

ILIN-Q-93-001

Sea Grant's Role In A Decade Of Change



Illinois-Indiana
Sea Grant Program

From the Bi-State Coordinators

Sometimes it seems like things move awfully slow on a day-to-day basis and we wonder if anything is being accomplished. With the completion of 10 years as a Sea Grant Program, we felt it would be a good idea to take a look back (not a backward look), and there were some significant things done in the areas of research, marine extension, education and communications.

The original idea for the Sea Grant concept occurred about 30 years ago when Athelstan Spilhaus wrote an editorial in *Science*:

... I have suggested the establishment of "sea grant colleges" in existing universities that wish to develop oceanic work. The sea grant colleges would focus attention on marine science, and it would develop strengths in the applications of marine science in the colleges of aquaculture and oceanic engineering. These would be modernized parallels of the great developments in agriculture and the mechanic arts which were occasioned by the Land Grant Act of about a hundred years ago ... Establishment of the land-grant colleges was one of the best investments this nation ever made. The same kind of imagination and foresight should be applied to the exploitation of the sea.

So timely was Spilhaus' idea that by 1966 an act was passed by Congress and signed into law by President Johnson, establishing a National Sea Grant College Program. The first three Sea Grant institutions were announced in 1968, but neither Illinois nor Indiana applied for a program until 1980, when after an initial contact and discussion, a proposal was submitted for a bi-state program. The approval was given, and the Illinois-Indiana Sea Grant Marine Extension Project began on 1 April 1982.

After 10 years, we are still the newest of the 29 Sea Grant programs. We have progressed from a marine extension project (1982), to a coherent program (1984), to an institutional program (1988). And we are on the threshold of applying for Sea Grant College status.

Although the focus of the program is on Lake Michigan and the Great Lakes, many research and marine extension projects have benefitted citizens of both states and the region. These projects provide new information related to aquaculture, zebra mussels,

recreation and tourism, hospitality practices, waterfront revitalization, and bed and breakfast enterprises.

Partnering, through Network participation, has allowed us to expand our fiscal resources and staffing level to provide necessary programming to other public agencies and private organizations. Interaction has been good for the program because it has kept us in regular contact with a broad spectrum of client groups.

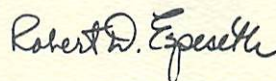
Sea Grant values its three advisory committees for the broad overview they provide on relevant policies and issues that affect our two states. The Marine Extension Area Advisory Committee provides ideas, direction and priorities that drive the Extension program. Representatives from various public agencies and private industry have served on the committee during the past 10 years.

The Research Advisory Committee provides proposal review and program direction. A significant responsibility of the committees is to relate research to local and regional needs, and assure that the research has scientific merit to compete for national resources.

As aquaculture interests in both states have grown, a specific advisory committee was established to guide aquacultural endeavors.

Although new issues continue to surface, our resources have not increased accordingly. Funding is needed to support additional research, extension and educational programming and necessary staff to meet the challenges ahead.

In the end, success or failure of a program is based to some degree on luck, but primarily on lots of hard work, good people and sufficient resources. Continued regional efforts will help Illinois-Indiana Sea Grant go the extra mile to achieve success. We believe that the synergism developed through regional and local networking has paid handsome dividends over the years and will continue to do so in the future.



Robert D. Espeseth — Coordinator



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Sea Grant, a unique partnership with public and private sectors combining research, education, advisory and communications for public service, is the national network of universities meeting changing environmental and economic needs of people in coastal, ocean and Great Lakes regions.



Illinois-Indiana Sea Grant Program

The ultimate goal of the Illinois-Indiana Sea Grant Program is to promote wise utilization of Lake Michigan and related water resources to enhance the quality of life in Illinois and Indiana as well as in neighboring states.

Objectives include incorporating economic benefit gains with a sustainable environmental concept. Currently supporting research, education, extension and communications activities, the program has continually changed as it has experienced steady growth in the past decade.

Change has been the theme throughout its pattern of growth. The program's current research projects address varied topics including coastal recreation, water resources, coastal zone processes, aquaculture and the recent zebra mussel migration into the Great Lakes, and rivers and streams. Marine Extension field staff transfer technology gained through Sea Grant research efforts to communities and businesses.

Change, too, has occurred in the number of Sea Grant Extension field staff providing service. The Marine Extension Service leader and three field staff members are augmented in their efforts through cooperation with various agencies. In addition, ten Purdue Extension and nine University of Illinois

Extension agents with aquaculture training work closely with the Sea Grant aquaculture specialist to provide comprehensive information to potential and practicing fish farmers.

As educational needs have changed, Sea Grant has filled the gap between knowledge gained by research and practical application of that knowledge. The education

Sea Grant communications staff develop strategies designed to best meet the information needs of not only the general public but also specialized audiences including legislators, educators, community planners, and governmental agency staff.

The program is jointly administered by the University of Illinois at Urbana-Champaign and Purdue



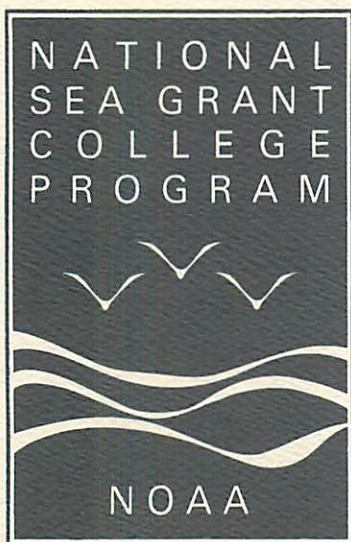
component of Illinois-Indiana Sea Grant has expanded steadily to include the formation of partnerships with various community and governmental agencies. The program sponsors educational programming in community offerings, elementary and secondary classroom teacher training, university-based courses and research assistantships.

Functioning in the rapidly changing communications field, the

University, West Lafayette, Indiana. The bi-state arrangement provides access to greater resources. Both universities are land-grant institutions, and the Cooperative Extension Service (CES) is an established, integral part of each university, providing a program implementation route. ●



The National Sea Grant College Program



Sea Grant is America's primary university-based coastal and marine resource program.

Operating in partnership with the federal government, the National Sea Grant College Program (NSGCP) combines research and the transfer of results to users of the nation's oceans and Great Lakes.

Comprised of 29 programs in coastal and Great Lakes states and Puerto Rico, Sea Grant fulfills its national commitment at the local level where specialists in research and education can focus on what they know best.

The programs that make up this National Sea Grant Network serve the public and private sectors in the following ways:

- Provide access to skills and resources of over 200 universities and institutions
- Fund problem-oriented research to solve urgent regional and national problems and to address issues of environmental concern
- Offer expertise in the areas of water quality, fisheries recruitment, aquaculture, biotechnology, seafood product improvement and safety, critical habitats, coastal processes and marine policy issues
- Communicate results of Sea Grant research through varied media
- Train future scientists and policy makers through research assistantships, fellowship programs, and educational programs

The NSGCP is an outreach arm of the National Oceanic and Atmospheric Administration. Sea Grant provides a link between a number of federal agencies — such as the Environmental Protection Agency, the National Science Foundation and the Department of Agriculture — and researchers, educators, business leaders and innovators. ●



The Great Lakes Sea Grant Network

Along with the wide array of amenities offered by the five Great Lakes, the regional ecosystem also has its problems.

In 1976 the Great Lakes Sea Grant Network was established to coordinate regional efforts to find solutions to these major problems. The strength of the Network is its ability to conduct interstate workshops, share talent among communicators and advisory agents, coordinate regional research efforts and share publications and audiovisuals.

Through a united effort, members of this Network can find solutions to problems using the collective strengths of each individual Sea Grant program. The six programs that make up the Network include the Illinois-Indiana Sea Grant Program, Michigan Sea Grant College Program, Minnesota Sea Grant College Program, New York Sea Grant Institute, Ohio Sea Grant College Program and Wisconsin Sea Grant Institute.

The Network also serves as a regional "think tank" to come up with new ideas in response to the changing concerns and problems of its clientele.

High lake levels and shoreline erosion have been major issues addressed in the past. More recently, the Network has taken a leading role in response to the invasion of the zebra mussel. Illinois-Indiana Sea Grant shared with the Network its findings from

a survey on zebra mussel information needs indicated by industrial and municipal water users who had been experiencing problems with zebra mussels.

Strategies were developed by outreach specialists to monitor the spread of zebra mussels. These activities have been instrumental in getting the message out to help prevent further spread.

Regional aquaculture efforts

restricting the use of the lakes' fisheries due to the health risks of eating contaminated fish.

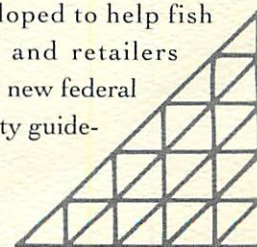
The Network response has been to sponsor research that determines sources, transport and fate of toxic chemicals in the region. Research and education also is provided on the human health risks of consuming fish, including ways to prepare fish to minimize risk of exposure to the contaminants.



coordinated by the Network have helped aquaculturists to get established and attain high profitability; legislators to develop effective state aquaculture plans; and the Midwestern public to enjoy seafood at a lower cost and at higher levels of quality.

Great Lakes water quality is a very high profile issue in the region especially as it relates to

The Network has joined forces to help understand why fish and seafood spoils rapidly and to preserve the quality and safety of seafood products. Workshops are being developed to help fish processors and retailers comply with new federal seafood safety guidelines. ●

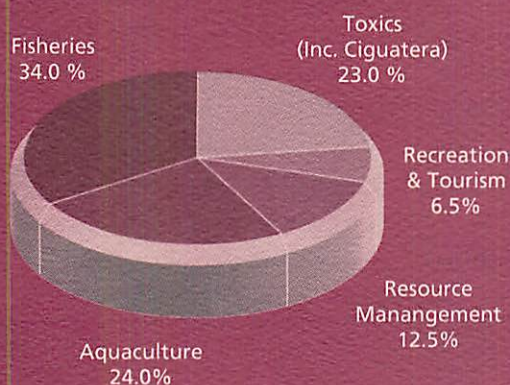


Great Lakes Sea Grant Network

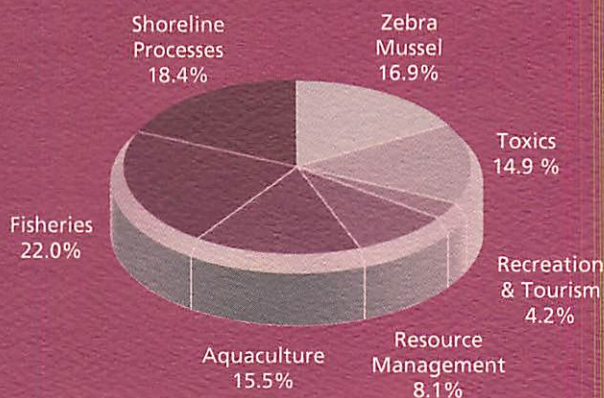


Research Fund Distribution by Programmatic Areas 1982–1992

Sea Grant Funding Only (\$965,500)



Sea Grant Funds plus Pass-Through Funds (\$1,492,000)



Sea Grant research is the nucleus from which technology transfer and communications to the general public are derived. Targeted toward local needs, Sea Grant research activities are conducted not only to seek answers to immediate concerns but to look at potential long-range problems and solutions. Sea Grant continues to respond to changing environmental conditions, addressing issues that become areas of concern.

Following the establishment of an Illinois-Indiana Sea Grant research component in 1984, a research advisory committee was established in 1986, with four priority areas identified. The original priority areas included Great Lakes fisheries, aquaculture, environmental processes, and recreation and tourism. Today research focus has been expanded to include biotechnology, shoreline protection and

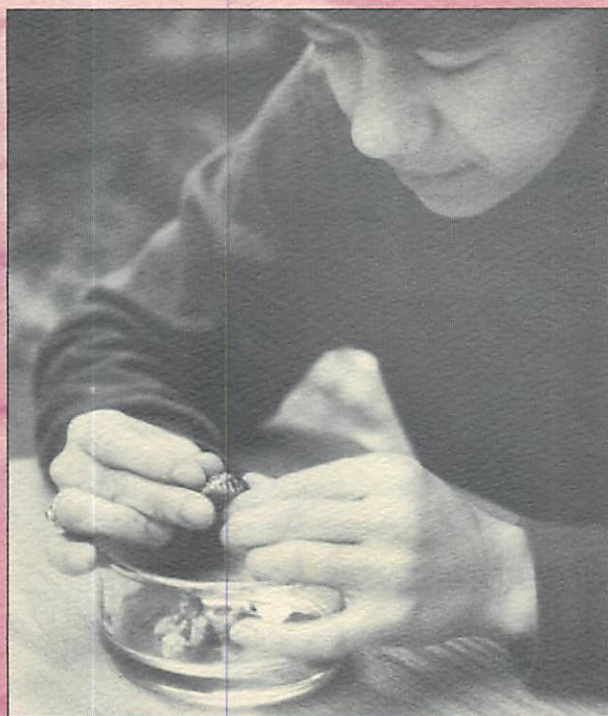
coastal zone processes, and the most recent avenue of investigation, biology and control of zebra mussels which threaten water supply intakes and native aquatic life.

Proposals for research are requested every two years. Criteria for judging proposed research projects is based upon the quality of research and relevance of each project to Sea Grant priorities. The review process is conducted by an interdisciplinary Research Advisory Committee of academia, governmental agencies and the private sector in Illinois and Indiana. To avoid duplication and insure that appropriate methodologies are employed, an additional evaluation is conducted by NOAA Sea Grant representatives.

A complete understanding of the physical, chemical and biological parameters of the Lake Michigan's environment is essential to determine the impacts of society upon the greatest freshwater supply of North America. Due to lim-

ited budgets, only a small fraction of present and future problems can be explored.

A principal benefit of research has been the defining of some problems that will have major economic consequences unless appropriate research and corrective action is undertaken. For example, research has revealed that the occurrence of a natural hazard such as high lake levels and a concurrent storm surge would create a major deterioration of the shoreline levees resulting in substantial economic loss. ●



ZEBRA MUSSELS

Sea Grant Researcher Ellen Marsden Studies Zebra Mussel Spread

Imagine waking up tomorrow morning and finding no water available from those reliable faucets to make morning coffee or take that wake-up shower That was precisely the situation that residents in Monroe, Michigan, faced when zebra mussels clogged water intake pipes. Residents were forced to go without water for two days until the intake pipes could be cleared. Magnify those problems in terms of impacts on a metropolitan population coping with major industries that can't operate . . . power plants that can't produce power . . . the list is substantial.

Ellen Marsden, Sea Grant researcher, based at the Lake Michigan Biological Station, Zion, Illinois, is targeting her work toward preventing a similar occurrence in other cities. In conjunction with other zebra mussel studies, Marsden is monitoring the locations of zebra mussels and their responses to different control measures.

"The water qualities and temperatures found in the Great Lakes and in streams and rivers throughout the Midwest and upper South appear to provide ideal conditions for zebra mussels to multiply," Marsden noted. Zebra mussels reproduce rapidly, with female zebra mussels producing up to 40,000 eggs annually.

Juvenile zebra mussels are microscopic and freefloating in the water when they attach themselves to various surfaces and colonize. The colonies form rough surfaces which interfere with the flow of water, and as the layers build up, they drastically decrease or completely clog intake pipes.

The zebra mussel invasion has the potential to cause more than \$5 billion damage by the year 2000 through its effect on water and power plant intakes. Additionally, because zebra mussels attack the base of the food web, the effect on aquatic life can be devastating. First found in the Great Lakes in 1986, zebra mussels have now migrated into rivers and streams including the Illinois, Mississippi and Ohio rivers.

"Zebra mussels have caused real problems throughout Europe," said Glenn Stout, Illinois-Indiana Sea Grant research coordinator. "Control methods remain very limited. The main method for handling the problem has been the installation of dual intake pipe systems," Stout said. "When one pipe becomes clogged, the other is used while the clogged pipe is cleared."

Chlorine, which Marsden cited as a powerful chemical, has been used routinely in control methods. "Part of the reason for the existence of the Environmental Protection Agency is to balance our need for clean water against environmental damage from chemicals. There are other non-chemical ways of controlling zebra mussels." Simply raising the temperature level of the water is an example of another control method, but one which cannot be used by some water users, including power plants where water is used for cooling purposes.

Sea Grant is cooperating with the Illinois Natural History Survey, the Environmental Protection Agency and the Illinois Department of Conservation in the search for viable control measures. ●

"The increase of zebra mussels has been on a steady, steep, upward slope, but this has to stop at some point."

Research

TOURISM AND RECREATION

Recreational Use of Lake Michigan in Indiana

A research project on marina use provided data to potential marina developers to help in determining the economic impact of monetary investment by private developers. Additional research on marina use in north-west Indiana was funded by the Lake Michigan Marina Development Commission. Sea Grant staff continue to serve as resources for private marinas and public agencies.



ENVIRONMENTAL PROCESSES

Modeling Beach and Nearshore Profile Response to Lake Level Change and Storm Wave Forcing

Any construction, most shoreline use, and major storms systems impact the normal, natural coastal zone currents and sand movement. Beginning in the mid-1800s, piers and harbors were built which disturbed the natural flow of currents carrying sand particles along the shores, enriching the beaches. Predicting future high lake level due to impacts of volcanic ash in the atmosphere and the geology of existing sand ridges of past high lake levels have been the subjects of Sea Grant studies. Planners and designers of shoreline structures have used these findings to reduce the potential for great economic losses that could result from inadequate design and construction.

Sand Deposits Disappearing

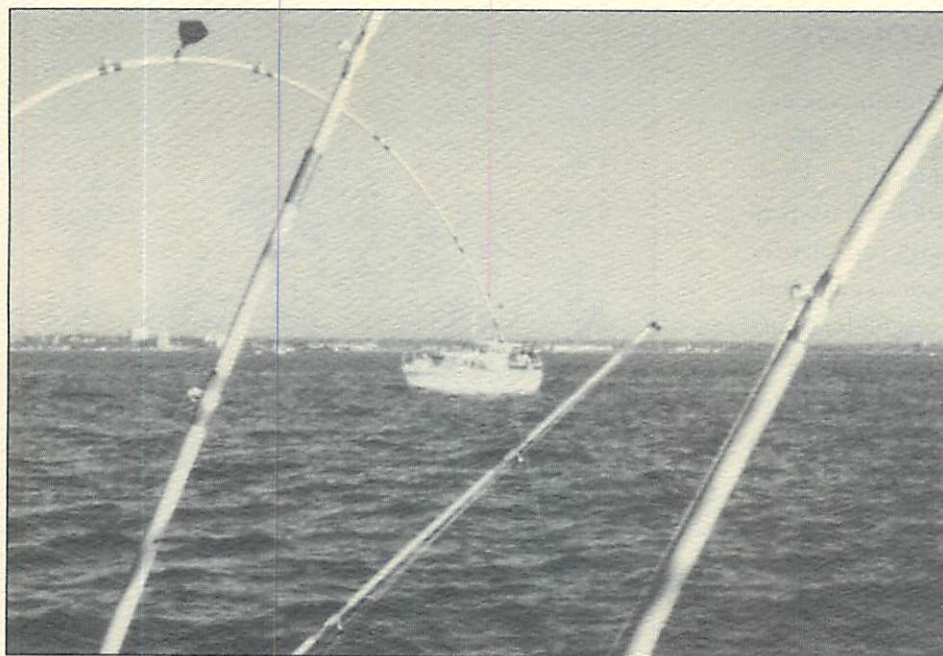
In the Chicagoland area, Sea Grant researchers have investigated the potential impacts of large quantities of sand disappearing from the nearshore zone. Sand protects existing structures from storm wave action. Recent high lake levels and loss of sand contributes to the deterioration of the shoreline protection system which was built to protect property and park land. Dredging and movement of sand to rebuild sand beaches is costly and non-productive because the normal enrichment process is no longer present. Sea Grant studies are looking at alternative means of shoreline protection.



Southern Lake Michigan Sportfishery

Southern Lake Michigan studies in 1986 and 1987 focused on angler profiles, especially income levels and frequency of use, providing statistics to the Illinois Department of Conservation and Indiana Department of Natural Resources. The state agencies utilized these statistics to better manage the tourism business in context of a diverse and complex set of social and cultural values.

Research



tions and frequency must be determined. Research that has identified spawning sites will permit further work to determine whether the eggs survive to hatch and whether the young can survive. Restoring lake trout will in turn reduce the cost of annual stocking. Information from this study will assist decision-making by the Illinois Department of Conservation and other agencies involved in rehabilitating lake trout in the Great Lakes, and benefits anglers and charter fishers, and the scientific community working on this restoration.

FISHERIES

Protection of Fish Habitat

Channelization, dredging and agricultural practices have reduced the quality of in-stream habitats for game fish in tributaries of the Great Lakes. Agricultural pollution and sedimentation affects around 50 percent of U.S. stream mileage. Improving the quality of those waters requires serious efforts to reduce sediment and chemical runoff from farmland.

Research projects investigated the relationship between farming practices and in-stream habitat quality for game fish. Results provide cost-effective techniques for improving habitat quality, and show how better stream quality can be achieved in an affordable manner. Beneficiaries of this research include those who value species diversity in the Great Lakes region; taxpayers who are relieved of some costs of stocking fish; and tourists who enjoy increased quality of the region's waterways.

Lake Trout Restoration

Restoring native Lake Michigan lake trout is the focus of an intensive effort by federal and state agencies to help stabilize the food base in the Great Lakes. To understand why lake trout are not reproducing successfully in the Great Lakes, their spawning loca-

Salmonid Diet Study

Salmonids (trout and salmon) continue to heavily consume alewives despite a decline in the alewife population. Two studies looked at the diet of salmonids on a seasonal and locational basis. Additional research on salmonid foraging behaviors helped determine what keeps salmonids from seeking other prey species. As a result, scientists and fisheries managers can make more realistic judgments to ensure the continued success of the salmonid fishery.

Survival of Yellow Perch in Lake Michigan

Yellow perch support important sport and commercial fisheries in Lake Michigan. These fisheries are vulnerable to dramatic changes in the size and abundance of this species. Researchers have developed models that assess the roles of food availability and alewife predation. Results have established a benchmark for future studies of survival, growth and recruitment of yellow perch and to help in managing this species' fluctuations. Another study provided information to predict consequences of management decisions that influence abundance of yellow perch in Lake Michigan.



AQUACULTURE BIOTECHNOLOGY

Establishment of new strains and identifying new species of fish that perform well under Midwest climatic conditions is essential for aquaculture development. Sea Grant biotechnology studies have produced genetically engineered fish with capacity for enhanced growth. These fish could grow at an accelerated rate and thus be immediately useful for aquaculture. An earlier study helped identify techniques for transferring genes which could be used to alter such traits as disease resistance, growth, thermal tolerance, and behavioral traits to produce new and useful fish strains.

WATER QUALITY

All residents of Illinois and Indiana have a stake in the "health" of Lake Michigan. The lake provides drinking water for millions of people in Illinois and northwest Indiana and offers excellent swimming, fishing and boating opportunities.

Some harbors in Illinois and Indiana have been flagged as "areas of concern" due to poor water quality and impaired uses. Toxic contaminants, which restrict use of harbors and spread into the lake, must be dealt with.

Illinois-Indiana Sea Grant has sponsored research to address these water quality concerns. The program funds those projects which will lead to increased productivity of Lake Michigan's fishery and provide cleaner water for numerous recreational activities.

Two Sea Grant studies have tackled the problem of toxic contaminants. One examined a new class of environmental damage that had been previously overlooked, focusing on the effects of sunlight on the toxicity levels of hydrocarbon pollutants. Findings showed that toxicity can increase 1,000-fold when exposed to light. Such toxicity can cause spinal cord defects in developing fish and is passed along the fish food chain.

A second study examined why the environment is not cleansing itself of a certain group of carcinogenic

All residents of Illinois and Indiana have a stake in the "health" of Lake Michigan.

chemicals called polycyclic aromatic hydrocarbons (PAH). Researchers looked at the effects of adding microorganisms to accelerate the breakdown of PAHs

for improved water quality.

Measuring the levels and effects of toxic contaminants is critical to understanding how they can best be reduced. Sea Grant research results help reveal what toxic substances exist and how they are changing over time.



Education

The impact of coastal issues — economic development, recreation and tourism, and toxic contaminants — reaches beyond coastal cities and towns to touch everyone living in the states that border Lake Michigan.

Understanding the marine environment and its contribution to the overall well-being of the region is essential to preserving a vital economy and healthy environment. With governmental commitment to improved water quality through enactment of the Clean Water Act, a growing public awareness of water-related issues and concerns has developed.

Illinois-Indiana Sea Grant maintains an education component to enhance this understanding. Education is targeted toward better management of the environment, enhancement of water-related industries, and increased marine knowledge. Education programs are built around the roles of Lake Michigan and related resources in the Great Lakes ecosystem.

Sea Grant assists in training professionals through university-based courses, laying the foundation for the development of future marine researchers and educators. Great Lakes curricula, such as *Appreciating Your Great Lakes*, designed for elementary and secondary school students, and for organizations such as 4-H clubs, is developed and disseminated. ●

WETLANDS

Sea Grant Educator Moves Wetlands Awareness into Classrooms

Sandra Lignell and Chris Pennisi both saw awareness of the wetlands issue as a critical area of education that should be addressed. Lignell is a youth educator in the Cooperative Extension Center in Countryside, where she works with Cook County residents. Pennisi, Sea Grant marine extension educator, was conducting wetlands work-

ous wetlands and what the consequences are if they are destroyed," Lignell said.

Fulfilling its Congressional mandate to support education in marine affairs through the provision of teacher training, Pennisi conducted wetlands workshops for Chicago science teachers recruited by Lignell. The workshops were a product of networking among Illinois-Indiana Sea Grant, the Cooperative Extension Service and the Chicago Board of Education. Wetlands awareness was brought to the forefront for more than 350 science teachers who were trained



shops as a part of a Sea Grant Extension project. Pennisi began presenting annual workshops incorporating essential information on the definition, value and preservation of wetlands.

"Urban residents lack knowledge about wetlands in our area, and generally are not aware of the role that wetlands play in our day-to-day lives. They need to understand their roles in preserving vari-

ous wetlands and then transferred that knowledge to their students.

"Wetlands awareness helps youth develop an understanding of and appreciation for their environment," Lignell said.

Sea Grant's marine education series, *Wetlands are Wonderlands*, has been introduced into wetlands education programs throughout the country. ●

Education

SEA GRANT FELLOWSHIPS AND RESEARCH ASSISTANTS

John Epifanio served as Illinois-Indiana Sea Grant's first fellow under the Dean John A. Knauss Marine Policy Fellowship Program. He represented NOAA and the Sea Grant program as a staff member with the 16-member Senate Great Lakes Task Force during 1990-91. The vital understanding acquired as a participant in the legislative process, particularly in the area of appropriations, provides yet another means of moving toward a marine-literate public. Sea Grant fellows return to their communities as educators and other professionals. They serve as effective supporters of a marine-literate public as well as policy makers.

Through the support of program development funding, Sea Grant graduate research assistants were able to study the economic and cultural benefits that may be derived from the resources of Lake Michigan. Resulting publications include the following:

- *Illinois Shipwrecks: The Past, The Present, The Future*, is intended to educate the general public, legislators and others on the value of shipwrecks as historical and cultural resources
- *Indiana Boating* and *The Impact of Recreational Boating in Illinois* made available a wide range of information for boaters and provided statistics on economic impacts

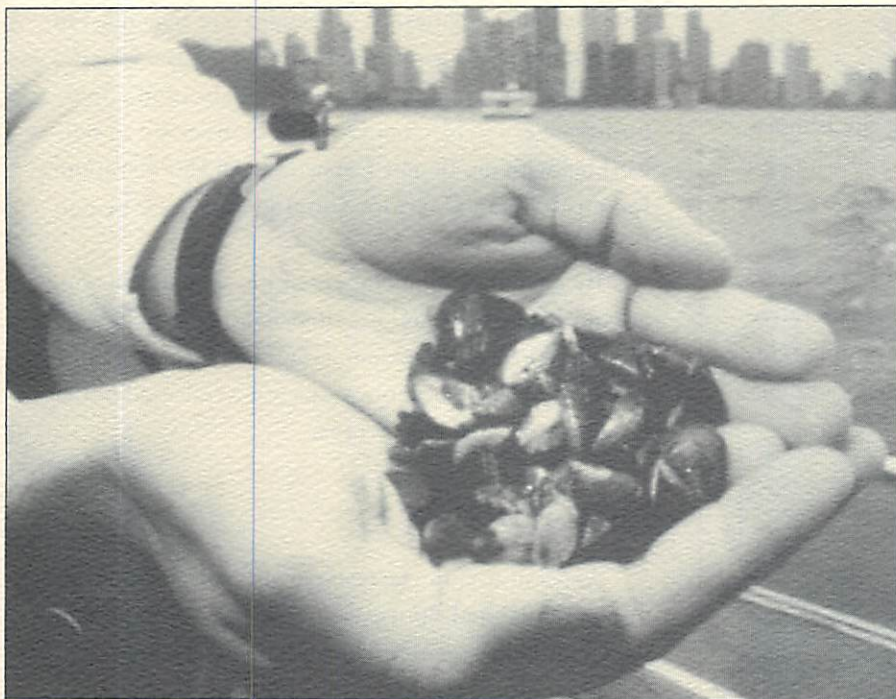
UNIVERSITY-BASED COURSES

In order to address growing public concern for the decreasing quality of water resources, it has become necessary to train specialists in aquatic animal medicine and environmental toxicology. Veterinarians and allied scientists are among those who receive this instruction.

The Envirovet program, an intensive summer course in the biology, diseases and toxicoses of aquatic animals, has been developed to respond to the need for more abundant harvests of edible aquatic animal products. Envirovet participants are able to help control contamination and diseases of aquatic animals, and provide leadership in aquatic animal health and environmental toxicology in industry, government and academia.



Marine Extension



Developing links with individual communities, identifying problems, and transferring knowledge gained from Sea Grant research to those communities are key elements of Sea Grant Marine Extension.

One aspect of the Extension mission is the provision of a link among university researchers, decision-makers, the public and agencies that use Lake Michigan and its related resources. A second aspect is the provision of training and continuing education to enable govern-

ment and private enterprises to operate more effectively.

To provide maximum benefits, information from research findings must find its way beyond the confines of the scientific community. Addressing various topics including water quality, seafood safety, zebra mussel invasion, recreation and tourism, waterfront revitalization and shoreline erosion, Sea Grant field staff and campus specialists seek to blend scientific knowledge and technical expertise. That unique blend ultimately is transferred to a broad spectrum of marine clientele.

Sea Grant field staff serve a two-fold purpose: They prompt researchers to address high profile needs in a changing environmental and economic climate, and they provide knowledge gained through Sea Grant research to people who can implement that knowledge. ●



Charterboat Industry Viability Impacts Southern Lake Michigan Communities

Closely tied to waterfront revitalization are marine-dependent industries such as charterboat operations. Sea Grant provided management workshops for charterboat operators and addressed issues that enhanced coastal economics. Extension Educator Chris Pennisi worked closely with a number of organizations and individual charterboat operators to develop educational programs on the safety of eating Great Lakes fish.

Dan Thomas, president of Great Lakes Sport Fishing Council, praised the productive efforts of Pennisi in assisting the charterboat industry, which is directly dependent upon tourism.

"She was very, very helpful. She closely coordinated an informational program and provided supporting data," Thomas said. Pennisi presented educational programs in cooperation with the Wisconsin Sea Grant Institute, Illinois Department of Conservation, Indiana Department of Natural Resources and the National Marine Manufacturers Association.

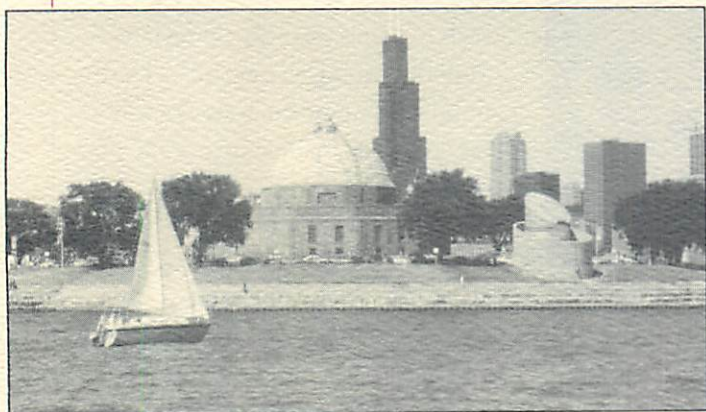


Marine Extension

TOURISM AND RECREATION

Gaining Expanded Boating Access

One concern in boating access along the Illinois-Indiana shoreline of Lake Michigan, in the Chicago area was the limited access for small boaters. Sea Grant addressed small boaters' concerns about access to Lake Michigan. The Community Boating Center, for which Sea Grant provided data and a collaborative effort, provides rental boat services to people who have met certification requirements for boat handling,



with training offered at the center. Sea Grant's cooperative efforts with marina operators and boating organizations played a role in the Chicago Park District's decision to renovate one small harbor and build four new boating centers with less costly fees, providing access for less affluent boaters.

Additionally, Sea Grant participated in assuring that small boaters' concerns were addressed in the objectives of the Illinois chapter of the National Coalition for the Advancement of Recreational Boating Facilities. Sea Grant initiated networking among varied state and community agencies, private industry and clubs to help in facilitating access for small boaters.

WATERFRONT REVITALIZATION

As a part of a coastal business initiative, Sea Grant provided educational programs for tourism, government, urban planners and water-dependent business on the implementation of various waterfront

revitalization activities. Workshops were scheduled to educate not only agencies and businesses, but also the general public about waterfront revitalization opportunities were held. Sea Grant was involved in networking with the Illinois Department of Conservation, Lake Michigan Corridor Council and the Chicago Park District.

By encouraging members of boating and fishing organizations to attend hearings held by the Chicago Shoreline Protection Commission, Sea Grant enabled concerns of those organizations to be reflected in the Commission's planning process.

AQUACULTURE

Aquaculture, the fastest-growing form of agriculture in the United States, is now taking a firm hold in the Great Lakes region. The outlook for the growth of the aquaculture (fish farming) industry in the Great Lakes region is optimistic for several reasons.

- A growing health awareness of the benefits of eating fish and other aquatic food products has increased the demand for production. The aquaculture industry will help meet this consumption demand, which has increased by 30 percent per capita since 1980.
- Seafood imports to the U.S. have jumped to almost \$10 billion per year, indicating a need for locally grown aquatic food products.
- Fish farmers in the Great Lakes region are accessible to major markets which sell their products — half of the U.S. population lives within a day's drive.

Farmers in Illinois and Indiana have been attracted to aquaculture to diversify traditional operations with the goal of increased profits to make ends meet in tough economic times. With the growth of the industry in the Midwest, local farmers can produce a greater variety of fish and shellfish — beyond catfish, crayfish, rainbow trout and salmon currently being produced in other regions of the country.

Illinois-Indiana Sea Grant has been a major resource for the development of aquaculture in both states during the past decade. The program's contributions are reflected in the following activities:



Marine Extension

1984 - Sponsored an aquaculture strategy meeting to discuss possibilities for research and extension to address needs of the emerging industry

1985 - Cooperated with the Illinois Department of Agriculture to bring together legislators and other key people to discuss long-range implications for aquaculture

1986 - Served on the Illinois Aquaculture Advisory committee; supplied information for the feasibility study to implement the state's aquaculture plan

-Published and distributed *The Illinois Aquaculture Industry: Its Status and Potential* as further background information for interested constituents

-Prepared *Aquaculture Research Priorities for Illinois*, a volume of the Illinois Aquaculture Development Plan

1987 - Passage of the Illinois Aquaculture Act, which had a major impact on the growth of the aquaculture industry in the state

1988 - Passage of the Indiana Aquaculture Act. Illinois-Indiana Sea Grant's role in this legislation was as an advisor to legislators and the industry

1989 - Sea Grant initiated its newest program focus, Aquaculture Extension

Now in its fourth year, the Aquaculture Extension program continues to address escalating interest in the establishment and operation of aquaculture facilities. The Aquaculture Extension Specialist handles daily multiple requests for highly specific and technical information.

Sea Grant's Aquaculture Extension program offers unbiased education programs to farmers, venture capitalists and others searching for alternative forms of agriculture. Through these programs attendees can make educated decisions related to entering the

aquaculture industry. In turn, by providing fish farmers with the techniques and skills they need to run an effective operation, midwestern residents also will benefit from the increased supply of high quality farm-raised fish and shellfish.

Aquaculture Programming

Aquaculture programs address varied topics to help clientele make informed decisions. These programs, which identify best management practices, ultimately benefit consumers of farm-raised fish and shellfish through:

- Wise management practices that result in higher quality fish that are safe to eat
- Knowledgeable producers who can offer fish at lower cost

Aquaculture Extension programs have taken many forms — informal phone discussions, descriptive educational materials, workshops and presentations. The aquaculture specialist conducts farm visits to assess on-site problems and provide management and operational advice.

Numerous benefits have resulted from Sea Grant workshops and educational materials on production techniques, species selection, legal requirements and the following topics:

Water Quality Requirements

Gaining a clearer understanding of the best management practices will improve the quality of the nation's lakes and streams. Maintaining the proper water quality will reduce mortality, decrease production costs and lower the market price.

Fish Diseases

Learning how to reduce fish diseases will increase income of fish farmers. Information presented on disease management and proper use of chemicals and drugs used for treatment will ensure safer products for consumers.

Cage Culture

Taking advantage of existing water resources for fish production such as gravel pits, strip mine ponds and farm ponds will allow farmers to save money by avoiding pond construction costs. As a result of cage culture workshops, 20-30,000 pounds of fish will be produced per year in Illinois and Indiana. Locally sold products are fresher and less costly to consumers.

Indoor Aquaculture Systems

Providing guidance and details about the startup and operation of indoor fish farming facilities helps potential users make informed decisions. Sea Grant's workshops addressed keen interest based on two features: Water temperature can be controlled for a 12 month growing season, and there is less chance of extraneous contaminants entering the system.



Sea Grant Broadens Pool of Knowledge to Stimulate Aquaculture Growth

A real team worker

A great motivator

Able to answer the tough questions

Respected and sought after by groups both in and outside of the state

These are attributes of Sea Grant's LaDon Swann noted by people he has served in his three years as Aquaculture Extension Specialist. Through Swann's efforts, Sea Grant has increased the interest in aquaculture by both traditional farmers and entrepreneurs.

Educating the Educators

Gary Horner and Charlie Felkner, both Extension agriculture agents in Indiana; Dennis Bowman, Extension crop systems educator in Illinois; and 19 other Cooperative Extension Service personnel have been trained to discuss the basics of getting started in the aquaculture business; the economics of fish production; and marketing possibilities. But, they look to Sea Grant as a resource when they are asked questions they can't answer.

"Aquaculture is a relatively new industry for people across the state of Indiana and a new consideration for use of some of our farm ponds," said Felkner. "And LaDon is on the cutting edge in terms of Extension for training people in this area."

Swann facilitated Horner and Felkner's participation in the intensive aquaculture training at Southern Illinois University. "It was excellent training in terms of variety of topics and quality of instruction. And the sessions provided us with information that we might not have gotten anywhere else," said Horner.

"The real highlight in working with the Sea Grant Program," said Felkner, "has been my involvement in the video, 'Something Fishy.' This production provided a better understanding about raising hybrid striped bass in cages." Swann estimates that 20,000-30,000 pounds of farm-raised fish will be produced each year in Illinois and Indiana as a result of cage culture workshops and the video.

Bowman gained valuable information on indoor system design and associated problems from a workshop on water recirculating systems, co-coordinated by Sea Grant. "I use the presentation summaries compiled by LaDon as a helpful reference when answering questions from people in my region," said Bowman.

Sea Grant's basic research on hybrid striped bass and cage culture will help Illinois and Indiana producers compete by raising premium species rather than trying to compete with the catfish market, according to Bowman.

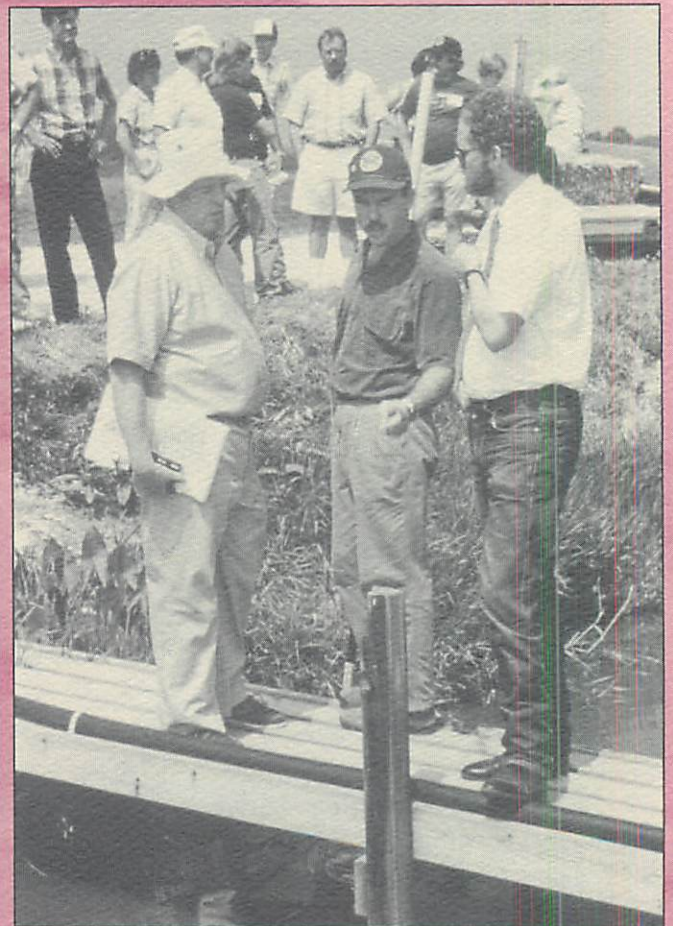
Walking Fish Farmers through the Process

Sea Grant has helped fish farmers by addressing their more technical questions related to aquaculture, such as:

What kinds of diseases do my fish have?

How can I treat them and what techniques can I use to keep my fish healthy?

What are the proper feeds to use for the species I am raising?



Marine Extension

And one of the most common questions:

What type of aquaculture should I engage in?

Bob Helt of Rochester, Indiana, asked this very question of Sea Grant and is grateful that the program got him started. Swann and Horner walked his farm and determined that ponds were the way to go for the land Helt had. Helt had considered starting an indoor aquaculture system, but after learning the pros and cons of such a system from Sea Grant he decided the expense would be too great.

By accompanying Swann to several existing aquaculture operations similar to the type he was interested in, Helt learned of potential problems and expected earning potential for growing different species of fish.

"Swann was of great help in the startup of my operation because he linked me to people involved in marketing and gave me enough information to help me select the right fish foods," said Helt. "If we have a question, we just call him, and if he doesn't have an answer then he puts us in touch with someone who knows."

In April 1992 Helt started digging ponds and now, one year later, has 13 ponds in which he raises yellow perch, bluegill, red-eared sunfish, largemouth bass, grass carp and channel catfish. "I have just begun to sell my fish and it's been excellent," said Helt. He has sold his products to a local restaurant, fee fishing enterprises for pond stocking, and to the Chicago Fish House, a major distributor of fish and seafood.

Sea Grant sponsored several workshops that helped in Helt's operation. His farm served as the field site for the cage culture workshop which encouraged discussion among producers about their problems and concerns.

Coordinating Efforts with Other Aquaculture Professionals

As a member of the board of the North Central Regional Aquaculture Center, Swann has access to research findings that will help fish farmers. For instance, Swann has taken the results from a water quality research project on effluents and has rewritten

this information in layman's terms to share with interested people.

Sea Grant has been actively involved in aquaculture organizations such as the Indiana Aquaculture Association (IAA), and Illinois Aquaculture Industry Association (IAIA). Howard Breeden, former president of the IAA and vice-president of a goldfish farm, commends Swann's leadership role in putting together educational programs for IAA members.

"He has a knack for finding information for private producers and making sure they get information they need," said Breeden. For example, Swann's coordination of workshops on indoor

aquaculture systems has educated IAA members and others on the advantages and disadvantages of using this type of production method. "Our members have realized that indoor systems can be

their chance to become a producer without needing huge land and water resources," said Breeden.

Sea Grant has also served as the go-between in obtaining regulations on chemical registration for aquaculture. Swann helps fish farmers understand the legal requirements of running an aquaculture operation.

Swann's most important contribution to aquaculture, according to Horner, is that he has increased the consciousness of the potential for aquaculture in Indiana. "Before Sea Grant began conducting its aquaculture programs, the main perception had been that aquaculture was catfish farming only," said Breeden. "But because of LaDon, many people are now trying fish farming and experimenting with it."

An Unbiased Educator

"The good thing about LaDon," said Helt, "is that he doesn't try to push anyone into aquaculture. He just tries to get you what fits your needs. LaDon explains to us that it takes a lot of work and a lot of effort to be an aquaculture producer."

The biggest complaint about Swann, mentioned time and time again, was that because he is in such demand, there aren't enough hours in the day for him to visit often enough to talk about what he knows best — aquaculture. ●

"He has a knack for finding information for private producers and making sure they get information they need."



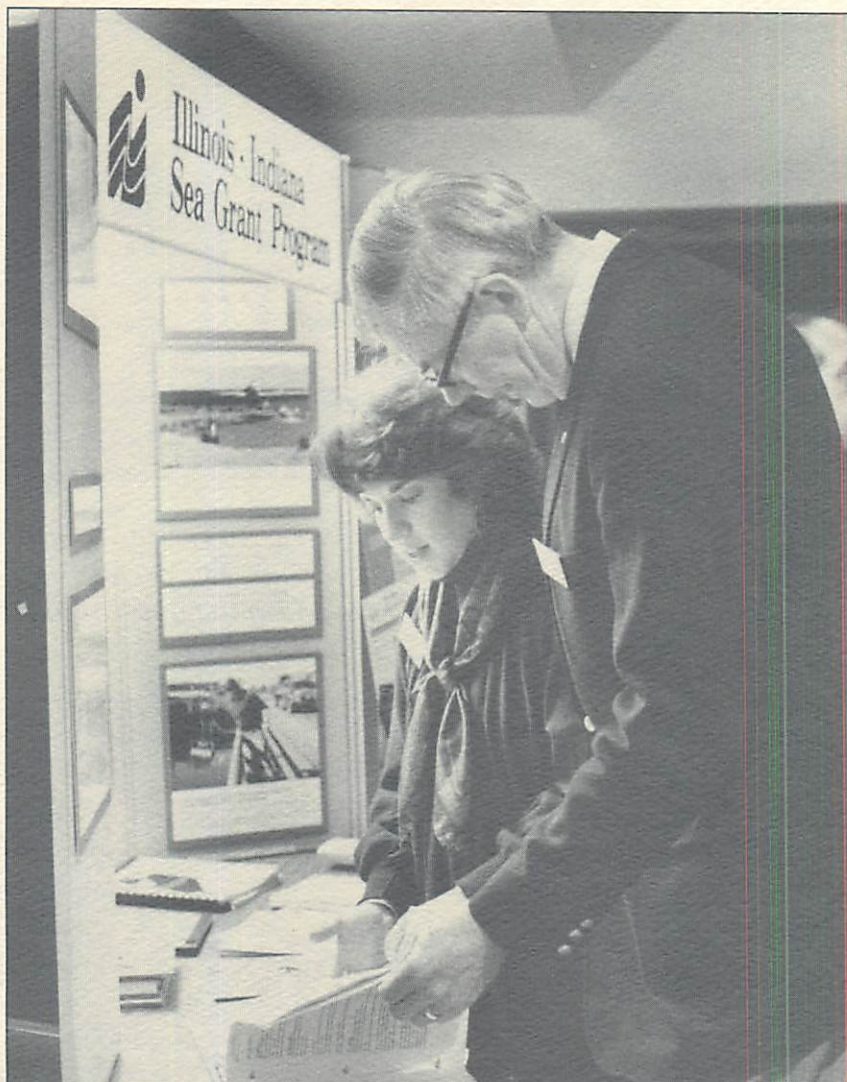
Communications

Sea Grant communicators work closely with extension and research staff to develop educational programming. Communicators develop effective communications strategies, educational publications, and edit research reports.

With the addition of a research component and expanded Extension activities, the responsibilities of the communications component have steadily increased. One part-time communications professional managed the communications office until 1990, when a second professional position was added.

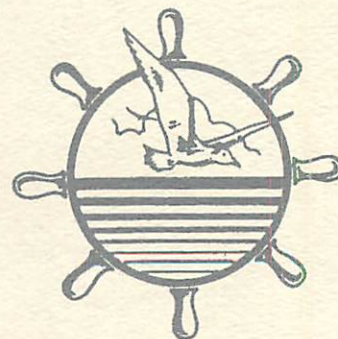
Identifying the best methods to disseminate the results of Sea Grant research and extension activities to legislators, governmental agencies, specific interest groups, and the general public, the staff responds daily to public and media inquiries on Sea Grant's role in solving coastal problems. In addition, the staff participates in the development and implementation of Great Lakes Sea Grant Network communications and Marine Extension projects.

The communicators produce a quarterly newsletter, *The HELM*, along with brochures, news releases, fact sheets, and research and educational reports. *The HELM* provides the primary avenue of regular communications on the program's activities. The format includes articles on extension activities targeted toward specific interest groups, a research in review section, a calendar promoting upcoming events, sections promot-



ing new and other relevant publications, and an overview of national Sea Grant activities.

Interactive and educational exhibits and photographic displays have been developed by the communications staff and provide an opportunity for the general public to experience hands-on learning. Exhibit sites have included the Illinois State Fair, the Governor's Conference on the Illinois River and an annual open house sponsored by the University of Illinois College of Agriculture. ●





Gulliver the Talking Gull Discusses Great Lakes Issues from a "Bird's-Eye View"

Some people might find it hard to imagine that you could learn anything from a three-foot tall talking sea gull, but Sea Grant's Gulliver "fills the bill" when it comes to teaching people about the Great Lakes.

Communicators in the Great Lakes Sea Grant Network worked together to develop this novel educational tool which has been so effective in spreading the word about the value of and problems facing our nation's largest freshwater system. Scripts were developed so that Gulliver could be conversant on many topics and issues such as pollution, loss of wetlands, history of the fishery, shipwrecks and the nutritional aspects of eating fish.

Just as McGruff teaches children to "take a bite outta crime," Gulliver effectively educates his listeners. His secret is to interact with them in an amusing way instead of just lecturing.

Gulliver is a real crowd-stopper, with a large colorful body, flapping wings, and movable head and

body. Flashing eyes and a beak that moves in synch with the voice who speaks for him are other attention grabbers.

The communications staff of the Illinois-Indiana Sea Grant Program has found this interactive exhibit much more successful at getting our message across and increasing program visibility, than a standard, static table-top display.

At his Illinois State Fair debut, Gulliver helped Sea Grant reach over 3,500 people in Conservation World's outdoor setting.

Conversations with Gulliver

go something like this:

"In the last 100 years, over half the wetlands in the Great Lakes have been destroyed. What do you think that means for gulls and other critters? It means there are only half as many places for us to eat, raise our young and find a quiet place to sleep. Think about it; you wouldn't like it if someone filled your bedroom with water, would you? But we need the water where we live. And draining a wetland drives us out of our homes just as flooding your house would make you leave."

Just as McGruff teaches children to "take a bite outta crime," Gulliver effectively educates his listeners. His secret is to interact with them in an amusing way instead of just lecturing.

Sea Grant's Gulliver also has educated over 10,000 people in two annual visits to the University of Illinois College of Agriculture Open House. And he has frequented museums, grade schools, boat shows and nature centers in Minnesota, Michigan and Ohio.

Recently the Sea Grant programs donated Gulliver and his Great Lakes repertoire to the Indiana Dunes State Park Nature Center. This permanent setting will allow tens of thousands of visitors to discover the beauty and value of the Great Lakes, and at the same time, learn what they can do to contribute to a healthy environment. All they have to do is "Gab with Gulliver." ●

Looking Ahead

Sea Grant will continue to help individuals in making decisions about future use of marine and coastal resources. Research, education and training, and technology transfer will be employed in providing that assistance.

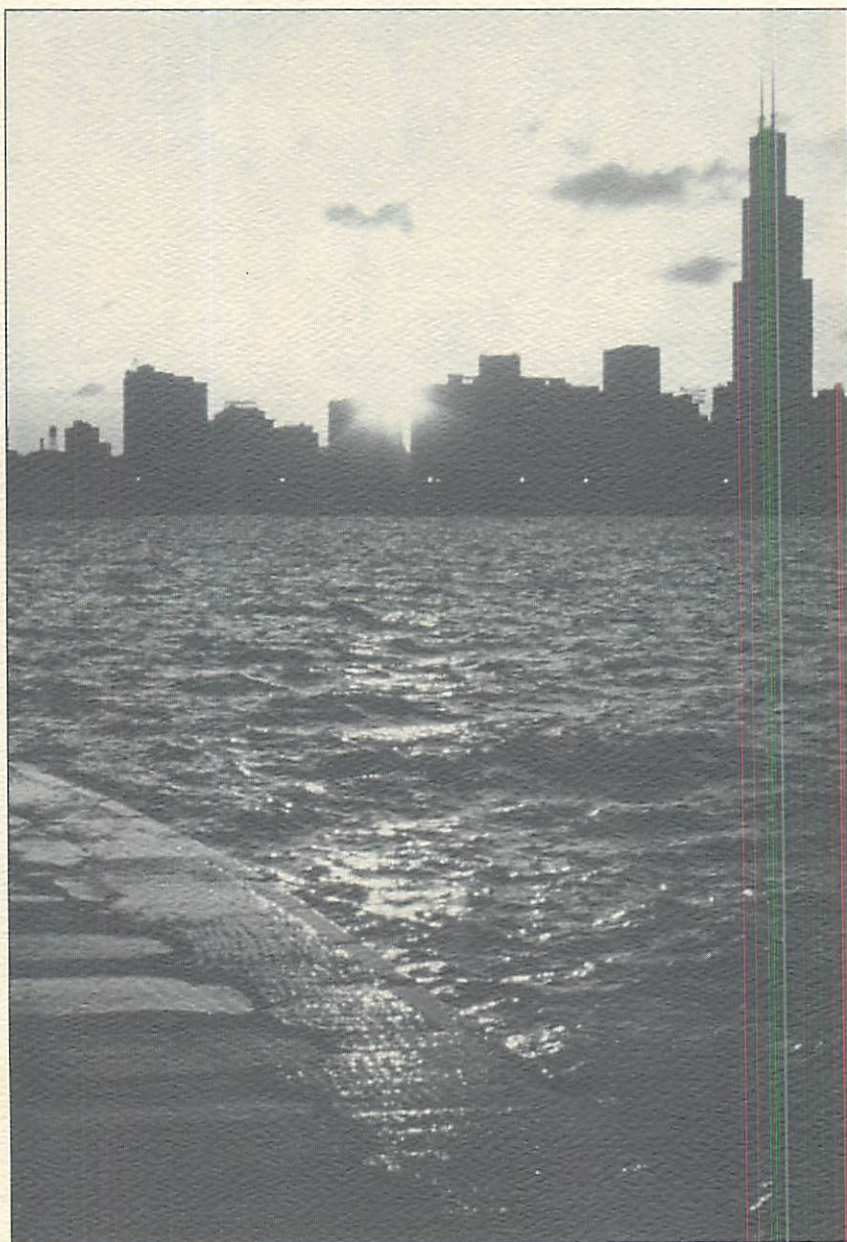
The focus in the next decade will be on solving coastal and environmental problems, improving commercial competitiveness, creating new products and markets, helping to manage and enhance natural resources, ensuring public health and safety and developing the aquaculture industry.

The Illinois-Indiana Sea Grant Program will continue to focus on areas as in the past, responding to national initiatives or to Great Lakes issues that have yet to surface. Long term problems of water quality continue to be a high profile concern.

The program recently created a partnership with the Lake Michigan Biological Station at Zion, Illinois, which provides a valuable resource as a research site.

The Biological Station staff will serve as a source of information, and Sea Grant researchers will have increased access to Lake Michigan.

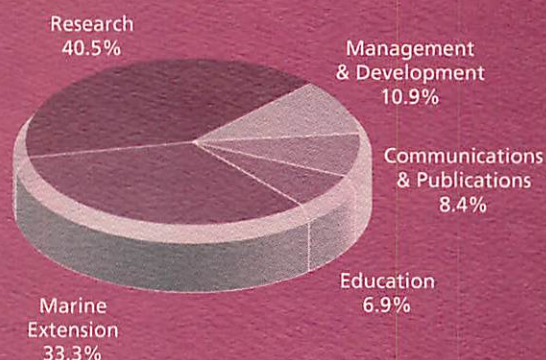
A new agreement between the University of Illinois and Purdue University raises the Sea Grant partnership to the chancellor/president level. The upgraded level serves as a stepping stone toward the program achieving designation as a Sea Grant College, the highest national Sea Grant level of recognition. ●



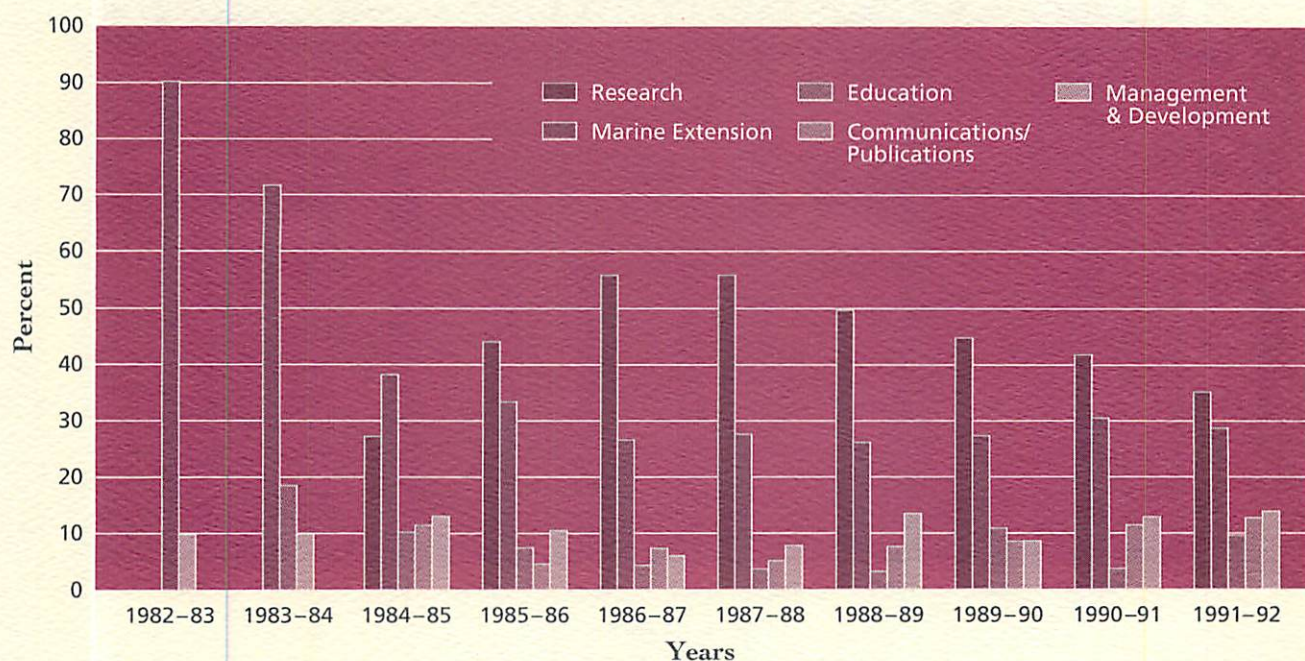
Budget

From a rather inauspicious start as a Marine Extension project, with a first-year budget of \$80,500, the program's budget has grown to \$375,700, in primary Sea Grant funds for the fiscal year 1992. This growth has occurred during a period when the National Sea Grant budget has been level funded by Congress, or actually operated on reduced funding. The NOAA Office of Sea Grant has been very supportive of the Illinois-Indiana Sea Grant Program both financially and programmatically, which has allowed the program to grow incrementally, if not astronomically.

Percentage of Sea Grant Funds by Component 1982–1992



Percentage of Sea Grant Funds Allocated to each Component 1982–1992

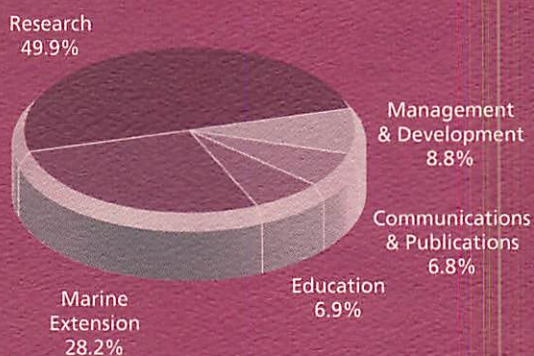


Budget

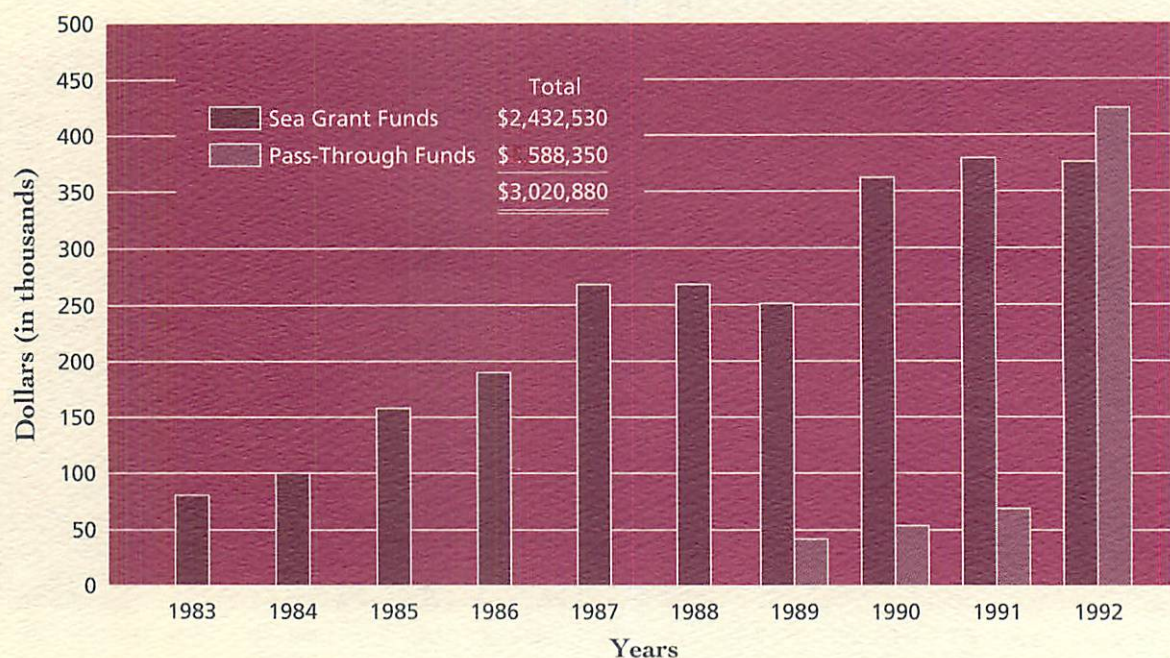
The program also has been very successful in obtaining funding from other sources. This funding included "pass-through funds" from the U.S. Geological Service (\$274,300); U.S. Environmental Protection Agency (\$19,890); and Non-indigenous Species Act (\$294,110). A total of \$3,020,880 has come to the Illinois-Indiana Sea Grant Program from Sea Grant funds and other pass-through funds.

During the first ten years of the program, no recurring university or state dollars were budgeted. All matching funds from the grantee have been primarily in the form of personnel time allotted with small contributions in the form of services and limited direction of indirect cost recovery funds for specific projects.

Percentage of All Funds by Component 1982-1992



Sea Grant plus Pass-Through Funding 1982-1992



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The Illinois-Indiana Sea Grant Program appreciates the contributions of the following former staff members. Their valuable dedication and service to the program helped it grow into the multi-dimensional program that it has become in its ten years of existence.

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Back row, Swann, O'Leary, Espeseth, Stout
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