News and Information from the Illinois-Indiana Sea Grant College Program Fall 2000

Predicting Urban Sprawl in Top 20 U.S. Coastal Cities

When someone is described as being "sprawled out" it usually means that he/she is taking up more than his/her fair share of the couch. Today the word sprawl is used to describe another kind of inequity. "Urban sprawl", the conversion of acres of farmland into acres of outlet malls, parking lots and other urban uses, although economically exciting, is environmentally frightening.

Population growth + Land Use

Daniel McGrath, Coastal Business and Environment Specialist for Illinois-Indiana Sea Grant and a Fellow at the University of Illinois at Chicago's Great Cities Institute has been studying the urban sprawl patterns of the top 20 coastal metropolitan regions ranked by population. Using population statistics from the 1990 U.S. Census and urban land area data from the past five decades, McGrath has arrived at a forecast for the year 2025. Assuming the current trends in average population density and land use continue, the forecast doesn't look good.

McGrath predicts, "Given that the nation's top 20 oceanic and Great Lakes coastal metropoli-

tan regions are likely to increase their population by an additional 32 million people, by the year 2025 the 'urban footprints' of these 20 regions are likely to expand by 46%, or from about 20,000 square miles to about 29,000 square miles." That's an additional 9,000 square miles, or about 5.8 million acres, of land that today is either agricultural land or open space. For comparison, this increase in land area is roughly equivalent to the current total combined urban land areas of the New York, Boston, Chicago, Los Angeles, and San Francisco metropolitan regions.

And, the reality of urban sprawl over the next 25 years is even worse since Portland and Los Angeles were excluded from McGrath's final forecast. These two cities have factors which make their future difficult to predict. "Portland has a tight urban growth boundary in order to limit development," says McGrath, "and Los Angeles has the physical barrier of the mountains as well as restrictions on land development which put endangered species at risk." It's also important to note that McGrath's forecast does not include the nearly 100 smaller coastal metropolitan regions currently experiencing a boom in growth as well, nor does it include the many large, non-coastal cities in the U.S. like Atlanta, Denver, and Nashville, for example.

Urbanized Area	Est. 2000 Land Area in sq. miles	2025 Land Area Forecast	Change 2000 to 2025	Percent Change 2000 - 2025	
New York	3,280	4,043	763	23.3%	
Los Angeles	2,155	3,587*	???*	???	
Chicago	1,766	2,460	695	39.3%	
Detroit	1,238	1,549	311	25.1%	
Washington	1,027	1,706	679	66.1%	
San Francisco-Oakland	973	1,596	624	64.1%	
Houston	1,403	2,020	617	43.9%	
Boston	994	1,272	279	28.0%	
San Diego	818	1,433	615	75.2%	
Baltimore	708	1,111	402	56.8%	
Cleveland	650	985	335	51.6%	
Tampa-St. Petersburg	803	1,382	579	72.1%	
Seattle	712	1,306	594	83.4%	
Miami	399	912	513	128.6%	
Portland	449	976*	???*	???	
Norfolk	937	1,732	795	84.9%	
Milwaukee	546	833	287	52.5%	
New Orleans	284	582	298	104.8%	
Fort Lauderdale	384	831	446	116.2%	
Buffalo	323	571	248	76.7%	
Total	19,850	30,889	9,079	45.7%	
*Current limitations to growth make forecasting future urban land area difficult					
continued on page 6					

Inside This Issue

Research in Review3
Open House Boat 4 & 5
Graduate Fellowships9
Publications Order Form11

Angela Archer joined

IISG in the Spring of

2000. She is assisting

Angie began working

on AquaNIC with Dr.

LaDon Swann at Purdue

University in the fall of

1999. While working

in the growth of the IISG

Web site and Web projects.





Phillip E. Pope

Letter from the Director

Discovery, knowledge, and engagement are hallmarks of the Illinois-Indiana Sea Grant College Program. Our Program continues to focus its efforts on the issues facing the people, resources, and economics of southern Lake Michigan. Through its partnerships with universities, state and local governments, businesses, industries, federal agencies, other Sea Grant Programs, and citizen groups, Illinois-Indiana Sea Grant contributes to the wise use and

sustainability of our coastal resources. During the past year alone, our Program has supported activities and projects to re-establish sustainable populations of yellow perch in Lake Michigan, to define characteristics of aquatic nuisance species that result in their success in Lake Michigan and to reduce their rate of spread, to improve the water quality of the Lake, and to restore degraded wetlands. The results of these efforts contribute positively to the regional economy and the health and quality of life for the citizens of Illinois and Indiana.

Illinois-Indiana Sea Grant staff engage a wide array of constituents to input on issues and to provide information and learning opportunities. A few highlights of our outreach and education activities include:IISG works with the Indiana E. coli Task Force to reduce the contamination of Lake Michigan waters, thereby reducing the number of beach closures. The Program joined with the Water Supply Task Force for the Northeastern Illinois Planning Commission to identify key water supply issues for the region and recommend solutions. Other activities included participating in writing the final Illinois State Comprehensive Management Plan for Aquatic Nuisance Species and organizing a state-wide land use educational program for land use planners and municipal officials in Indiana.

Additionally, the issue of the HELM describes some of the educational activities - teacher education, K-12 education, and graduate education and fellowships - for which Illinois-Indiana Sea Grant and its staff have been recognized. Needless to say, our Program is particularly proud of its educational efforts.

Illinois-Indiana Sea Grant is continually evolving in its programming. New priorities for the National Sea Grant Program are relevant in southern Lake Michigan. Illinois-Indiana Sea Grant is ready to adapt them to address local issues. National priorities of local interest include ports and harbors, coastal community development, recreation and tourism, and land use and sustainable development. In the coming months, we will be working with you, our constituents, to define and develop local area interests that fit within these broad national priorities.

illip & tope

Debra Levey Larson, Managing Editor Robin Goettel, Copy Editor Susan White, Publications Larry Ecker, Graphic Designer Rod Roberts, Designer/Layout

Printed on Recycled Paper





Illinois-Indiana Sea Grant is one of 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 #NA86RG0048), Office of Sea Grant, Purdue University, West Lafayette, Indiana, and the University of Illinois at Urbana-Champaign. Purdue University and the University of Illinois offer equal opportunities in programs and employment.

New Employees



Angela Archer

with AquaNIC, Angie assisted in the creation of an online aquaculture course.



Bob McCormick has over 20 years of experience with Purdue Extension Service, most recently as Extension Director in Howard County, IN. His work for Sea Grant will include serving as Statewide Coordinator of the Planning with

Bob McCormick

POWER (Protecting Our Water and Environmental Resources) Project, which is an educational effort linking the impacts of land use decisions on water quality. He will also be dealing with nonpoint pollution education of municipal officials.



Lisa Merrifield

previously worked as Executive Director of the Great Lakes Regional Pollution Prevention Roundtable at the Illinois Waste Management and Research Center. She is a Visiting Program Specialist and will be assisting

Lisa Merrifield

Rip Sparks in coordinating the research program of Illinois-Indiana Sea Grant. See her update on Joseph T. Hupp's research on page 3.



Research in Review

New Tools for Water Quality Testing by Lisa Merrifield

The availability of inexpensive and easy-to-use tools for the evaluation of water pollutants is an important first step in elimination of water quality problems in the Great Lakes. In a two-year study funded by the Illinois-Indiana Sea Grant College Program, researcher Joseph T. Hupp of Northwestern University investigated molecular recognition based sensing tools designed to classify water pollutants common in area waterways. "Successful sensor development could facilitate Lake Michigan remediation, compliance, and water-quality assessment efforts by providing simple, quantitative, chemically specific measures of critical and emerging pollutants, including non-point-source pollutants," Hupp says.

In this study, Hupp first evaluated currently available testing materials used to detect toxic agents that can cause cancer and other problems. These testing materials showed distinctions between small organic molecules of almost identical size and chemical properties.

Hupp then worked to improve upon these materials by developing a new family of sensors based on different chemical principles and a medium in which the sensors can be used. The new sensors are able to detect chemicals at even lower concentrations and will differentiate between them even more accurately than those currently available.

Just as litmus paper has proven to be a valuable testing material to determine acidity, it is hoped that the successful development of these new sensing materials will help provide more rapid and definitive water quality testing and thus better water quality.

Program Development Projects Funded by Illinois-Indiana Sea Grant

Illinois-Indiana Sea Grant has limited discretionary funds to support the development of promising research and outreach projects. The following program development projects were recently selected for funding:

"The Influence of Zebra Mussels on the Benthic Species Diversity in a Southern Lake Michigan Harbor"

Joseph Camp, Purdue University North Central

"Programming and Interpretation Planning for the Indian Ridge Marsh Environmental Center" Suzanne Malec, Chicago Department of Environment

"Outreach and Education about the Great Lakes Using a Research Vessel in a College Course" Kelly Tzoumis, Roosevelt University (see article on pages 4 & 5)

"Development of Rapid Bioassays for Measuring PCBs and Toxicity Equivalence Factor in Fish Tissue" Charles Santerre, Purdue University

"Determination of the Effects of Culture Temperature on Growth, Survival and Biochemical Composition of Largemouth Bass (*Micropterus salmoides*)"

James Tidwell, Kentucky State University

Spring 2000 Environmental Challenge Fund Awards

Mt. Tom Dune Stabilization and Vegetative Restoration Project, Friends of Indiana Dunes

Accelerate Habitat Restoration through Increased Seed Collection, Friends of Indiana Dunes, Inc.

Oak Savanna Restoration at Woodland Park, Portage Park and Recreation Department

Liberty Elementary Restoration Project, Liberty Elementary School in Chesterton, IN

France Park Prairie, Cass County Parks and Recreation Department

Hanna B. Walker Ditch Project, Tippecanoe Environmental Lake and Watershed Foundation

Illinois-Indiana Sea Grant and NiSource co-sponsor a number of Environmental Challenge Fund Awards each year. Not-for-profit organizations engaged in environmental restoration efforts are eligible for the grant funds. For application information, contact Karen McKeown of NiSource 219-647-5246.



™HČLM

All Hands (and eyes) on Deck!

by Robin Goettel



Illinois-Indiana Sea Grant sponsored several public open houses of the W.G. Jackson which was docked at Chicago's Navy Pier from July 25-29. This research vessel is operated by Grand Valley State University in Muskegon, MI, which travels throughout the Great Lakes. Illinois-Indiana Sea Grant funded the stop in Chicago in cooperation with Roosevelt University.

For five days, Chicago-area residents and visitors got a taste of what it's like to work on a Lake Michigan research vessel. They were face to face with a round goby feasting on zebra mussels, (both Great Lakes invaders). They witnessed a larval zebra mussel, or veliger. They handled a preserved sea lamprey—that eel-like creature which can suck the life out of its prey with its sharp teeth. They learned how different types of water monitoring equipment are used to test for such characteristics as pH and turbidity levels.

At the July open house, Janet Vail, senior program manager at the Annis Water Resources Institute at Grand Valley State University welcomed people as they boarded the vessel and encouraged them to take a hands-on look at the laboratory specimens and apparatus. Sea Grant outreach staff answered

visitor questions, shared useful Web sites, and provided handouts on water quality issues and information for boaters on how to prevent the spread of aquatic nuisance species.

Although the weather was occasionally threatening, the hail and strong winds didn't stop more than 300 visitors from coming on board to learn about important water issues in Lake Michigan-issues such as exotic species and toxic contaminants. Christina Somlo, a 13 year old visitor from Urbana, Illinois, remarked, "it was awesome to see all the water testing equipment on the boat to study the stuff that's out there on Lake Michigan." She said, "I had never really heard about zebra mussels before. I thought that animals were usually good and hadn't realized that people

were actually against some species. After learning about them today I realized that these animals really do cause lots of problems for other fish in the lake and for people, too."



Inside the boat, young visitors view live and preserved non-native species.



Roosevelt Students On Board the W. G. Jackson

A new perspective on the resources and issues related to Lake Michigan and a well rounded understanding of the lake's ecosystem were key benefits for the 13 students who participated in Roosevelt University's summer course on board the W.G. Jackson.

Kelly Tzoumis, associate professor of public administration and Vicky McKinley, associate professor of biology taught a 6-week summer course about the Great Lakes to Roosevelt University students. The course gave them a better appreciation for Lake Michigan's attributes and problems.

These students represented a wide range of disciplines including biology, chemistry, environmental science, public administration, education, and environmental policy. Tzoumis said, "This multi-disciplinary approach to learning is important to understand how we can best manage our natural resources." She explained that the biology and chemistry students will be able to apply their new knowledge to real world situations, while the education and policy students will be able to communicate better about the scientific aspects of the lake.

"The main benefit of this intensive hands-on course," said McKinley, "is that students understand the holistic patterns of the whole watershed–getting a clear idea of how everything in the ecosystem ties together." McKinley said that it is not enough anymore to have a distinct piece of knowledge. "Government and industry is looking for future employees who have the big picture, rather than ones who are narrowly trained in one specific area," she added.

What's in the future for Roosevelt's Lake Michigan teaching program? McKinley hopes to expand their program and develop curricula for various grade levels, beginning with high school. This year, a dozen enthusiastic students and teachers from Harlan High School in Chicago experienced Lake Michigan from the research vessel Jackson. "If we can get funding for vessels, then we would work with Chicago-area schools to provide interactive experiences for students taught by our College of Education and our Science faculty."



Chemistry student, Steve Bridges looks for benthic animals in a sediment grab sample brought up from the bottom of Lake Michigan.





Urban Sprawl continued from page 1

We can live further from work, and get there faster! Increases in real income (that is, income which has been adjusted for inflation) and advances in the technology of transportation over this past century are major factors contributing to urban sprawl, according to McGrath. On average since 1950, U.S. coastal cities are 100% larger than they would have been if there had been no changes in real wealth and transportation technology that determine urban land area. Put another way, since 1950, nearly half of urban land area growth has been determined by technology factors rather than by population.

"We've spread out further, continuing to make the trade-offs between urban amenities and the cheaper land that suburban locations provide because we have had the means to do so-both in terms of wealth and technology," says McGrath. Stated simply: people want to live and work in or near cities; and, because of better, faster transportation options today, people can continue to demand semi-rural residential locations while still maintaining a reasonable commute-time to work.

McGrath fears that even a comprehensive strategy is unlikely to make a dent in the wave of urbanization facing U.S. metropolitan regions. "The private development industry will likely continue to take advantage of cheaper land opportunities at the urban fringe as it has since World War II," continues McGrath, "subsequently putting more farmland and open space at risk."

Changing the Forecast

Although the future may look somewhat cloudy for these coastal communities, McGrath adds that there are efforts being made to change the forecast, "In order to help coastal communities deal with these pressing problems, National Sea Grant College Program has developed study groups focusing on coastal communities and economies, and urban coasts. Initiatives are being developed in coastal community development, ports and harbors, and a legal program. These new initiatives will focus Sea Grant research and outreach throughout the Sea Grant network."

But McGrath doesn't sugar coat the future either. He says that if an effort to change this trend in urban sprawl does not happen soon, our metropolitan regions will continue to fight to fix the problems imposed by unbalanced, market-driven urbanization after the fact and we'll wind up losing our natural capital and species diversity forever. McGrath concludes, "If cities continue to sell land to the highest bidder and undervalue our natural capital, they'll always be trying to solve problems post-mortem." Maybe at that point, we won't even have a "couch" to sprawl on.

For more information contact:



Daniel McGrath, Coastal Business and Environment Specialist for Illinois-Indiana Sea Grant at 312-355-1276, or visit the Illinois-Indiana Web site at iisgcp.org

Swann's Swan Song

This past May, Illinois-Indiana Sea Grant said farewell to Aquaculture Extension Specialist, LaDon Swann. Swann was with IISG for almost eleven years. He is now located at the Dauphin Island Sea Lab on Dauphin Island, Alabama. He serves as both the Associate Director for the Mississippi-Alabama Sea Grant Consortium and as shellfish researcher for Auburn University.

About his years with Illinois-Indiana Sea Grant, Swann said that he views his work on the AquaNIC Web site as one of his most important accomplishments.

Contact information:

LaDon Swann, Associate Director Mississippi-Alabama Sea Grant Consortium Auburn University Department of Fisheries & Allied Aquacultures Dauphin Island Sea Lab 101 Bienville Boulevard P.O. Box 369-370 Dauphin Island, AL 36582

lswann@acesag.auburn.edu 334-861-7544



Exotic Species Day Camp Wins Award

The idea began with an observation. Robin Goettel, Communications Coordinator for Illinois Indiana Sea Grant noticed that collectively the Great Lakes Sea Grant Network had a wealth of educational resources on aquatic exotic species, but no plan for how to share these materials on a regional level. Goettel began to fill that need by working with five other Great Lakes Sea Grant Programs (Michigan, Minnesota, New York, Ohio and Wisconsin) to develop workshops called "Exotic Species Day Camps" which trained teachers in the use of a collection of materials, submitted by all six Sea Grant Programs.

At the Great Lakes Sea Grant Network meeting in April 2000, Robin Goettel, Communications Coordinator, was presented with the "Outstanding Program Award" for her leadership on the Exotic Species Day Camp.

The training sessions included eight resources: two hands-on education kits, a Web site, a zebra mussel monitoring kit, purple loosestrife lesson plans, a Great Lakes activity guide, a Great Lakes CD-ROM, and an audiovisual training package on zebra mussels.

"Doug Jensen in Minnesota suggested we call the training sessions day camps," Goettel explained, " to underscore the intention that they be fun, interactive, and would take teachers outdoors for some up-close observation of exotic species in their natural habitats." The day camps were held at the John G. Shedd Aquarium in Chicago, the Aquarium of Niagara in New York, Belle Isle Zoo and Aquarium in Detroit, the Center of Science and Industry in Toledo, and at the University of Minnesota in Duluth. Ginny Figura, a teacher who attended one of the day camps wrote the following about a teacher-developed lesson on the spread of zebra mussels, "I saw an instant application of the lesson to the diffusion of diseases. I just concluded the lesson with my 6th grade science classes and it was extremely effective. We 'infected' the whole school. I maintain a good lesson can be adapted to other disciplines and this one certainly did."

Although the day camps themselves are completed, Goettel says that, "...they have been reshaped to reach a new geography teacher audience in the Exotic Aquatics On the Move project. What will live on is the huge compendium of classroom activities that was developed by Day Camp participants. There are now 34 activities bundled under the title, *ESCAPE*, in many different disciplines– science, math, social studies, language arts and cultural arts–but all focusing on exotic aquatics."

Congratulations to Robin Goettel for her vision and leadership on the Exotic Species Day Camp project.

For more information about these and other classroom activities contact Robin at, 217-333-9448, goettel@uiuc.edu



Robin Goettel holds her "Outstanding Program Award" for her work on the Exotic Species Day Camp at the Great Lakes Network meeting, April '99 in Milwaukee.







Knauss Fellow Updates

The Knauss Fellowship was established by Congress in 1979 to give highly qualified graduate students who are enrolled in marine or Great Lakes studies a unique one-year educational experience. Each of the 30 Sea Grant programs can nominate up to five students each year. The final selections are made competitively from those nominated. They are then matched with hosts in the federal, legislative or executive branch or in appropriate associations and institutions.

Adrienne Froelich was named Knauss Fellow for the year 2000. She is currently working in Senator Ron Wyden's office (D-Oregon) on the groundfish crisis and salmon issues.

Jeff Stein-"River Guy"

As a 1998 Knauss Fellow, Jeff Stein worked in the office of Rep. Ron Kind (D-WI) and was responsible for coordinating and staffing the Upper Mississippi River Taskforce. During his fellowship, Stein had frequent interaction with staffers from American Rivers who visited Rep. Kind's Office to work on developing changes to a primary habitat restoration project.

At the end of his fellowship, and with a Master's degree in Natural Resources, Ecology and Conservation Biology from the University of Illinois at Urbana-Champaign, the possibility of working for American Rivers and moving back to the Midwest meshed into an excellent career opportunity. Now, 18 months after the end of his fellowship, Stein is still working to protect and restore rivers. He is the Mississippi River Regional Representative for American Rivers and is located in Davenport, Iowa. Currently, as the Regional Representative, he is working to influence and create pieces of legislation to support a basin-wide water quality monitoring project, water habitat restoration work, and also is involved in coordinating activities with other organizations to complete land acquisition to protect floodplain lands on the Upper Mississippi.

Stein credits his fellowship experience as providing the opportunity to make a number of contacts and connections in Washington DC, learning "how the system works" and navigating red tape. This all comes in handy when it comes time for lobbying Congress.

Ed Buckner–"Taking Capitol Hill to the Classroom"

Following in Jeff Stein's footsteps, Ed Buckner also served in 1999 as the Fellow in Rep. Kind's Office. Currently, Buckner has returned to Purdue University, Department of Forestry and Natural Resources to finish his doctorate in natural resource policy. His research evaluates alternative vegetative filterstrips for use in agricultural ecosystems. He anticipates graduating in December 2000.

Buckner hopes to obtain a job in academia, specifically in natural resource policy. As a Knauss Fellow, he gained valuable experience working with policy-makers in drafting relevant natural resource policy and insight into how the legislative branch actually works. Buckner states, "All in all, it opened up my eyes to see the opportunities that exist both on Capitol Hill and the federal agencies. Also, I learned how academicians interact with policy-makers." In his future career, perhaps given his exposure to the process, Buckner hopes he'll be well equipped to teach students about the process.

Holly Koehler — "The Perfect Job"

After receiving her Master's degree from Indiana University, Holly Koehler, a 1999 Knauss Fellow, worked in the Office of Marine Conservation at the United States Department of State. Koehler now has a position as a Foreign Affairs Officer in the Office of Marine Conservation. In her new position, Koehler works on many of the same issues she did as a Knauss Fellow, including sea turtle conservation and interaction with commercial fisheries, Pacific highly migratory fisheries (e.g., tunas), ship-generated marine debris (such as derelict fishing nets and gear), and United Nations meetings and treaties.

"The work I do is exciting," Koehler said, "and I feel that I am making a difference, albeit sometimes in small ways, but nonetheless making a difference in the state of our world's fisheries and living marine resources. And in doing this, I get to work and travel with some of the most committed and hardworking people I have ever met." As far as Koehler is concerned, she has landed "The Perfect Job."





Graduate Fellowships Awarded

For the 2000-2001 academic year, Illinois-Indiana Sea Grant has awarded graduate fellowships to three students who are involved with very different research projects, but each with an impact on Lake Michigan. The three recipients were selected because of their outstanding academic records and because the focus of their individual research projects directly relates to issues of concern to Illinois-Indiana Sea Grant.



Brian Graeb



Glenn Sandiford



Argyilan measuring the water level in the East Branch of the DuPage River.

Brian Graeb, a graduate student in the Department of Natural Resources and Environmental Sciences at the University of Illinois at Urbana-Champaign, is investigating the possible reasons for the declining yellow perch population in Lake Michigan. Graeb will conduct a series of laboratory experiments at the Lake Michigan Biological Station designed to determine how zooplankton density affects yellow perch growth. This study is of particular interest due to the recently discovered presence of *Cercopagis pengoi*, commonly called the fishhook flea, and its potential for adversely affecting the food web of Lake Michigan.

Glenn Sandiford, a Ph.D. candidate in the Urban and Regional Planning Department at the University of Illinois at Urbana-Champaign, is studying the history of the introduction of the German Carp. German Carp is a non-native fish which was transplanted in the United States during 1870-1900 in an attempt to restore the nation's declining fisheries. Studying the history of the introduction of non-native species can help in decision-making for future introductions.

Erin Argyilan, a Master's degree candidate at the University of Illinois at Chicago's Department of Earth and Environmental Sciences, is studying the effects of climate and land-use on the fluctuating levels of Lake Michigan-Huron since the year 1860. During the past 35 years, Lake Michigan-Huron lake levels have changed dramatically with a historic high in 1987 to a present level that is approaching the record low which was set in1965. Argyilan will attempt to better quantify the effects of precipitation, evaporation and runoff on lake levels.

Judith Coffman Thomas of Indiana University's Department of Geological Sciences was awarded the first IISG Graduate Fellowship in 1999. In her two-year fellowship, Thomas is investigating *E. coli* contaminated streamflow in the southern Lake Michigan watershed.

Illinois-Indiana Sea Grant intends to award additional graduate fellowships next spring. For more information contact: Michele Browna, Program Manager, 765-496-3722, <u>michele@fnr.purdue.edu</u> or visit iisgcp.org

Geography Teachers on the Move at Exotics Workshop

Watching beetles devour leaves of the purple loosestrife plant

Trying to get the most points in the exotic species knowledge game, Rival for Survival

Holding clusters of zebra mussels just pulled up from an Indiana boat landing

Playing Beat the Barriers: A Lamprey board game



Teachers from IL, IN, and WI plot the location of zebra mussels where they first entered the Great Lakes system. They also used data tables to determine how far and wide these invaders have spread.

These are just some examples of the hands-on fun and learning that kept 25 teachers actively involved at "Exotic Aquatics on the Move" workshop on June 27-28 at the Indiana Dunes State Park Nature Center in Chesterton. Indiana. The workshop was offered through a partnership with Geography Educators' Network of Indiana. This session, presented by project coordinator, Robin Goettel and project assistant, Valerie Eichman, helped teachers acquaint themselves with a variety of exotic species-from the beaver-like nutria invading Louisiana wetlands to green crabs making their way up the Pacific coast to the highly adaptive zebra mussels and purple loosestrife that are quickly spreading throughout much of the U.S.

10

"It was exciting to share Sea Grant's information on these invaders with a new audience–primarily geography and social studies teachers," said Goettel. "We focused on exotic aquatic origins, distribution, movement, consequences and solutions–all topics that relate to the subject of geography and tie to national education standards."

The participants were grateful to receive armloads of classroom resource information in the "big green binder" and numerous maps and posters featuring exotic aquatics. Teacher comments included:

"I am very excited to teach about exotics and my mind is just spinning with new ideas."

"I will now use exotic species as a way to explain how geography connects the world."

"I think it is important to make students aware of the [exotic species] problem. I also will utilize this information for a school wide bulletin about geography." The participants have already used what they learned in the workshop to prepare seven new geography-based lessons on these exotic creatures. These lessons link the environmental issue and introduced species, with geographic concepts. Sample activities include Acuáticos Exóticus— a purple loosestrife play in Spanish, a zebra mussel hunt in your local waterway, America's Most Unwanted–a student poster project, and The Purple Problem–A mapping lesson involving problem solving.

"I am thrilled with the quality of the lessons we have already received," said Goettel, "and look forward to the next phase of this project where our teachers will guide their students in creating community awareness projects. We hope these service projects will help students become environmental stewards who can make informed decisions about their world."

This project was funded through a National Strategic Initiative grant from the National Sea Grant College Program, NOAA, U.S. Dept. of Commerce. Project partners for this national project include Sea Grant programs in Louisiana, Minnesota, New York, Ohio and Washington.



Great Lakes Fishes Poster

☐ Marine Science Careers

Getting Started in Freshwater Aquaculture





□ Free Recipe Offer

Coming soon-

Exotic Species Compendium of Activities to Protect the Ecosystem (ESCAPE) is a collection of activities developed from the Exotic Species Day Camp Project for Educators. This package includes user-friendly sets of lessons that incorporate experiments, art, music and games. For use by educators of grades K-12. For more information contact: Robin Goettel at 217-333-9448 or goettel@uiuc.edu

		_
President Contraction of the Con	Beat the Barriers	7
	J. J	- -
		ζ

Please return a copy of this entire form along with a check or money order made payable to University of Illinois, Illinois-Indiana Sea Grant Publications, Attention: Cyndi Moore, 1917 S. Wright St., Champaign, IL 61820, or call 1-800-345-6087 or fax 217-333-3917

Visa/Master Card (circle one)		
Card #	Subtotal:	
Exp. Date:	Shipping:	
Signature:	Total:	
Ship to:		
Name:		
Business/Organization:	SHIPPING RATES	
Address:	\$4.99 and under add \$2.50 \$5.00-\$19.99 add \$3.50 \$20.00-\$99.99add \$6.50	
City/State/Zip:		
Phone:	for each additional \$100.00 add \$3.50*	
E-mail:	*includes insurance	



Happenings & Education around Lake Michigan (*The HELM*), reports on Illinois-Indiana Sea Grant research, extension, education and other Lake Michigan issues and activities.

For a free subscription, program information or to send suggestions for articles or editorial correspondence write to us at the address above or contact **Debra Levey Larson at** 217-333-8055 dlarson@uiuc.edu

If reprinting this material, we ask that you give credit to *The HELM* and Illinois-Indiana Sea Grant and send us a courtesy copy.

Visit our Web site at: iisgcp.org

Illinois-Indiana Sea Grant College Program fosters the creation and stewardship of an enhanced and sustainable environment and economy along southern Lake Michigan and in the Great Lakes region through research, education, and outreach. Purdue University 1200 Forest Products Bldg. West Lafayette, IN 47907-1200 765-494-3573

Phillip E. Pope, director ppope@purdue.edu

Brian K. Miller, assistant director bmiller@purdue.edu

Michele Browna, program manager michele@fnr.purdue.edu

Research Coordinator

Richard E. Sparks University of Illinois 1101 West Peabody Dr., Room 278 Urbana, IL 61801-4723 217-333-0536

Aquaculture

Search underway

Water Quality

Leslie Dorworth Purdue University Calumet Dept. of Biology Hammond, IN 46323-2094 219-989-2726

Biological Resources

Patrice Charlebois Illinois Natural History Survey 400 17th Street Zion, IL 60099 847-872-0140

Coastal Business and Environment

Daniel McGrath University of Illinois at Chicago 412 South Peoria Street, Suite 400 Chicago, IL 60607-7067 312-355-1276

Communications/Youth Education

Robin Goettel University of Illinois 1301 West Gregory Dr. 63 Mumford Hall Urbana, IL 61801 217-333-9448

University of Illinois at Urbana-Champaign Illinois-Indiana Sea Grant College Program 63 Mumford Hall, MC-710 1301 West Gregory Drive Urbana, IL 61801 Non-Profit Organization U.S. Postage Paid Permit No. 75 Champaign, IL 61820