began it all.

Spilhaus – left: courtesy of *nasa.gov*; right: Brisco Center for American History, University of Texas at Austin.

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

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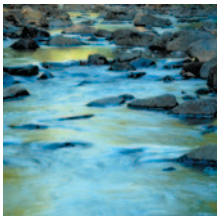
a joint newsletter from UW Sea Grant and UW Water Resources



CALENDAR OF EVENTS

FEB. 3–4, 2012

Lake Sturgeon Bowl
Milwaukee, Wis.
glwi.uwm.edu/sturgeonbowl

FEB. 16–17, 2012

Wisconsin Wetlands Association Wetland Science Conference
Lake Geneva, Wis.
wisconsinwetlands.org

MARCH 1–2, 2012

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

MARCH 26–28, 2012

American Water Resources Association Spring Specialty Conference – GIS and Water Resources
New Orleans
awra.org/meetings/spring2012

SOCIALIZE WITH US

Have you gotten social with UW Sea Grant and the Water Resources Institute yet?

If not, there's no time like the present. We're active on a wide variety of social media networks and channels, and connecting with us there is the best way to follow and gain instant access to the latest research, news and developments in our Great Lakes and groundwater universes.

Connecting really couldn't be easier:

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Follow us on Twitter:
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