

# ASC

## Aquatic Sciences Chronicle

aqua.wisc.edu/chronicle

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

### INSIDE:



pg. 3

*Frogs on the Firing Line*



pg. 4

*Great Lakes Restoration*



pg. 5

*Knauss Fellow Heads to DC*



## SEA GRANT OUTREACH

# COASTAL EROSION AND BLUFF FAILURES

### ARE ISSUES FOR PEOPLE AND PROPERTY

*Severe tall bluff failure along the Lake Superior shoreline in Bayfield County near Bark Point.*

In the tug-of-war between the force of gravity on soil masses and the resistance against it, gravity will always win.

“Most of Lake Michigan bluffs are marginally stable at best,” said Gene Clark, UW Sea Grant coastal engineer.

The mixture of sandy and clay soils, rain, melting snow and groundwater flow, and the freezing and thawing cycles of ice during the winter months—all create instability.

Additionally, the Wisconsin Initiative on Climate Change Impacts predicts increased storm events, with more precipitation, increased wind velocities, reduced ice cover and increased nearshore wave height—all of which can increase coastal erosion—will occur as part of our changing climate.

“It’s like a teeter-totter where it doesn’t take much to turn from stable to unstable,” explained Clark. “All it takes is a severe storm, someone watering, someone cutting vegetation that was providing some stability, someone putting dead vegetation on the bluff front face. It just makes it worse.”

*continued on page 7 >>*

# 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](mailto: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**  
Maira Harrington

**Editor**  
Elizabeth A. White

**Writers**  
Carolyn Rumery Betz, Aaron Conklin,  
Maira Harrington, 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](http://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](http://wri.wisc.edu)



## SUBSCRIBE

E-mail [chronicle@aqua.wisc.edu](mailto:chronicle@aqua.wisc.edu) to request a no-cost subscription to the "Aquatic Sciences Chronicle," a quarterly publication. Please specify whether you prefer a mailed print edition or electronic delivery to an e-mail in-box.

## GET ASC NEWS ALERTS BY E-MAIL

You can receive e-mail notices about ASC news. Sign up at our pressroom link at [seagrant.wisc.edu](http://seagrant.wisc.edu).

kids + teachers

Frogs



Field IDs



activities a frog's life cool science field ids origami quizzes



## FEATURED WEBSITE

# Find Frog Facts and More at Updated Sites

[seagrant.wisc.edu/kidsteachers](http://seagrant.wisc.edu/kidsteachers)

The UW Sea Grant "Kids and Teachers" Web pages have been updated with new images and content, as well as smoother navigation. What didn't change, though, are the field guides, quizzes and multiple hands-on activities that engage kids in learning more about Great Lakes critters and habitats. There is also a link to Wisconsin's Water Library ([aqua.wisc.edu/waterlibrary](http://aqua.wisc.edu/waterlibrary)) and its resources for educators, parents and young people. Plus, another extensive section offers a history of underwater exploration, complete with a timeline; kid-gear experiments; and a link to lots of information about exploring Great Lakes shipwrecks.

"These pages make science accessible to young audiences and are some of our most consistently popular," said Mary Lou Reeb, assistant director. "We wanted to ensure the experience of visiting the pages remains engaging. On our frog pages, for example, visitors can listen to the calls of Wisconsin frogs and get an update on the latest Sea Grant research being conducted on Wisconsin amphibians."

Visit [seagrant.wisc.edu/kidsteachers](http://seagrant.wisc.edu/kidsteachers).

## program people news

# New AIS Fighters on Staff

Wisconsin Sea Grant is reinforcing its ranks of AIS fighters through two new hires. **Tim Campbell** will be working as an aquatic invasive species outreach specialist for Wisconsin Sea Grant starting in May. **Erik Rollefson** will be the new watercraft inspector coordinator.

For both, partnerships and collaboration will be a big part of the job. Although based in Manitowoc, the pair will cover both of Wisconsin's Great Lakes coasts working with the Wisconsin Department of Natural Resources (DNR), and also promoting and expanding the role of citizen monitoring groups.

In particular, Campbell will develop and distribute communication pieces and tools to reach varied audiences. A final set of duties involves coordination with enforcement staff to promote AIS-law compliance.

Campbell has a master's degree in Biology from the Oakland University in Rochester, Mich. He also has experience doing research on aquatic invasive species, including Chinese mystery snails, round gobies and rusty crayfish.



Tim Campbell

Jeff Stephens

SEA GRANT RESEARCH

# FROGS ON THE FIRING LINE

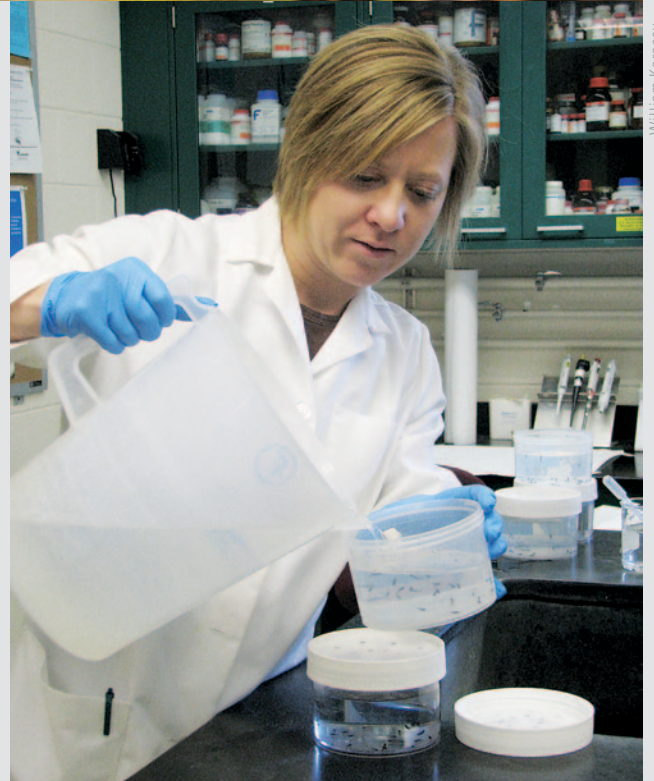
To the high school biology student, the northern leopard frog is the dissection specimen that first revealed the secrets of animal anatomy.

To the modern scientist, it can be a sentinel, a harbinger of poor environmental health—especially in the river regions that flow into the Great Lakes. In Dr. William Karasov's lab, the frog is front and center in a series of research experiments, funded in part by the UW Sea Grant Institute, designed to explore how environmental toxins may be affecting the frog's immune system, growth and development.

Polybrominated diphenyl ethers—PBDEs for short—are toxic compounds used as flame retardants that have been found in significant concentrations in the Great Lakes region. Karasov, professor and chair of the UW–Madison's Department of Forest and Wildlife Ecology, and Tawnya Cary, a first-year Ph.D. student, have fed northern leopard frog tadpoles a prepared diet that includes a static level of PBDEs from birth until metamorphosis, the point at which the frog's forelimbs begin to emerge. Their goal is to measure the potential effect of PBDEs on survival, growth rate and the amount of time it takes for the tadpole to develop into a frog.

"These contaminants can create a situation where animals can suffer direct effects, and also weaken their immune systems, making them vulnerable to other pathogens in the environment," explains Karasov.

*continued on page 6 >>*



First-year Ph.D. student Tawnya Cary feeds northern leopard frog tadpoles a diet laced with PBDEs to measure its effects on development and the immune system.



Erik Rollefson

Conor Farley

"Research and outreach are both things I have always been interested in, so the chance to join a program like Wisconsin Sea Grant that does both so well is a great opportunity," Campbell said. "I have always felt that if people were better educated on issues relating to AIS they would be more than willing to do their part to protect the resources they enjoy using."

Rollefson's specific role is coordination of the activities and training of the Lakes Michigan and Superior boat inspectors. Rollefson will also coordinate the boat ramp locations for the other conservation programs that have boat inspectors in the Great Lakes counties, and will work with DNR wardens to post AIS prevention signs at boat access points. He has degrees in Geography and Biology, with an emphasis on ecology, from the University of Wisconsin–Whitewater.

Rollefson said, "Being from Wisconsin, I am very passionate about the natural resources of our state, particularly our water resources. I grew up in Oconomowoc and have always had an affinity for water recreation and fishing. Since childhood, I have seen the spread of many exotic invasive species to our inland waters with the zebra mussel being a prime example."

"Tim and Erik bring strong backgrounds in field work and the skill to convey scientific principles to Great Lakes users," said Wisconsin Sea Grant's Phil Moy, who will supervise the pair's work.



# Hop on over and read about frogs!

Frogs are a favorite water-related topic in Wisconsin's Water Library. The Great Lakes are home to 10 varieties of frogs. They can range in size from half an inch (the tiny Blanchard's cricket frog) all the way up to a mighty eight inches (the bullfrog). Sometimes they are green; sometimes they are brown. And they are always fun to read about!

## FACE TO FACE WITH FROGS

**BY MARK MOFFETT. WASHINGTON, D.C.: NATIONAL GEOGRAPHIC, 2010.**

Scientist and photographer Mark Moffett invites readers into the world's rain forests to meet dozens of fascinating frogs. During this journey, he lets you in on what's amazing about each kind of frog. And he adds tips about how to study frogs and how to help them, as well as lots of fun, froggy facts.

## FROGS AND TOADS

**BY STEVE GRENARD. HOBOKEN, NJ.: HOWELL BOOK HOUSE, 2008.**

The authoritative information and advice you need to have frogs and toads as pets—including easy-to-care for breeds and intriguing, exotic varieties.

## FROGS, TOADS, AND TREE FROGS: EVERYTHING ABOUT SELECTION, CARE, NUTRITION, BREEDING, AND BEHAVIOR

**BY R.D. BARTLETT AND PATRICIA BARTLETT. HAUPPAUGE, NY.: BARRON'S, 2007.**

Terrarium keepers will find advice from two of the country's leading experts on amphibians, their housing, care, feeding and breeding in this helpful title.

## THE FROG SCIENTIST

**BY PAMELA S. TURNER. BOSTON, MA.: HOUGHTON MIFFLIN BOOKS FOR CHILDREN, 2009.**

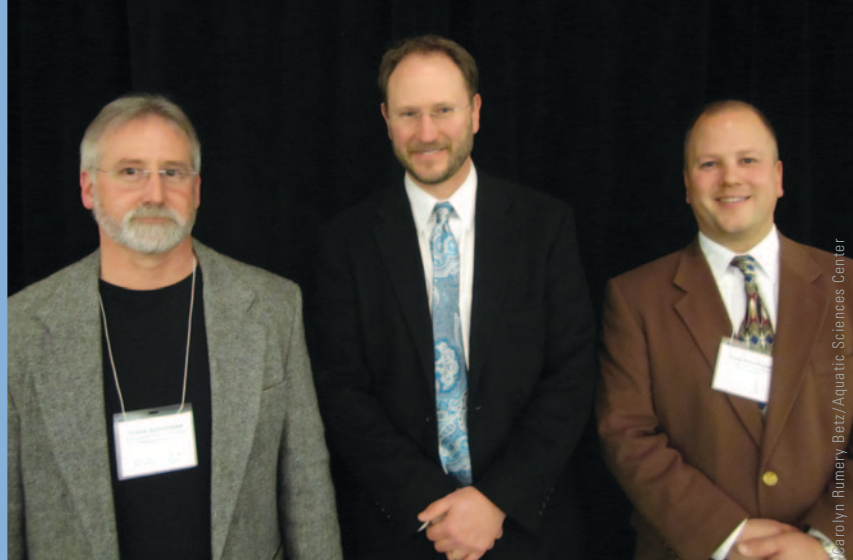
Tyrone Hayes works to discover the effects pesticides have on frogs and, in turn, us.

## WISCONSIN FROGS: PLACES TO HEAR FROGS AND TOADS NEAR OUR URBAN AREAS

**BY RANDY M. KORB, PATRICIA WARRICK, AND BETHANY MATULA. GREEN BAY, WI.: NORTHEASTERN WISCONSIN AUDUBON SOCIETY, 2001.**

Produced with the aid of the Northeast Wisconsin Audubon Society, this guidebook and accompanying CD helps non-herpetologists identify the calls of Wisconsin species of true frogs, tree frogs and true toads.

Please visit the Water Library at [aqua.wisc.edu/waterlibrary](http://aqua.wisc.edu/waterlibrary) for more information. Anyone in Wisconsin can borrow these books. Just e-mail [askwater@aqua.wisc.edu](mailto:askwater@aqua.wisc.edu).



*L. to r.: Steve Galarneau, Wisconsin Department of Natural Resources, Cameron Davis, U.S. Environmental Protection Agency, and Greg Kleinheinz, UW-Oshkosh, served as keynote speakers at the 2011 AWRA Meeting.*

# OUTREACH

## Scientists Gather Around State's Surface and Groundwater

About 200 water scientists from around the state representing government, academic and private organizations attended the 35th meeting of the Wisconsin Section of the American Water Resources Association, held in Appleton on March 3 and 4. The theme of this year's conference was Wisconsin's Role in Great Lakes Restoration, and the conference's three keynote speakers, Cameron Davis, Steve Galarneau, and Greg Kleinheinz, addressed this topic from federal, state and local perspectives.

"We're trying to coordinate our efforts better and forge a new level of care toward the Great Lakes," said Davis who is the senior advisor to the U.S. Environmental Protection Agency administrator on the Great Lakes.

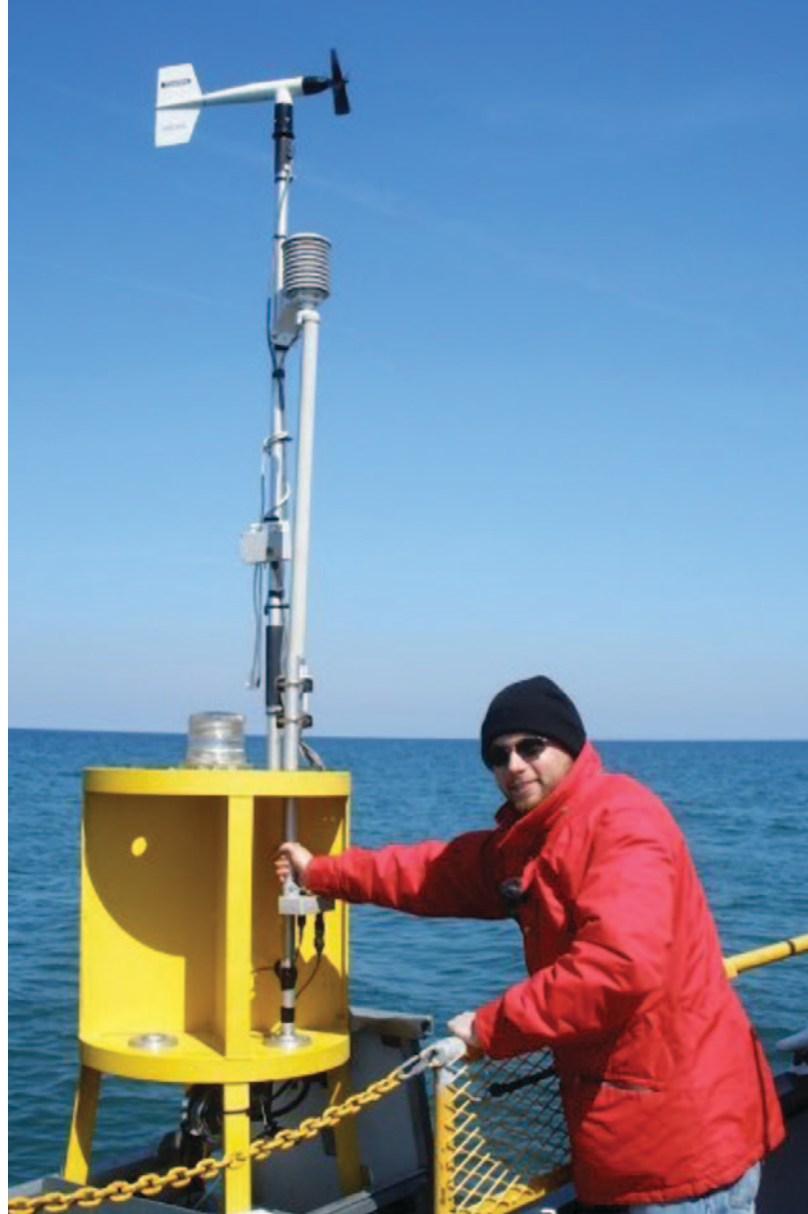
About 60 presentations were delivered around the themes of Great Lakes issues, biological and chemical contamination of surface and groundwater, hydrologic modeling, agricultural management, climate change and watershed and wetland management.

Roger Bannerman, who has served as a water quality specialist at the Department of Natural Resources (DNR) for more than 30 years, received the group's Distinguished Service Award for his work in rural and urban nonpoint source pollution control.

The meeting was co-sponsored by the UW Water Resources Institute, Center for Watershed Science and Education at UW-Stevens Point, DNR, Wisconsin Geological and Natural History Survey, and the Wisconsin District of the U.S. Geological Survey.



Tournament anglers at a recent Cabela's Master's Walleye Circuit tournament wait in line to have their catch weighed.



## SEA GRANT EDUCATION

Joe Fillingham traded the shores of Lake Michigan for the shores of the Potomac River in Washington, D.C., as the newest Knauss Fellow from Wisconsin. The Milwaukee native is a program analyst for the Laboratories and Cooperative Institutes in NOAA's Office of Oceanic and Atmospheric Research (OAR).

"So far the fellowship has exceeded my expectations," Fillingham said. "I have learned more than I thought possible about NOAA, OAR, and the federal government environmental policy process."

Fillingham comes with a solid science background—a B.S. in Atmospheric and Oceanic Science from UW–Madison and experience working as a research assistant and lab technician at UW–Milwaukee's WATER Institute while earning his master's in atmospheric sciences. After his stint in the nation's capitol, he intends to pursue a Ph.D. at UW–Milwaukee's School of Freshwater Sciences.

## Fishing Tournaments Will be Ground Zero in AIS Fight

Sportsmen at fishing tournaments earn bragging rights and pick up prizes. Through the coming season's competitive events, they'll also be picking up aquatic invasive species (AIS) information. This is thanks to an effort led by Wisconsin Sea Grant, which is teaming up with the other seven Great Lakes Sea Grant programs and four professional sportsmen's groups. These forces will spread the word about how to stop the spread of species that can mess up a favorite fishing hole.

Throughout the season, the angler group members will speak from tournament stages, at thousands of seminars, in guide boats and wherever they travel.

"AIS messages will also be incorporated into youth fishing clinics. Solidifying those messages at an early age will pay off in future fishing years," said Phil Moy, Wisconsin Sea Grant's AIS outreach specialist. "We really value the cooperation from the national angler groups and are pleased that aquatic invasive species prevention is endorsed by these groups."

The National Professional Anglers Association is a participating sportsmen's group. Executive Director Pat Neu said, "We will make educational materials available to our members to help them understand and explain the severity of the invasive species problem."

One way the group has already done that is through a special all-member training session in January.

The other groups involved in this initiative are the Masters Walleye Circuit, The Bass Federation and Wildlife Forever.

Joe Fillingham contributed photo

# FROGS ON THE FIRING LINE

continued from page 3

## SEA GRANT RESEARCH



Leopard frog: Matt Reinbold, Bismarck, ND.

He points to situations where large groups of dead frogs have been found by naturalists in the wild. “We’ve never really known if a weakened immune system is the problem.”

While there’s been plenty of research on the dangerous environmental effects of the more commonly known polychlorinated biphenyls (PCBs), PBDEs have gone almost entirely unexamined.

“That’s where we began. We wanted to get a very fast start on this, because nobody has looked at it yet,” Karasov said.

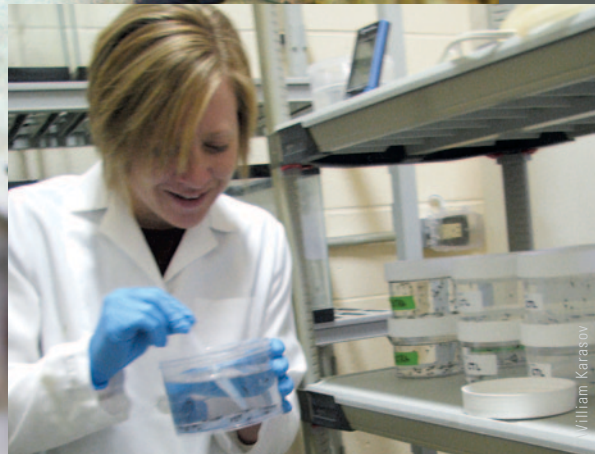
As it turns out, it’s a good thing Karasov and Cary did. Their initial findings, published in a recent issue of *Environmental Toxicology and Chemistry*, show that the PBDE-tainted diet both increased mortality and stunted growth among the tadpoles. Other experiments have shown the toxin doesn’t appear to damage the frog’s immune system or make it more susceptible to infection from common fungi and bacteria. That’s a question Karasov and Cary will be exploring in greater detail in the coming year.

Karasov and Cary’s work is on the front lines of a new research discipline called immunotoxicology, aimed at creating a better understanding of the ways the immune functions of several animal species develop and protect them in their natural environment. Karasov is also studying development of immune function in nesting birds.

“Frogs play an important role in our ecosystem—they’re a key part of the food web,” said Cary, “It’s a heads-up as to why we should be concerned about this, and how it could affect humans.” —ARC



Watch video at [youtube.com/UWASC](https://www.youtube.com/UWASC).



William Karasov

**KARASOV AND CARY’S WORK IS ON THE FRONT LINES OF A NEW RESEARCH DISCIPLINE CALLED IMMUNOTOXICOLOGY, AIMED AT CREATING A BETTER UNDERSTANDING OF THE WAYS THE IMMUNE FUNCTIONS OF SEVERAL ANIMAL SPECIES**

# Coastal Erosion and Bluff Failures

## ARE ISSUES FOR PEOPLE AND PROPERTY

*continued from page 1*

Property owners should get the advice of a coastal engineer or professional landscape architect to help stabilize coastal shorelines and bluffs, according to Clark, because not every beneficial approach is intuitive. Planting vegetation can stabilize the shore or the front of the bluff, but it can also backfire. Grass or sod requires watering, and adding water to the slope may activate soil movement.

Bushes, on the other hand, have a deeper root structure, said Clark. Dogwoods and willows can add greater stability because they send out suckers and put down more roots.

Clark said stability is not acquired by adding things like old Christmas trees, dead leaves or tree branches to the bluff face or an eroding path. These objects can actually make things worse by blocking the sun's ability to reach the ground and promote natural live vegetation, channelizing flow around the objects when it does rain, or allowing water to pool or pond instead of infiltrating into the ground.

Since Mother Nature will always win in the end, coastal experts like Clark recommend placing structures far from the shoreline. Clark warns that even septic systems, especially mound systems, should also be sited far from the shore. Mound septic systems are continually dosing the ground with water, which can make the ground and bluff unstable and prone to erosion.

Most coastal communities use shoreline zoning as a proactive development tool, according to David Hart, a geographic information specialist at Sea Grant.

The delineation of building setbacks is traditionally based on the location of the Ordinary High Water Mark (OHWM), the place where the regular action of water against the bank leaves a distinct mark. That may not be easily seen, particularly on the Great Lakes. Currently, Lake Michigan is at a prolonged low, making the OHWM seem extremely far from the shore, tempting placement of dwellings much closer to the shoreline than would be allowed during a high-water period.

Hart is developing an electronic toolbox full of aids to be used by coastal managers, including historical databases showing erosion over time.

"When you can see how much the shorelines change, and how quickly, you realize how important significant setbacks are," says Clark.

Clark has worked with property owners and/or community leaders in all four of Wisconsin's Lake Superior shoreline counties and nine of the eleven Lake Michigan shoreline counties, advising on shoreline erosion and bluff instability Best Management Practices. — CRB

*Top: Bluff failure slump crack along a private property on Lake Superior, Bayfield County shoreline. Bottom: Severe bluff failure with little live vegetation along the Lake Michigan coastline, just south of Manitowoc, WI.*



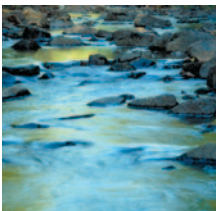
Photos: Gene Clark/Aquatic Sciences Center

# ASC

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

**MAY 30 – JUNE 3, 2011**

**The International Association  
for Great Lakes Research (IAGLR) 2011**  
Duluth, Minn.  
[iaglr.org/conference](http://iaglr.org/conference)

**JUNE 19 – 22, 2011**

**Sea Grant Great Lakes Network Regional Meeting**  
Sheboygan, Wis.  
[seagrant.wisc.edu/sheboygan2011](http://seagrant.wisc.edu/sheboygan2011)

**JULY 17 – 21, 2011**

**Coastal Zone 2011**  
Chicago  
[doi.gov/initiatives/cz.html](http://doi.gov/initiatives/cz.html)

**JULY 24 – 29, 2011**

**10th International Conference on Mercury  
as a Global Pollutant**  
Halifax, Nova Scotia, Canada  
[mercury2011.org](http://mercury2011.org)

### Save Paper: Read the Aquatic Sciences Chronicle Online



Save paper by signing up for e-mail delivery of the "Aquatic Sciences Chronicle." E-mail [chronicle@aqua.wisc.edu](mailto:chronicle@aqua.wisc.edu) and request your subscription be electronic-only. Staff will send you a message each time a new issue is ready for download.