The HELM

Illinois-Indiana Sea Grant Spring 2014

Asian carp jump into new markets

By Anjanette Riley

The men behind a new fish processing plant in Illinois aren't veterans of the industry. They are a lawyer, alloy company owner, and restaurant builder who saw Asian carp jumping in the Mississippi River and thought, "There must be something we can do with these things."

That thought became a reality this April when American Heartland Fish Products opened its doors in Grafton, IL, a small town near the confluence of the Mississippi and Illinois rivers. The plant uses a unique production process to turn Asian carp into fish and bone meal and Omega 3 oils. The high-protein meals are primarily sold to animal feed producers. Their biggest seller, Omega 3 oil, is used for everything from cosmetics to dietary supplements.

Courtesy of the Asian Carp Regional Coordinating Committee

"I have been involved in a lot of businesses, but never one where there is such a demand for the product," said Ben Allen, who co-owns American Heartland Fish Products with Gray Magee and Bryan Lebeau.

The idea started taking shape in 2010 during a two-day summit that brought business owners, researchers, and agency officials from eight states together to discuss the potential of reducing Asian carp numbers by marketing the fish. Organized by Illinois-Indiana Sea Grant (IISG), the Asian Carp Marketing Summit ended with

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Illinois-Indiana Sea Grant
Two States Caring for One Great Lake

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recommendations for connecting local processers to Asian markets, where there is a higher demand for carp, and making use of byproducts locally.

Once it is fully operational, the Grafton plant will process around 60,000 lbs of Asian carp each day—without the characteristic odor and waste of traditional processing plants.

Plants like these will help control Asian carp, but research done in response to the summit suggests we will never be rid of the invaders. Commercial fishing reduces adult populations, but the key to eradication lies with hatchlings and yearlings. And, at least right now, we don't have the technology or knowledge to target younger carp.

"We think it is the adults that are reducing zooplankton populations and impairing recreation," said Jim Garvey, director of the Center for Fisheries, Aquaculture, and Aquatic Sciences at Southern Illinois University Carbondale (SIUC). "There is strong evidence that fishing can suppress adult populations to the point that Asian carp won't have much of an impact anymore."

Courtesy of Silvia Secchi

SIUC researchers gauge interest in Asian carp cakes at the local farmers market.

Incentives for commercial fishing may come from more than just a demand for fish parts. According to another study, it may also be possible to market Asian carp as food fish in the U.S. Using survey data, SIUC researchers discovered that people would be willing to pay about the same amount for these tasty, high-protein invaders as they do for existing fish products.

Consumers would be willing to pay the most, between $8 and $12, for restaurant-prepared carp, particularly grilled Asian carp steak served with a tomato garlic sauce. Buyers also said they would pay around $4 for a box of fish sticks or a 10-oz package of breaded fillets.

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New tour app explores Chicago lakefront stories

Did you know that parts of the downtown Chicago lakefront were built on the charred remains of the Great Chicago Fire? Before that, the shoreline sat near Michigan Avenue, roughly half a mile from where it is today.

Chicago's man-made shoreline is just one of many topics featured in a new self-guided app tour that shows a different view of the Chicago lakefront. Chicago Water Walk takes you on a journey through time to discover how Lake Michigan and the Chicago River transformed a small trading post into one of the economic and cultural hubs of the world—and the vital role these natural resources play now and in the future.

The app explores some of the city's most celebrated sites—Navy Pier, the Chicago River, downtown marinas, Buckingham Fountain, and Museum Campus. Each stop weaves history, current events, and water sciences with fun facts to show the importance of aquatic ecosystems. Loaded with images—past, present, and future—and links to videos and other resources, the app brings these issues to life and reveals a lakefront that will surprise even the most veteran Chicagoans.

For example, discover why the decision to reverse the Chicago River is still making waves more than a century later. Learn how a city that sits along Lake Michigan can be concerned about having enough drinking water. Uncover how native trees and plants are helping the city prepare for changing weather patterns. And read about efforts to restore much-needed habitats for birds, fish, and other wildlife.

With 18 stops across four routes, Chicago Water Walk is easily customized to enhance any trip to the lakefront. You can follow the suggested tours or visit the sites that most appeal to you using the interactive map.

Chicago Water Walk is available for free on both Android and Apple devices. It was developed by IISG, with funding from the Illinois Department of Natural Resources Coastal Management Program and technical support from the University of Illinois Administrative Information Technology Services.

For more information and to download the app, visit www.chicagowaterwalk.org.

Calling all experts to join PhragNet

Phragmites is a tricky plant to manage. The wetlands along southern Lake Michigan are home to both native and non-native varieties of this grass, and distinguishing between the two isn't always easy. Coupled with concerns over hybrid species or that native *Phragmites* could behave invasively, it is often unclear which plants should be controlled and where.

Courtesy of Dan Larkin

Amy Price, a graduate student at Northwestern University, collects *Phragmites* near Chicago for gene analysis.

Researchers at the Chicago Botanic Garden hope to change all that with a new collaborative network that brings together scientists and wetland managers. The idea behind PhragNet is simple. Managers provide soil and plant samples and share information about their management strategies and goals. In return, researchers use that data to better understand *Phragmites* invasions and help managers hone in on the most effective control and restoration strategies.

The IISG-funded network is still in its early stages, but PhragNet co-founders Dan Larkin, Jeremie Fant, Vicky Hunt, and others have already collected data from roughly 50 participants in 15 states and Ontario.

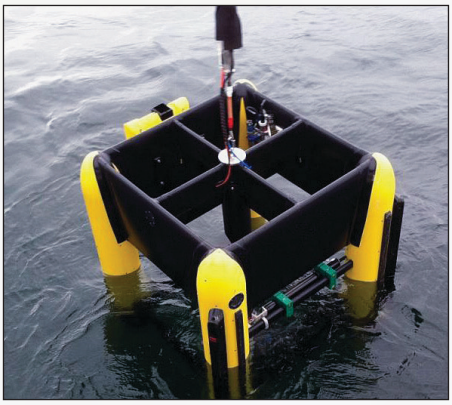
"There is so much we can learn by 'crowd-sourcing' information about how to effectively manage *Phragmites*-impacted wetlands," said Larkin. "The value will increase over time as we see how sites respond to management."

The researchers have some guidance for Chicago-area wetland managers now due to a 2010 investigation of the ecology and genetics of native and non-native *Phragmites*. Their Discovery Grant project showed that native *Phragmites* is not a threat to plant diversity, so managers can focus control efforts on the harmful non-native subspecies. Managers should also pay attention to the plant's seeds. *Phragmites* was long thought to expand primarily through stems that sprout new plants, but genetic analysis revealed it can also spread through seeds.

Great Lakes data collection gets smarter

The U.S. EPA Great Lakes monitoring program is expected to get a shot in the arm this summer through a collaboration with IISG. For the first time, researchers on a handful of *R/V Lake Guardian* cruises will use a new modeling program to find data patterns that currently take months to identify.

The cutting-edge program uses a variety of statistical tools to quickly analyze large amounts of data collected by EPA's Triaxus sensors, fill in missing information, and pinpoint unexpected results—spikes in water temperature, drops in oxygen levels, or a pocket of zooplankton-rich water.



Triaxis collects information on water characteristics like temperature, pH, and depth in the Great Lakes.

Barbara Minsker, an environmental engineer at the University of Illinois, and PhD student Wenzhao Xu have spent the last two years developing the program using historical data from

Knowing nutrient patterns helps predict pollution

April showers bring more than May flowers. They also carry nutrients that can reduce oxygen in lakes by spurring algal growth. While concerns about 'dead zones' continue to rise, researchers at the Illinois State Water Survey set out to untangle the complex relationship between man-made landscapes, pollution, and climate change.

With support from IISG, Alena Bartosova, Momcilo Markus, and former graduate student Siddhartha Verma looked at years of data from 14 rural and suburban watersheds in Illinois, Indiana, and Ohio. The comprehensive study reveals key patterns in nitrate, phosphorus, and sediment pollution. For example, although there is more precipitation in summer, nutrient levels are at their highest in winter and spring, when there are fewer plants to help prevent erosion and absorb nutrients. What's more, the five largest storms in a watershed carry more than half of the nutrients that flow off it each year. And where farmers use tile drains to remove excess water, nitrate pollution is much higher the year after a drought—a pattern long supposed but never quantified.

Nutrients carried in stormwater are the primary drivers of dead zones in Lake Erie and the Gulf of Mexico.

Knowing when and how nutrients are most likely to enter waterways will help agencies design more effective and cost-efficient monitoring strategies. It also makes it possible to estimate nutrient pollution levels in watersheds where no water quality data is available. In fact, managers in most Midwestern watersheds could use Bartosova and Markus's methods to predict next year's nutrient loads.

Understanding these patterns may also help the region prepare for—and perhaps even mitigate—a potential rise in hypoxia if climate change brings wetter springs and drier summers to the Midwest.

"We need to consider many more factors before we can confidently say that climate change will increase nutrient loads," said Markus. "But our results do suggest that it could have a significant impact on sediment and nutrient pollution."

Lake Michigan. This summer is a trial run, but EPA hopes to integrate the program into regular surveying. Once that happens, it could even be used to make in-the-moment adjustments to sampling plans.

For EPA and others that rely on *Lake Guardian* data to understand and protect Great Lakes water quality, this program could be a game changer. For example, its high-resolution models could alert researchers to algal blooms and provide a clearer picture of the highs and lows of nutrient pollution. Several researchers, including IISG's Paris Collingsworth, also hope to use the program to uncover differences in Lake Ontario's deep chlorophyll across the lake and see how water characteristics change when river water mixes with Lake Michigan.

The project is connected to a larger effort led by IISG and the University of Illinois National Center for Supercomputing Applications to make it easier for scientists, decision makers, and the public to access water quality data. At the center is greatlakesmonitoring.org, which brings together data collected across the Great Lakes by several state and federal agencies. The site is still in development, and Minsker hopes to include her analysis program in a later iteration.

Bon voyage! Robin and Susan set course for retirement

This year promises a lot of changes for Illinois-Indiana Sea Grant. The program is growing, and we are excited to welcome new faces. But we have also had to say goodbye to a few long-time staff members and friends. Graphic Designer Susan White and Associate Director for Education Robin Goettel retired earlier this spring after dedicating decades to communicating with audiences of all ages.

Robin Goettel always found new ways to engage students in educational activities.

Since joining the program in 1983, Robin played a crucial role in improving and expanding environmental education in the region. Her passion, creativity, and dedication is evident in the eight curricula, dozens of publications, and hundreds of teacher workshops she has coordinated over the years. Robin has brought in nearly $2 million for environmental science, geography, and technology education and reached more than 300,000 students across the region.

But her true legacy is much broader. Since her early years in communication, Robin was a strong advocate for collaboration with organizations like the National Park Service, Shedd Aquarium, the Peggy Notebaert Nature Museum, the Alliance for the Great Lakes, and Sea Grant programs coast-to-coast. Success can be seen in numerous resources that help educators teach key issues affecting aquatic ecosystems. The annual Shipboard Science Workshop, dozens of service-learning projects, and the *Nab the Aquatic Invader!* website—featured at the Smithsonian Museum of Natural History—are just a few results of Robin's partnerships.

"I will certainly miss all the wonderful friendships I have made over the years," said Robin. "And I'm very grateful to have been a part of so many exciting projects that are solving problems in sustainable ways and making an important difference in the health of our aquatic and marine environments."

As IISG's graphic designer, Susan helped shape the look of the program. During her roughly 20-year tenure, she created everything from flyers to program logos to interactive displays—even a life-size Asian carp. Many of these products have won awards, including *The Medicine Chest* curriculum, the *Getting Rid of Stuff Sensibly* display, and the *30 Milestones* booklet.

Although she did the bulk of her work from the IISG office at the University of Illinois, Susan wasn't afraid to get her feet wet. She would often hit the road with displays to spread the word about IISG and its work. Over the years, Susan went onsite at boat shows, state fairs, Earth Day events, agricultural shows, and much more.

"I have always said I had the best job in the program because I had the opportunity to work with each staff member on all kinds of projects," she said.

At the Illinois State Fair, Susan White's clever exhibits provided fun and learning.

Staff update

Terri Hallesy is IISG's new education coordinator. She has been a part of the education team since 2004 and has played a key role in developing curriculum, conducting educator workshops, and designing IISG-led courses. Her list of accomplishments includes the *Nab the Aquatic Invader!* website and the B-WET teacher workshop. Terri has received several awards during her tenure with IISG, including an Extension Award of Excellence in 2008 for her efforts on a University of Illinois service-learning course. As the education coordinator, Terri will develop new programs and resources to build our program and improve Great Lakes education in the region. She will also oversee several state and regional collaborative education efforts.

Jay Beugly is IISG's new fisheries management specialist. Located at Purdue University, he works closely with our research team to increase public awareness of IISG data resources for Lake Michigan, such as the Michigan City nearshore buoy. He also provides technical assistance to improve water quality and ecosystem health in northern Indiana streams and ponds and helps boaters, anglers, and other stakeholders better understand water conditions. Jay has a Master's degree in biology from Ball State University, where his work on river and stream ecology earned him the 2009 Outstanding Graduate Student in Fisheries Award. He is currently working towards a PhD in aquatic community ecology at Purdue.

Alice Denny has joined the IISG aquatic invasive species (AIS) team as an outreach assistant. From the Chicago Botanic Gardens in Glencoe, IL, she works on all aspects of AIS outreach, including educating tournament anglers on how they can help curb the spread of invasive species. Alice started her tenure with IISG as a summer intern. Prior to that, she worked as a field technician in the Chicago area and conducted research on invasive species in New York state parks. Alice holds a Bachelor's in biology from Hartwick College. She is also a member of the Illinois Volunteer Lake Monitoring Program.

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But don't expect to see Asian carp in grocery stores just yet. According to SIUC researcher Silvia Secchi, the major hurdle for developing such products is not public perception but a lack of infrastructure and capital for capturing, processing, and transporting the fish domestically and abroad. The situation has improved since the marketing summit—in part due to a food-handling training program for anglers funded by the Illinois Department of Natural Resources—but there is still a long way to go.

"It will take time and money to improve all the steps in the supply chain," said Secchi, an environmental economist. "But this approach seems to be cheaper and more cost effective than any other strategy for controlling the population of Asian carp."

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Lady Quagga announces latest tour

Illinois-Indiana Sea Grant is proud to announce the arrival of our new “spokes-mussel” Lady Quagga. This world-wide sensation is available to go on tour to your school or public event to publicize the latest information about aquatic invasive species (AIS).

Lady Quagga is a native of the Ukraine, but quagga mussels were first sighted in the Great Lakes in 1989. Since then, along with the closely related zebra mussels, quagga populations have grown dramatically—and their impact as well. They clog pipes, outcompete other filter feeders, and leave water vulnerable to algae outbreaks.

Because Lady Quagga is unusually large for a mussel, she is a celebrity, captivating audiences with her style and message of how to help prevent the spread of AIS.

She has big shells to fill—Lady Quagga is replacing Zelda the Zebra Mussel, who retired several years ago after a long career of meeting people and making friends throughout the Great Lakes region.

If you are interested in Lady Quagga, contact her manager, Terri Hallesy, at thallesy@illinois.edu.