Fall/Winter 2010

ASC
Aquatic Sciences Chronicle
www.aqua.wisc.edu/chronicle
UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE UNIVERSITY OF WISCONSIN WATER RESOURCES INSTITUTE

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Oh, Well!

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SEA GRANT RESEARCH

Sea Grant is Key Partner in New Lake Superior Estuarine "Living Laboratory"

This year, Wisconsin got an extra treat right around Halloween. Oct. 26 was the designation ceremony of the Lake Superior National Estuarine Research Reserve (LSNERR) located on the Wisconsin side of the St. Louis River, which divides Wisconsin and Minnesota at the western end of Lake Superior.

The LSNERR is now part of the National Estuarine Research Reserve program, funded by the National Oceanic and Atmospheric Administration (NOAA) and encompassing 1.3 million acres nationwide. Wisconsin's reserve means a $500,000 annual infusion from the federal government. That money will be augmented by state resources and will have a multiplier effect – creating jobs, attracting additional funding and enhancing Wisconsin's reputation as a hub for Great Lakes conservation efforts.

"This is a big deal," said UW Sea Grant's Gene Clark, who is based in Superior at the heart of this new living laboratory. He noted the lab will yield useful results not only for the Badger and Gopher states, but the Great Lakes Basin and nation as well.

Sue O'Halloran (left), coastal trainer with the newly designated Lake Superior National Estuarine Research Reserve, confers with others while visiting just a small area in the 16,697-acre reserve.

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Aquatic Sciences Chronicle

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FEATURED VIDEO

Fish Don't Speak English

When it comes to fish, there are no language barriers. Growing Power, a sustainable urban farm operating as a non-profit organization in Milwaukee, brought together more than 1,500 attendees from nine different countries for a recent three-day international conference.

Will Allen, a MacArthur Fellow named one of "Time Magazine's" 100 most influential people from around the globe this year, is chief executive officer of Growing Power and was host of the conference. The goals of the conference were to showcase and share the methods that provide food to central-city neighborhoods, including using aquaponics, a synergistic plant-and-fish-production system.

Allen has relied heavily on the expertise of UW Sea Grant Aquaculture Specialist Fred Binkowski in refining Growing Power's cultivation techniques. At the conference, Binkowski spoke about fin fish husbandry and biology, water quality, and aquaculture system design and technology.

Check out this video about Growing Power's aquaponics operation, *aqua.wisc.edu/chronicle*.

programpeoplenews

Vicky Harris (top), a UW Sea Grant water quality specialist, and her husband, Dr. **H.J. "Bud" Harris**, professor emeritus from UW-Green Bay, recently received a lifetime achievement award from the Nature Conservancy in Wisconsin in recognition of their years of work to restore water quality and conserve habitats in the Green Bay watershed. In the award letter, Nature Conservancy leaders wrote, "Without the ongoing contributions of scientists like you who are interested in and support our work, we would not have been able to protect and restore so much of Wisconsin's natural heritage."

In August, **Kathleen Schmitt Kline** resigned her science writer position at the Aquatic Sciences Center. She then applied for a new position, that of outreach communicator, and took on new duties in mid-October. She is working with the Advisory Services staff to set up and conduct climate-assessment workshops, contribute to an aquatic invasive species project funded by the Great Lakes Restoration Initiative, and collaborate with the water quality specialist and coastal hazards specialist on the Clean Marina Program.

Second-year library science graduate student **Amy De Simone's** energy and enthusiasm, evidenced by her multiple volunteer causes, is now a project assistant at Wisconsin's Water Library. "People in libraries are happy people," De Simone said. "I also like specialty libraries, and this is one of them." Wisconsin's Water Library is the only one of its kind in the state, with roughly 30,000 volumes of water-related information about the Great Lakes and the waters of Wisconsin.

WATER RESOURCES RESEARCH

Tracking the Source of Well Contamination

About ten one-gallon jugs of water line the shelves in Wayne Stefan's garage, waiting to be used for drinking, cooking or mixing up a pitcher of lemonade. The water from his rural Fond du Lac well is contaminated with coliform bacteria, and he has to buy the family's water. Their water has been considered unsafe to drink since the floods of 2008.

Leaking septic systems or manure from adjacent rural properties are the two most common sources of fecal contamination of a well. The University of Wisconsin Water Resources Institute is funding a new research project to refine a methodology to determine the source of well water contamination.

Sam Sibley, a UW-Madison post-doctoral research associate, attaches a series of hoses and a filter to the outside spigot connected to the Stefans' well, one of six wells with known contamination problems he is sampling around the state. Thirty gallons of water are run through Sibley's filtration system, which employs the same kind of dialysis device used for people with failing kidneys. The filter contains thousands of tiny straws that are capable of trapping the three types of microorganisms that may contaminate groundwater—bacteria, viruses and parasites. After about 70 minutes, the filter is disconnected from the hose, the hose from the tap, and Sibley is on to the next home to start the process again.

At the State Laboratory of Hygiene, Sibley washes the microorganisms from the filter and pelletizes them for DNA purification and analysis. He is looking for adenoviruses and polyomaviruses, viruses which are considered source-specific fecal indicator organisms.

The technology of finding the source of fecal contamination has evolved rapidly over the past decade, and microbial source tracking has been used for several years. Now, viral source tracking is being used to differentiate human from bovine viral contaminants. Bacteria and viruses may both be present in the well, and they may have entered the system at different times.

Steve Ales is a regional manager for the drinking and groundwater program at the Department of Natural Resources and has done field work with Sibley. "Once a well is contaminated with *E. coli*," said Ales, "you need to figure out why, because unless you know how the *E. coli* got into the well, the well is always going to be vulnerable to *E. coli* contamination in the future."

Long-term solutions can be implemented once the source is known. Sibley's techniques revealed human viruses in a sample from a home in Rock County. Further investigation by Ales found a break in a pipe between one of three homes that had contaminated water and the mound septic system. When the pipe was replaced, the bacteria numbers declined.

When the source is manure, it may be difficult to assess if it is from improperly spread manure on a nearby field, fractured bedrock, or poor casing in the well. Qualified homeowners may be compensated through Wisconsin's Well Compensation Fund for cleanup measures if it is demonstrated that the contamination is from manure.

Homeowners with private wells are encouraged to test their water for bacteria annually. The water may smell, look and taste fine but still be contaminated and pose a health risk. — CRB

Watch video at **www.aqua.wisc.edu/chronicle**.

Left: Wayne Stefan points to his well that has been contaminated since 2008. Right: Sam Sibley uses a kidney dialysis filter to collect pathogens from a contaminated well. Photos by Carolyn Rumery Betz

wisconsin's**water**library

Go Underground for Great Reading

Most Wisconsin residents (95 percent) rely on groundwater for their drinking water. This recommended reading list will help you learn more about this "buried treasure."

THE ESSENTIAL HANDBOOK OF GROUND-WATER SAMPLING
BY DAVID NIELSEN AND GILLIAN NIELSEN.
Boca Raton, Fla.: CRC Press/Taylor & Francis, 2007.
Tremendous improvements in groundwater sampling methodologies and analytical technologies have made it possible to collect and analyze truly representative samples to detect increasingly lower levels of contaminants—now in the sub-parts-per-billion range. New methods produce more accurate and precise data and, even though they are less expensive, many companies and government agencies are reluctant to use them. This handbook details the economic and scientific case for adopting these new methodologies.

GROUNDWATER: WISCONSIN'S BURIED TREASURE
BY NATASHA KASSULKE AND LAURA CHERN.
Madison, Wis.: Wisconsin Department of Natural Resources, 2006.
This booklet is a short introduction to Wisconsin's groundwater, the programs that protect it, and what we can all do to safeguard it. The 2006 edition looks at new challenges to our groundwater resources and the progress that has been made since the first edition was published in 1983.

GROUNDWATER GEOPHYSICS: A TOOL FOR HYDROGEOLOGY
REINHARD KIRSCH, EDITOR.
Berlin: Springer, 2009.
This book describes the latest geophysical techniques used to map underground conditions, including groundwater quality.

GROUNDWATER IN THE ENVIRONMENT: AN INTRODUCTION
BY PAUL L. YOUNGER.
Malden, Mass.: Blackwell Publishers, 2007.
This new textbook provides a thorough introduction to all aspects of groundwater systems and their management.

GROUNDWATER SCIENCE
BY CHARLES R. FITTS.
Boston, Mass.: Academic Press, 2002.
Fitts provides a clearly written introductory text for students and professionals in hydrogeology that should also be useful to the general reader who wants to know more about groundwater.

Please visit the Water Library at *aqua.wisc.edu/waterlibrary* for more information. Anyone in Wisconsin can borrow these books. Just e-mail *askwater@aqua.wisc.edu.*

SEA GRANT OUTREACH

Left to Right: Lake Michigan beach (Michigan Travel Bureau). Lake Superior's South Shore (Minnesota Extension Service, Dave Hansen).

Projects Funded Through Great Lakes Restoration Initiative

Wisconsin is the beneficiary of funding made available under the Great Lakes Restoration Initiative (GLRI), a $475 million program to restore fish and wildlife habitat, clean up toxic pollution, reduce nonpoint source pollution, and control and prevent the spread of aquatic invasive species in the Great Lakes. Wisconsin Sea Grant will be involved in several regional projects that will be implemented with multiple partners. The four new projects are: developing a beach information communication system, developing a regional public outreach campaign on aquatic invasive species, developing a regional green marina education and outreach project, and expanding understanding of the Lake Michigan food web.

The beach information project will provide an online health and safety beach report that recreational users can use to learn about water temperatures, rip currents, bacteria levels and blue-green algae blooms before making their decision on whether or not to hit the beach. The program will be piloted in Minnesota and later expanded to two Lake Michigan beaches in Wisconsin and Michigan. Wisconsin Sea Grant's coastal engineer, Gene Clark, is involved in this project.

All eight of the Great Lakes states are involved in the campaign to prevent, control and minimize the impacts of aquatic invasives, and the new GLRI funding will allow them to ramp up the currently underfunded public outreach campaign. Phil Moy, UW Sea Grant's aquatic invasive species specialist, is Wisconsin's lead in this cooperative effort.

Vicky Harris, Sea Grant's water quality specialist, will be spearheading the Green Marina project with Michigan and Ohio's Sea Grant programs. The project's goal is to reduce the amount of nonpoint source pollution and toxic substances entering the Great Lakes from marina activities. This regional project will expand and improve upon the existing Clean Marina programs in the Great Lakes states.

Finally, Wisconsin Sea Grant will team up with Illinois - Indiana Sea Grant to further examine the nearshore Lake Michigan foodweb and connections between nearshore and offshore zones. Harvey Bootsma and John Janssen from the Great Lakes WATER Institute will be the Wisconsin principal investigators on this project.

While all these projects rely on collaboration, this final one required more than usual. As always, Wisconsin Sea Grant conducted its proposal review and funded as many projects as possible. However, there are often more meritorious projects—such as this food web effort—than can be funded. In this case, the Great Lakes Regional Research Information Network ranked projects to attract external funding, effectively supplementing base funding for investigators.

"Chronicle" Survey Results – Thanks for Voicing Opinions

It came through loud and clear – response to the recent survey on the "Aquatic Sciences Chronicle," that is. Nearly 10 percent of the "Chronicle's" readers weighed in to say, fairly overwhelmingly, that it's a valuable publication. A majority of respondents said they read each of the four annual issues always or occasionally and that they pass on its content. A quarter of respondents also report having changed their activities, behaviors or plans thanks to something that appeared in the "Chronicle."

The survey was in the field for roughly two months in late spring and into the summer. Here's a sampling of some quotes that respondents volunteered after answering the standardized questions:

The "Chronicle" provides information in a format that non-scientists can understand.

I share the "Chronicle" with several other biologists on staff.

I'm a professor and I incorporate information into my classes.

I live in New England and read for content about the Great Lakes.

I have changed my behaviors about waste oil, catch and release, and fertilizers.

I have been sharing the information with my 15-year-old son. He is interested in environmental issues and I would like to encourage his interest for possible career ideas. We have attended several activities that we heard about through the "Chronicle."

Chronicle staff is considering switching to an all-electronic format and survey responses in regard to that question were mixed. Whatever decision is made regarding production and distribution, the readership will certainly be well-informed in advance of any possible changes.

Although the survey has concluded, we always welcome feedback. Send comments to *chronicle@aqua.wisc.edu* or call (608) 262-0905.

Calling All Former Sea Grant-Supported Graduate Students

Sea Grant is now more than 40 years old!

As part of our five-year review next spring by our federal funding source, the National Sea Grant College Program, we are being asked to document our accomplishments and the impacts of our program. Since graduate student education is such an essential part of our program, we are in the process of doing a survey to learn about the progress of the careers of Sea Grant graduate students supported throughout the years.

Results of this survey will be a featured part of our federal program review, which will in large part determine our future funding level. Individual responses may also be included in various program publications, as well as our websites.

A copy of the survey, together with a postage-paid envelope, is enclosed for those residing within the United States. Former students, including those residing abroad, can choose to fill out an online version instead (*aqua.wisc.edu/feedback/2010*).

Please fill out this survey as soon as possible – but no later than Jan. 17, 2011. As a thank-you, we will send a complimentary copy of our most popular historic poster, Partie Occidentale Du Canada ou de la Nouvelle France ($10 value). This is one of the first maps to accurately portray the five Great Lakes and the northern section of the Mississippi river (*greatlakesmaps.org/1688*).

In addition, your name will be included in a drawing for a signed copy of our award-winning "People of the Sturgeon: Wisconsin's Love Affair with an Ancient Fish." This 320-page, beautifully illustrated, coffee-table book chronicles the history of this remarkable fish and the cultural traditions it has spawned (*winnebagosturgeon.org*).

We thank you for your continued support of our program and look forward to your response. Questions? Contact Mary Lou Reeb at *mlreeb@aqua.wisc.edu*.

Wisconsin Fellow Named

Wisconsin Sea Grant and the Wisconsin Coastal Management Program have the honor of sharing the state's first NOAA Coastal Management Fellow, Kathy Johnson, who recently received her master's degree in city and regional planning from Clemson University in South Carolina. One of five national fellows, Johnson will spend the next two years in Madison developing a toolbox consisting of GIS or other software tools for coastal planners and managers to use in implementing their comprehensive plans and addressing coastal hazards resilience.

"This will be a one-stop shop on the Internet for managers to see how certain conditions such as flooding, climate change, population growth or nonpoint source pollution can affect their coastal communities," said Johnson. She will present her results at the Coastal Zone Conference in Chicago in 2011 and at the Coastal Society Conference in 2012.

Lake Superior Estuarine "Living Laboratory"

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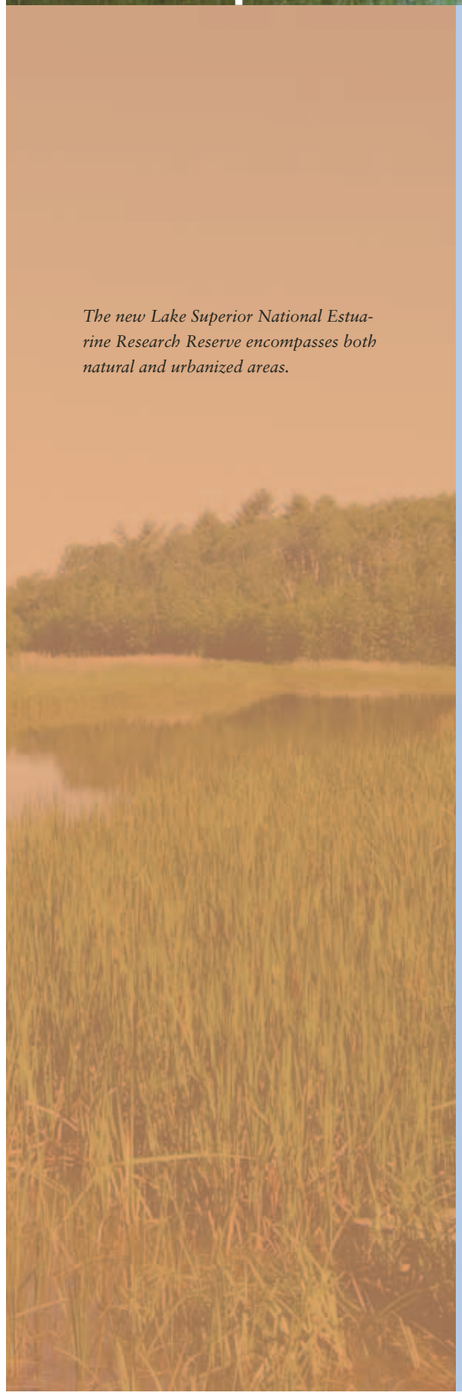

The new Lake Superior National Estuarine Research Reserve encompasses both natural and urbanized areas.

Kathy Johnson photo: UW Aquatic Sciences/Carolyn Rumery Betz LSNERR photos: Patrick Robinson, University of Wisconsin-Extension

Patrick Robinson, a freshwater estuary specialist with the UW-Extension who has shepherded the project through the designation process, echoes Clark's comment, "It's a great opportunity to capture federal resources to do research, education and outreach. This is a real feather in Wisconsin's cap because it's only the 28th estuary reserve in the country and only the second freshwater reserve in the nation."

At 16,700 acres, the LSNERR dwarfs the other freshwater site, Ohio's 571-acre Old Woman Creek on Lake Erie. All national reserves, regardless of size, are charged with protecting varied biogeographic regions through long-term research, water-quality monitoring, education and coastal stewardship.

The LSNERR mirrors the national program with its specific goals: research and monitoring to increase the understanding of Lake Superior freshwater estuaries and coastal ecosystems; educating youth, students, community members and visitors about Lake Superior freshwater estuaries and coastal resources and improving their ability to address coastal issues; increasing community leaders' and other decision makers' ability to address critical Lake Superior coastal management issues; and protecting and enhancing the ecological health of the St. Louis River Watershed and Lake Superior coastal habitats.

Wisconsin's reserve is also similar to others in that, according to Clark, "It represents all kinds of areas, from the almost-pristine natural areas all the way to working waterfronts."

"Not surprisingly," Robinson said, "Sea Grant is a key partner" in the reserve that connects NOAA's core goals to diverse local partners digging into "so much more than can ordinarily be done because this (the reserve) is leveraging financial and human resources."

In fact, Sea Grant is using the impetus of the LSNERR to kick-start a dual-state project, the first of its kind, between Minnesota and Wisconsin. While the wide-ranging effort is set within the reserve, it also will go beyond to encompass the entire St. Louis River estuary. Plus, said Janet Silbernagel, chair of the Conservation and Biology Sustainable Development Program and a landscape architecture professor at UW-Madison and Wisconsin's lead project investigator, "The work we're doing, connecting landscape and aquatic research around the estuary to innovative learning tools, we hope will be a prototype that could be applied to other places."

The Minnesotan part of the project is to apply models of stress on the estuary's water quality. Silbernagel's part is to build spatial literacy, which she defined as gaining an understanding of a region's geography, including its natural environment, industry, culture, history – and connections of those factors – to deepen knowledge of a place.

"It's a counter response to the tendency for youth and others to want to 'save the rainforest' without even knowing the birds within their own backyard," she said.

The Wisconsin team will build this place-based learning through multi-faceted land-, ship- and Internet-based outreach and collaborative learning activities that target youth, educators, citizens, managers and local decision makers. These learning tools will include an online "deep map" that incorporates vignettes of local communities, reality-based games delivered through hand-held mobile devices, geo-tours of the estuary and an array of complementary online resources.

To learn more about the LSNERR, including its five-year management plan, please visit *nerrs.noaa.gov/Doc/PDF/Reserve/LakeSuperiorNERR.pdf*. — MH

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Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources

CALENDAR OF EVENTS

FEB. 4-5, 2011

Lake Sturgeon Bowl

Milwaukee, Wis.

glwi.uwm.edu/sturgeonbowl

FEB. 15 – 17, 2011

Wisconsin Wetlands Association Wetland Science Conference

Baraboo, Wis.

wisconsinwetlands.org

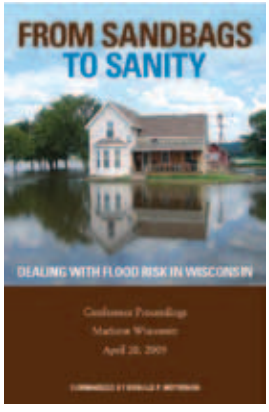
MARCH 3 -4, 2011

American Water Resources Association – Wisconsin Section Meeting

Appleton, Wis.

awra.org/state/wisconsin

Sandbags to Sanity: Dealing With Flood Risk in Wisconsin



The proceedings of the Sandbags to Sanity: Dealing With Flood Risk in Wisconsin conference, held in Madison in April 2009, are available as a free download from the ASC Publications Store. The book summarizes key contributions from the conference and covers a broad range of relevant topics about flooding in Wisconsin such as hydrology, climate change, water quality, health impacts, mitigation options, human services and economic consequences.

aqua.wisc.edu/publications