Summer 2010

ASC
Aquatic Sciences Chronicle
www.aqua.wisc.edu/chronicle

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

INSIDE:

photos – Tim Asplund

WATER RESOURCES RESEARCH

WISCONSIN'S CHANGING CLIMATE

WATER RESOURCES ARE A REFLECTION OF A CHANGING CLIMATE

Scattered storms dropped 1 1/2 inches of rain on southern Wisconsin in 30 minutes in late May while boaters up north sat dry-docked because launching ramps remained high and dry. Are these simply short-term weather events, or do they represent long-term climate change?

Dozens of Wisconsin scientists have come together to form the Wisconsin Initiative on Climate Change Impacts (WICCI), an interdisciplinary project drawing from multiple agencies and specialties. They have conducted thorough analyses of weather records collected at dozens of observation stations statewide for the past 56 years.

Their conclusion is that Wisconsin's climate is changing.

Wisconsin is becoming "less cold," according to Chris Kucharik, UW-Madison assistant professor of agronomy and atmospheric and ocean sciences. Northern Wisconsin has become drier, but southern and western Wisconsin have become much wetter, by as much as 7 inches per year.

continued on page 7 >>

FREE CLEAN BOATER TIP SHEETS
page 8

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*

The Aquatic Sciences Center is the administrative home of the **University of Wisconsin Sea Grant Institute** & the **University of Wisconsin Water Resources Institute.**

Communications Manager
Moira Harrington

Editor
Elizabeth A. White

Writers
Carolyn Rumery Betz, Moira Harrington, John Karl, Kathleen Schmitt Kline, Anne Moser

Art Director and Designer
Tina Yao

Circulation Manager
Linda Campbell

University of Wisconsin Sea Grant Institute is part of a national network of 32 university-based programs funded through the National Sea Grant College Program, National Oceanic & Atmospheric Administration, U.S. Department of Commerce, and through matching contributions from participating states and the private sector. *seagrant.wisc.edu*

University of Wisconsin Water Resources Institute is one of 54 Water Resources Research Institutes nationwide authorized by the federal Water Resources Research Act and administered through the U.S. Geological Survey. *wri.wisc.edu*

Sea Grant University of Wisconsin WRI University of Wisconsin

GET ASC NEWS ALERTS BY E-MAIL
You can receive e-mail notices about new postings to the Chronicle Online. Just sign up at ***aqua.wisc.edu/chronicle***. We'll send you occasional links to announcements and news from the Aquatic Sciences Center.

Watch two new videos about the world's busiest sturgeon spearing season and the management that makes it possible. Each February, spearers move their ice shanties onto lakes Winnebago, Butte des Morts and Poygan. They cut a hole in the ice, push shanties over it and then they wait...and wait. Some people wait 15 years; others spear one their first morning on the ice.

Sturgeon spearing has its roots in Native American customs. Specific rules and regulations have changed several times, but the Lake Winnebago system is now a model for management agencies around the world.

Sturgeon spawning is a yearly event that draws spectators, researchers, wardens and volunteer guards. They gather on the banks of Wisconsin's Wolf River and its tributaries, where the fish journey to spawn on the rocky banks from where they themselves hatched years before. It's truly a sight to behold, and all of the sturgeon look like the ancient creatures they are—nearly unchanged for 150 million years.

Watch the videos at

youtube.com/UWASC

40 Years Serving Wisconsin

During his tenure as director of the University of Wisconsin Sea Grant Institute, Anders W. Andren is often asked, "What is 'Sea Grant' and what is it doing in Wisconsin?"

"People are curious about our name—why something named 'sea' is located in Wisconsin, a state hundreds of miles from an ocean," he said. "I explain that the Great Lakes are officially the nation's fourth coastline, and roughly one thousand miles of that coastline belong to Wisconsin. So it's 'sea' as in coastal and 'grant' as in money—we provide grants for Wisconsin university research, outreach and education projects focused on addressing and resolving Great Lakes, coastal and ocean-related issues."

Now that the name conundrum is settled, the second question requires a more comprehensive answer. Given that the Wisconsin Sea Grant program has celebrated 40+ years of service to the state, Andren's response to "What is Sea Grant *doing* in Wisconsin?" is even more extensive.

"Where do I begin?" he said.

Throughout the years, the Wisconsin Sea Grant program has invested in high-priority Great Lakes research in fisheries management, water supply and quality, toxic contaminants risk assessment, fluctuating lake levels, coastal development, ecosystem dynamics, aquatic invasive species, freshwater aquaculture, seafood safety, and remote sensing and geographic information systems for real-time observations. While supporting this research, Wisconsin Sea Grant has also provided financial support for almost 650 graduate students—a third of them women—that helped these students earn 399 master's degrees and 283 doctoral degrees.

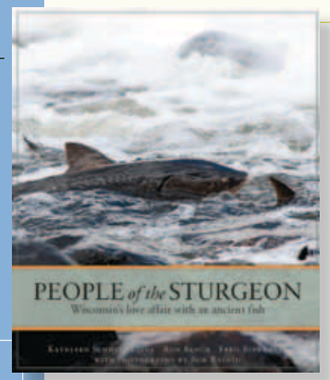
Not only does Sea Grant fund critical research, it goes to great lengths to share the results with the people who need them most, a true embodiment of the Wisconsin Idea. Resource managers and the public learn about Sea Grant research findings through an integrated outreach program that brings together the collective expertise of on-the-ground outreach and education specialists at UW-Green Bay, UW-Madison, UW-Manitowoc, UW-Milwaukee and UW-Superior.

Communicating the significance of the Great Lakes has also been at the heart of Sea Grant's mission. It co-produced the longest-running science and environmental news program, *Earthwatch Radio*, which at its peak was distributed by more than 160 radio stations reaching hundreds of thousands of listeners in the U.S. and around the world. Wisconsin Sea Grant support also enabled Wisconsin Historical Society archaeologists to document and nominate 35 Great Lakes shipwrecks for the National Register of Historic Places. Wisconsin now has more shipwrecks listed on the register than any other state in the nation, and 17 of them can be explored virtually through the Wisconsin Sea Grant-developed website *wisconsinshipwrecks.org*.

Established by the National Sea Grant College and Program Act of 1966, Sea Grant was originally conceived as the marine equivalent of the nation's land-grant colleges and universities. Wisconsin Sea Grant launched in 1968 as the first program in the Great Lakes region. Today, headquartered at the UW-Madison Graduate School's Aquatic Sciences Center, it is part of a national network of 32 university-based programs funded through the National Oceanic and Atmospheric Administration, with matching contributions from participating states and the private sector.

For a copy of the 40th Anniversary Report of the University of Wisconsin Sea Grant College Program, go to *aqua.wisc.edu/publications*. — KSK

programpeoplenews



People of the Sturgeon: Wisconsin's Love Affair with an Ancient Fish won the Ellis/Henderson Outdoor Writing Award from the Council for Wisconsin Writers, which is dedicated to promoting local, state and national awareness of Wisconsin's great literary heritage and to encouraging excellence among today's Wisconsin writers. The book has received eight additional regional and national accolades: Outstanding Achievement Award, Wisconsin Library Association; Winner, Nature Category, ForeWord Reviews Book of the Year Award; Gold Award, Sports/Fitness/Recreation Book Category, PubWest Book Design Awards; Winner, Nature Category, Midwest Book Awards; Winner, Nature Category, National Indie Excellence Awards; Winner, Great Lakes – Best Regional Non-Fiction, Independent Publisher Book Awards; Winner, Science/Nature/Environment, Next Generation Indie Book Awards; Finalist, Best Overall Design, Next Generation Indie Book Awards.

Science Writer **Kathleen Schmitt Kline** and Aquaculture Specialist **Fred Binkowski** authored the book along with **Ron Bruch** of the Wisconsin Department of Natural Resources. **Tina Yao**, ASC's art director, designed its cover. It was published by the Wisconsin Historical Society Press. *People of the Sturgeon* features more than 150 color photographs by the late **Bob Rashid**.

Carolyn Rumery Betz

Make A Splash! Read!

This summer, public libraries around Wisconsin are offering a reading program all about water called "Make a Splash!" Wisconsin's Water Library will be touring around southern Wisconsin, offering water-themed story times from its collection of awarding-winning books for children. Here are some of the Water Library's favorite children's books that you might love, too:

I'M THE BIGGEST THING IN THE OCEAN
BY KEVIN SHERRY.

New York: Dial Books for Young Readers, 2007. First-time author-illustrator Kevin Sherry is sure to garner fans of all sizes for his perfect-for-preschool read-aloud with simple text, bold and delightful collage art, and a lovable squid whose spirit just cannot be crushed.

MARSH MUSIC
BY MARIANNE BERKES.

Brookfield, CT: Millbrook Press, 2000. Berkes turns the night songs of 10 different kinds of frogs into a concert in the marsh led by Maestro bullfrog. Containing beautiful watercolor depictions of marsh life, this book teaches children about both nature and music in an entertaining fashion.

MINN OF THE MISSISSIPPI
BY HOLLING C. HOLLING.

Boston: Houghton Mifflin, 1951. The history of the Mississippi River Valley is told in text and pictures through the adventures of Minn, a snapping turtle, as she travels downstream.

PADDLE-TO-THE-SEA
BY HOLLING C. HOLLING.

Boston: Houghton Mifflin, 1941. Holling's tale of the wooden canoe and figurine carved by a young American Indian boy that is launched from Lake Superior and makes its way down the St. Lawrence Seaway is a classic for portraying life in and along the great waterway in an exhilarating style.

SPLASH!
BY ANN JONAS.

New York: Greenwillow Books, 1995. The vivid illustrations will delight kids learning to count as fish, frogs, turtles, pets and even a little girl climb in and out of a pond. How many are in my pond? Find out in this fun book!

Read about the library's storytimes at *aqua.wisc.edu/waterlibrary/Default.aspx?tabid=226*

Please visit Wisconsin's Water Library for Kids at *aqua.wisc.edu/waterlibrary/Default.aspx?tabid=63* for more information. Anyone in Wisconsin can borrow these books. Just e-mail *askwater@aqua.wisc.edu.*

Left to Right: Thanks to the Schneider Family of Taycheedah, Wis., a genuine sturgeon spearing shanty made it off of frozen Lake Winnebago and on to the UW-Madison campus for the annual Science Expeditions event. Inside the shanty, visitors found out more about the state's unique spearing culture from a video produced by ASC's John Karl. (credit: Carolyn Rumery Betz). Apostle Islands sea cave (credit: Helena Rylander).

Sturgeon on Campus

Wisconsin Sea Grant hosted a lake sturgeon exhibit as part of UW-Madison's Science Expeditions, a free event on campus that encourages families and learners of all ages to experience science as discovery. The highlight of the exhibit was a UW-themed sturgeon spearing shanty towed to Madison from the shore of Lake Winnebago by Vic, Mary Lou and Betty Schneider. The Schneiders are one of the many families featured in the book *People of the Sturgeon: Wisconsin's Love Affair with an Ancient Fish*. Communications staff members John Karl and Kathleen Schmitt Kline designed the lake sturgeon exhibit, one of 40 hands-on "Exploration Stations" hosted by UW students, staff and faculty. Karl has helped organize the entire Science Expeditions event for the last four years. Nearly 2,000 people visited this year's event.

Sea Cave Safety

Engineers continue to fine-tune the final design and get ready to install a remote pressure sensor to measure waves and water temperatures at the Apostle Islands mainland sea caves near Meyers Beach, a popular sea kayaking destination within the Apostle Islands National Lakeshore. The sea caves were formed by years of waves and ice carving through sandstone cliffs. Under certain conditions, waves roll into and reflect off the cave walls, where they can intensify and capsize even experienced kayakers. Gene Clark, UW Sea Grant coastal engineering specialist, has been working with Chin Wu, a UW-Madison civil and environmental engineer, to find a way to transfer the real-time wave information to kayakers, outfitters and park service staff. This summer, they plan to install the remote sensor to monitor the waves and finish developing the project website. Support for the project is from the Wisconsin Coastal Management Program and the Friends of the Apostle Islands. Next year, Wisconsin Sea Grant will be providing funding for a much larger wave and water ciculation study throughout the Apostle Islands region.

Josh Anderson (above), a UW-Madison graduate student working with Clark and Wu, informed paddlers about the first phase of the project as part of an exhibit by the Friends of the Apostle Islands at this year's Canoecopia, the world's largest paddlesport exposition held every March in Madison, Wis.

Marshfield High School Claims Title in National Ocean Sciences Bowl

It wasn't enough for a team of five to win the Wisconsin Lake Sturgeon Bowl and the National Ocean Sciences Bowl in 2009; they won both again in 2010. The Marshfield High School team—Seth Berger, Alex Jensen, Elisa Prebble, Priya Pathak and Michael Josephson—claimed victory in the state and national competitions designed to raise awareness of aquatic sciences. The team was in a tough pool as they competed against 24 teams in a national tournament that took place in April in Florida.

"They won more easily in the national event than they did last year," said Sea Grant Education Coordinator Jim Lubner, who travelled with the team to both competitions. "They always had fun and seemed pretty relaxed."

Wisconsin Sea Grant co-sponsors the competition for both gold and silver divisions, the latter of which is for teams involved in UW-Milwaukee's Ocean Odyssey Diversity Initiative. The team from Milwaukee's Charter School, Advanced Language and Academic Studies team, won this year's Silver Division. The Ocean Odyssey recruits under-represented Milwaukee high school students and their teachers to extend their knowledge of the Great Lakes and oceans, prepare for the Lake Sturgeon Bowl competition and provide actual fieldwork on Lake Michigan.

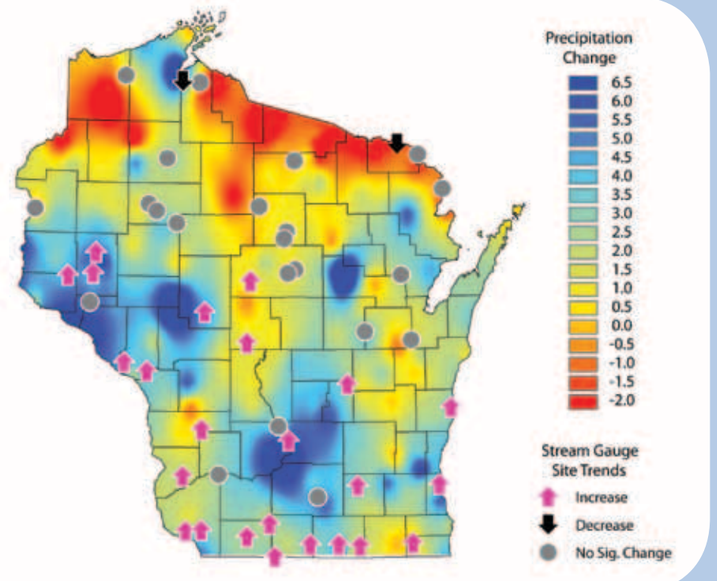
"This was the last of three years for this team, composed of all Hispanic students, to compete before graduating," said their advisor Caroline Joyce of UW-Milwaukee. "All are on their way to higher education. We are thrilled for them."

Three of the Marshfield High School team members and one from the ALAS team participated in the award received from the win—spending a week on a two-masted schooner on a cruise based out of Boston in July.

National Ocean Sciences Bowl – Will Ramos, Ocean Leadership; flood – FEMA

WISCONSIN'S CHANGING CLIMATE

continued from page 1



From 1950-2006, Wisconsin as a whole has become wetter, with an increase in annual precipitation of 3.1 inches. This observed increase in annual precipitation has primarily occurred in southern and western Wisconsin, while northern Wisconsin has experienced some drying. The southern and western regions of the state show significant increases in base flow, corresponding to the areas with greatest precipitation increases. (Data from Chris Kucharik, UW-Madison, and Steve Greb, Wisconsin Department of Natural Resources; map prepared by Eric Erdman, WDNR.)

Water resources are changing as a reflection of these changing climate patterns, too. Long-term ice cover data on Wisconsin lakes show lakes are freezing later and breaking up earlier. Geneva Lake in southeast Wisconsin did not freeze at all during two winters in this decade, something that has never before been documented.

Groundwater and lake levels also reflect changing climatic conditions and their variability across the state. Water levels in most groundwater-dependent lakes in north-central and northeastern Wisconsin are at their lowest levels in the past 60 years. In contrast, water levels in groundwater-fed lakes in southern Wisconsin have risen. Stream flow also mirrors these historic trends—where precipitation has increased in the state, so has stream flow.

Projections show that average temperatures in the state will warm by four to nine degrees Fahrenheit by the middle of the century, yielding fewer nights below zero and more days above 90 degrees.

Precipitation is much more difficult to predict, but winter and spring precipitation is likely to increase by 20 percent. Combined with warmer temperatures, there may be less snow, and more rain and freezing rain. Higher temperatures may also lead to more spring thunderstorms and heavy rains.

All of these changes will affect Wisconsin dramatically, from the kinds of fish and plants that can live here, to crop selection and cultivation, and recrecreation choices.

Over the past year, water experts have identified likely effects of climate change on water resources. These include:

- Increased flooding will affect infrastructure and agricultural land.
- Harmful blue-green algae will occur more frequently with increased summer temperatures.
- Groundwater extraction and demand for water will increase due to variable precipitation and warmer growing season temperatures.
- Seepage (groundwater-fed) lakes will change due to variable precipitation, recharge or increased evaporation.
- Increased sediment and nutrient loading will result from earlier and more intense spring runoff events.

Adaptation strategies to these projected impacts are being developed by WICCI's working groups and will be shared in an assessment report to the Wisconsin Natural Resources Board in October 2010.

"WICCI is an incredible opportunity to bring together some of Wisconsin's best scientific minds over a very important topic that will affect all of us," said Jim Hurley, co-chair of WICCI's water resources working group and assistant director for research and outreach at the Aquatic Sciences Center. "It's exciting to see hydrologists, stream biologists, limnologists, wetland experts and hydrogeologists all interacting with the common goal of adapting to climate change in the state."

See *wicci.wisc.edu* for more information. — CRB

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

SEPT. 10 - 12, 2010

Growing Power's National-International Urban & Small Farm Conference

Milwaukee, Wis.

growingpowerfarmconference.org

SEPT. 13-15, 2010

International Coastal Atlas Network—Great Lakes Meeting

Madison, Wis.

aqua.wisc.edu/ican

OCT. 7-8, 2010

Great Lakes Commission Annual Meeting

Toronto, Canada

glc.org/meeting

OCT. 15-20, 2010

Sea Grant Week

New Orleans, La.

laseagrant.org/sgweek2010

Keep it Clean

Help protect natural resources while you're boating. Learn how to clean and maintain your boat, protect aquatic ecosystems and deal with waste problems.

Free Clean Boater Tip Sheets are available for download from the Wisconsin Clean Marina website: *Wisconsincleanmarina.org*

Marina owners can also request a copy of the Clean Marina Guidebook and join the Clean Marina Program.