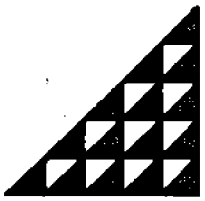

GREAT LAKES SEA GRANT NETWORK

ILLINOIS-INDIANA · MICHIGAN · MINNESOTA · NEW YORK · OHIO · WISCONSIN



# A Regional Network Serving the Nation

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# A Regional Network Serving the Nation

## Sea Grant and the Great Lakes

Sea Grant — a unique partnership of public and private sectors that combines research, education and technology transfer for public service — is a national network of universities meeting the changing environmental and economic needs of Americans in coastal ocean and Great Lakes regions.

Sea Grant has an outstanding record of achievement in transferring the results of university research to a wide range of audiences and giving special assistance to coastal communities, businesses and individual citizens. A 1981 analysis estimated that the *annual* benefits to the national economy from Sea Grant-sponsored research and outreach surpassed the federal government's *total* investment in the program over the preceding 12 years. By 1987, that value had more than tripled to $842 million. Congressional committees have repeatedly cited Sea Grant as one of the most efficient and cost-effective programs funded by the federal government.

Through its network of Advisory Service agents and its use of modern communications and education techniques, the Great Lakes Sea Grant Network plays a central role in supplying the region and the nation with usable solutions to pressing problems and providing the basic information needed to better manage Great Lakes resources for present and future generations of Americans.

## Zebra Mussels and Other Nonindigenous Species

The introduction of nonindigenous aquatic species via the ballast water discharges of transoceanic ships is a global problem. A recent Oregon Sea Grant study showed that Japanese ships discharged some 250 different species of exotic aquatic plants and animals into U.S. Pacific Coast waters, and many of the 130 nonindigenous species in the Great Lakes arrived recently in the ballast of trans-Atlantic ships.

The most notorious recent example is the Eurasian zebra mussel. First discovered in Lake St. Clair near Detroit in 1988, this small, barnacle-like mussel rapidly spread to all five Great Lakes, forcing lakeshore communities and industries to spend millions of dollars to unclog their water intakes. The mussel has since spread to seven major rivers and several inland lakes spanning a 12-state area, and it threatens to spread across most of North America.

The Great Lakes Sea Grant Network has led the region's response to the zebra mussel — initiating sampling programs to monitor the mussel's spread; conducting research and workshops on control strategies for affected industries and municipalities; and establishing a national research information clearinghouse. The network has also produced and distributed a wide range of technical and public information materials about the mussel and other exotic species.

The knowledge and experience gained by the Great Lakes Sea Grant Network is now being transferred to affected coastal and inland states via other Sea Grant programs, resource management agencies and the Cooperative Extension Service.

## Freshwater Aquaculture and Seafood Safety

Aquaculture ("fish farming") in the Great Lakes region is on the threshold of realizing its potential for significant food production. Hundreds of fish farmers throughout the region are already raising a variety of panfish, baitfish, and cool- and warm-water game fish. Fisheries management agencies throughout the region depend on aquaculture to support the Great Lakes sport fisheries. Lake Michigan's premier trout and salmon fisheries are almost entirely maintained by stocking hatchery-raised fish, as are many inland fisheries.

Working closely with the USDA's North Central Regional Aquaculture Center, Great Lakes Sea Grant scientists are developing and refining techniques for culturing perch, walleye, whitefish and other cool- and cold-water species of fish specially suited to northern climates and freshwater systems. Sea Grant aquaculture specialists are actively transferring this information to both the private and public sectors via technical support and direct one-to-one assistance. Such research and outreach are critical to realizing the region's aquaculture potential.

Sea Grant Advisory Service specialists and field agents have a long record of assisting the Great Lakes commercial fishing industry. Currently, the Great Lakes Sea Grant Network is developing training materials and workshops to help the region's commercial fishers, fish processors and marketers comply with federal seafood safety guidelines.

Sea Grant seafood scientists in the Great Lakes region's Big 10 universities have provided major breakthroughs in our understanding of why and how fish and other seafoods spoil so rapidly, and in developing new processing and packaging techniques to preserve the quality and safety of seafood products to the benefit of both consumers and the U.S. seafood industry. This research and outreach is pivotal to providing consumers nationwide with a safe, high-quality supply of seafood.

## Fisheries Management

The invasion of exotic species and devastation of native fish stocks have made the Great Lakes a natural laboratory for fisheries management research. Because top predator populations are sustained almost entirely by stocking, fishery managers are able to exert extremely powerful top-down control over the lakes' food webs. However, this management is plagued by uncertainties about predator-prey interactions and the stability of key fish populations.

Using an ecosystem approach, Sea Grant research provides resource managers with essential information about the Great Lakes food web, predator-prey dynamics and the life histories of key fish populations on which to make stocking decisions. Great Lakes Sea Grant scientists have developed computer models of fish bioenergetics to forecast fish growth in lake, river and ocean environments based on the availability of prey and a variety of physiological factors. Sea Grant Advisory Service personnel are now teaching fish managers throughout the United States and abroad how to use this powerful new management tool. Such

tools and knowledge can help managers halt the over-exploitation of U.S. fisheries resources and rebuild stocks to the level needed for increased sustainable landings.

### Toxic Contaminants

Though larger in area than some states, the Great Lakes have a very limited capacity for assimilating toxic contaminants from municipal and industrial waste discharges and farmland runoff. First DDT and mercury, then PCBs and a variety of other toxic chemicals have been found in Great Lakes fish at levels high enough to severely restrict use of the lakes' fisheries due to the human health risks of eating the fish.

Great Lakes Sea Grant scientists are national leaders in determining the sources, transport and fate of toxic chemicals in the environment; the human health risks of consuming contaminated Great Lakes fish, and ways to trim and cook fish so the risk of exposure to these contaminants is minimized.

Toxic contaminants continue to be a major concern. The region's Sea Grant programs are major players in the development of Remedial Action Plans mandated by the U.S.-Canadian International Joint Commission for cleaning up the most severely polluted 43 "Areas of Concern" in the Great Lakes basin.

Growing concern about coastal pollution and the discovery of similar toxic contaminants in ocean fish makes this Great Lakes Sea Grant expertise in contaminants research and consumer education a national asset.

### Marine Engineering

The Great Lakes and oceans serve many practical needs for the United States and its citizens, including the large-scale transport of bulk commodities and manufactured goods, recreational opportunities, coastal living environments, and oil, gas and mineral supplies. The utilization of lake and ocean resources involves the construction and maintenance of many structures — harbors, locks, canals, marinas, breakwaters, shore protection and water intakes — and the capability to operate ships and marine equipment in all kinds of weather conditions.

Resourceful, efficient use of Great Lakes and ocean resources requires the application of many engineering disciplines and the use of myriad scientific and mathematical principles to design and construct ships and recreational craft, docks, offshore work platforms and related equipment, as well as to develop technologies for combating coastal erosion, storm wave damage and pollution. Great Lakes Sea Grant researchers and outreach specialists are actively involved in many aspects of marine engineering important to the utilization of Great Lakes and ocean resources.

### Education

Sea Grant assists in training a wide range of professionals through university-based courses, laying the foundation for the development of future marine researchers and educators. Sea Grant research assistantships help support hundreds of students financially while also providing valuable hands-on research experience and training in a variety of academic disciplines — oceanography, limnology, marine and coastal engineering, various life sciences, earth sciences and even social sciences, including resource economics and law.

Sea Grant also supports the development of K-12 curricula for teachers and a host of adult education materials about the Great Lakes and oceans that contribute to the environmental education and general scientific literacy of Americans nationwide.

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