Illinois-Indiana Sea Grant College Program

Annual Report 2002

Sea Grant
Illinois - Indiana

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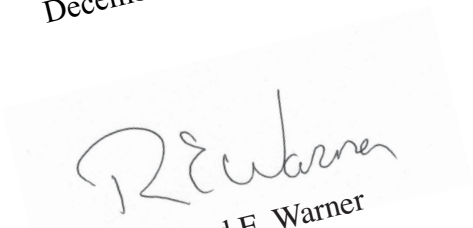
Contents

The Midwest is known for its rich agricultural fields as well as its thriving metropolitan regions, both of which provide valuable resources for the nation and the world. Not coincidentally, this region also sits along some of the most important waterways in the U.S.—the Great Lakes, and the Illinois and Mississippi Rivers which ultimately reach the Atlantic Ocean and the Gulf of Mexico. Ensuring the health and vitality of the region as well as the nation as a whole depends quite heavily on maintaining the health and vitality of these waters.

Illinois-Indiana Sea Grant plays a vital role in this process. The mission of the Illinois-Indiana Sea Grant College Program is to foster 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.

Our program is geared towards measurable impacts, many of which are noted in these pages. This report describes important developments and accomplishments associated with the Illinois-Indiana Sea Grant College Program from January 1, 2002 through December 31, 2002.



Richard E. Warner
Director

Illinois-Indiana Sea Grant College Program 2002 Annual Report

New Program Administrator

Dr. Richard E. Warner, formerly assistant dean of the College of Agricultural, Consumer and Environmental Sciences in the University of Illinois at Urbana-Champaign was named the new director of Illinois-Indiana Sea Grant. At this time, the director's position was elevated to a full-time appointment. Warner also serves as the associate vice chancellor for research at the University of Illinois, and Sea Grant (IISG) is positioned in the Office of the Vice Chancellor for Research. As these changes have unfolded, the host institutions have also elevated the Program's reporting lines within the campus administrative standards.

Administration of the outreach functions of the program was centered at Purdue University; Dr. Brian Miller, the IISG associate director, reports to the director of Purdue University Cooperative Extension Service.

Outreach Overview

The outreach functional area had many notable achievements in 2001-2002. Program staff focused on increasing media relations efforts, improving marketing, and improving Internet access to program materials. The radio campaign is one good example. Its goal was to reach large numbers of people with key information about critical environmental concerns in the southern Lake Michigan region. By raising awareness of these issues, we aimed to help the public make informed decisions either in personal actions or support for public policy. Another goal of the campaign was to raise awareness of Illinois-Indiana Sea Grant as a source of valuable and accurate information related to coastal concerns. To achieve these goals, we developed radio messages to air on major Chicago radio stations. Two radio messages were developed and broadcast in July on WLS-AM, a major Chicago area station, to raise awareness and provide information about coastal issues vital to the region. An estimated 250,000 people, over the course of two weeks, heard the latest information about *E.coli* outbreaks at the beach, and the potential for water shortages in the region. WGN, the top-rated AM radio station in Chicago, featured a third Sea Grant message about the impact of invasive species, on its popular show "The Great Outdoors," which has a target audience of anglers and boaters. The messages referred listeners to the Sea Grant Web page where they obtained additional easy-to-reach information.

The Illinois-Indiana Sea Grant College Program Web site continues to be improved and made more efficient for information retrieval through improved navigation and a more user-friendly Web page structure. Program Web sites reached scientists, students, aquaculture producers and natural resource managers around the world. There were 43,071 visitors from over 150 countries who downloaded 1,073,463 files in the 12-month period of October 1, 2001 through September 30, 2002.

One thousand (1,000) people learned about exotic aquatic species—identification, impacts, and preventative measures—through Sea Grant exhibits at the Field Museum in Chicago for the major event, "It's Wild in Chicago, 2002," the 2002 Illinois State Fair and Nature Week on Navy Pier. An outreach directory, *Making Waves,* continues to be distributed at public events and to water resource management agencies in Illinois and Indiana and to attendees of Sea Grant workshops.

In the past year, Sea Grant outreach staff members have been invited to, or continued to serve on a number of key committees that have an influence on policy. The water quality extension specialist serves on the Indiana *E. coli* Task Force, which is composed of 17 governmental agencies working together to solve the *E. coli* problem in southern Lake Michigan, and serves as chair of the task force's outreach committee.

The biological resources extension specialist has played a critical role in the establishment of key aquatic nuisance species (ANS) prevention tools at both the state and federal levels. Along with Richard Sparks, former research coordinator for IISG, she co-wrote the Illinois ANS Management Plan, which was submitted and approved for funding by the U.S. Fish and Wildlife Service (USFWS). Currently, she has a grant from the Illinois Department of Natural Resources for its implementation. Components of the plan include an ANS monitoring inventory, a rapid response plan, and outreach. For several years, she and Sparks have served as members of the Chicago Waterways Dispersal Barrier Advisory Committee. Their work on this committee has helped result in installation of an experimental fish barrier for the waterways. Their continued work on the committee should result in a more-permanent barrier designed to impede movement of a variety of organisms between the Great Lakes and Mississippi drainage basins.

The biological resources extension specialist has also directly impacted policy in Illinois. Her testimony for the City of Chicago's City Council on snakehead fish helped

spur the State to develop legislation banning the fish. This legislation is the first step towards developing an easily amended, State of Illinois prohibited species list. Her participation on a State committee examining the feasibility of regulating shippers entering Illinois waters of Lake Michigan resulted in the State's willingness to work with the shipping industry through education rather than regulation. (It has been determined that regulation of shippers on a regional level is preferable to individual state regulations.) Charlebois then developed a ballast water brochure for the Great Lakes shipping community, which is being distributed to each ship captain entering an Illinois port.

The coastal business and environment (CBE) extension specialist currently serves on the following agency committees and task forces, thus encouraging environmental and economic concerns to be considered and integrated into ongoing local and regional planning initiatives:

- The Environment and Natural Resources Work Group of the Northeastern Illinois Planning Commission's "Common Ground" regional planning process (a new planning initiative currently being undertaken by the Northeastern Illinois Planning Commission (NIPC) to develop a regional comprehensive plan by 2004). In addition, the CBE specialist also served on the Water Supply Task Force and Water Resources Advisory Committee that oversaw NIPC's recently adopted Strategic Water Resources Management Plan (2002).
- The Northwestern Indiana Regional Planning Commission's Governmental Regulations, Enhancement, and Coordination Watershed Technical Team for its EPA 319 Watershed Management Plan.
- The Natural Environment Work Group of the Chicago Metropolis 2020 Project of the Chicago Commercial Club. The Chicago Metropolis 2020 Project also published its regional trends report, *The 2020 Metropolis Index* (2002), which included many of the natural environmental indicators recommended by the CBE specialist.
- Sustainability Task Force of the Chicago Wilderness Biodiversity Project.
- Lake Calumet Ecological Plan Task Force of the City of Chicago's Department of Environment.

The CBE specialist is also involved in developing and evaluating environmental indicators for Environment Canada and the U.S. EPA, through his invited participation in the bi-national State of the Lakes Ecosystem Conference (SOLEC 2002). He was also the principal author for the Water Resources Policy Guide adopted by the Board of Directors, American Planning Association in April, 2002.

Outreach Achievements

The following outreach accomplishments, milestones and impacts have been achieved in our 4 thematic areas:

Aquaculture

Aquaculture Network Information Center (aquanic.org) was one of the first aquaculture Internet sites to deliver scientific information to aquaculture users, and was fostered by the program in 1994. It was established to be the "gateway" to the world's electronic aquaculture resources. AquaNIC is a one-stop source of aquaculture information, available 24 hours a day, to producers, educators and scientists.

Users of AquaNIC may:

- Participate in threaded discussion groups.
- View publications, newsletters, multimedia files, or calendars.
- Post jobs and resumes or search for viable candidates or leads.
- Share email addresses with people with similar interests.
- Search for other aquaculture Web sites or post their favorites.

A memorandum of agreement between NOAA and the USDA libraries was signed in 1999 making AquaNIC the primary aquaculture Web site for the AgNIC network project. Formal partnership agreements with 14 institutions will provide coordinated aquaculture information to users.

The growth of this site (2 million hits in 1998 to the present 9.7 million hits) and the contribution of the partners make AquaNIC useful to clients in Illinois and Indiana, as well around the world. The site has been accessed by users from over 160 countries and received 9.7 million hits last year.

In March of 2002, Sea Grant worked with the Indiana Aquaculture Association to convene a meeting of the association. This is the first time the association has met in over two years. A one-day educational workshop was organized to update producers on the latest regulations and technical information vital to their industry. Experts on hazard analysis and critical control points, farm loans and assistance, production strategies, marketing, feed formulations, and processing spent the day with these producers and helped them learn and understand developments in each of these areas. Producers were also provided an update on the latest research findings. This workshop not only provided a needed educational program

for the state's producers, but also served as a catalyst for the association to convene and strengthen their organizational structure.

Biological Resources

The history of exotic species in the Great Lakes is one of great ecological change at great financial cost. The modern Great Lakes are still threatened by new introductions as well as unrealized impacts from those species already in the basin. These threats also apply to inland waters in both Illinois and Indiana. The ecological and economical impacts of nonindigenous species can be reduced by helping water users understand the consequences of these invasions and teach them to take proactive steps toward preventing the spread of these species.

IISG's clientele that requires information on exotic species and Lake Michigan's fisheries is quite diverse. It includes youth educators, anglers, charter captains, lake associations, recreational boaters, and resource managers. In many cases, this clientele has no organizational affiliation, or is only loosely organized. For example, not all anglers belong to an angling group, and not all lake associations are active members of the state lake management association. In addition, the species of concern (both exotic species and sportfish species) are numerous. Given these factors, our outreach methods must be diverse to address the varying needs and types of clients.

Our goal is to educate targeted client groups about the actual and potential impacts of ANS on Lake Michigan and inland aquatic systems, and ways that these impacts can be attenuated. Through this approach, a higher number of recreational boaters and anglers will consciously avoid spreading ANS. A comprehensive education and monitoring program will be used routinely at inland lakes throughout both states to reduce the introduction and impacts of ANS. Outreach projects in place are designed to ensure that:

- Zebra mussels will neither spread as widely nor as quickly as models predict.
- Round gobies will not spread as widely as environmental conditions allow.
- Barriers to the dispersal of aquatic nuisance species will be installed and tested.
- Rate of exotic introductions into Illinois and Indiana waters will decline.

Outreach efforts in the biological resources thematic area have resulted in the following impacts:

- Actions by boaters now delay zebra mussel infestation of inland lakes by several decades, according to a model. This buys time to develop control methods and may save native mussels in hundreds of miles of streams and rivers.
- Economic impacts of exotic species on industry and recreational water users have been reduced because: 1) industries have changed their zebra mussel control practices to be more effective and cost efficient, and 2) 25,000 boaters have obtained information on how to protect their boats and boat engines from zebra mussels.
- 64% of anglers in the Chicago metropolitan area can identify the round goby; more than 70% of recreational boaters and anglers reportedly take steps to prevent the spread of aquatic nuisance species.
- Youth in Indiana and Illinois are more informed about issues surrounding ANS (purple loosestrife in particular) and are more involved as environmental stewards working on solutions.

Participation in Regional and National Outreach Projects

Participation in two regional and national Sea Grant projects has brought Sea Grant aquatic nuisance species information to two new audiences – the bait industry and water gardeners. Illinois-Indiana Sea Grant has participated in development of a series of outreach tools aimed at the bait industry including a HACCP-like (Hazard Analysis and Critical Control Point) plan for bait wholesalers, a poster for retail outlets, and workshops for federal fish hatcheries teaching the principles of HACCP. A sticker for bait consumers (i.e., a bait bucket or tackle box sticker) was designed and developed; over 550,000 copies of this sticker are being distributed by bait shops and resource managers throughout the Great Lakes.

Illinois-Indiana Sea Grant is also organizing one USFWS regional workshop, and facilitating the adoption of the ANS-HACCP principles by state fish hatcheries. This project is important because the potential exists for ANS to spread to uninfested waters through the transport of aquacultured fish–bait minnows and fish for stocking. For example, ANS could be introduced with fish used to feed young muskie, or with water drawn from an inland lake and used in baitfish-rearing tanks. Regulations could be summarily imposed that would ban harvest of bait and other fishes from infested waters. However, this approach would also significantly impact the economy of the bait and aquaculture industry at the local, state, and regional levels. These risks of spreading ANS can be minimized by employing the HACCP approach. Through HACCP, protocols for harvest from infested waters, as well as education and training for those engaged in the bait and aquaculture industry have been developed. These efforts can greatly reduce the risk of spreading ANS from infested waters, reduce ANS impacts on operations, and avoid undo

regulations. The overall benefit of the HACCP project will be that the nation's baitfish and fish stocked into public waters will present a reduced risk of spreading ANS.

Illinois-Indiana Sea Grant also participated in a national outreach initiative on invasive aquatic plants—a new area of involvement for Sea Grant. As part of this initiative, the biological resources specialist worked with the aquatic plant industry to develop a brochure for water garden hobbyists entitled *Invasive Aquatic Plants: what every plant enthusiast needs to know* to inform them about the potential risk for ANS spread posed by backyard water garden plants. Over 35,000 of these brochures have been distributed nationally.

The introduction of aquatic plants outside their native ranges can represent one of the most severe examples of biological invasion, resulting in significant ecological and economic consequences. Unfortunately, introductions of highly invasive plants into aquatic and wetland habitats are increasing at an alarming rate around the Great Lakes and nationwide. This increase is due in large part to the rising demand for attractive exotic plants to use in aquaria and aquascaping, in particular water gardens. The means of introduction include the accidental escape of cultivated plants, the intentional release of aquarium contents by hobbyists, and the inadvertent containment of non-native plants (and other hitchhiking organisms such as snails and insects) in shipments of native plants. Once introduced and established, these invasive species can impact the environment by displacing native plants, which in turn reduces food and shelter for wildlife. These invasive species can impede human activity as well by blocking drainage pipes and impeding navigation. Their control can be quite costly. For example, the State of Florida spends over $14 million per year on control of one plant species (*Hydrilla*) alone.

Through the participation of eight Sea Grant programs, this project coordinated efforts at the state, regional, and national levels to 1) educate extension, regulatory and environmental agency field personnel about the threat and identification of the 22 most invasive and noxious aquatic plants in North America; 2) provide a stimulus for aquatic and wetland plant nursery and water garden industries to develop and cultivate desirable native species as alternatives to certain invasive, exotic pest plants; and 3) educate plant users (gardeners, professional landscapers, and other land management groups) about the dangers of invasive aquatic and wetland plants and about attractive native alternatives. The outreach products and research projects that developed have common threads and are complementary in nature, but address distinct audiences. Expected impacts from this project are that the largest retailer of ornamental aquatic plants will distribute this brochure, and that water gardeners in turn will take steps to reduce the risk of introduction and spread of ANS.

Coastal Business and Environment

The Illinois-Indiana urban corridor along southern Lake Michigan continues to grow and will rely heavily on the tremendous diversity of natural resources that Lake Michigan provides. Within the Chicago metropolitan region alone, the population is projected to grow by 1.5 million by 2020. Currently, more than six million visitors use the region's coastal lake resources each year for recreation, an area of nationally significant dune and swale wetland ecosystem fragments of extraordinary biodiversity. Accommodating the region's projected growth while protecting its fragile natural resources comprises a critical management challenge for government planners and decision makers.

According to the Northeastern Illinois Planning Commission's (NIPC) *Strategic Plan for Water Resources Management* (2002), the metropolitan region's projected growth will stress its water supply resources. Illinois is constrained by a U.S. Supreme Court decree from diverting more than 3,200 cubic feet per second from Lake Michigan, and has entered into a memorandum of understanding with the other Great Lakes states to not only maintain this diversion limit, but to also reduce Great Lakes water use even further over the next decade to make up for violating the limit in the past. Communities within the Chicago metro region continue to mine their deep aquifer system at unsustainable pumping rates, and some are already within 80 percent of the estimated sustainable yield of their localized shallow aquifers. These factors make water supply planning a priority issue in the region. Sustainable water supply management strategies must be considered and promoted in the region.

The region's projected growth also means that considerable planning is underway to guide this new development. NIPC is in the process of updating its comprehensive plan, and the private sector is placing increased emphasis on economic development and manpower planning to capture the economic opportunity that new development brings. The Commercial Club of Chicago, a business group that initially supported Daniel Burnham's famous 1909 plan for Chicago, has also been engaged in a regional planning process called Chicago Metropolis 2020 that will provide input into NIPC's regional planning process. The Northwestern Indiana Regional Planning Commission (NIRPC) is also engaged in a new regional planning process to protect the water quality of streams, rivers and lakes within the Lake Michigan basin from threats posed by new development, as part of its 319 watershed planning process. It is important that the Illinois-Indiana Sea Grant

College Program work with these public and private-sector groups to ensure that critical environmental and natural resources management issues are not ignored in these new planning initiatives, and to continue to work with non-profit environmental organizations to build a stronger constituency for these issues within these planning processes.

Water Resource Decision Making

To improve the scientific basis for water resources decision-making in the Chicago metro region, Coastal Business and Environment Extension Specialist Martin Jaffe and Debby Mir, a visiting Great Cities Institute Scholar, compiled and edited the proceedings of an Illinois-Indiana Sea Grant and Great Cities Institute conference, "Improved Decision-Making for Water Resources – the Key to Sustainable Development for Metropolitan Regions." These proceedings were published by IISG in 2002 (as Sea Grant Publication No. IISG-02-02) and posted on its Web site to ensure wider dissemination. Jaffe also co-authored, with Professor Odeh Al-Jayyousi of Jordan's Applied Science University, an article examining water resources modeling and sustainability, published in the *Journal of Environmental Planning and Management* 45(3): 309-322 (May, 2002).

As part of the Illinois-Indiana Sea Grant College Program's educational mission, the CBE specialist is also directing Rebecca Retzlaff, a doctoral student in the University of Illinois at Chicago, College of Urban Planning & Public Affairs. Retzlaff is assisting the CBE specialist in his research examining the use of economic incentives to promote water supply sustainability. Her IISG-funded research assistantship in the Great Cities Institute will help better define her dissertation research interests and provide valuable graduate research and public outreach training.

Balancing Land Use Change and Natural Resources

The newly released 2000 census shows that Indiana's population increased 9.7 percent from 1990 to 2000; however, this growth was not uniform. The fastest-growing areas increased by as much as 67 percent, with most of the growth sprawling on agricultural lands. Indiana ranks 38th in the nation in land area, but ranks second in prime farm land. Increased development and the resulting land use changes have a significant impact on water quality and water quantity. Sediment, nutrient loading, biological contamination (e.g. *E. coli*), toxins (including metals and oils from automobiles), and increased runoff rates can all result from development. As communities grow, local officials generally focus on the economic implications of growth (i.e., tax base, number of jobs, new housing starts, etc.) and pay little attention to water quality implications.

The *Planning With POWER* project brings together two successful, statewide educational and technical assistance projects as partners: the Purdue Extension Land Use Team—educators who assist local communities in land use planning; and the Conservation Partnership—composed of the Indiana Department of Natural Resources, the Natural Resources Conservation Service, Purdue Extension, and the Soil and Water Conservation Districts. In addition, the *Planning with POWER* project partners with the recently organized Indiana Land Resources Council.

The Planning with POWER project is currently housed within the Illinois-Indiana Sea Grant College Program in the Department of Forestry and Natural Resources at Purdue University, and is funded by Purdue Cooperative Extension Service and IISG. Initial funding came from an EPA 319 Grant.

Over the past two years, the *Planning with POWER* project has been developing and providing information about the impacts of increased development in watersheds. These impacts may include an increase in total water volume reaching streams and lakes due to improved drainage and an increase in impermeable surfaces. To date, a program brochure and six peer-reviewed extension publications have been created:

ID-255	Protecting Our Water and Environmental Resources Nonpoint Source Pollution
ID-256	A Threat To Our Waters
ID-257	Impacts of Development on Waterways
ID-258	Strategies for Coping With Runoff
ID-259	How to Get Started: Protecting Your Community From Polluted Runoff
ID-260	The Relationship Between Land Use Decisions and the Impacts on Our Water and Natural Resources

A Web site for the program has been established at www.planningwithpower.org and a professionally designed display explaining the program has been produced. To date, the *Planning with POWER* program has staffed displays at more than 25 events around the state reaching over 6,000 people. Advisory committee meetings are held regularly to obtain guidance on product development and to gain input on the structure of the project.

A 25-minute PowerPoint presentation was produced in cooperation with the advisory committee, Conservation Partnership and Cooperative Extension Land Use Team. Expert technical input was incorporated into a cohesive presentation that serves as the first educational program currently delivered at the county level to county commissioners, planning and zoning officials, and local officials. It has been presented in 23 Indiana counties, with 2 additional counties scheduled. Over 60 professional groups and agencies in Indiana and surrounding states have seen the presentation. This program is used in follow-up

presentations to larger stakeholder groups in counties desiring to move forward.

In addition to counties, professional organizations, and agency presentations, the *POWER* program was presented to 90 local officials at the Purdue Road School. Other presentations include: Indiana Land Resource Council, Indiana Rural Development Council, Governor's Conference on the Environment, Illinois Watershed Academy, Michigan State Extension Land Use Conference, Indiana Soil and Water Conservation State Conference, Gaining Ground Conference, and the Hoosier Environmental Council. Additional counties are continually expressing interest in the *Power* program presentation, averaging 2-3 per month.

Impacts

The *Planning with POWER* project has begun working closely with five communities on *POWER* goals and objectives.

In Hendricks County, local leadership organized a *Planning with POWER* Advisory Committee that meets monthly and advises the Hendricks County Plan Commission on incorporating natural resource protection into the comprehensive planning process. Currently, this group is helping to update and revise the subdivision control ordinances. In addition, the *POWER* group is developing a conservation design subdivision ordinance for the Hendricks County Plan Commission.

In Elkhart County, *Planning with POWER* has held several meetings to discuss natural resource protection and to help initiate a comprehensive land use plan update. The *POWER* project is also working with several watershed projects in Elkhart County to help them incorporate the results and findings into the land use planning goals for the future.

In Howard County, *Planning with POWER* has delivered several presentations including a Developers Workshop. The *Planning with POWER* coordinator serves on the Wildcat Creek Watershed Alliance Land Use Committee and is providing expertise on natural resource protection on an ongoing basis.

In Dearborn County, *Planning with POWER* has been working with the City of Aurora and Dearborn County officials on long-range planning. The *POWER* project helped to plan a Hillside Slippage Workshop for developers, builders, and other local officials in collaboration with the Indiana Land Resources Council and the local Soil and Water Conservation District.

In Putnam County, *Planning with POWER* has been working closely with a Putnam County Farm Land Preservation group and more recently with the Indiana Land Use Consortium on a community workshop on land use and the environment. The *POWER* project presented information on water quality status and county officials are currently discussing updating the comprehensive plan as well as other GIS initiatives.

The *Planning with POWER* project is also working closely with the recently formed Indiana Land Resources Council (composed of appointees by the Governor and chaired by the Lt. Governor of Indiana) on balancing growth and development with natural resource protection across the state as they work with local communities. The *Planning with POWER* project has been asked by the Indiana Land Resources Council to provide assistance and guidance to their first pilot community. The needs of local land use decision-makers will be assessed and resources will be developed and assistance provided to communities facing the challenges of balancing growth and protection of their vital and critical natural resource base.

Planning for Regional Natural Resources into the Future

The land surrounding southern Lake Michigan is highly developed and continues to be a very fast-growing area. This area includes three counties in northwest Indiana, six counties in northeastern Illinois, and seven counties in southeastern Wisconsin, with an estimated 2000 Census population of 11 million people. Existing development and future growth in this area will have impacts on Great Lakes environmental and coastal resources. If coastal resources are to be managed sustainably in this region, consideration for them must be included in the region's developing growth plans. Planning for this multi-state area is conducted by four regional planning organizations serving the Gary-Chicago-Milwaukee corridor: the Chicago Area Transportation Study, NIPC, NIRPC, and the Southeastern Wisconsin Regional Planning Commission. Prior to this project, these four organizations operated independently, did not plan for the region as a whole, and made few provisions for natural resources in future growth plans.

Funding was provided to the NIPC to convene these four planning agencies to initiate a process to improve communication and coordination of planning activities. Initial meetings were held with the executive directors of the four regional planning organizations to develop a course of action. This was the beginning of a regular dialog between these four organizations. In a July 2001 conference, the board leadership from each of these organizations was brought together. They gained an

improved understanding of the growth and development issues affecting all of their jurisdictions, as well as Lake Michigan. These leaders reached agreement on a "regional accord," in which the organizations commit themselves to increased communication, cooperation, and collaboration with each other on interstate planning issues. The Wingspread Accord was publicly sign in Chicago in the Spring 2002. A work plan was developed and initiated by these four agencies. It undertakes a set of short- and long-term initiatives on topics of common concern including sustainability of water and other coastal resources, economic development and transportation planning.

A second meeting of the signatories to this accord was convened in the fall of 2002. Since that meeting, a tri-state economic growth plan is being developed; preliminary activities in transportation infrastructure are underway; proposals have been developed to work on coordinated watershed and water quality planning; and plans are underway to bring together policy and management officials in control of surface and groundwater supplies to work toward sustainable water use and planning in this tri-state region.

Water Quality

Water quality has become a major issue along the southern shores of Lake Michigan in recent years. The sources of pollution are many, and the culprits diverse. According to the State of Indiana, non-point source pollution (NPS) is the leading cause of water quality problems, including impairments to drinking water supplies, recreation, fisheries, and wildlife. NPS is another term for polluted runoff that results from a variety of land use practices. NPS is fed by various diffuse sources. It spreads by rainfall and snowmelt that moves across the ground as runoff picks up and transports pollutants to wetlands, lakes, rivers, coastal waters and drinking water sources.

Pathogens are disease-causing microorganisms, such as bacteria and viruses that come from the fecal waste of animals and humans. Pathogens from wild animal, farm animal and pet waste wash off the land and into waterways. They can also enter a lake from improperly functioning septic systems, leaky sewer lines and boat sanitary disposal systems. Nutrients, compounds that stimulate plant growth like nitrogen and phosphorous, can become both an environmental and health threat in high concentrations. Nutrients in polluted waters can come from agricultural fertilizers, septic systems, home lawn care products, and yard and animal wastes.

Toxins are substances that can harm aquatic and human life. They are created by a wide variety of human practices and products like heavy metals, pesticides and organic compounds like polychlorinated biphenyls (PCBs). Many toxins are resistant to breakdown and tend to pass through the food chain, concentrating in top predators. Oil, grease and gasoline from roadways, and chemicals used in home, gardens, yards and on farm crops, are major sources of toxic contaminants. These factors alone or in combination have resulted in beach closures, fish consumption advisories, reduced drinking water quality and loss of recreational value for certain water bodies.

Reducing Beach Closures Due to E. coli Contamination

Each summer, thousands of people visit Indiana's Lake Michigan beaches during the summer months. Throughout the summer, beaches are periodically closed or posted to swimming due to high bacterial counts (*Escherichia coli*). Illinois-Indiana Sea Grant has partnered with Indiana University Northwest and Save the Dunes Conservation Fund to develop the "Monitoring and Public Notification Plan for Indiana's Lake Michigan Beaches." The Indiana Department of Environmental Management (IDEM) has contracted with these organizations to develop the plan in response to the Beaches Environmental Assessment and Coastal Health (BEACH) Act requirements. The Interagency *E. coli* Task Force, which includes state and federal agencies, non-profit organizations, academic institutions, and interested citizens, will guide this process to completion. Obtaining the grant will enable Indiana to take important steps towards protecting the health of the beach-going public along Indiana's Lake Michigan shoreline.

Reducing Risks to Contaminants When Consuming Wild Caught Fish

Fish take in contaminants such as PCBs from the water they live in and the food they eat. These contaminants build up in the fish and over time, through consumption, in humans. In Indiana, IDEM, in conjunction with the State Department of Health, issue fish consumption advisories based on a composite of skin-on filets; however, skin-off filets may be used. The advisories are developed to help the angler plan which fish to keep as well as how often and how much fish to eat.

Illinois-Indiana Sea Grant has partnered with a researcher from Purdue University and IDEM to develop an alternative method to measure PCBs in fish than the State's practice of grinding fish tissue. Semipermeable membrane devices (SPMDs) containing triolein were placed in the St. Joseph River near South Bend, Indiana for one month. Placing the SPMDs in the river coincided with IDEM's fish sampling schedule. Upon retrieval, the triolein was extracted and analyzed for PCBs. The SPMDs did not simulate natural fish (comparison of IDEM's data with the SPMD data) in the environment. It is assumed that the SPMDs would need to be in the water column for a time

period greater than one month. A poster based on this effort was presented in Anaheim, California at the International Food Technology Meeting. A graduate student working on the project won the graduate paper award at this meeting. This project has determined that SPMDs are not a good quantitative indicator of PCB content in naturally occurring fish; however, SPMDs may be useful in tracking PCB sources in an aquatic environment.

River Restoration: Practices and Concepts

Many dams were built in the Midwest during the late 1800s and early 1900s. Over time, weathering and water pressure will slowly break down a dam, which will require repair, replacement or removal. A workshop on dam modification and removal took place in the spring of 2002. The event was sponsored by Sea Grant, Purdue University Calumet and Chicago Wilderness and explored the topic from a variety of perspectives including biological, socioeconomic and civil engineering. The workshop attracted a varied audience including natural resource managers, environmental consultants, park department staff, landscape architects, consulting engineers, city planners, public works directors and municipal engineers who actively participated in the various sessions presented. Enthusiasm for the workshop was enthusiastic enough that another one is currently planned for next spring.

Communications

The communications unit works closely with IISG subject matter specialists in our four thematic areas (aquaculture, biological resources, coastal business and environment and water quality) to develop publications and other products that proactively respond to client needs. The communications unit also responds to requests for information from a diverse audience ranging from classroom teachers to research scientists, and from fish farmers to regional planners.

Communications specialists use their skills in product development, packaging, and marketing to further IISG's mission. Activities improve efficiency and quality of production and distribution; increase public awareness through media efforts; increase usage of IISG materials; and increase IISG's responsiveness to audience needs.

A new exhibit, *Arrest that Invader!* was created to educate people of all ages about the impacts of invasive aquatic plants. This project translated outreach information into an interactive educational exhibit. Its design was versatile enough to use at venues such as the Field Museum for "It's Wild in Chicago, 2002,", the Illinois State Fair, the University of Illinois College of Agricultural, Consumer and Environmental Sciences Open House, and at the City of Chicago's "Nature Week" at Navy Pier. By participating in the *Arrest that Invader!* exhibit, 1,500 people learned to identify invasive aquatic plants, understood their impacts, and found out how to prevent their spread.

The *BeachWatch* education campaign won a Gold Award from Agricultural Communicators in Education in the category of External Communications Programs. In addition, the campaign won the Outstanding Professional Skill Award for the best Integrated Communication Program. Through numerous distribution channels, *BeachWatch* provided critical information about *E. coli* outbreaks, and about other beach and water quality issues. The campaign included distribution of *BeachWatch* postcards and posters, a news release, and an online survey. This information has reached thousands of Lake Michigan residents and businesses in Illinois and Indiana, helping the public understand how their behavior can impact the environment.

Public information

Two one-minute radio messages were created, providing valuable science-based information about the causes of *E. coli* contamination at the beach, and a potential water shortage in the Chicago area. Together, these messages aired 34 times over two weeks in July 2002 on WLS-AM, one of the highest-rated news-talk radio stations in the Chicago area. The messages played eight times on the "Don Wade and Roma" show in the mornings. Besides its high ratings, this show offered frequent discussions about boating and Lake Michigan. The messages also aired ten times on "Chicago PM," an early evening news show. The remaining 16 messages aired randomly throughout the two-week period.

By airing messages on major radio stations in Chicago, Sea Grant reached significantly more people than ever before, informing large numbers of the Chicago population about critical coastal issues and about Illinois-Indiana Sea Grant. Each of the eight times Illinois-Indiana Sea Grant radio messages aired on the "Don Wade and Roma" show on WLS, they reached an average of 84,000 listeners. Altogether, about 672,000 new or repeat listeners heard two of the Sea Grant messages on that show alone. The "Chicago PM" show averages 36,600 listeners each night. After Sea Grant messages ran 10 times on that show, about 366,000 new or repeat listeners heard the critical information provided. Finally, the remaining 16 times that these messages aired on WLS, they reached an average of 32,200 new or repeat listeners, for a total of 515,200. Altogether, these two messages about the causes of *E. coli* contamination at the beach and about a potential water shortage in the Chicago area likely reached over 1.5 million new or repeat listeners.

Another one-minute message explaining the impact of aquatic nuisance species on the food web in Lake Michigan aired in August 2002 on "The Great Outdoors" on WGN-AM, the highest-rated news-talk radio station in Chicago. This show has a loyal audience of anglers and boaters, an important target audience for this message on this program. It has an average weekly listening audience of nearly 72,000, many of which are anglers and boaters.

All three radio messages referred listeners to the IISG Web page where the radio messages were easy to access, as were press releases, fact sheets and other pertinent information on water quality and aquatic nuisance species. During the months of July and August, 2002, (when the radio messages aired) IISG Web site hits increased dramatically—101 percent higher (106,750 hits) and 138 percent higher (115,020 hits) than the same months in 2001. While it is difficult to attribute these increases solely to the radio campaign, it is likely that it played a significant role. Although the number of hits on the Web site for the summer of 2002 was consistently higher than for the summer of 2001, the difference was less dramatic before the radio campaign. In June 2002, Web site hits were 57 percent higher (83,896 hits) than in June 2001.

Education

Traveling Trunk – Zebra Mussel Mania

The Zebra Mussel Mania Traveling Trunk Project continues to receive high praise from educators who use it to teach about aquatic exotic species and their impacts. Eight additional lending sites have been added to the Network, creating a total of 38 sites in the U.S. and Canada. This program has offered the curriculum to over 1,700 teachers who have educated 42,000 students about biology, spread, impact, and people's role in addressing the issue.

ESCAPE from Exotics: Break Out of your Classroom Routine and Explore the Intriguing World of Exotic Aquatics

The Exotic Species Day Camp project's compendium of 36 teacher-developed lesson plans, titled *ESCAPE*, is being distributed nationally—over the past year 500 copies have been purchased or provided gratis to specialized users (such as participants in our teacher mentoring project). This resource is also being showcased at regional, state, and national conferences and workshops, and articles have appeared in national publications including NOAA's Coastal Services magazine. Illinois-Indiana Sea Grant has trained over 200 educators who now have a newfound commitment to teach about exotic species issues. This project earned a Gold Award as an Education Non-Credit Project from Agricultural Communicators in Education as well as an Outstanding Professional Skill Award for its Distance Education category.

Several agencies and organizations (in Michigan, Maryland, Minnesota, Louisiana, New York, and Illinois) that were coordinating exotic species courses and workshops and wished to provide *ESCAPE* to the attendees ordered multiple copies. One agency representative described *ESCAPE* as the best resource to use in teaching about exotic aquatic species.

The teacher-to-teacher mentoring project has helped introduce Sea Grant's educational materials into more schools. Twenty new teachers in Illinois and Indiana are now working in teams to integrate *ESCAPE* into their current biology, environmental science, and ecology curricula. This helps a school in providing a more cohesive education program—using exotic species as a continuing theme and ensuring continuity from the elementary through the high school level.

Exotic Aquatics on the Move

200 teachers have now been trained to teach new activities from the Exotic Aquatics on the Move project. Many have requested the 22 lessons, which are offered on a CD, to help them meet national geography education standards. A survey instrument has been developed and distributed to assess the effectiveness and impact of the student-developed community stewardship project component of *Exotic Aquatics on the Move.*

Research-Outreach Linkage

A formal procedure to integrate research with outreach activities was instituted in the spring of 2000. Under these procedures, extension specialists have input in the development of program RFP's and are asked for input and analysis on the compatibility of pre-proposals with thematic area objectives and potential for impact. After projects are selected, extension specialists and the media specialist meet with researcher(s), the research coordinator and the associate director prior to project initiation. The goal is to identify the outreach actions required for the research to result in positive impacts for clients.

The extension specialist contacts researchers quarterly to stay abreast of progress and ongoing research results. Based on this contact, the extension specialist can relay researcher progress or difficulties to program administration and alert the media specialist regarding the initiation of press releases or public information activities. The close working relationship that evolves from regular and frequent contact with researchers helps enable outreach personnel to include researchers into outreach efforts, such as workshops, conferences, and events. This coordinated research and

outreach effort focuses on impacts from the beginning. It ensures that outreach efforts are targeted to programming that will allow the research to be used by or to have an impact for clients.

All research projects initiated on March 1, 2000, have followed this process and formal meetings between researchers and outreach staff have been conducted. This same process is now being implemented for all projects beginning in March 2002 and for all new projects funded through National Strategic Initiatives. In addition, all new research proposals beginning in FY 2000 are required to have a specific discussion of connecting research results to users.

As a result of this process, two new development projects have been identified that will move existing research results to impact. In addition, a research symposium was held in 2001 in Chicago. This symposium brought Illinois-Indiana Sea Grant researchers together with agency officials, university administrators, and the media. Recent results were presented and a proceedings was produced and is now receiving wide distribution.

Research

Research projects in aquaculture, biological resources, water quality and coastal business and environment were conducted in FY 2001. Funding through omnibus, development funds and National Sea Grant Initiatives has allowed research to be conducted on a wide variety of issues important to the environmental health and economic success of the Southern Lake Michigan region.

Aquaculture

Chicago is one of the five largest U.S. seafood markets, but most of the supply is produced outside the Midwest. Coupled with an abundant, but declining, population of marketable native fish species, such as the yellow perch, ample room exists for aquaculture efforts in the Great Lakes. Fish farming might be a solution, but the adoption of high-value native species in aquaculture depends on research to improve their growth rates and thereby increase the return on one's investment. Researchers currently lack the tools they need to measure the levels of growth hormone in fishes such as yellow perch. Researcher Fredrick Goetz (RA-05-99) successfully cloned yellow perch growth hormone as a first step in development of reliable assays for growth hormones. The method was indirect, using the messenger RNA that directs the synthesis of the growth hormone protein in perch. This message was used to produce an artificial perch growth hormone. Goetz has tested the antibody and found that it can be used to measure natural perch growth hormone. Future research can use the antibody to measure growth hormone in yellow perch in the laboratory and in hatcheries to assess what environmental parameters increase levels of growth hormone and thereby presumably increase growth rates for aquacultured yellow perch. To facilitate the dissemination of information from this project to other researchers, Goetz has developed a web page at www.mlb.edu/goetz/perca.html.

Paul Collodi (R/A-03-01) is exploring ways to improve Midwest aquaculture by developing cell-mediated gene transfer technology. He is producing a conditionally sterile line of fish that will be valuable for managing the environmental risk associated with aquaculture production. During the first year of this project, Collodi developed the tools needed to implement the technology. One of the main tools is an established embryonic stem cell line that can be used to introduce genetic alterations into the fish embryos to create genetic lines of fish that possess the desired characteristics. Collodi has successfully derived two embryonic stem cell lines that possess the desired characteristics. In the coming year, he will continue working with the stem cell line to knock out the aromatase gene and render the fish conditionally sterile.

Biological Resources: Invasive Species

The biological resources of the Great Lakes are under stress not only from toxic contaminants in sediments, but also from "biological pollution" – the introduction of nonindigenous aquatic species.

A study by Martin Berg and John Janssen (R/ANS/03-99) points out that repeated introduction of non-native species has caused frequent restructuring of lake food webs, the demise of economically important fisheries, and an increase in management costs associated with attempts to control these nonindigenous species. A recent threat to the Great Lakes is the invasion of a fish called the round goby. The addition of round gobies to the Lake Michigan nearshore food web combined with the apparent elimination of mottled sculpins (a benthic fish native to the Great Lakes) raises concerns about possible local extinctions and about changes in the food web that could affect other species, including game and non-game fish. Berg and Janssen used cage experiments to assess the differential impacts of round gobies and mottled sculpins on the benthic invertebrate community structure in nearshore Lake Michigan. In addition, the diet overlap of round gobies and mottled sculpins and differences in prey behavior was examined in areas where the two species co-occur and where they occur in isolation from one another.

Berg and Janssen found that round gobies significantly alter benthic invertebrate community structure when compared to the effects of the native mottled sculpin. These results have

strong implications for the availably of food resources for game and non-game fishes in the Great Lakes. A reduction in available prey for these fishes can result in decreased growth of native benthivorous species and can cause a bottleneck for young age classes of fish that feed on benthic invertebrates early in their life cycle and later switch to other prey. This can result in the failure of young-of-the-year fishes to reach maturity. The research confirms Berg and Janssen's earlier findings that invertebrate community structure does differ in areas where round gobies are present compared to areas where they have not yet invaded, but where mottled sculpins are present. Berg and Janssen also documented continued range expansion of the round gobies in a northerly direction from Chicago.

Gary Lamberti and Martin Berg (R/ANS-06-99) have collaborated to assess and predict interactions among three invading aquatic species, round goby, Eurasian ruffe and zebra mussels, and native species, including highly valued, native sport fishes such as the yellow perch. The ultimate objective of the research is to develop a predictive model that will assist in the management of exotic and native aquatic species in Lake Michigan and elsewhere in the Great Lakes. Lamberti and Berg found that ruffe will compete with native yellow perch for food and habitat, and that the growth of both species declines during coexistence. However, they also found that yellow perch have a greater ability to withstand periodic hypoxia at summer water temperatures than do ruffe. The research suggests that where food resources are limited in the Great Lakes, introduced gobies will have a competitive advantage over introduced ruffe, which could impede the invasion of ruffe into areas where gobies are firmly established. This research on the added impacts of gobies, ruffe and zebra mussels on yellow perch grown and behavior suggests that all fish are similarly affected by the decrease in food availability associated with increasing fish densities and that yellow perch growth rates do not decline disproportionately in the presence of these exotics.

In complementary research examining zebra mussels in the Great Lakes, Chris Rehman and Daniel Schneider (R/ANS-07-99) in collaboration with New York Sea Grant have explored ways to reduce the destructive and expensive effects of zebra mussels on water users and native species by determining how they are transported in rivers and estuaries. Because patches of mussels cannot sustain itself without a constant supply of larvae, the number of zebra mussels in an entire river can be drastically reduced if the larval supply is blocked. Thus, zebra mussels tend to populate low flow areas, like backwater lakes and areas behind locks and dams. Without a strong current, larvae may simply oscillate around the spot where they are spawned. Successful control of zebra mussels, thus, depends on understanding the combined impacts of river flow and the biology of the zebra mussels.

To help identify the mechanisms by which zebra mussels are spread, Rehmann and Schneider have conducted field measurements of larval abundance and size from the Illinois River to determine the spread of larvae as they move downstream, the larval death rate, and the rate at which the larvae settle out of the flow. This information will help predict where future colonies of zebra mussels are likely to arise. Additionally, investigators have conducted tests with non-toxic, fluorescent dye to determine areas where zebra mussels might be able to colonize. These field tests were then used to build the mathematical model of larvae transport and settlement. By constructing a single model that combines the physical transport mechanisms with the biology and population dynamics, Rehmann and Schneider are attempting to improve control strategies by identifying environmental conditions that are undesirable for zebra mussels. This model will not only illustrate the spread of zebra mussels, but can be used to evaluate the effectiveness of various control methods before they are implemented.

In the past fifteen years, two exotic invertebrate predators, *Bythotrephes* (the spiny water flea) and *Cercopagis* (the fish hook flea), have invaded the Great Lakes. Investigators Carla Caceres and John Dettmers, in a National Sea Grant Office (NSGO) funded ANS project conducted in conjunction with New York Sea Grant, have begun studying the impacts of these invertebrates on Great Lakes food webs. Like most zooplankton, these organisms are relatively small (<1cm in length) and pelagic, and are often not noticed by the public. Despite their less visible presence in lakes, both native and exotic invertebrate predators are key components of aquatic food webs. Because they sit in the center of the web, between smaller plankton and fish, invertebrate predators have the potential to impact both upper and lower trophic levels. Depending on their food preferences and palatability, invertebrate predators can serve either as energy sources or sinks for fish. Several native invertebrate predators in the Great Lakes, such as *Leptodora* and *Polyphemus*, tend to consume small prey that is not preferred by planktivorous fish and are themselves readily consumed by fish; thus these native invertebrate predators seem to serve as an energy link to fish. The two exotic invertebrate predators, *Bythotrephes* and *Cercopagis*, have become very abundant in some of the Laurentian Great Lakes. There is evidence that *Bythotrephes*, at least, prefers large zooplankton prey and may compete with larval and young fish for food. Furthermore, both *Bythotrephes* and *Cercopagis* possess long, barbed tailspines that may interfere with predation by fish smaller than 6 or 7 cm. Thus *Bythotrephes* may serve as an energy sink because it is shunting energy away from small fish, because it is less energetically efficient at producing biomass than are small

fish and because it may be a less favored prey for fish. Little is known, however, about the food preferences and consumption rates of *Cercopagis*, or about their palatability to fish. This research has begun sampling to determine the abundance and distribution of the native and exotic zooplankton and conducting multiple predator experiments. The results of these experiments will be processed in the next year.

Nonindigenous species are most often discovered after they become established in a waterway. However, bighead and silver carp species provide a unique opportunity to explore an invasion before it has happened. Bighead carp and silver carp, large filter-feeding fish native to Asia, are now established in the Upper Mississippi River and are moving upstream through the Mississippi and Illinois rivers. It is likely that they will enter the Great Lakes in the next few years if they are not stopped. The bighead and silver carp diet consists of plankton, which are also important and necessary food sources for several Great Lakes species, such as white fish, and the larval and juvenile fishes of many species. It is feared that if bighead and silver carp enter the Great Lakes, they will significantly impact commercial and recreational fisheries and ecology of the entire area.

Mark Pegg and John Chick (A/SE (ANS)-02-01) are currently conducting research to determine the extent of dietary overlap between bighead carp and native filter feeding fishes in the Mississippi and Illinois river systems and examine the impact of environmental factors on Asian carp reproduction. Understanding this ecology will help predict the impacts of these carp species should they reach the Great Lakes. In a related study, Pegg and Chick (A/SE ANS 01-01) are exploring the efficacy of various methods for stopping the spread of Asian Carp. The major goal of this study is to evaluate the efficiency of various fish barriers alone and in combination. Electric, bubble and acoustic barriers will be tested for their ability to prevent upstream movement by Asian carp. To date, experiments have been conducted with electric barriers. The barrier is designed to have a "graduated field array" such that as fish move into the barrier, the electric current becomes increasingly strong forcing the fish to turn around in order to mitigate the electric current passing through its body. Observations have shown that the majority of bighead and silver carp stay well away from the electric current. The electric barrier was found to be 96% effective in restricting the movement of bighead and silver carp and 99.5% effective in repelling attempts to cross the barrier. While the barrier is highly effective, some fish are able to cross it, suggesting that a combination of barriers may be necessary to prevent entry into the Great Lakes.

A second project dedicated to exploring ways of preventing nonindigenous species spread is being conducted by David Lodge (R/ES-05-01). Lodge is identifying the live aquatic species that are in trade through live bait, pet, water garden and biological supply companies in the southern basin of Lake Michigan and the economic and environmental risks associated with those species. Investigators are purchasing and identifying plant and animal species from all relevant pathways and conducting quantitative risk assessments for each species. The results will provide a list of species that are likely to be safe and those with the potential to be invasive. With the knowledge gained from interactions with vendors and of the species being sold, educational materials will be developed to lower the risk posed by the live aquatic organism trade.

The initial research has focused on plant species. To date, over 100 plants that are available from local or web vendors in the upper Midwest have been purchased and identified. Lodge has found that many known invasive plants are readily available, including Eurasian water milfoil (Myriophyllum spicatum) and Egeria (Egeria densa). He has also concluded that vendors often give plants the wrong scientific name, unidentifiable names or refer to them with only ambiguous common names. Lodge has found that other live organisms, such as snails and other plants frequently accompany the desired plant, posing additional and unpredictable threats. In the second year of this research, Lodge will begin to explore animal species available through similar channels.

Biological Resources: Yellow Perch

Yellow perch is a highly valued sport and food fish that has experienced recruitment failures in Lake Michigan since 1988. Two research projects are exploring larval yellow perch ecology with the goal of improving management strategies to increase populations.

It appears that year class strength of a fish population is determined during a one-month period after hatching. John Janssen (R/CF-02-99), in cooperation with investigators at other institutions around Lake Michigan, is investigating young-of-the-year perch to determine where they have been and what they have eaten using analysis of stable isotope ratios in their ear bones (otoliths) and muscle tissue. Shortly after hatching in shallow water, the young yellow perch can drift with wind-driven currents. The investigators have five seasons of data comparing nearshore versus offshore sampling of newly hatched larval yellow perch. The results show a statistically clear offshore movement with upwelling (rising of deep water to the surface) and nearshore movement with downwelling (sinking of surface water). The sampling indicated that larval yellow perch can be transported 10 miles in one week and over 20 miles

offshore in two weeks. As the fish remain pelagic for about a month, it is likely that the fish could be transported across the lake. The working hypothesis is that wind-driven water movements affect survival (e.g., by moving the larval fish into or out of concentrations of food). Janssen's findings indicate that larval yellow perch are more abundant where downwelling occurs rather than where upwelling occurs in lakes. The concentration of larvae may be due to the combined effects of transport to nearshore areas and also the warm water and turbulence associated with downwelling may stimulate hatching. From analysis of the daily growth rings in the otoliths of juvenile yellow perch it appears that the juvenile yellow perch caught in Illinois originated elsewhere. The peak abundance of newborn larvae in Illinois has been early June, but the older, large juveniles appear to have been born in late June, indicating they were probably transported from much father north. It is clearly evident that many yellow perch travel great distances. This means that there is a challenge for the juveniles to find their way back to shallow water, the location of most of their food for the rest of their lives.

A second major finding by investigators has been documentation of larval yellow perch's preference for rocky habitats. The fish feed on the abundant prey associated with the rocks. The Lake Michigan yellow perch population likely operates as a source-sink situation, with the rocky west side of the lake being the prime habitat, but with the larval perch tending to drift towards the relatively poor, sandy habitat on the east side of the lake.

Janssen's research helps determine what spawning grounds are most important for the yellow perch and what factors affect survival during their critical early life. One particular application will be a reliable sample method to assess reproductive success well before the fish reach a legally harvestable size, so that harvest regulations can be adjusted much more precisely to the expected population size.

A complementary research project, funded through an IISG fellowship resulted in a series of experiments during the summers of 2000 and 2001 to investigate growth, survival, prey selection and foraging behavior of larval yellow perch foraging on different zooplankton taxa. John Dettmers and Brian Graeb hypothesized that changes in the food web in Lake Michigan might be contributing factors in yellow perch declines.

By monitoring the feeding habits of 4 size-classes of yellow perch (newly hatched, small, medium and large), Dettmers and Graeb found that small (<12mm) yellow perch larvae grew and survived best while they were feeding on small zooplankton; when fed large zooplankton, these larvae did not survive. Larger (>12 mm) yellow perch larvae grew and survived well when feeding on large zooplankton, but grew and survived poorly when feeding on smaller zooplankton. Dettmers and Graeb concluded that various sizes of zooplankton must be present in order for larval yellow perch to survive.

The results of this work will help fisheries managers understand the ways changes in the food web impact the yellow perch population by either providing or not providing an adequate food supply for larval fish. These results enable managers to predict strong or weak year-classes of yellow perch based on the composition and density of zooplankton and can, thus, allow for fishing regulations that more closely mirror fish populations.

Coastal Business and Environment

Determining whether the costs of new development outweigh the benefits is often difficult in local communities. With hundreds of variables and incomplete data, local government officials are often left making decisions without being able to completely identify the economic and environmental consequences. Larry DeBoer, with Illinois-Indiana Sea Grant development funds, is evaluating the fiscal impacts of development in Indiana and building a model to provide a relatively quick and easy mechanism for local government officials to evaluate best land use practices. The model will examine the added costs and revenues associated with different types of development, while integrating wildlife habitat and water quality data to provide a comprehensive decision-making tool for local officials. It will also differentiate between compact developments and sprawl to determine how the density of development impacts the costs. Modelers are integrating tax and budget data to ensure ease of use by managers who may not have that information readily available. The resulting model will provide quicker and easier analysis of land use choices.

Water Quality

Water and sediment quality affect the environmental and economic health of the communities surrounding lakes, rivers and canals in northeastern Illinois. Many waters and sediments are contaminated by heavy metals, organic chemicals and high levels of *E.coli* bacteria.

IISG researchers are developing ways to trace *E.coli* back to their sources and to use fish indicators of sediment contamination. Investigators Charles Tseng and Evert Ting developed DNA "fingerprinting" techniques that can identify *E.coli* bacteria according to their source (the human or animal species that hosts them). A library of such fingerprints could be accessed by researchers and public health agencies to detect and mitigate sources of bacterial contamination of public beaches. Over 500 *E. coli* isolates from human and nonhumans have been

constructed to build such a library. The library also includes "fingerprints" of more than 50 environmental *E. coli* isolates from beach sand and lake water.

With current methods, however, the process of identifying the source of *E. coli* contamination is cumbersome and not very practical for local government agencies. In research funded through an NSGO technology project, Tseng and Ting are now testing automated equipment that will make source determination quicker and easier. In testing the equipment, they have compared their library results with the automated ribotyping machine results to ensure accuracies and efficacy.

In addition to biological contaminants, many wetland areas of the southern Lake Michigan region contain elevated concentrations of a number of metals such as zinc, lead and mercury. This is related to the disposal of steel mill slag that was often used to fill in low-lying, marshy land. Atmospheric deposition and industrial activity have also contributed to increases in the ambient concentration of metals in this region. Since many of these elements can be toxic to plants and animals, even in very small concentrations, they pose a potentially significant threat to the healthy functioning of the wetland ecosystem.

Researcher Jean-Francois Gaillard (R/PS-01-01) is conducting research to determine chemical speciation of the metals present in wetlands sediment and plants. In contrast to methods that are conventionally used to determine chemical speciation and that are based on chemical extraction procedures, Gaillard is developing direct speciation methods based on the use of spectroscopic methods using x-rays generated at a synchrotron source. The advantage of this approach is that environmental samples are probed directly, reducing the problems associated with experimental artifacts created during extraction procedures and that lead to biased information.

In a complementary project, Robert Hudson is conducting research on mercury availability with an eye towards management implications. Managing mercury pollution in watersheds depends on being able to quantify (model) the relationship of mercury loads and levels of in place contaminants to rates of mercury methylation and demethylation. At present, there is no model capable of doing so without calibration to each site being investigated. Researchers are measuring rates of mercury methylation and demethylation in critical compartments of a heavily-contaminated watershed in the Lake Michigan drainage basin. Results will allow researchers to determine which field methods are the best predictors of methyl-mercury levels in sediments and surface waters. It is expected that process modeling efforts in this study will likely lead to improvements in the existing models. Finally, these data and model improvements can be used in calibrating watershed-scale management models used for the TMDL and RAP being developed for the Grand Calumet watershed.

Fellowships and Student Involvement in Research
IISG funds fellowships directly through several avenues: its fellowship program; special projects funded via program development; and as components of competitively-awarded research projects. The reporting period 2001-2002 marks the continuing success of IISG in supporting educational and training efforts for undergraduate and graduate students. Currently, 12 undergraduate and 15 Master's/Ph.D. students receive support through funded projects.

Leveraged Funding

Principal investigators report that over the past year, Sea Grant-funded projects have leveraged additional project funding to continue or enhance on-going research. Two of IISG's thematic areas – biological resources and coastal business and environment – have benefited from the additional funding.

Four biological resources projects have secured additional funding. Berg and Janssen (R/ANS-03-99) have complemented their IISG-funded project by securing funding for two projects from U.S. EPA–GLNPO. Rehmann and Schneider (R/ANS-07-99) have enhanced their work with zebra mussels by gaining funding from National Sea Grant for additional projects. Pegg and Chick (A/SE (ANS) -01-01) have leveraged their IISG and National Sea Grant funding to secure additional funding from the International Joint Commission and U.S. EPA (pending). Lamberti (R/ANS-06-99) has secured complementary funding from USDA–CREES National Research Initiative Competitive Grant Program and the National Science Foundation.

Researcher John Swanson leveraged development funds to promote the interstate coordination for economic and environmental planning around southern Lake Michigan to fund a Lake Michigan Watershed Academy and a project devoted to development of a tri-state economic development framework. The Planning with POWER project has also secured outside funding from a variety of sources.

Staff Update

Kristin TePas joined the program in the biological resources thematic area, under the direction of Pat Charlebois, biological resources extension specialist. TePas has a part-time appointment with Illinois-Indiana Sea Grant to help with aquatic nuisance species outreach. The remainder of her appointment is focused on the coordination and implementation of the Illinois Aquatic Nuisance Species Management Plan (under a grant from The Illinois Department of Natural Resources directed by Charlebois).

TePas is housed at the Illinois Natural History Survey lab in Zion, IL.

A half-time fisheries extension appointment was added to the program in response to the Fisheries Extension Enhancement Initiative. This position will be housed in the Illinois Natural History Survey.

A grant was received for a Great Lakes ecosystem extension specialist position from the United States Department of Agriculture (USDA-CSREES). This position will be housed at the U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office (GLNPO) in Chicago. The position will be filled in 2003.

Martin Jaffe served as the interim coastal business and environment extension specialist in 2002. His status has been upgraded to permanent status beginning in the 2003 fiscal year.

With the change in administration, several part-time positions will be added in the director's office at the University of Illinois at Urbana-Champaign, including a secretary, fiscal and policy analyst, and program assistant.

Extramural Funds

JANUARY 1 - DECEMBER 31, 2002

Principal Investigator	Co-PI(s)	Title of Project	Agency/Source	Start	End	Amount
Illinois-Indiana Sea Grant Funded Researchers:						
Chick, John	M. Pegg	An Evaluation of Barriers for Preventing the Spread of Bighead Carp into the Great Lakes	National Sea Grant	2002	2004	$101,543
Collodi, Paul		Fish Embryo Cell Cultures for Targeted Gene Inactivation	USDA	12/15/01	12/31/03	$150,000
Lodge, David	G. Lamberti	Ecological Forecasting and Risk Analysis of Nonindigenous Species: Strategic Optimization Using a Bio-economic Approach	NSF-IRCEB	06/01/02	05/31/07	$2,989,645
Padilla, Dianna	C. Rehmann	Metapopulation Dynamics and Control of the Zebra Mussel in Freshwater and Estuarine Systems: The Effects of Hydrodynamics, Larval Supply, and Embayments	National Sea Grant	2002	2003	$294,647
Rehmann, Chris	D. Schneider	Evaluation of a Scheme to Control Invasive Species in the Chicago Sanitary and Ship Canal	Illinois Water Resources Center	2002	2002	$14,494
Santerre, Charles	B.K. Miller, L. Dorworth J. Stahl	Rapid Detection of Total PCBs and Toxicity Equivalence Quotient (TEQ) in fish Tissue from Indiana Waters and Use of a Novel Device to Predict Contaminant Load in Fish	Purdue – ARP Competitive Grant Program	10/01/00	09/30/02 (IISG portion)	$20,000
Ting, W.T.E.		Tracking the Source of *E. coli* Contamination in Four Lake County Beaches and Two Ravines by Ribotyping	Lake County Dept. of Health, Illinois	2002	2003	$26,000
Ting, W.T.E.		Ribotyping for Tracking the Potential Sources of *E. coli* in Turkey Creek, Oklahoma	USGS	2002	2003	$30,000
Turco, Ron F.	L.S. Lee, P.S.C. Rao, A.E. Konopka, M. Mischoff, T. Filley, L. Niles, J. Jafvert, B. Miller, L. Dorworth	Contaminant Remediation Optimization Program	Environmental Protection Agency	07/01/02	09/30/02	$500,000
Illinois-Indiana Sea Grant Staff:						
Charlebois, Patrice		Augmentation of ANS outreach activities in Illinois	Illinois Department of Natural Resources	07/01/02	06/30/03	$10,000
Dorworth, Leslie	S. Wilmore, E. Szarleta	Developing The Beach Monitoring and Notification Plan for Indiana	Indiana Department of Environmental Management	09/15/02	09/14/03	$58,694

Extramural Funds . . . continued

Principal Investigator	Co-PI(s)	Title of Project	Agency/Source	Start	End	Amount
Einstein, Mark		NCRAC Extension Project	Michigan State University/USDA	09/01/01	08/31/02	$5,500
Goettel, Robin	B.Miller, . P. Moy	Transferring Sea Grant Aquatic Nuisance Species Research and Outreach Results to the Nation using a World Wide Web Server - A continuing Project 2001-2003	NOAA, National Sea Grant	10/01/01	09/30/02	$69,000
Goettel, Robin	P. B. Blanchard, A.D. Danielski, H. M. Domske, R. W. Fortner, D. A. Jensen, M. R. Klepinger, K. T. Ricker, M. E. Zhuikov	ESCAPE from Exotics: Break Out of Your Classroom Routine by Exploring the Interesting World of Exotic Aquatic Species	NOAA, National Sea Grant	10/01/01	9/30/02	$26,849
McCormick, Robert	B. K. Miller, J. Ayres, W. Hoover, L. Dorworth	Reducing non-point source impacts through land use planning in developing watersheds; educational and technical support for local officials.	IDEM 319 per year	7/1/2000	6/30/02	$56,250
McCormick, Robert	B. Miller	Reducing non-point source impacts through land use planning in developing watersheds; educational and technical support for local officials.	Indiana Department of Environmental Management	07/01/00	06/30/02	$112,500
Miller, Brian		Coastal Community Development Program	NOAA/Sea Grant	9/1/01	8/31/02	$50,000
Miller, Brian	P. Moy	Transferring Sea Grant Aquatic Nuisance Species Research and Outreach Results to the Nation Using a World Wide	NOAA/Sea Grant	9/01/01 (IISG portion)	8/31/03	$135,000

Program Awards

JANUARY 1 - DECEMBER 31, 2002

Awardee	Co-Awardee(s)	Award Name	Awarding Organization
Goettel, Robin	Susan White, Valerie Eichman	Outstanding Professional Skill Award, for distance education and instructional design for ESCAPE (Exotic Species Compendium of Activities to Protect the Ecosystem) project	Agricultural Communicators in Education
Goettel, Robin	Susan White, Valerie Eichman	Gold Award as a non-credit educational project for the ESCAPE (Exotic Species Compendium of Activities to Protect the Ecosystem) project	Agricultural Communicators in Education
Miles, Irene	Leslie Dorworth	Outstanding Professional Skill Award in integrated communications programs	Agricultural Communicators in Education
Miles, Irene	Leslie Dorworth	Outstanding Professional Skill Award in integrated communications programs	Agricultural Communicators in Education
Miles, Irene	Leslie Dorworth	Gold Award in external communications	Agricultural Communicators in Education

Research and Outreach Projects

JANUARY 1 - DECEMBER 31, 2002

Project #	Title	Principal Investigator	Affiliation
Completed during the year			
R/ANS-03-99	Consequences of Round Goby Invasion for Littoral Zone Communities: Effects on Sculpins and Benthic Invertebrates	Martin Berg	Loyola University
R/A-05-99	The Development of Molecular and Biochemical Tools to Assess Changes in Yellow Perch Growth Hormone	Frederick Goetz	Notre Dame
R/CF-02-99	Influence of Upwelling Events on Larval and Juvenile Yellow Perch	John Janssen	University of Wisconsin-Madison
R/PS-01-99	DNA Fingerprinting as a Means for Determining the Source of *E. Coli* Contamination	Charles Tseng	Purdue University-Calumet
On-going at time of omnibus submission			
A/SE(ANS)-01-01	A National ANS-HACCP Training Initiative to Prevent the Spread of Aquatic Nuisance Species in Baitfish and Fish for Stocking	Patrice Charlebois	Illinois Natural History Survey
A/SE(ANS)-06-01	ESCAPE from Exotics: Break out of your Classroom Routine by Exploring the Interesting World of Exotic Aquatic Species	Robin Goettel	University of Illinois at Urbana-Champaign
R/CMB-27	Effects of Invasive Invertebrate Predators on the Food Web of the Great Lakes	Carla Caceres	University of Illinois at Urbana-Champaign
A/SE(ANS)-08-01	Transferring Sea Grant Research and Outreach Results to the Nation Using a World Wide Web Server	Brian Miller	Purdue University
R/ANS-02-02	Metapopulation Dynamics and Control of Zebra Mussels in Freshwater and Estuarine Systems: The Effects of Hydrodynamics, Larval Supply and Embayments	Dianna Padilla	Stony Brook State University
R/ANS-03-02	An Evaluation of Barriers for Preventing the Spread of Bighead and Silver Carp to the Great Lakes	Mark Pegg	Illinois Natural History Survey
R/A-01-02	Modeling the Inactivation of Vibrio Parahaemolyticus in Oysters by High Pressure Processing	Peter Slade	Illinois Institute of Technology, Moffett Campus
R/PS-01-02	Use of an Automated Ribotyping System for Tracking the Source of *E. coli* Contamination	Charles Tseng	Purdue University-Calumet
R/ES-04-01	Bighead Carp in the Upper Mississippi River: Competition with Native Filter-Feeding Fishes and Potential Threats to the Great Lakes	John Chick	Illinois Natural History Survey
R/A-03-01	Targeted Inactivation of the Fish Aromatase Gene	Paul Collodi	Purdue University
R/PS-01-01	Chemical Speciation and Availability of Metals in Wetlands	Jean-Francois Gaillard	Northwestern University

Research and Outreach Projects . . . continued

Project #	Title	Investigator	Affiliation
R/PS-02-01	Mercury Methylation and Demethylation in a Contaminated Urban Watershed	Robert Hudson	University of Illinois at Urbana-Champaign
R/ANS-06-99	Zebra Mussels, Round Gobies, and Eurasian Ruffe: Predicting Ecological Impacts of the 'Exotic Triad' to Improve Control	Gary Lamberti	University of Notre Dame
R/ES-05-01	Quantifying Pathways of Nonindigenous Aquatic Species	David Lodge	University of Notre Dame

Collaborators, Partners and Affiliates

JANUARY 1 - DECEMBER 31, 2002

Universities

- Kentucky State University
  - Aquaculture Research Program
- Loyola University
  - Department of Biology
- Northwestern University
  - Department of Civil Engineering
- Purdue University
  - Animal Disease Diagnostic Laboratory
  - Environmental Sciences and Engineering Institute
  - School of Agriculture
    - Agricultural Communications Service
    - Agricultural Research Programs
    - Cooperative Extension Service
    - Department of Agricultural Economics
    - Department of Animal Sciences
    - Department of Food Science
    - Department of Forestry and Natural Resources
- Purdue University Calumet
  - School of Engineering, Mathematics & Science
- Purdue University North Central
  - Department of Biological Sciences
- University of Georgia
  - Savannah River Ecology Laboratory
- University of Illinois at Chicago
  - College of Urban Planning and Public Affairs
  - Institute of Environmental Science and Policy
  - The Great Cities Institute
- University of Illinois at Urbana-Champaign
  - Department of Civil and Environmental Engineering
  - Department of Urban and Regional Planning
  - Environmental Council
  - Illinois Natural History Survey
  - College of Agricultural, Consumer, Environmental Sciences
    - Agricultural Experiment Station
    - Cooperative Extension Service
    - Department of Natural Resources and Environmental Sciences
    - Information Technology and Communications Services
  - Water Resources Center
- University of Minnesota-Duluth
  - National Resources Research Institute
- University of Notre Dame
  - Center for Environmental Science and Technology
  - Department of Biological Sciences
- University of Wisconsin-Madison
  - Aquaculture Program
- University of Wisconsin-Milwaukee
  - Great Lakes WATER Institute

State and Federal Agencies

- Cook County Forest Preserve
- Great Lakes Commission
- Great Lakes Fisheries Commission
- Great Lakes Panel on Aquatic Nuisance Species
- Illinois Department of Natural Resources
  - Division of Education
  - Office of Resource Conservation
- Illinois Environmental Management
- Illinois International Port District
- Illinois Natural History Survey
- Indiana Department of Environmental Management
- Indiana Department of Natural Resources
  - Division of Water
  - Fish and Wildlife
- Indiana Dunes National Lakeshore
- Indiana Dunes State Park
- Indiana Land Resources Council
- Inter-Agency Fish Advisory Council
- International Joint Commission
- Lake County Health Department
- National Oceanic and Atmospheric Administration
- Natural Resources Conservation Service
- Ocean and Atmospheric Research
- Soil and Water Conservation Districts
- U.S. Army Corps of Engineers, Chicago District
- U.S. Environmental Protection Agency
  - Great Lakes National Program Office
  - Region 5 - Lake Michigan
- U.S. Fish and Wildlife Service
  - Department of the Interior
- U.S. Geological Survey
  - Biological Resources Division
- United States Coast Guard
- Wisconsin Department of Natural Resources

Collaborators, Partners and Affiliates . . . continued

Sea Grant Institutions

Connecticut Sea Grant College Program
Florida Sea Grant College Program
Great Lakes Sea Grant Program Network (GLSGN)
Hawaii Sea Grant
Louisiana Sea Grant College Program
Michigan Sea Grant College Program
Minnesota Sea Grant College Program
Mississippi-Alabama Sea Grant College Program
National Sea Grant College Program (NSGCP)
New York Sea Grant College Program
North Carolina Sea Grant College Program
Ohio Sea Grant College Program
Pennsylvania Sea Grant College Program
Sea Grant Association (SGA)
Washington Sea Grant College Program
Wisconsin Sea Grant College Program

Partnerships

Aquaculture Information and Technology Task Force of the Joint Subcommittee on Aquaculture
Chicago Academy of Sciences
Chicago Wilderness Consortium
Cooperative Extension Service
Hendrick's County Planning with POWER Advisory Committee
Illinois Aquaculture Association
Indiana Aquaculture Industry Association
Inter-Agency Technical Task Force on E. coli
John G. Shedd Aquarium
NASAC: National Association of State Aquaculture Coordinators
NCRAC: USDA North Central Regional Aquaculture Center
World Aquaculture Society

Publications

JANUARY 1 - DECEMBER 31, 2002

Publications Developed by Illinois-Indiana Sea Grant Staff

Biological Resources

Article—not Peer-reviewed

North American Lake Management Society. The round goby. Lakeline.
Goss, Hanna, Robin Goettel and Valerie Eichman, contributors. "Students ESCAPE Boredom with Great Lakes Exotic Species Lessons," Coastal Services Magazine, Vol. 5, Issue 4, July/August 2002, p. 8.
Miles, Irene. The Illinois Steward, Volume 11, Number 3, Fall 2002. Building Barriers to Invasive Species

Brochures

Charlebois, P. M., R. Grigoletti, and L. Dorworth. The ABCs of PCBs: Know Your Catch.
Charlebois, Patrice. Stop ballast water invasions. 2002.

Governmental Testimony

TePas, Kristin. Snakehead fish. Hearing held by House Committee on Conservation and Land Use. Chicago, IL. 09/24/02
Charlebois, Patrice. Snakehead fish. Joint hearing of Committee on Energy and Environmental Protection and Committee on Health. Chicago City Council. Chicago, IL. 07/30/02.

Newsletters

Eichman, Valerie. "Students Set Sights on Community Awareness," The HELM, Fall/Winter 2001.

Products

TePas, Kristin and Patrice Charlebois. "Notice: Zebra Mussels Infest These Waters". Boat landing sign.
Charlebois, P. M., R. Grigoletti, and K. M. TePas. Asian carp watch. Identification card. 2002.
Charlebois, P. M., and M. Zhuikov. Exotics to go! CD-Rom. 2002.
Goettel, Robin and Valerie Eichman. Exotic Aquatics on the Move CD-ROM, January 2002.
Goettel, Robin; Susan White, Valerie Eichman. ESCAPE (Exotic Species Compendium of Activities to Protect the Ecosystem)
TePas, Kristin and Patrice Charlebois. "Hop On Board: Stop Aquatic Exotics" banner.
Charlebois, Patrice and Kristin TePas. "Hop On Board: Stop Aquatic Exotics" beverage wrench.

Coastal Business and Environment

Proceedings

Jaffe, Martin and Debby Mir. Urban Water Resources Conference Proceedings, Improved Decision-Making for Water Resources: The Key to Sustainable Development for Metropolitan Regions. 2002.

Marketing

Products

White, Susan, Robin Goettel, and Irene Miles. Directory of Resources (Aquaculture, Education, Biological Resources, Water Quality, Coastal Business and Environment & Program Publications).

Planning with Power

Fact Sheet

Miller, Brian, and Robert McCormick. The Relationship Between Land Use Decisions and the Impacts on Our Water and Natural Resources. ID-260, IISG-01-19.

Public Information

Book and Book Chapters

Miller, B. K., J. Lemus, B. Malouf, J. Murray, and J. Rasmussen. Issues, opportunities, and conceptual mechanisms for improving Sea Grant's Capabilities. A discussion Paper to the Assembly of Extension

Special Reports

Illinois-Indiana Sea Grant College Program Annual Report 2001

Publications . . . continued

Water Quality

Article, Peer-reviewed

Dorworth, Leslie. Developing the Beach Monitoring and Notification Plan for Indiana/AWRA 2002 Specialty Conference

Brochure

Santerre, Charles, and Leslie Dorworth. Angling Indiana, Choosing Fish Wisely. IISG-02-09.

Fact Sheet

Santerre, Charles, Leslie Dorworth, and Brian Miller. In The News: Choosing Fish Wisely!

Invited Reviewer

Dorworth, Leslie. Monitoring and Emergency Response for Harmful Algal Blooms.

Proceedings

Dorworth, Leslie and Diane Trgovcich-Zacok. A Hands-on Workshop on the Latest Techniques for Dam Modification and Removal/Conference Notes

Dorworth, Leslie and Diane Trgovcich-Zacok. River Restoration: Practices and Concepts.

Products

White, Susan and Leslie Dorworth. Frisbee: Smart Anglers Reel in Current State Fish Advisories.

Publications Developed by Illinois-Indiana Sea Grant-Funded Researchers

IISG Fellow

Oral Presentations

Dahl, Amy Midwest Environmental Chemistry Workshop, Chicago, IL, October 2002.

Posters

Dahl, Amy Goldschmidt Conference, Davos, Switzerland, August 2002.

Dahl, Amy Gordon Research Conference, Environmental Bioinorganic Chemistry, June 2002.

Publications and Manuscripts

Drake, John Drake, J.M. Allee effects and the risk of biological invasion. Risk analysis (in press).

Research

Abstracts

Carr, M.L., L.M. Leach, P.R. Jackson, C.R. Rehmann, J.A. Stoeckel, D.K. Padilla, and D.W. Schneider. 2002. Exchange between embayments and the Hudson River and implications for zebra mussel populations. American Geophysical Union Ocean Sciences Meeting, Honolulu, HI.

Collodi, P. 2002. Derivation of zebra fish ES cell cultures. Workshop on Current Protocols in Stem Cell Biology.

Fan, L., A. Alestrom, P. Alestrom, and P. Collodi. 2002. Zebrafish ES cell lines. International stem cell meeting: Stem cells from land and sea. Mount Desert Island Biological Lab, Salisbury Cove, ME.

Lamberti, G.A. 2002. Eurasian ruffe, round gobies, and zebra mussels: Will the 'exotic triad' spell trouble for Great Lakes yellow perch? 45th Conference on Great Lakes Research (IAGLR). Winnipeg, Manitoba, June 2-6.

Lamberti, G.A. 2002. Zebra mussels, round gobies, and Eurasian ruffe: Predicting ecological impacts of the 'exotic triad'. Notre Dame Environmental Education and Research (NDEER) Symposium. Notre Dame, IN, November 13.

Lamberti, G.A. 2002. Potential interactions between Eurasian ruffe and round gobies in the Great Lakes: prey and habitat preferences. 11th International Conference on Aquatic Invasive Species. Alexandria, VA, February 26.

Lamberti, G.A. 2002. Eurasian ruffe, round gobies, and zebra mussels: Will the 'exotic triad' spell trouble for Great Lakes yellow perch? Annual Meeting of the International Association of Great Lakes Research. Winnipeg, Manitoba, Canada, June 3.

Rehmann, C.R., J.A. Stoeckel, D.K. Padilla, and D.W. Schneider. 2002. A biophysical model of zebra mussel dispersal in the Illinois River. American Geophysical Union Ocean Sciences Meeting, Honolulu, HI.

Rehmann, C.R., L.M. Leach, M.L. Carr, P.R. Jackson, J.A. Stoeckel, D.K. Padilla, and D.W. Schneider. 2002. Transport and trapping of zebra mussel larvae in the Illinois and Hudson Rivers. 11th International Aquatic Invasive Species Conference, Alexandria, VA.

Padilla, D.K., C.R. Rehmann, J.A. Stoeckel, D.W. Schneider, and R.E. Sparks. 2002. Metapopulation dynamics, larval mortality, and recruitment in the zebra mussel (*Dreissena polymorpha*): Potential for control in large river systems. 11th International Aquatic Invasive Species Conference, Alexandria, VA.

Stoeckel, J.A., D.W. Schneider, C.R. Rehmann, and D.K. Padilla. 2002. Veliger abundance patterns in the Upper Mississippi River, 1998-2000. Meeting of the Mississippi River Research Consortium.

Ting, W.T.E., D.S. Johnson, G.A. Thomas, A.M. Holler, and C.C. Tseng. 2002. Discriminant analysis of random amplified polymorphic DNC (RAPD) Patterns of *Eschedrichia coli* isolated from different human and nonhuman sources. Abstr. Q108, p. 396. Abstracts of the 102nd General Meeting of the American Society for Microbiology, Washington, DC.

Tseng, C.C., D. Johnson, and W.T.E. Ting. 2002. Comparison of ribotypes of *Escherichia coli* from sewage, humans, and animals. Abstr. Q-59, p. 388. Abstracts of the 102nd General Meeting of the American Society for Microbiology, Washington, DC.

Tseng, C.C., D.J. Johnson, and W.T.E. Ting. 2002. Differentiation of *E. coli* isolated from human and nonhuman sources using automated ribotyping method. Proceeding of 2002 Great Lakes Beach Conference, Chicago, IL.

Articles

Dean-Ross, Deborah, Joanna Moody, and C.E. Cerniglia. 2002. Utilization of mixtures of polycyclic aromatic hydrocarbons by bacteria isolated from contaminated sediment. FEMS Microbiology Ecology 41:1-7.

Fan, L. and P. Collodi. 2002. Progress towards cell-mediated gene transfer in zebrafish. Briefings in Functional Genomics and Proteomics 1: 131-138.

Kolar, C.S., A.H. Fullerton, K.M. Martin, and G.A. Lamberti. 2002. Effect of zebra mussel shells on amphipod behavior and foraging rates of Eurasian ruffe and yellow perch. Journal Great Lakes Research. 28:664-673.

Leung, B., D.M. Lodge, D. Finnoff, J.F. Shopgren, M.A. Lewis, and G.A. Lamberti. 2002. An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. Proceedings of The Royal Society of London Ser. B. 269:2407-2413.

Souch, C., Filippelli, G.M., Perkins, S., Collar, N.L., and Mastalerz, M. 2002. Accumulation rates of heavy metals in wetlands: Assessing past metal mobilization by comparing long- and short-term rates. Physical Geography 23:21-44.

Invited Papers

Graeb, B.C.S., J.M. Dettmers, and D.H. Wahl. 2002. Tradeoffs between energetic gain from different prey and foraging efficiency affect growth, survival, and prey selection of larval yellow perch. 132nd Annual Meeting of the American Fisheries Society, Baltimore, Maryland.

Lamberti, G.A. 2002. Linkages among aquatic ecosystems: from bacteria to bears. Swiss Federal Institute of Science and Technology. Zurich, Switzerland. April 8.

Lamberti, G.A. 2002. Scientific linkages: aquatic ecosystems and environmental research at Notre Dame. Notre Dame Environmental Education and Research Symposium. November 13.

Lamberti, G.A. 2002. Linkages among aquatic ecosystems: from bacteria to bears. Annis Water Resources Institute, Grand Valley State University. December 19.

Rehmann, J.A. 2002. "Zebra Mussel Transport in Rivers," Department of Mechanical Engineering, University of Iowa.

Rehmann, J.A. 2002. "Zebra Mussel Transport in Rivers," Department of Civil and Environmental Engineering, Purdue University.

Rehmann, J.A. 2002. "Zebra Mussel Transport in Rivers," Department of Civil, Structural, and Environmental Engineering, State University of New York at Buffalo.

Media Coverage

Pegg, M.A. Over 48 radio, newspaper and television interviews including regional and national television coverage by CNN, FOX and CBS news.

Swanson, J.A. National Public Radio pick up of Chicago Public Radio (WBEZ) report, April 3, 2002.

Swanson, J.A. Chicago Tribune article, April 3, 2002.

Ting, W.T.E. "Local professors enlisted to fight *E. coli*", The Times, July 31, 2002. (Written by Susan Erler.)

Tseng, C.C. An article on our *E. coli* DNA typing research appeared in The Times (Newspaper) on July 31, 2002 I"PUC professors enlisted to fight *E. coli*" by Susan Erler, reporter)

Presentations

Bauer, C.R., G.A. Lamberti, and M.B. Berg. Potential interactions between Eurasian ruffe and round gobies in the Great Lakes prey and habitat preferences. 11th International Conference on Aquatic Invasive Species, Alexandria, VA. February 26, 2002.

Bauer, C.R., G.A. Lamberti, and M.B. Berg. Eurasian ruffe, round gobies, and zebra mussels: Will the 'exotic triad' spell trouble for Great Lakes yellow perch? Annual Meeting of the International Association of Great Lakes Research, Winnipeg, Manitoba, Canada. June 3, 2002.

Brodner, R. (with C.C. Tseng, et al.). 2002. Comparison of 16S rRNA gene sequence from different strains of *E. coli*. Abstract of Undergraduate Research Conference, Butler University, Indianapolis, IN, p. 18.

Chick, J.H. Bighead and silver carp in the Upper Mississippi River system and potential threats to the Great Lakes. Presented to the Illinois Waterway Dispersal Barrier Committee in Chicago, Illinois, January 2002.

Publications . . . continued

Chick, J.H. Establishment of Asian Carp in the Upper Mississippi River and potential threats to the Great Lakes. Illinois Waterway Barrier Workshop hosted by the Great Lakes Protection Fund, in Chicago, Illinois, June 2002.

Graeb, B.D.S., J.M. Dettmers, and D.H. Wahl. Tradeoffs between energetic gains from prey and foraging efficiency affect growth and survival of larval yellow perch. American Fisheries Society National Meeting. August 2002.

Graeb, B.D.S., and J.M. Dettmers. Zooplankton and larval fish growth implications for recruitment of yellow perch in Lake Michigan. International Association of Great Lakes.

Keller, R., C. Van Loon, and D.M. Lodge. 2002. "Coming To A Pond Near You: Live Aquatic Plant Trade As An Invasion Pathway". Poster presented at the Janet Meakin Poor Research Symposium on Invasive Plants. Chicago, Illinois, October 2002.

Kotys, D. (with C.C. Tseng, et al.). 2002. Comparison of 23S rRNA gene sequence of different strains of *E. coli* with use of automated DNA sequencer. Abstract of Undergraduate Research Conference, Butler University, Indianapolis, IN, p. 18.

Lasrado, J.A., C.R. Santerre, D.C. Deardorff, J.R. Stahl, and T. Noltemeyer. 2002. Measurement of PCBs in Fish Tissue Using GC and ELISA. Institute of Food Technologists Annual Meeting, Anaheim, CA. Paper #46I-1, Technical Poster Session. (Toxicology and Safety Evaluation Division Graduate Paper Competition – First Place.)

Lodge, D.M. 2002. Great Lakes Panel of the Aquatic Nuisance Species Task Force, Ann Arbor, Michigan, December 2002.

Lodge, D.M. 2002. Mayor Daley's "Great Lakes—Great Ideas" Great Lakes Mayors' Initiative, November 2002. (One of 3 non-mayor speakers at a conference of 50 Great Lakes city mayors on Great Lakes environmental issues.)

Santerre, C.R. 2002. Rapid Detection of PCBs in Fish Tissue and Use of SPMDs to Predict Contaminants in Fish. Joint USDA ARS—Purdue University Center for Food Safety Engineering Annual Meeting, Philadelphia, PA, October 24.

Shade, C.W., R.J.M. Hudson, and H. Hintelmann. A novel HPLC-FIA system for rapid preconcentration, speciation, and detection of inorganic and monomethylmercury in environmental samples. American Society of Limnology and Oceanography annual national meeting. Victoria, BC, June 2002.

Shade, C.W., R.J.M. Hudson, and H. Hintelmann. A novel HPLC-FIA system for rapid preconcentration, speciation, and detection of inorganic and monomethylmercury in aueous media. Midwest Environmental Chemistry Workshop, Chicago, IL, October 2002.

Shim, S.M., C.R. Santerre, L.E. Dorworth, B.K. Miller, and J.R. Stahl. 2002. Prediction of PCB Concentration in Fish Using Semipermeable Membrane Devices (SPMD). Institute of Food Technologists Annual Meeting, Anaheim, CA. Paper #46I-2, Technical Poster Session. (Toxicology and Safety Evaluation Division Graduate Paper Competition Finalist.)

Souch, C. 2002. Human effects on wetlands. Invited colloquium Department of Biology, Valparaiso University, Indiana. October 21, 2002.

Souch, C. 2002. Accumulation of airborne heavy metals in wetland sediments: Indiana Dunes National Lakeshore, USA. Goteborg University, Sweden. June 2002.

Souch, C., Filippelli, G., and Dollar, N. 2002. Chemical fractionation of metals in wetland sediments and implications for restoration strategies: Indiana Dunes National Lakeshore. Association of American Geographers, Los Angeles, CA. March 2002.

Ting, W.T.E., D.S. Johnson, and C.C. Tseng. 2002. Discriminating *E. coli* isolated from various human and nonhuman sources based on analysis of random amplified polymorphic DNA (RAPD) patterns. Proceedings of 2002 Great Lakes Beach Conference. Chicago, IL.

Ting, W.T.E. and C.C. Tseng. 2002. A preliminary study of the source of *E. coli* contamination at Marquette Park Beach by random amplified polymorphic DNA typing. Proceedings of 2002 Great Lakes Beach Conference. Chicago, IL.

Publications

Ting, W.T.E., D.S. Johnson, G.A. Thomas, A.M. Holler, and C.C. Tseng. 2002. Discriminate analysis of random amplified polymorphic DNA (RAPD) patterns of *Escherichia coli* isolated from different human and nonhuman sources. Abstracts of American Society for Microbiology 102nd General Meeting, Salt Lake City, Utah, p. 396.

Tseng, C.C., D.S. Johnson, W.T.E. Ting. 2002. Comparison of ribotypes of *Escherichia coli* from sewage, humans, and animals. Abstract of American Society for Microbiology 102nd General Meeting, Salt Lake City, Utah, p. 388.

Publications and Manuscripts

Chick, J.H. 2002. Asian carp in the Upper Mississippi River System. Illinois Natural History Survey Reports. Spring 2002.

Kolar, C.S., A.H. Fullerton, K.M. Martin, and G.A. Lamberti. In press. Effect of zebra mussel shells on amphipod behavior and foraging rates of Eurasian ruffe and yellow perch. J. Great Lakes Res.

Pegg, M.A. Evaluation of barriers in preventing Asian carp from entering Lake Michigan. Presented to the International Joint Commission, Chicago, Illinois, August, 2002.

Pegg, M.A. Evaluation of barriers in preventing Asian carp from entering Lake Michigan. Presented to the Electric Barrier Scientific Advisory Panel, Chicago, Illinois, July, 2002.

Schneider, D.W., J.A. Stoeckel, C.R. Rehmann, K.D. Blodgett, R.E. Sparks, and D.K. Padilla. A population bottleneck in pelagic larvae implications for control or conservation of aquatic species. Submitted to Science.

Taylor, R.M., M.A. Pegg, and J.H. Chick. 2002. Aquatic nuisance species: An evaluation of barriers for preventing the spread of bighead carp to the Great Lakes. Final report submitted to the International Joint Commission, Washington, DC.

Students Supported by Illinois-Indiana Sea Grant

JANUARY 1 - DECEMBER 31, 2002

Students supported by the Illinois-Indiana Sea Grant College Program in 2002

Level of Study	Number of Students
Undergraduate and post-baccalaureate	12
Graduate students (MS candidates)	15
Graduate students (PhD candidates)	6
Post Doctoral associates	1
Total Supported	34

Students supported by the Illinois-Indiana Sea Grant College Program in 2001

Level of Study	Number of Students
Undergraduate and post-baccalaureate	13
Graduate students (MS candidates)	13
Graduate students (PhD candidates)	5
Post Doctoral associates	1
Total Supported	32

Workshops, Seminars, Short Courses, Field Tours, and Conferences

JANUARY 1 - DECEMBER 31, 2002

Presenter	Co-Presenter(s)	Date	Location	Subject	Attendees
Charlebois, Patrice	Chuck Pistis	03/02/02	Porter, IN	Regional Fishery Workshop	50
Charlebois, Patrice	R. Kinnunen, J. Troxel	10/30/02	Natchitoches, LA	HACCP baitfish/hatchery training	50
Dorworth, Leslie	Diane Trgovcich-	04/18/02	Hammond, IN	River Restoration: Practices and Concepts. A Hands-on Workshop on the Latest Techniques for Dam Modification and Removal	78
Merrifield, Lisa	Dick Warner, John Branden, Stephanie Lage	11/06/02	Champaign, IL	Illinois Water 2002 Conference	250
Miller, Brian	Robert McCormick	09/27/02	Indianapolis, IN	How Your Community Can Start Planning with POWER at the Indiana Governor's Conference on the Environment	100
Miller, Brian		03/23/02	Indianapolis, IN	Opportunities for Aquaculture in Indiana: An Update of Research, Regulations, and Marketing Opportunities	50
Miller, Brian		3/17-20/02	Baton Rouge, LA	National Conference of the Assembly of Sea Grant Extension Program Leaders: Strengthening Regional and National Programming	50
Miller, Brian	Natalie Carroll	02/07/02	Indianapolis, IN	Biocontrol of Purple Loosestrife: Lessons for the classroom. Hoosier Association of Science Teachers.	25
TePas, Kristin	Robin Goettel	05/08/02	Allerton Park, IL	2002 Illinois Envirothon— judged	150

Posters/Presentations to Scientific and Professional Audiences

JANUARY 1 - DECEMBER 31, 2002

Presenter	Co-Presenter(s)	Date	Location	Title/Event	Attendees
Charlebois, Patrice	K. M. TePas.	02/21/02	Moline, IL.	ANS reporting form. Invasion of the exotics: identifying, understanding, and controlling Illinois' aquatic exotic species. Illinois Chapter of the American Fisheries Society Meeting	40
Charlebois, Patrice	Jensen, D. A., M. R. Klepinger, J. L. Gunderson, R. Kinnunen, and F. L. Snyder.	02/26/02	Washington, D. C.	Angler knowledge, behavior, and risk for spreading aquatic nuisance species based on surveys in five Great Lake states. Eleventh International Zebra Mussel and Aquatic Nuisance Species Conference	75
Charlebois, Patrice	Snyder, F. L., J. L. Gunderson, D. A. Jensen, M. Klepinger, and R. E. Kinnunen.	02/26/02	Washington, D. C.	Potential dispersal of aquatic nuisance species by live bait in the Great Lakes region. Eleventh International Zebra Mussel and Aquatic Nuisance Species Conference	75
Charlebois, Patrice		04/24/02	Chicago, IL.	Understanding our most troublesome invasive aquatic species: critters. 15th Annual National Conference on Enhancing the States' Lake Management Programs	100
Charlebois, Patrice		09/24/02	Fishers, IN	Avoiding the spread of ANS in backyard habitats. Backyard Wildlife Habitat Management Workshop	50
Dorworth, Leslie		05/14/02	New Orleans, Louisiana	Developing the Beach Monitoring and Notification Plan for Indiana/American Water Resources Association's 2002 Spring Specialty Conference	27
Eichman, Valerie		04/18/02	Cayuga, IN	ESCAPE Wanted Posters Activity--Student Workshop at the Indiana Envirothon—Regional competition in Vermillion County	50
Eichman, Valerie		07/27/02 07/29/02	Chesterton, IN	ESCAPE Teacher Training at the Indiana Dunes National Lakeshore Teacher Training, Course 104	38
Eichman, Valerie	Pamela B. Blanchard	10/17/02	Philadelphia, PA	Exotics on the Move: Activities on Pathways, Spread, and Impact for the National Council for Geographic Education	
Eichman, Valerie		03/20/02	Homer, IL	Spring Fling, Environmental Education Association of East Central Illinois	20
Einstein, Mark	Brian Miller	02/25/02 -	Washington D.C.	13th Annual Aquatic Nuisance Species conference	500
Goettel, Robin	Valerie Eichman	02/08/02	Indianapolis, IN	New Hands-on Activities from ESCAPE Compendium at the HASTI Conference for Indiana Science Teachers	50
Goettel, Robin	Kristin TePas	05/07/02-05/08/02	Allerton Park—Monticello, IL	ANS Workshop for Teachers and Student Event Judging for	20

Posters/Presentations . . . continued

Presenter	Co-Presenter(s)	Date	Location	Title/Event	Attendees
				the Illinois State Envirothon	
Goettel, Robin	Valerie Eichman	06/19/02	Peoria, IL	"Escape from Exotics" for the Illinois DNR ENTICE Exotic Species Workshop	35
Goettel, Robin		06/25/02	Sullivan, IL	Exotic Aquatics workshop - Habitats and Watersheds Workshop (science teachers)	25
Goettel, Robin		07/24/02	New London, CT	"Exotics are on the Move and Making a Great ESCAPE", National Marine Educators Association Conference (teachers & non-formal educators)	29
Goettel, Robin	Valerie Eichman	08/30/02	Cayuga, IN	5th Annual 4-H Wonders of Wetlands Day (7th grade students)	200
Goettel, Robin		09/27/02	Bloomington, IL	"Exotic Aquatics: Activities that Focus on Origin, Distribution, Movement, Consequences and Solutions" at the Illinois Geographic Alliance State Conference	15
Goettel, Robin		11/08/02	St. Charles, IL	"Taking an ESCAPE from Exotic Species" at the Illinois Science Teachers Association Convention	36
McCormick, Robert		02/07/02	Indianapolis, IN	Hoosier Heartland Research Conservation and Development	15
McCormick, Robert		02/21/02	Champaign-Urbana, IL	Planning With POWER presentation/Illinois Watershed Academy	20
McCormick, Robert		02/27/02	Indianapolis, IN	Planning With POWER presentation/Purdue Extension Land Use Training	50
McCormick, Robert		03/19/02		Planning With POWER presentation/Community Planner Certification Training at seven remote sites across Indiana	100
McCormick, Robert		03/19/02	Indianapolis, IN	Planning With POWER presentation/Indiana Land Resources Council	15
McCormick, Robert		04/06/02	Nappannee, IN	Planning With POWER Presentation/ Hoosier	75
McCormick, Robert		04/08/02	Indianapolis, IN	Planning With POWER presentation/League of RC&Ds	15
McCormick, Robert		05/22/02	Muncie, IN	Planning With POWER Update/Purdue Land use Team	15
McCormick, Robert		06/12/02	Champaign-Urbana, IL	Planning With POWER Update/Illinois-Indiana Sea Grant College Program meeting	15
McCormick, Robert		08/06/02	Groton, CT	Planning With POWER presentation/National NEMO Open Space Planning Conference	25

Posters/Presentations . . . continued

Presenter	Co-Presenter(s)	Date	Location	Title/Event	Attendees
McCormick, Robert		08/13/02	Muncie, IN	Planning With POWER presentation/ Purdue Area Council on Agricultural Research, Extension and Teaching	75
McCormick, Robert	Brian Miller	09/27/02	Indianapolis, In	Planning With POWER presentation/Governor's Conference on the Environment	100
Miller, Brian		02/07/02	Indianapolis, IN	The impact of aquatic nuisance species on our wetland environments. Hoosier Association of Science teachers annual convention—purple loosestrife for the classroom workshop	25
Miller, Brian		03/12/02	Washington, D.C.	The current focus and direction of the National Assembly of Sea Grant Extension Program Leaders. Sea Grant Association	50
Miller, Brian		01/28/02	Charleston, SC	Planning with POWER program establishment and design for impact, National NEMO network conference	55
TePas, Kristin		02/21/02	Chicago, IL	"Research and Invasive Species in the Great Lakes." (Presentation) Great Lakes Commission: Baltic Fellows Workshop hosted by USEPA— GLNPO in the Federal Building	20

Formal Presentations to Landowners and Other Audiences

JANUARY 1 - DECEMBER 31, 2002

Presenter	Date	Location/Venue	Title/Event	Attendees
Charlebois, Patrice	04/06/02	Merrillville, IN	Illinois-Indiana Sea Grant outreach activities on aquatic exotics. 14th Annual Indiana Lake Management Society Conference.	40
Charlebois, Patrice	03/02/02	Porter, IN	Dispersal barrier for the Chicago waterways: an update. Southern Lake Michigan Regional Fishery Workshop. Indiana Dunes National Lakeshore.	50
Charlebois, Patrice	04/18/02	Rockford, IL.	Aquatic exotics: what's happening in Illinois. Illinois Lake Management Association 17th Annual Conference.	70
McCormick, Robert	07/06/02	Angola, IN	Steuben County Lakes Assoc. Board	20
McCormick, Robert	01/03/02	Rossville, IN	Planning With POWER Update/Wildcat Creek Watershed Alliance	8
McCormick, Robert	01/04/02	Danville, IN	Planning With POWER Update/Hendricks County Planning With POWER Committee	15
McCormick, Robert	01/17/02	Greencastle, IN	Planning With POWER presentation/Putnam County Farm Land Preservation Committee	15
McCormick, Robert	02/06/02	Winamac, IN	Planning With POWER presentation/Citizens group from community	20
McCormick, Robert	02/20/02	Lafayette, IN	Planning With POWER presentation/Tippecanoe Vision 20/20	15
McCormick, Robert	02/21/02	Plymouth, IN	Planning With POWER Presentation/LaPorte, Marshall, and Starke	70
McCormick, Robert	03/11/02	Martinsville, IN	Planning With POWER Presentation/ Morgan County Plan Commission	18
McCormick, Robert	03/13/02	Greenfield, IN	Planning With POWER Presentation/Hancock County Plan staff and	10
McCormick, Robert	08/03/02	Angola, IN	Steuben County Lakes Assoc. Annual	120
McCormick, Robert	07/17/02	Aurora, IN	Aurora City Council	15
McCormick, Robert	03/13/02	Shelbyville, IN	Planning with POWER/Plan staff, Commissioners, Plan Commission members, SWCD	12
McCormick, Robert	06/18/02	Star City, IN	Planning with POWER update/Community Leaders & Citizens	25
McCormick, Robert	06/17/02	Decatur, IN	Planning with POWER update/Adams County SWCD Board	10
McCormick, Robert	06/07/02	Greencastle, IN	Land Use Consortium Site Visit Workshop	45
McCormick, Robert	05/31/02	Aurora, IN	Aurora Vision Conference/Planning with	35
McCormick, Robert	05/16/02	Bloomington, IN	Planning with POWER/Local Leaders & County Officials	15
McCormick, Robert	05/15/02	Kokomo, IN	Planning with POWER/Wildcat Watershed	50

Formal Presentations to Landowners . . . continued

Alliance Developers Workshop

Presenter	Date	Location/Venue	Title/Event	Attendees
McCormick, Robert	05/15/02	Kokomo, IN	Planning with POWER/Wildcat Watershed Alliance Developers Workshop	50
McCormick, Robert	05/13/02	Danville, IN	Hendricks County Planning With POWER Committee	8
McCormick, Robert	04/16/02	Lebanon, IN	Planning with POWER/Commissioners Plan	8
McCormick, Robert	04/15/02	Valparaiso, IN	Planning with POWER/Chain of Lakes Watershed & County Officials	40
McCormick, Robert	04/10/02	Aurora, IN	Planning with POWER/Aurora Plan	13
McCormick, Robert	04/10/02	Mt. Vernon, IN	Planning with POWER/County Officials & Plan Commission Citizens	35
McCormick, Robert	08/01/02	Russiaville, IN	Wildcat Watershed Land Use Subcommittee	8

Poster Displays/Exhibits

JANUARY 1 - DECEMBER 31, 2002

Presenter	Co-Presenters (s)	Date	Location/Venue	Subject	Attendees
Charlebois, Patrice	Kristin TePas	04/19/02	Rockford, IL	Hop on Board!: stop aquatic exotics. Illinois Lake Management Association 17th Annual Conference	100
Goettel, Robin	Valerie Eichman, Lisa Merrifield	11/22-23/02	St. Charles, IL	Aquatic Nuisance Species as Environmental Education. 2002 Midwest Environmental Education Conference and Leadership Clinic	150
McCormick, Robert		02/02/02	Purdue Agricultural Fish Fry, West Lafayette, IN	Planning with POWER	1,500
McCormick, Robert		04/13/02	Purdue Spring Fest, West Lafayette, IN	Planning with POWER	5,000
McCormick, Robert		07/14-15/02	Indianapolis, IN	National Soil & Water Conservation Conference	600
McCormick, Robert		08/26-28/02	French Lick, IN	National Rural Development Partnership	250
McCormick, Robert		01/07-08/02	Indiana Soil & Water Conservation, Indianapolis, IN	Planning with POWER	200
Miller, Brian	Natalie Carroll, Susan Steves		International Aquatic Nuisance Species Conference - Indianapolis, IN	Nonindigenous Species	5,000
Miller, Brian	Mark Einstein	02/28/02	International Aquatic Nuisance Species Conference	Sea Grant's Nonindigenous Species Web site and Web of Webs	200
TePas, Kristin	Susan White, Irene Miles, Randi Grigoletti	09/21-22/02	Nature Week, Navy Pier, Chicago, IL	"Arrest That Invader" is an interactive exhibit that teaches the public about exotic aquatic plants.	4,000
TePas, Kristin	Pat Charlebois	04/05-06/02	Indiana Lake Mgmt. Conference, Merrillville, IN	"Hop On Board" exhibit with information on exotic species for lake associatons.	200
TePas, Kristin	Robin Goettel, Irene Miles	02/09/02	The Chicago River Student Congress, Amundsen High School, Chicago, IL	Exhibit on exotic species with information for teachers as well as students	300
TePas, Kristin		02/23-24/02	Northwest Indiana Steelheaders Outdoor Show,	Exotic Species exhibit with information for boaters and anglers on how they can help	1,000

Poster Displays/Exhibits . . . continued

Presenter	Co-Presenters (s)	Date	Location/Venue	Subject	Attendees
				prevent the spread of invasive species	
White, Susan	Robin Goettel, Valerie Eichman, Irene Miles, Kristin TePas	08/16-17/02	Illinois State Fair	"Arrest that Invader" display	350
White, Susan	Robin Goettel, Valerie Eichman, Irene Miles	04/06/02	Wild in Chicago, Field Museum, Chicago, IL	"Arrest that Invader" display	25
White, Susan	Robin Goettel, Valerie Eichman, Irene Miles	03/08-09/02	College of Agricultural, Consumer and Environmental Sciences Open House 2002, Urbana,	"Arrest that Invader" display	300
White, Susan	Robin Goettel, Valerie Eichman, Irene Miles, Randi Grigoletti	09/21-22/02	Nature Week, Navy Pier, Chicago, IL	Arrest That Invader! display	300

Public Information Products

JANUARY 1 - DECEMBER 31, 2002

Newspaper

Joint Efforts Underway to Improve Beach Monitoring, Chesterton Tribune. Chesterton, IN. 08/16/02

Joint Efforts Underway to Improve Beach Monitoring, Chesterton Tribune. Chesterton, IN. 08/16/02

Beaches open in time for new heat, Chicago Tribune. Chicago, IL. 07/26/02

State funding granted for E. coli research, Michigan City News Dispatch. Michigan City, IN. 08/18/02

Beach Watch: Why is the Beach Closed?, Hammond Times. Hammond, IN, 08/08/02

Beach Watch: What is E. coli?, Hammond Times. Hammond, IN. 08/14/02

Professors ID beach bacteria sources, Gary Post Tribune. Gary, IN. 08/16/02

Beach Watch: E. coli at the beach?, Hammond Times. Hammond, IN. 08/26/02

PUC Professors enlisted to fight E. coli, Hammond Times. Hammond, IN. 07/31/02

Residents help clean up the beach, Michigan City News Dispatch. Michigan City, IN. 09/22/02

Charlebois, P. M., Chicago Tribune. Chicago, IL. 07/31/02

Press Releases

Electric Barrier May Stop Asian Carp, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana, posted on several web pages, and sent to U of I Extension educators.

Consider Dam Removal at Upcoming Workshop, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana and posted on several web pages.

U of I Ecologist Steers Sea Grant Forward, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana and posted on several web pages.

E.coli DNA Fingerprinting May Lead to Fewer Beach Closings, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana and posted on several web pages.

Beware! Invaders! ESCAPE Offers Break from Classroom Routine, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana, posted on several web pages, and sent to U of I Extension

New CD-Rom Offers Rich Menu of ANS Information, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana, posted on several web pages, and sent to U of I Extension educators.

Get Ready for the Season at the Southern Lake Michigan Fisheries Workshop, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana, posted on several web pages, and sent to U of I

Tri-State Accord Agencies Face Water Shortage, Irene Miles, Illinois-Indiana Sea Grant. Distributed to print media outlets in Illinois and Indiana, posted on several web pages, and sent to U of I Extension educators.

Volunteers to Clean Lake Michigan Beaches, Irene Miles, Illinois-Indiana Sea Grant. Distributed via print and Web.

Television and Radio Appearances

2 one-minute radio messages ran 34 times on WLS-AM, Irene Miles. July 8-12, 2002 and July 22-26,2002. Chicago, IL.

A one-minute radio message played on The Great Outdoors, WGN-AM radio, Irene Miles, 08/17/02. Chicago, IL.

Chicago Tonight, PBS-Channel 11, Patrice Charlebois. 08/25/02. Chicago, IL.

Video

BEACHWATCH: Marketing *E. coli* Contamination, Irene Miles, Debra Levey Larson, Jim Knoblauch. 07/15/02

ESCAPE (Exotic Species Compendium of Activities to Protect the Ecosystem), Outstanding Professional Skill award - Greer Kimmel, Robin Goettel, Susan White, Valerie Eichman. 07/17/02

Professional and Committee Affiliations

JANUARY 1 - DECEMBER 31, 2002

Patrice Charlebois
Member, International Association for Great Lakes Research
Illinois State Management Plan for Aquatic Nuisance Species Steering Committee
Member, North American Benthological Society
Executive Committee of the Dispersal Barrier for the Chicago Waterways Advisory Panel
Exotic Species Committee, Illinois Natural History Survey
Communications, Education and Outreach Committee of the Aquatic Nuisance Species Task Force
Co-Chair, Ballast Water Policy Committee
Public Outreach and Education Committee, Illinois Natural History Survey
Information and Education Committee for the Great Lakes Panel on Aquatic Nuisance Species
Vice Chair, Great Lakes Panel on Aquatic Nuisance Species

Leslie Dorworth
Rhone-Poulenc Citizen Advisory Committee
Inter-Agency Technical Task Force on E. coli
CARE Committee
Great Lakes Sea Grant Network Coastal Land Use Committee
Extension Advisory Committee (PCARET)
Indiana Dunes Good Fellows Camp
Grand Calumet River / Indiana Ship Canal Corridor Vision Steering Committee
Blue Green Algae Task Force
Wolf Lake Task Force
Environmental Management Policy Committee (voting member)
Brownfields Technical Advisory Committee

Mark Einstein
Executive Board Member - Agricultural Network Information Center (AGNIC) Project (2003 - 2005)

Robin Goettel
Education Liaison to Communications Committee - Chicago Wilderness
Illinois Envirothon Student Judging Panelist
Illinois State Envirothon Planning Committee
National Sea Grant Communications Products Contest Committee
Agricultural Communicators in Education
University of Illinois College of ACES Open House Planning Committee
Education Organizing Committee - Chicago Wilderness
National Sea Grant Outreach Growth Committee
National Sea Grant Exhibits and Special Events Taskforce

Martin Jaffe
Northeastern Illinois Regional Planning Commission, Water Resources Advisory Committee and Water Supply Task Force
Chicago Metropolis 2020 Project, Commercial Club of Chicago, Natural Environment Work Group
Chicago Wilderness, Sustainability Team and Chicago Region Biodiversity Council (General Member)
American Planning Association, Water Resources Subcommittee, Environmental Policy Guide Task Force
Ely Chapter, Lambda Alpha International Honorary Land Economics Society
City of Chicago, Department of Environment, Lake Calumet Ecological Management Plan Task Force
Steering Committee, University of Illinois at Chicago Institute for Environmental Science and Policy
Editorial board, Journal of Architectural and Planning Research
Editorial board, Land Use Law & Zoning Digest
Northwestern Indiana Regional Planning Commission, Watershed Planning Task Force, Government Regulation Working
Urban Land Institute, Chicago District Council
Commissioner, Village of Wilmette (IL) Historic Preservation Committee

Professional and Committee Affiliations . . . continued

Robert McCormick
Purdue University Co-operative Extension Specialists Association
American Whitewater Affiliation
Epsilon Sigma Phi National Extension Honorary
Indiana Rural Development Association

Brian Miller
State Wetland Management Plan User Advisory Committee
National 4-H Sport Fishing Executive Board
NRCS Prescribed Fires Committee
Purdue University Cooperative Extension Service, Water Quality Common Interest Group
Programming Subcommittee of the Lake Calumet Intergovernmental Working Group
Lake Calumet Intergovernmental Working Group
Coastal Communities and Economies Theme Team, National Sea Grant
National Sea Grant Assembly of Program Leaders
National Sea Grant's Regional and National Extension Program Development Committee

Kristin TePas
Member, Society for Conservation Biology

Richard Warner
Executive Board, Illinois Water Resources Center
Cook County Illinois Animal Control Advisory Committee
Partnership Illinois Water Issues Ad Hoc Advisory Board
AD Hoc Agricultural Policy Committee – The Wildlife Society Regional/National
National Association of University Fish and Wildlife Program (NAUFWP)
Illinois Advisory Committee on Animal Damage Control, USDA-APHIS
North-Central Regional Experiment Station Committee, Administrative Advisor for NC-94
North Central Regional Aquaculture Committee (NCRAC) Board of Directors
North-Central Regional Experiment Station Committee NCA-23

Susan White
Agricultural Communicators in Education