The Helm

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Illinois-Indiana Sea Grant

Co-owner of a shrimp farm in Fowler, Karlanea Brown describes her operation to the participants of the Aquaculture Industry Tour for Culinary Professionals.

Indiana seafood: Coming to a restaurant near you

Location, location, location is what Indiana's aquaculture industry is relying on as it reaches a critical juncture in its growing economy.

"Indiana-farm-raised fish" doesn't appear on most menus in the Midwest, so the industry is trying to change that through workshops and tours like the recent Aquaculture Industry Tour for Culinary Professionals hosted by Purdue University Extension, the Indiana Aquaculture Association, the Indiana Soybean Alliance, and Illinois-Indiana Sea Grant (IISG).

Aquaculture really started to take off in Indiana about 10 years ago with a handful of farmers and annual sales of about $5 million. Today the industry boasts about 40 farms that produce tilapia, yellow perch, prawns, shrimp, bait fish, catfish, hybrid striped bass, bluegill, and decorative fish bringing in about $15 million in sales each year—a threefold increase.

Kwamena Quagrainie, IISG marketing specialist, has worked one-on-one, advising potential and ongoing producers throughout the state, and engaged in numerous market studies. To be competitive in the expansive seafood market, he encourages local fish farmers to take advantage of niche marketing opportunities.

Capitalizing on the relatively recent consumer trend to "buy local," the tour took 25 culinary professionals from throughout Indiana to visit a saltwater shrimp farm in Fowler and a tilapia farm in Romney. For some, the visits were the first time seeing fish raised indoors in tanks.

In This Issue:

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"I try to get food that's from our community," said Padraig Cullen, chef and director of culinary at Upland Brewing Co. in Bloomington who attended with two of his coworkers. "At least once a day I am asked where the food I serve comes from," he added.

Nicole Reeves, a culinary student at Ivy Tech Community College in Indianapolis, wanted to see how the fish were raised. "I'd rather buy locally grown than go to the store and wonder where it was from," Reeves said.

For Wayne Blackerby, the price tag for local fish is still too high for the two restaurants he owns in the Columbus area, but he's optimistic. He thinks in five years it will be a different story.

Even though buying fish directly from an Indiana farm is sometimes twice as expensive as buying it from a grocery store, the producers say the demand is there. The problem is maintaining a steady supply of the product.

"We're in that catch-22," says Karlanea Brown, co-owner of shrimp farm RDM Aquaculture LLC in Fowler, which is 1 of 11 shrimp farms in the state. "We're struggling to keep up so we're expanding from 17 to 22 tanks."

"One of the main concerns brought up on the tour by the culinary professionals, was the quantity and consistency of supply," said Quagrainie. "They need a dependable supply of local fish if they are going to advertise it in their restaurants."

Phillip Shambach (pictured above on left with Quagrainie) owner of Tippco Farms in Romney is facing a different problem. He raises tilapia and ships the live fish in tanks mostly to Asian markets in the Midwest. Shambach would like to expand his clientele by being able to sell a small number of cleaned, gutted, or fileted fish. But right now a facility to do that doesn't exist.

"I can't process a small amount of fish for a restaurant when the majority of my fish goes to the market live," said Shambach. "I'd like to find a way for farmers to group together with buyers to be able to buy a processed product from us. The demand is there."

Balancing the supply with the demand is tricky for any young industry and Indiana aquaculture is no different.

"I've been working with the farmers for the past 10 years and at certain times you think it's going to go down, but then then you have hope," Quagrainie says. "Those who are farming now have gone through the various learning stages and they know what they're doing. Indiana aquaculture is definitely growing."

Aquaculture in Indiana

Indiana produces roughly *1.5 million pounds* of fish per year from about *40 farmers* estimated at a value of *$15 million.*

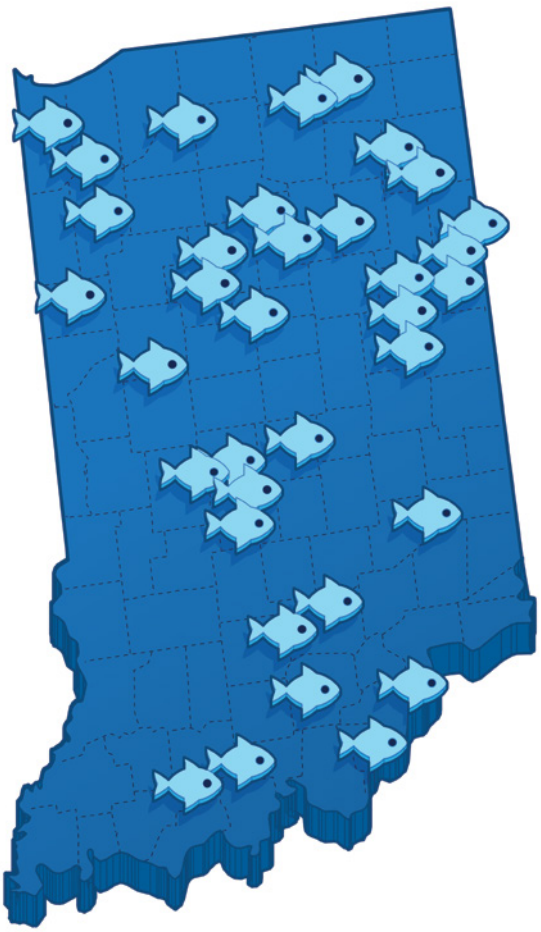

Photo courtesy the Center for Neighborhood Technology

New tool will help Cook County critical facilities reduce flooding impacts

Flooding is always hard on a community, but when hospitals, mass transit, utilities, and others that impact the health and safety of residents are under water, these facilities may not be able to provide critical services or may even be forced to shut down. This leaves residents and businesses vulnerable to other threats and makes flood recovery ever more challenging.

To combat these hazards, IISG and the Midwestern Regional Climate Center (MRCC) have joined forces with the Cook County Department of Homeland Security and Emergency Management to assess the vulnerability of critical facilities throughout Cook County and to work directly with building managers on adaptation steps that could reduce their risks in the face of future flooding events.

The heart of the project is the *Flood Vulnerability Assessment for Critical Facilities*, which is an assessment tool. This set of questions will help Cook County managers determine a facility's risk based on factors like its proximity to a flood plain, past flooding issues, stormwater drainage systems, and the location of key systems like back-up generators and computer servers. Facilities may also be able to use the tool to evaluate current emergency communication plans for heavy rainfall and determine whether improvements are necessary. After a pilot phase, the final assessment tool will be made available online for facilities beyond Cook County.

What's more, to help managers plan with an eye on the future, the project team will use historic rainfall data and climate forecasts to pinpoint the frequency of heavy storms now and predict how that rate may change as the climate does.

The *Reducing Flooding Vulnerability of Chicago Critical Facilities* project is led by Molly Woloszyn, IISG and MRCC extension climate specialist, and Beth Hall, MRCC director, with additional support from the Coordinated Hazard Assessment and Mapping Program at the Illinois State Water Survey. Funding is provided through the National Sea Grant Office as part of the Community Climate Adaptation Initiative, which is focused on helping communities prepare for climate change.

The Grand Cal just keeps getting better

The Grand Calumet River in northwest Indiana, abused from centuries of industrial contamination, celebrated a triumphant milestone in October.

Volunteers, environmental organizers, and local, state, and federal politicians gathered to admire the incredible transformation of a river that was once drained of its ecological significance.

IISG Environmental Social Scientist Caitie Nigrelli who led an outreach team to raise awareness about this enormous undertaking soaked it all in.

“I’m enjoying the beautiful river,” Nigrelli said. “It‘s amazing because just a few years ago I was standing in the same spot, and it was contaminated. Now I look out and it is clean and beautiful.”

Nigrelli serves as a liaison between the U.S. Environment Protection Agency (EPA) and community stakeholders to promote awareness of the Grand Cal remediation through public meetings, tours, and events with school children.

The Grand Calumet was at rock bottom when the International Joint Commission designated it as an Area of Concern in 1987. Since then $159 million in combined state and U.S. EPA funds through the Great Lakes Legacy Act have thus far provided the means to clean it up.

Because of the extent of the work, the Grand Cal’s 13-mile system was divided into eight separate projects, with more milestones to come. This most recent event marked the completion of a 2-mile section from Kennedy Avenue to Cline Avenue at a cost of $82 million. The money went toward remediating 1.1 million cubic yards of contaminated sediment, restoring 58 acres of marsh habitat, and installing more than 170,000 plants.

This effort not only remediated sediment, but also removed invasive species like Phragmites that had overrun dune and swale habitat, crowding out native plants.

The federal funding, while generous, comes with a significant stipulation: Local partners must match at least 35 percent of the cost of remediation. The Indiana Departments of Natural Resources and Environmental Management footed the bill with money from a Natural Resource Damage Assessment involving eight industries.

But a remediation project requires more than money. It takes supportive partnerships and community trust. The Kennedy to Cline section was made possible with the knowledge and expertise provided by The Nature Conservancy, Shirley Heinze Land Trust, Save the Dunes, U.S. Fish and Wildlife Service, and IISG, as well as the local municipalities.

Kris Krouse, Shirley Heinze Land Trust executive director, said, “From our perspective as an organization, it is probably one of the most spectacular and monumental

achievements when it comes to land conservation."

Octogenarian Lee Botts, a prominent Great Lakes environmental activist since the 1960s, is making a film about the changes the south end of Lake Michigan is experiencing. She remembers questioning that any kind of restoration was ever going to happen.

"Amazing progress is being made by partnerships among all kinds of interests—some of whom in the past were enemies and opposed the conservation," Botts said. "Now it's a shared goal of all these interests. We're making progress."

For more information on the cleanup of the Grand Calumet River, visit www.greatlakesmud.org.

Image courtesy Duane Raver, U.S. Fish and Wildlife Service

Medicines in Lake Michigan impact minnow embryos

An IISG-funded researcher found that the mixture of pharmaceutical and personal care products (PPCPs) present in Lake Michigan can have significant negative effects on fathead minnow embryos.

Maria Sepúlveda, a Purdue University ecotoxicologist, is telling the next chapter on research of PPCPs in Lake Michigan. In 2011, Ball State researchers, also funded by IISG, examined the concentration and detection of pharmaceuticals in the nearshore waters in Lake Michigan.

Sepúlveda chose to study two of the chemicals found in that study: triclocarban, a compound found in antibacterial soaps, lotions, and toothpaste, and cotinine, a metabolite of nicotine. Both of these chemicals find their way into Lake Michigan through sewage wastewater treatment effluent.

The researchers created realistic field concentrations in the laboratory, examining effects of the chemicals both individually and in a mixture. They also examined acute and chronic toxicity of field-observed levels of chemicals on four organisms from different parts of the food chain: green algae, diatoms, zooplankton (water flea, Daphnia magna), and fathead minnow embryos.

Sepúlveda found that when she tested the four organisms with individual compounds at levels similar to those found in Lake Michigan, they remained largely resistant with the exception of the fathead minnow embryo, which was slightly affected by the triclocarban. When she exposed the organisms at the bottom of the food chain—diatoms, zooplankton, and Daphnia magna—to the mixtures, they were not affected even at high levels. Yet the hours-old fathead minnow embryo proved to be significantly susceptible to the contaminants. "This is not surprising since embryos are known to be more sensitive to most contaminants compared to adults," said Sepulvida. "The fish embryos were more sensitive than anything else we tested.

"We chose this species because there was no data in the literature and therefore our values are novel," she added.

Research on PPCPs in Lake Michigan and the Great Lakes overall is limited, so she cautions that these results are very preliminary. "It would be ideal if we had more data from not just Lake Michigan, but from the Great Lakes in general. But there's just not a lot of data on pharmaceuticals from the Great Lakes right now," Sepúlveda said. "There are over 200 pharmaceuticals that people look for all the time in surface water. It's overwhelming when you start thinking about it. It's very complicated to study in a lab or in the field."

New research projects address pollutants and other key issues

Residents of Illinois, Indiana, and the broader Great Lakes region will benefit from new IISG research. Altogether, the four, two-year projects will receive more than $780,000 starting in 2016.

John Kelly, a Loyola University biologist, will survey eight major rivers around the lake to trace the origins of microplastics pollution and what river characteristics—such as surrounding land use or nearby wastewater treatment plants—may be driving this.

Purdue University's Zhao Ma will lead an interdisciplinary team that seeks to reduce nutrients, sediment, and *E. coli* contamination in southern Lake Michigan. The team will use models to assess best management practices (BMP) for reducing runoff and the willingness of individuals to implement these BMPs. Looking at these two approaches together will allow them to optimize the best courses of action to reduce overall pollution.

A project led by Sara McMillan, who studies biogeochemistry and hydrology at Purdue University, will examine drainage ditch design from multiple perspectives. McMillan will compare designs that improve long-term stability and ecological effectiveness.

And Beth Hall, Midwestern Regional Climate Center director, will work with Paul Roebber of the University of Wisconsin-Milwaukee to improve how flash flooding events in urban centers are predicted and communicated. Hall and Roebber's project is partially funded by Wisconsin Sea Grant.

Staff Updates

Abigail Bobrow
Communication Specialist

Abigail's writing, photography, and videos about program news and research projects appear on the blog, in publications, and on websites.

Abigail has an extensive background in journalism, having worked at several newspapers throughout the Midwest. She received a dual Bachelor's degree in geography and studio art from Clark University in Worcester, Mass.

Erin Knowles
Communication Specialist

Erin Knowles is a communication specialist overseeing and growing the social media and digital strategy for the program. Before this, she worked to share information through social media and video as part of the IISG pollution prevention team.

Erin also brings a wealth of experience as a freelance writer and photographer to the social media position. She received a Master's degree in public health from Boston University.

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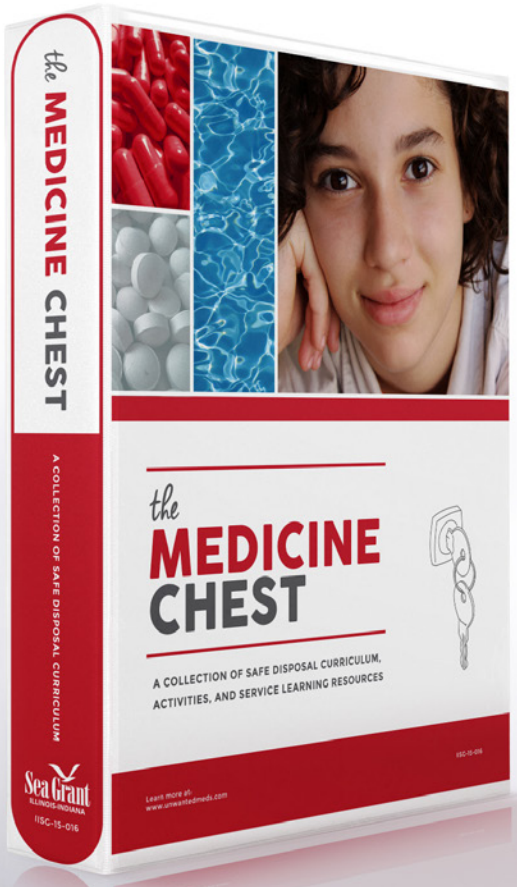
Illinois-Indiana Sea Grant is one of more than 30 programs of the National Sea Grant College Program created by Congress in 1966. Sea Grant is a partnership of universities, government, business, and industry that addresses marine and Great Lakes needs to enhance sustainable coastal economic development. Funding is provided by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA Grant # NA140AR4170095), Office of Sea Grant, University of Illinois at Urbana-Champaign, and Purdue University. The University of Illinois and Purdue University offer equal opportunities in programs and employment.



The Medicine Chest has a new look and new lessons

A new version of *The Medicine Chest* is now available. This award-winning curriculum introduces students to the issues of medicine disposal through a variety of disciplines.

The Medicine Chest offers activities on issues surrounding pharmaceuticals and personal care products disposal and incorporates a variety of educational approaches, including the flipped classroom method, for instructing high school-level students. It also introduces students to a variety of careers related to pharmaceuticals and personal care products.

"Through the multifaceted service-learning program presented in *The Medicine Chest*, students will be empowered to take action," said Kristen Hope Walker, IISG environmental educator. "This can serve as a catalyst to help communities reduce the impacts from improper storage, use, and disposal of pharmaceuticals."

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