

# ASC

## Aquatic Sciences Chronicle

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

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*Stephanie Schmidt digs through a vat of preserved fish searching for a particular specimen. Schmidt, a UW-Madison graduate student, worked with food web ecologist Jake Vander Zanden on a Sea Grant-funded project to piece together the historical Great Lakes food web.*

Hidden away in back rooms of museums around the country sit thousands and thousands of jars of pickled fish. Some of them have been there for over 100 years, locking up the stories of historical aquatic life. Those stories are preserved in the tissues of the fish, and Jake Vander Zanden is discovering what they have to say.

Vander Zanden, a food web ecologist at the University of Wisconsin-Madison, and graduate student Stephanie Schmidt have been analyzing these preserved fish in a research project that is the first of its kind. The two scientists are using the chemistry of fish tissues to piece together the historical Great Lakes food web to which the fish belonged.

"We were the first people to take this approach of going to museums, taking out specimens, and using the chemistry of the tissue to try to infer what the food web was like in historical times," said Vander Zanden.

By using a technique called stable isotope analysis, Vander Zanden and Schmidt separated out the carbon and nitrogen levels from tiny slivers of fish tissue that had been preserved for decades. These values compose a chemical signature for the fish and provide information that allows the scientists to discover the ecological roles that these fish historically filled.

"Isotopes can tell us where in the lake you're feeding and how high up in the food chain you are," said Schmidt. "You are what you eat."

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# Aquatic Sciences Chronicle

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**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. [www.wri.wisc.edu](http://www.wri.wisc.edu)



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## FEATURED WEB SITE

**Water Resources Institute**  
[www.wri.wisc.edu/](http://www.wri.wisc.edu/)

This fall the Web site for the Water Resources Institute (WRI) was rebuilt from ground(water) up to make it easier and faster for visitors to find information about WRI research projects and publications.

Construction of the new site was a year-long team effort led by **James Hurley**, assistant director for research & outreach, and his assistant **Liz Albertson**, a recent graduate from the UW Water Resources Management program.

One of the goals of the site redesign was to provide the public with a real-time link to information about current research. To meet this goal, the site was integrated with the Interactive Project Reporting Online (iPRO) system, an online tool that allows principal investigators to report on the progress of their projects.

According to **Tina Yao**, art director for the Aquatic Sciences Center, the new site features a fresh design with better readability and vivid photography. The design is the first step in an effort to visually unify the WRI, Sea Grant, and Aquatic Sciences Center Web sites by introducing shared graphic elements and themes. —RD

## programpeoplenews

The **Wisconsin Sea Grant Program** received the 2007 Great Lakes Outreach Programming Award for its work co-hosting the Eighth International Conference on Mercury as a Global Pollutant, also known as "Mercury 2006: Toward Integration of Science, Policy and Socioeconomics." The award recognizes the leadership, teamwork, and accomplishments of Great Lakes Sea Grant personnel engaged in exceptional outreach projects or programs.

Congratulations to **John Magnuson**, **Jonathan Patz** and **Kevin Trenberth** for their significant contributions in developing the reports on the implications of global warming that led to the awarding of the 2007 Nobel Peace Prize to Vice President Al Gore and the United Nations' Intergovernmental Panel on Climate

Change (IPCC). Magnuson, Patz and Trenberth all gave talks during the Great Lakes Climate Change Seminar Series, sponsored by UW Sea Grant and the Wisconsin Coastal Management Program. Their presentations can be seen and heard at [www.seagrant.wisc.edu/climatechange/](http://www.seagrant.wisc.edu/climatechange/).



John Magnuson



Jonathan Patz



Kevin Trenberth





## UW WATER RESOURCES RESEARCH

## Wisconsin's Water-Minded Researchers to Meet

For the past three decades, water scientists and managers from all over Wisconsin have met to discuss the latest research on the state's most valuable asset, as well as the impending issues facing it. This year's annual meeting of the Wisconsin section of the American Water Resources Association (AWRA) will take place March 6-7 at the Sheraton Milwaukee Brookfield Hotel in Brookfield, WI.

The theme of the meeting is "Great Waters of Wisconsin," and it will include over 50 oral and poster presentations addressing a wide range of water resources topics. Students are strongly encouraged to attend the conference to learn, network, and gain experience in presenting their work. As such, AWRA offers a special reduced student registration rate of \$30 (\$45 after February 21), as well as several awards for the best student presentations. In addition, this year students are encouraged to sign up for a free career workshop that will follow the conclusion of the conference on Friday afternoon.

An opening plenary session will highlight water management in southeast Wisconsin, featuring invited speakers Robert Biebel (Southeastern Wisconsin Regional Planning Commission), Kevin Shafer (Milwaukee Metropolitan Sewerage District), and Vicki Thomas (U.S. Environmental Protection Agency Great Lakes National Program Office). In addition, featured evening speaker John Gurda, a Milwaukee-born writer and historian, will provide a unique perspective on the local history of Milwaukee and how its water resources influenced its development. Gurda is the author of 18 books, including *The Making of Milwaukee*, the first comprehensive history of the community published since 1948. Milwaukee Public Television premiered an Emmy Award-winning documentary series based on the book in 2006.

For more information about the conference, including a registration form, please visit [www.awra.org/state/wisconsin](http://www.awra.org/state/wisconsin). The meeting is hosted by the AWRA-Wisconsin Section, UW Water Resources Institute, Center for Watershed Science and Education at UW-Stevens Point, Wisconsin Department of Natural Resources, and the Wisconsin District of the U.S. Geological Survey.

### AWRA SESSION TOPICS

- Water Policy: National and State Perspectives
- Surface Water and Groundwater Interactions
- Hydrogeologic Investigations
- Organic and Microbiological Contaminants
- Lake Management
- Investigations in Groundwater Management Areas
- Stormwater, Streams, and Runoff
- Planning and Management

The Sea Grant educational partnership COSEE Great Lakes uses the book *Paddle-to-the-Sea*, by Holling C. Holling, as its inspiration for linking the Great Lakes to the ocean. Now **David Hart**, Wisconsin Sea Grant GIS specialist, has developed an exciting program that uses Paddle's travels to link real-time Great Lakes data to Google Earth's mapping application. It includes themes, key words, and Web sites from each chapter, along with path of Paddle's journey to the sea and links to Great Lakes data. Visit his program at <http://seagrants.wisc.edu/digitalgreatlakes/>.



Cleaning up nearly 600 contaminated sites, implementing a law to protect groundwater quantity, and increasing efforts to address groundwater contamination from manure are among the advances Wisconsin made in 2007 in protecting groundwater, according to a recently released report to the Wisconsin Legislature. The report also summarizes major groundwater concerns in Wisconsin and recommends future directions for protection activities. The 2007 Groundwater Coordinating Council Report to the Legislature can be found at <http://dnr.wi.gov/org/water/dwg/gcc/rtl/gccreport.htm>.

The recent IPCC Fourth Assessment Report, also known as "Climate Change 2007," includes many insights as to how climate change will affect the Great Lakes Region, especially if lake levels continue to decline. Potential impacts include shallow navigation channels, loss of critical wildlife habitat, less potential for hydropower, more disputes over water quantity and increased illness from water contamination. The full IPCC report is available at [www.ipcc.ch](http://www.ipcc.ch).

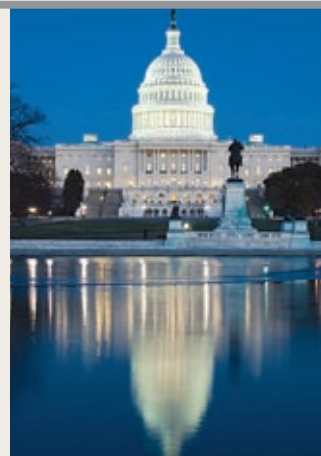


## Sea Grant Sends Students to D.C. for Policy Fellowships

**Applications due February 29, 2008**

Sponsored by the National Sea Grant College Program, the Dean John A. Knauss Marine Policy Fellowship provides a unique educational experience to students who have an interest in the national policy decisions affecting ocean, coastal, and Great Lakes resources. The one-year paid fellowship places highly qualified graduate students in positions within the legislative and executive branches of government located in the Washington, D.C., area. For more information, visit [www.seagrants.noaa.gov/knauss/](http://www.seagrants.noaa.gov/knauss/).

To date, 15 Wisconsin students have been selected by NOAA Sea Grant for a fellowship, which is partly funded by UW Sea Grant. Applications are due at the Wisconsin Sea Grant office by 4:00 p.m. CST, Friday, February 29, 2008, addressed to: Terri Klousie, Room 267, Goodnight Hall, 1975 Willow Drive, Madison, WI 53706-1177.





# Looking Back to Look Ahead

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The researchers have found that a fish's carbon value indicates the depth in the water column at which the fish lived and ate. The nitrogen shows how many steps there were between the base of the food chain and the fish in question.

"Each provides different types of information," said Vander Zanden. "The two together can help you really describe a food web."

This information is important for scientists and fisheries managers because many fish that once thrived in the Great Lakes have disappeared. Knowing what roles various fish played in the past may help guide fisheries managers as they consider reintroducing native fish whose populations have been eliminated.

In their study, Schmidt and Vander Zanden focused on several species of fish known as deepwater ciscoes. These fish, which ranged in length from six to 16 inches, once were the main source of food for lake trout. But over the course of the 20th century, populations of ciscoes collapsed.

"Exotic species introductions totally rewired the food web," said Vander Zanden. He also implicates overfishing, habitat destruction, eutrophication, and toxic pollution discharges in the decline of the ciscoes.

"It was just a crazy time for the Great Lakes," he said in reference to the 1920's through the sixties. "Basically what

happened is the food web collapsed, and the deep water ciscoes were wiped out."

If Vander Zanden and Schmidt can identify the ciscoes' historical roles and functions, and whether those roles differed from species to species, they may be able to increase the likelihood of successful reintroduction.

"We're trying to see if these fish were the same throughout all of these lakes such that if we reintroduce one species from Lake Superior into Lake Michigan, would it be successful," said Schmidt, "would it serve the same ecological function as it did historically in Lake Michigan?"

Although their research is in the early stages, Great Lakes Fishery Commission Science Advisor Randy Eshenroder said it "will be of great interest to the management community."

Eshenroder said the interest among managers is in diversifying the food web, and that ciscoes would provide a "more diversified prey community" for fish like lake trout and salmon. And in order to stack the odds for successful reintroduction, it's important to know what ecological roles the fish played historically.

Vander Zanden agreed: "It can help you see where you've been in the system, and that's pretty critical when trying to decide where you're going." —EK-R



## Sharing the Great Lakes Story

Wisconsin Sea Grant staff added their own words to "The Great Lakes Story," a nationally touring exhibit that recently stopped off at Green Bay's Neville Public Museum.

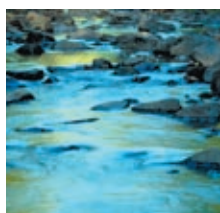
Water quality specialist Vicky Harris helped organize a weekly public lecture series to coincide with the exhibit. Sea Grant speakers included Phil Moy, who discussed the threats posed by aquatic invasive species to the Great Lakes, and John Karl, who evoked the great age of sailing ships on Lake Michigan in stories and photographs. Harris presented a sneak preview of the updated State of the Bay, which she described as "an ecosystem health check-up" of Green Bay. Her presentation can be viewed at <http://seagrants.wisc.edu/waterquality/>.



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a joint newsletter from UW Sea Grant and UW Water Resources



## CALENDAR OF EVENTS

**FEBRUARY 23, 2008**

**Lake Sturgeon Bowl**  
UW-Milwaukee

[www.glwi.uwm.edu/sturgeonbowl/](http://www.glwi.uwm.edu/sturgeonbowl/)

**FEBRUARY 29, 2008**

**John A. Knauss Marine Policy Fellowship**

Class of 2009 Application Deadline

<http://seagrant.wisc.edu/funding/FundingInfo/gradopps.asp>

**MARCH 6-7, 2008**

**Annual Meeting of the American Water Resources Association – Wisconsin Section Brookfield, Wis.**

[www.wri.wisc.edu/conference.html](http://www.wri.wisc.edu/conference.html)

**MAY 19-23, 2008**

**2008 IAGLR Conference on Great Lakes Research**  
Peterborough, Ontario

[www.iaglr.org](http://www.iaglr.org)

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[aqua.wisc.edu/publications/](http://aqua.wisc.edu/publications/)

**Deciding about Sediment Remediation:  
A Step-by-Step Guide to Making the Decisions**

Edited by Philip Keillor

80 pages

Paperback \$20



**T-Shirts**

**Featuring artwork by students  
from around the world**

**\$13**

As part of the **2006 International Conference on Mercury as a Global Pollutant**, students in Brazil, Canada, China, Japan, Slovenia, Sweden and the U.S. participated in the Youth Art Project, a program designed to educate young people about the problem of mercury pollution.

For more information and T-shirt designs, visit  
[aqua.wisc.edu/publications/](http://aqua.wisc.edu/publications/)



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