

ASC

Aquatic Sciences Chronicle

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

INSIDE:



pg. 2

Meeting the Perch Challenge



pg. 3

Kitchell: Lifetime Achievement



pg. 6

Weston Winners



SEA GRANT OUTREACH

CAN ASIAN CARP INVASION BE AVERTED?

In December 2009, an emergency brigade of 450 Americans and Canadians descended on Romeoville, Ill., armed with nets, boats and thousands of gallons of poison. The 20-agency response was brought on by recent environmental DNA (eDNA) tests indicating that Asian carp were closer to invading Lake Michigan than previously thought.

One of the 450 who dropped everything and headed to Romeoville was Phil Moy, UW Sea Grant fisheries and aquatic invasive species specialist. Fifteen years ago, Moy served as the first manager of a project to erect an electric barrier in the Chicago Sanitary and Ship Canal to repel foreign fish.

Chicago dug this canal more than a hundred years ago to manage wastewater, and its construction joined two major ecosystems that until then had remained distinct. Over the last several decades, Asian carp that escaped from Southern aquaculture and wastewater facilities have been moving up the Mississippi to the Illinois River, and the canal connecting it to Lake Michigan is an ideal pathway for the fish to advance into the Great Lakes.



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continued on page 7 >>

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FEATURED VIDEO

Can Wisconsin Cash in on Yellow Perch Aquaculture?

Creating a yellow perch aquaculture industry is loaded with challenges. For one, the mature fish are smaller than many farmed fish. A dinner-sized portion may include five or six fillets on a plate, instead of a single tilapia or walleye fillet. That means raising more fish for each dinner.

Perch farmers have traditionally not controlled the diet of the fish during their early life stages. They often throw fingerlings into a pond and hope for the best. However, fertilizing the ponds to produce the right plankton for the perch to eat may pay off. Yet another challenge is that when they are moved indoors, the young fish need to be trained to change their diet from the zooplankton they ate in the pond to a completely new, freeze-dried diet.

Nevertheless, Wisconsin's appetite for the firm, flaky fish is nearly insatiable. Overcoming the obstacles to raising yellow perch in aquaculture facilities could pay off tremendously. Check out the new video explaining how researchers funded by Sea Grant are tackling these challenges. It can be seen at aqua.wisc.edu/chronicle.



programpeoplenews

Tina Wolbers has joined the ASC team as a project assistant, working with Assistant Director for Research and Outreach Jim Hurley. Wolbers, originally from Minneapolis, is a first-year graduate student in the Water Resources Management program in the Nelson Institute for Environmental Studies at UW-Madison. She earned a B.S. degree in biology from Lawrence University in 2009. Wolbers will be working on climate change-related projects.

perch-US Department of Agriculture; Wolbers-UW ASC/Carolyn Rumery Betz; Chris Bocast; Jim Kitchell-Peter McIntyre/University of Michigan School of Natural Resources & Environment

James Kitchell

University of Wisconsin-Madison professor of Limnology James Kitchell, whose work is funded in part by the University of Wisconsin Sea Grant Institute, has won an important lifetime achievement award from the American Society of Limnology and Oceanography (ASLO), to be awarded in June.

The annual A. C. Redfield Award is given to recognize and honor long-term achievements in the fields of limnology and oceanography, including research, education and service to the community and society.

The award recognizes Kitchell's body of work, which the society termed, "field-changing contributions in the areas of fish ecology and fisheries, trophic dynamics and understanding the role of fish in aquatic ecosystems."

"I am surprised by this recognition and delighted to see the American Society of Limnology and Oceanography encourage approaches that put fishes and fisheries in an ecosystem context," Kitchell said.

In fact, one of the sessions at the society's 2010 international summer meeting is "Fish and Fisheries in an Ecosystem Context: A Celebration of the Career of J.F. Kitchell." The session is predicated on a hallmark of modern ecology – fish are critical structuring components of aquatic ecosystems.

The session description reads, "J.F. Kitchell developed many of the key insights that have enabled fish ecology to become an integrated dimension

of aquatic ecosystem ecology. This symposium will highlight state-of-the-art science focused on understanding fish and fisheries ecology in an ecosystem context."

Wisconsin Sea Grant has funded 23 of Kitchell's projects since 1974. Currently, he is working on a Sea Grant-funded study to gauge the effect of climate change on sea lamprey and food web interactions in Lake Superior.

Superior, the world's largest freshwater lake, is warming more quickly than other lakes around the globe. These conditions appear to be favoring a longer growth period for sea lamprey, a parasitic creature that attaches to and feeds on the blood of lake trout. The lampreys are therefore able to grow larger and produce a greater number of offspring. This increases the parasitic toll on the trout and can cascade down through the food web.

UW Sea Grant Director Anders W. Andren said, "We are extremely pleased to have been able to support Prof. Kitchell's work through the years. He has conducted and published critical research on the nature of aquatic environments and fisheries. It has been a groundbreaking approach in that Prof. Kitchell is one of the first to integrate fish in a total ecosystem approach."

ASLO is a 54-year-old professional membership organization that fosters a robust international scientific community focused on basic and applied research, information sharing, public awareness and stewardship policies. There are nearly 4,000 members from 58 countries. — MH

Chris Bocast, another new project assistant, is drawing on his dual interests in sound and the environment to create podcasts about mercury-related research. Bocast, a longtime San Francisco resident originally from Los Angeles, is researching acoustic ecology as a doctoral student in the Nelson Institute's Environment and Resources program. He earned an M.A. degree in American studies from the University of Texas at Austin.





Wade Into the Asian Carp Debate Without Getting Wet

BIOLOGICAL INVADERS IN INLAND WATERS: PROFILES, DISTRIBUTION AND THREATS
EDITED BY FRANCESCA GHERARDI. LONDON: SPRINGER, 2007.

Biological Invaders examines the identity, distribution and impact of freshwater non-indigenous species and the dynamics of their invasion.

BIGHEADED CARPS: A BIOLOGICAL SYNOPSIS AND ENVIRONMENTAL RISK ASSESSMENT
BY CINDY S. KOLAR. BETHESDA, MD.: AMERICAN FISHERIES SOCIETY, 2007.

This book contains a detailed risk assessment and biological synopsis of the bigheaded carps of the genus *Hypophthalmichthys*, which includes the bighead, silver and largescale silver carps.

BLACK CARP: BIOLOGICAL SYNOPSIS AND RISK ASSESSMENT OF AN INTRODUCED FISH
BY LEO G. NICO, JAMES D. WILLIAMS AND HOWARD L. JELKS. BETHESDA, MD.: AMERICAN FISHERIES SOCIETY, 2005.

This book offers a detailed assessment of the risks posed by the invasion of the black carp, a large mollusk-eating cyprinid fish native to eastern Asia.

INVASION ECOLOGY
BY JULIE L. LOCKWOOD, MARTHA F. HOOPES AND MICHAEL P. MARCHETTI. MALDEN, MA: BLACKWELL PUB., 2007.

Get a comprehensive introduction to all aspects of biological invasion by non-native species.

GREAT LAKES SHIPPING, TRADE, AND AQUATIC INVASIVE SPECIES
WASHINGTON, D.C.: NATIONAL ACADEMIES PRESS, 2008.

This book reviews existing research and efforts to date to reduce aquatic invasive species introductions into the Great Lakes and identifies ways that these efforts could be strengthened toward an effective solution.

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



Left to Right: Phil Moy (credit: Bob Rashid). In February, Sea Grant's Aquaculture Specialist Fred Binkowski (far right) donated more than 500 pounds of yellow perch to the Hunger Task Force of Milwaukee (credit: UW Sea Grant video stills).



Phil Moy Takes on Additional Duties

Phil Moy has been promoted to the position of Advisory Services Manager for the University of Wisconsin Aquatic Sciences Center. Phil will report directly to Jim Hurley, assistant director for research and outreach.

Phil will continue his present duties as aquatic invasive species and fisheries outreach coordinator and will help Jim in day-to-day outreach management with particular emphasis on strategic planning and developing new programmatic opportunities for both the Sea Grant and Water Resources programs housed in the Aquatic Sciences Center.

"We are really pleased to announce that Phil will be joining our management team in Madison," Director Anders W. Andren said. "We get a double benefit – the addition of Phil Moy and his insights from several years of field experience on outreach and education issues, and letting Jim have more time to develop our climate service research and outreach activities as well as new research focus areas."

Moy leaves behind regional outreach work in Manitowoc, Wis., in four counties that hug the north-central shore of Lake Michigan. "We are presently exploring a number of avenues to maintain our outreach capability in Manitowoc field office, and hope to have arrangements worked out in a few months," Andren said.

Sea Grant Research Ends up on Dinner Plates

When some scientists complete their research, they turn off Bunsen burners, wipe down lab tables and wash out test tubes. When Sea Grant's Aquaculture Specialist Fred Binkowski finishes a project, he's looking at a tank full of market-size yellow perch. It's research you can eat, and that's just what hundreds in the Milwaukee area did with it.

In a February donation to the Hunger Task Force of Milwaukee, Binkowski turned over 500 pounds of the fish. The processed, frozen yellow perch ended up on the dinner plates of families whose financial resources would otherwise have prohibited such a tasty meal. Retail prices on the fish vary but can be as high as \$16 per pound. The total estimated value of the donation was \$8,000. This is the second year in a row the pantry has received a fish donation.

The fish hand-off took place as part of a media event on Fat Tuesday, covered by all four of Milwaukee's television stations, Wisconsin's largest daily newspaper and a news service that circulated the story throughout the Midwest.

Until 1996, commercial fishermen caught yellow perch in Lake Michigan. Then changes to the lake's ecosystem brought about a collapse of the food web, and the fish can no longer be harvested in big numbers. Any retail yellow perch coming out of the Great Lakes now hails from Lake Erie.

Binkowski's research has yielded promising results on economically viable production methods, such as multiple spawning seasons in a 12-month period, instead of a single spawning; accelerated fish-growth rates; and refined management practices for commercial-scale systems.

Watch video at aqua.wisc.edu/chronicle.

Clean Marina Program Sets Sail

UW Sea Grant is helping marinas around the state stay shipshape while protecting the water resources we all enjoy.

With support from the Wisconsin Coastal Management Program, UW Sea Grant and the Wisconsin Marina Association launched a Clean Marina Program to promote environmentally friendly practices at marinas across the state.

The voluntary program aims to be a win-win venture for marina owners and the environment supporting their businesses. Sea Grant Water Quality Specialist Vicky Harris and Coastal Engineering Specialist Gene Clark worked with a steering committee of marina owners and agency representatives to develop criteria for Clean Marina certification. They also produced outreach and education materials, including a Clean Marina Guidebook and Clean Boater Tip Sheets. These materials debuted this past winter at two training workshops for marina operators, and they are now available on the program's Web site, wisconsincleanmarina.org.

The guidebook outlines practices required by law as well as additional best-management practices. Facilities that follow the practices may be certified as "Clean Marinas," and they are encouraged to use the designation to promote their businesses.

The Wisconsin Clean Marina Program is part of a nationwide effort coordinated by the National Oceanic and Atmospheric Administration (coastal-management.noaa.gov/marinas.html).





CAN ASIAN CARP INVASION BE AVERTED? continued from page 1



In December, scheduled maintenance required temporarily shutting down part of the barrier. Because eDNA tests showed Asian carp advancing, a 5.7-mile section of the canal was treated with rotenone, a fish poison, to ensure that no carp would breach the barrier during the maintenance.

Moy said a successful Asian carp invasion is by no means a sure thing even if a fish slips through. “It takes some specific habitat for them to do really well,” he said.

Scientists believe the carp need access to a river with a deep, free-flowing main channel in order to successfully reproduce. If their eggs settle to the river bottom before hatching, the embryos will suffocate and die.

“One hundred kilometers—about 63 miles—is roughly the distance needed to provide enough current to keep the fish’s fertilized eggs suspended in water while they incubate,” Moy said. Out of thousands of tributaries that feed the Great Lakes, only 22 on the U.S. side (four in Wisconsin) meet this criterion. Adding another criterion—the availability of quiet, fertile backwater areas where the newly hatched fish larvae can eat and mature—reduces the list even more.

However, before they can reproduce, the fish would need to find each other within more than 94,000 square miles of the Great Lakes. While a few bighead carp have been captured in Lake Erie, probably due to someone releasing them there, they have yet to multiply into any significant numbers.

Indeed, Moy said it’s all about numbers now.

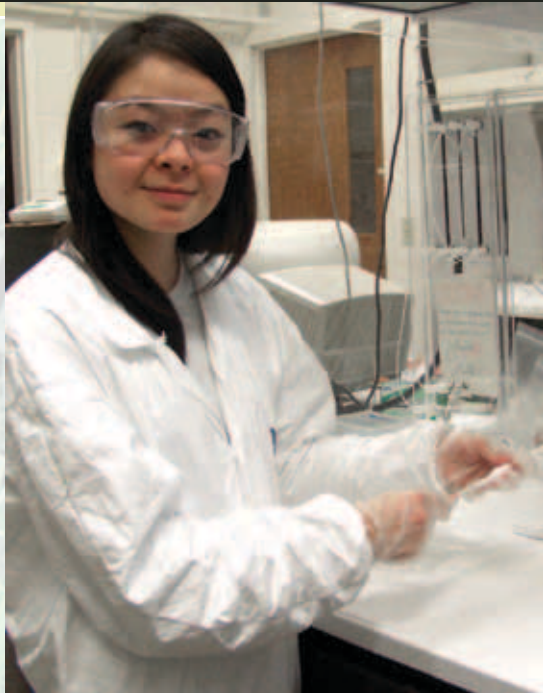
“We have to keep the numbers as low as humanly possible,” he said. “Even if there are a few Asian carp upstream of the electrical barrier, there is absolutely no assurance that they’ll be able to establish a population.”

Although Moy remains active on the electric barrier project, he acknowledges that it is not a permanent solution. It depends on the fish reacting predictably to a technology that could potentially fail. In addition, it doesn’t do anything to protect the Mississippi River basin from small, floating invasive species coming from the Great Lakes, such as quagga mussel larvae.

Ultimately, he said, the only sure way to keep Asian carp and other invasive species out of the Great Lakes is to permanently sever the link between the Mississippi River and Great Lakes basins.

“I really think that’s the direction we have to go,” Moy said. — KSK

Asian carp on the Spoon River, a half-mile upstream from its confluence with the Illinois River (credit: Kevin S. Irons / Illinois River Biological Station).



2010 Weston Scholars Announced

Alex Gooding and Sue-Zanne Tan are the recipients of the 2010 Carl J. Weston Memorial Scholarships from UW Sea Grant. The scholarship is awarded to undergraduates interested in Great Lakes and ocean issues.

Both students certainly meet and exceed that standard. Tan, an undergraduate chemical engineering student at UW-Madison, has been instrumental in determining and putting to use techniques for characterizing and quantifying microbial communities that play a role in methylation of inorganic mercury. She has completed analysis on both wetland sediments and mercury in aquaculture.

Chris Barbiaz, an assistant scientist with the UW-Madison Water Science and Engineering Laboratory, said Tan stands out as being in the

Tan-UW ASC/Moira Harrington; Alex Gooding

top five percent of the students with whom he has worked during the last 20 years. “Her success is an outcome of her attention to detail, excellent record keeping, insightful questions and determination.”

Gooding is majoring in pharmacology and toxicology at UW-Madison. As a first-year student, he approached Warren Heidemann about research opportunities. Since then, Gooding has worked as an undergraduate assistant on Heideman and Richard Peterson’s Sea Grant-funded research attempting to predict risks that dioxin and related environmental contaminants pose to feral fish populations during early life stages.

“Alex is a full participant in this project, and he has been ready and able to talk about his progress during lab meetings,” Heideman said.

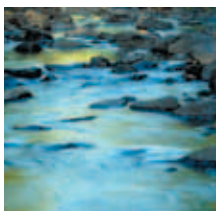




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Aquatic Sciences Chronicle

a joint newsletter from UW Sea Grant and UW Water Resources



CALENDAR OF EVENTS

JUNE 2-3, 2010

**Great Lakes Fishery Commission
55th Annual Meeting**

Sault Ste. Marie, Ontario

glfc.org/temp/annualmtg_notice.pdf

JUNE 12, 2010

Gathering Waters Festival

Lakeshore State Park

Milwaukee, Wis.

gatheringwatersfest.org

SEPT. 1, 2010

UW Sea Grant Project Completion Reports Due

(For projects ending Feb. 28)

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