

2000 ANNUAL REPORT



GREAT  
LAKES  
PROTECTION  
FUND

G R E A T  
L A K E S  
P R O T E C T I O N  
F U N D

The mission of the Great Lakes Protection Fund is to identify, demonstrate, and promote regional action to enhance the health of the Great Lakes ecosystem.

In 1989, the Governors of the Great Lakes states created the Protection Fund to help them protect and restore their shared natural resources. The Fund is the first endowment created to benefit a specific ecosystem. It is designed to support the creative work of collaborative teams that test new ideas, take risks, and share what they have learned. It is a source of support for groups that value innovation and entrepreneurship, learn by doing, and focus on tangible benefits for the Great Lakes ecosystem. Seven Great Lakes states have contributed \$81 million to the Fund's permanent endowment. Through December 2000, the Fund had committed over \$64 million to regional initiatives and in support of local priorities.

The Fund makes grants, loans, program related investments, and convenes experts to accomplish its mission. By the end of 2000, the Fund had made a total 173 grants and program related investments, representing a \$34.5 million commitment to protecting and restoring the ecological health of the Great Lakes ecosystem. Additionally, the Fund had returned over \$30.3 million to its seven member states to support their Great Lakes priorities.

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THE GREAT  
LAKES  
PROTECTION  
FUND IN  
2000

The Governors of the Great Lakes states created this corporation to protect and restore the ecological health of the Great Lakes. They have charged the Board and staff with two major responsibilities to accomplish that task. First, responsibly invest the endowment to generate income for current and future projects. Second, allocate investment income to projects that will return the greatest benefit to the ecosystem. In response, during calendar year 2000, the Fund generated over \$20 million in income from its endowment. The Fund also increased its regional portfolio of

projects to over \$16 million, the largest amount in the Fund's history. Additionally, the Fund returned over \$6 million to its member states in support of their Great Lakes priorities and convened practitioners who are testing strategies to improve ecological health by restoring more natural flow regimes in locations throughout the basin.

At the end of calendar year 2000, the Fund had four major categories of investment in its regional project portfolio. These categories included: preventing biological pollution, restoring natural flow regimes, creating markets for environmental



PHOTO COURTESY OF SEAWIFS PROJECT, NASA/GODDARD SPACE FLIGHT CENTER AND ORBIMAGE

The Fund increased its regional portfolio to over \$16 million to protect the health of the Great Lakes ecosystem, the largest amount in the Fund's history.

improvement, and grant making in response to general guidelines. These areas of programming provide the best chances to protect the health of the ecosystem, restore ecological integrity where it has been damaged, create self-sustaining mechanisms to increase ecological health, and explore new issues.

During 2000, Fund grantees created new approaches to conserving the ecological values of forested land, designed new means of assessing the effectiveness of measures to combat biological pollution, created a marketplace to reduce nutrient enrichment

of one of the basin's largest tributary streams, and disseminated a variety of field-tested techniques that allow the basin's land to be used in ways that make the basin's waters healthier. Also in 2000, new projects were added to characterize the techniques available to manage the threat of exotic species introductions, better understand the basin's water resources, and identify how we can more efficiently invest in watershed restoration.

#### DURING 2000, THE FUND MADE INVESTMENTS TO:

- PROTECT THE HEALTH OF THE ECOSYSTEM
- RESTORE ECOLOGICAL INTEGRITY
- CREATE SELF-SUSTAINING MECHANISMS TO INCREASE ECOLOGICAL HEALTH
- EXPLORE NEW IDEAS AND EMERGING ISSUES

P R E V E N T I N G  
B I O L O G I C A L  
P O L L U T I O N   P R O T E C T I N G   E C O S Y S T E M   H E A L T H

**B**iological pollution, the introduction and spread of non-native species, has significantly altered the physical, biological, and chemical fabric of the Great Lakes ecosystem. These non-native species impact the Great Lakes, as well as other water bodies, in ways distinctly different from chemical pollution. Over time, the impacts of many chemical pollutants gradually decrease as they degrade or are buried in sediments. But once non-native species, sometimes called biological invaders, are established, their impact does not decline.

In fact, their numbers expand over time multiplying impacts to the ecosystem.

It is widely believed that most aquatic non-native species were introduced to the Great Lakes through the ballast water of ocean-going vessels. Ships carry ballast water to adjust draft and trim, thereby increasing their stability and fuel economy. Organisms may be drawn into ballast tanks in foreign harbors and then released into the basin when ballast water is pumped out. These non-native organisms include fish, algae, and invertebrates.

ONCE ESTABLISHED, NON-NATIVE SPECIES SUCH AS THE ZEBRA MUSSEL AND THE ROUND GOBY MULTIPLIED AND SPREAD RAPIDLY, IMPACTING THE GREAT LAKES ECOSYSTEM. MANY OF THESE SPECIES WERE INTRODUCED BY BALLAST WATERS FROM OCEAN-GOING VESSELS.

## Round Goby (*Neogobius melanostomus*)



PHOTO COURTESY OF GLNPO

Even ships entering the Great Lakes with no ballast on board (so-called NOBOB vessels) may also be carrying invasive species. When water has been pumped out of a vessel's ballast tanks, some water and sediments are left behind in the tanks. Organisms can become trapped in the water and sediment remaining in the ballast tanks. These organisms can be released into the Great Lakes when the tanks are filled and emptied during travels between Great Lakes ports.

Since 1996, the Great Lakes Protection Fund has been supporting strategies to prevent ballast-mediated biological pollution. Fund grantees have demonstrated the practical application of several different technologies, which, either singly or in conjunction with one another, can significantly reduce the potential number and types of non-native aquatic organisms inadvertently brought into the



PHOTO COURTESY OF GLNPO

## Zebra Mussels (*Dreissena polymorpha*)



PHOTO COURTESY OF DAVID REID, GLERL

Dr. Tom Johengen of the University of Michigan entering an empty ballast tank to collect residual water and sediment samples.

Great Lakes basin. In 2000, these grantees have further improved the methods to measure the effectiveness of various treatment technologies, and began a design competition for low cost solutions for the shipping community to use to prevent the introduction of non-native species. The commercial shipping industry has been a strong supporter of this work and has provided vessels to test these technologies in a “real world” environment.

Also in 2000, the Fund supported a multi-national project team to characterize the biota carried in NOBOB vessels and assess the effectiveness of various management practices to reduce the introduction of non-native species. This team will sample the sediments and waters left in empty ballast tanks of ships visiting Great Lakes ports. The project will test the viability of organisms collected from those tanks to characterize the risks posed by NOBOB ships. The team will also sample ballast tanks during ships’ transoceanic journeys to

A multi-national project team is evaluating the viability of organisms, such as zooplankton resting eggs and newly hatched embryos, in residual mud and water collected from NOBOB ballast tanks.

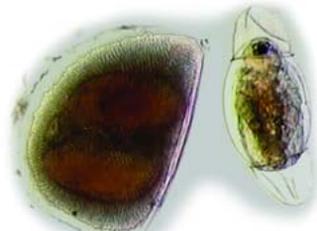


PHOTO COURTESY OF SARAH BANDONI, UNIVERSITY OF WINDSOR

evaluate and monitor the effectiveness of different open-sea ballast exchange techniques.

The Fund also supported an effort to minimize impacts of the non-native sea lamprey. This invasive species has significantly altered the structure of Great Lakes fish communities and how material and energy move through the ecosystem. Although controlled in many places, the sea lamprey still reproduces largely unchecked in a few places such as the St. Mary's River

between Lake Superior and Lake Huron. These remaining populations continue to be a significant fisheries management problem in the upper Great Lakes. Fund grantees are exploring non-chemical controls methods that, if effective, will help control the remaining reproducing populations of sea lamprey and minimize impacts on the ecosystem.

A team at Michigan State University is exploring innovative ways to control remaining sea lamprey populations in the Great Lakes.



PHOTO COURTESY OF GREAT LAKES FISHERY COMMISSION

R E S T O R I N G  
N A T U R A L  
F L O W  
R E G I M E S A “MASTER VARIABLE” FOR ECOSYSTEM RESTORATION

**F**low regime—where water moves, how it moves, when it moves, and how those movements change over time—determines the health of tributary and coastal ecosystems. The health of tributary and coastal systems, in turn, determines the health of the Great Lakes.

Where, how and when water moves, and how those movements change over time, form a pattern that dictates how materials are transported, determines how energy is distributed, and provides important

biological cues that influence spawning behavior and the movement of fish and other animals. Ecological systems are healthiest when this pattern of water movements is close to that in which the resident biota evolved. No single element of this pattern—low flow conditions, high flow conditions, flashiness, etc.—is a sufficient surrogate for all of the other components of flow regime.

Historically, the basin’s flow regimes have been significantly modified by changes in

WHERE WATER MOVES, HOW IT MOVES, WHEN IT MOVES, AND HOW THOSE MOVEMENTS CHANGE OVER TIME DETERMINES THE HEALTH OF GREAT LAKES AQUATIC ECOSYSTEMS.

PHOTO COURTESY OF SARA CREQUE, UNIVERSITY OF MICHIGAN



Response of fish communities to restoration of natural flow regimes will be tested at field sites such as this on the Manistee River in Michigan.

land use, water withdrawals, and the placement of structures such as dams and levees. Precisely because of these changes, significant opportunities exist within the basin to restore more natural flow regimes and re-connect tributaries to coastal areas of the Great Lakes. These restoration opportunities could significantly improve the basin's ecological integrity.

Fund grantees are testing the idea that a significant improvement in the basin's ecological integrity does not require a return to pristine or pre-settlement conditions. They are working to identify

what significant long-term ecological gains can be made by selectively restoring a more "naturalized" flow regime in several key places. By taking advantage of the synergies inherent in these systems, they are exploring how to achieve results greater than the sum of their individual actions.

This portfolio of thirteen grants is implementing flow regime restoration strategies at nearly 100 locations throughout the Great Lakes basin. In October of 2000, a workshop was held in

Restoration of natural flow regime in a coldwater stream in the headwaters of the Sheboygan River, Wisconsin will also restore habitat for brown trout.



PHOTO COURTESY OF S.D. MACKEY, GLPF

Evanston, Illinois to bring together these project managers and other experts actively involved in ecosystem restoration projects in the basin. This workshop allowed team members from the various projects to share their successes, help each other avoid mistakes that had been made, and begin to chart out a flow regime restoration strategy for the basin.

Also in 2000, the Fund supported a two-year project to systematically inventory sources of information on the status of the waters of the Great Lakes ecosystem, on

how those waters are being used, and on the ecological consequences of those uses. This project builds on the Great Lakes Governors' commitment to coordinated management of the waters of the Great Lakes as well as the success of the initial flow restoration work described above. This project is designed to identify critical baseline information. It is being undertaken in anticipation of a new regional agreement that provides a shared, resource-based, water use decision standard and a new mechanism to implement it. The project team includes the Great Lakes Commission, each of the Great Lakes states and provinces, the Council of Great Lakes Governors, USGS, NOAA, the Army Corps of Engineers, and Environment Canada.



PHOTO COURTESY OF S.D. MACKEY, GLPF

Restoration of natural flow between ground and surface waters enhance coastal wetlands and maintain diverse nearshore habitats in Door County, Wisconsin.

CREATING  
MARKETS FOR  
ENVIRONMENTAL  
IMPROVEMENT **BUILDING SELF-SUSTAINING STRATEGIES**

A market is where two or more parties come together and exchange items of lower value for ones of higher value. A market can be a place, such as a grocery store or “farmers’ market” or it can be a virtual space like eBay—the internet-based auction site. Markets are powerful because each participant—both the buyer and the seller—are better off after the transaction than they were beforehand. It is this feature of markets that make them flourish. Because of the win-win nature of the transactions, markets seem to emerge spontaneously.

The Fund has been assembling a suite of projects to test the notion that the Great Lakes basin ecosystem can also benefit from certain transactions among willing buyers and sellers.

In 2000, work was completed on two market-oriented approaches to improving Great Lakes health. A team led by The Nature Conservancy developed a new conservation tool called The Forest Bank. A landowner “deposits” timber harvesting rights in the bank and receives dividend

FUND GRANTEES HAVE HARNESSSED MARKET FORCES TO  
MANAGE GREAT LAKES FORESTS AND WATERSHEDS IN WAYS  
THAT PROTECT THE GREAT LAKES ECOSYSTEM.

payments and can withdraw the cash value of the deposited rights at any time. The rights to manage the timber, however, remain with the bank. The forested land is managed in a watershed friendly fashion in perpetuity. This market-oriented approach is spreading beyond the Great Lakes. Such banks, while still in development in the basin, have sprung up in Virginia, southern Indiana and Arkansas.

In the second project, a team led by the Center for Neighborhood Technology has built the Great Lakes Energy Network. The network has successfully restricted the ability of the electric utility industry to emit sulfur dioxide and a host of other pollutants by encouraging the use of energy efficient technologies and identifying how a portion of the savings attributable to lower energy bills can be used to purchase emission allowances on the open market. A pilot project in several basin school districts has retired the rights to emit 17,715 tons of pollutants each year.



PHOTO COURTESY OF S.D. MACKEY, GLPF

Fund-supported teams are developing and testing market tools to reduce atmospheric emissions and reduce pollution into our rivers and Great Lakes.

An on-going project has removed over 2000 pounds per year of nutrient pollution from the Kalamazoo River, a tributary of Lake Michigan. This project serves as the test bed for a new system of water quality trading rules in Michigan and as the hub of a national network of water quality trading professionals. Unlike systems that depend on creating property rights in pollution, this project is testing whether interests in pollution cleanup—like the pounds of pollution removed from the river—can be bought, sold and banked.

Also in 2000, the Fund invested in a new effort to create and test new financial incentives to support watershed-friendly activities in the Great Lakes. The Institute for Agriculture and Trade Policy is leading a team to identify a range of financial and institutional mechanisms to induce watershed-friendly practices in the basin's farms, forests and other working lands, recruit investors to underwrite those mechanisms, and design pilot projects to test the concept.



PHOTO COUTESY OF S.D. MACKEY, GLPF

E X P L O R I N G  
N E W  
I D E A S

In addition to the three areas of interest discussed above, Fund grantees remained active on a variety of projects, each exploring how the Great Lakes ecosystem can be made healthier. The Great Lakes Community Foundation Environmental Collaborative was working to grow environmental programs in twenty-seven community foundations along the shores of the Lakes. By the end of 2000, this network had leveraged Fund support over

sixteen-fold. Also with Fund support, another network of over 100 farm families had become engaged in whole farm planning—specifically considering how to reduce agriculture’s impact on the waters of the Great Lakes while reducing expenses. Still another project team developed, tested and disseminated an assessment procedure that identified how well watershed-friendly developments succeeded in reducing impacts on the basin’s water resources. This procedure is now in the hands of hundreds of developers in the basin.

THE FUND WELCOMES INNOVATIVE PROJECTS  
THAT EXPLORE NEW IDEAS AND IMPROVE THE  
ECOLOGICAL WELL BEING OF THE BASIN.

2 0 0 1  
A N D  
B E Y O N D

In future years, the Fund will continue to invest the endowment's proceeds in a portfolio of projects that test how management actions that target master variables—where minor changes significantly affect ecosystem integrity—can efficiently improve the health of the Great Lakes ecosystem. Efforts to prevent biological pollution and create markets for environmental improvements will continue to be a focus of the Fund's activity. Other master variables, which might receive increased attention in Fund programming, could include the movement of financial capital and long-range transport of pollutants through the atmosphere.

The Fund remains open to any project that tests how such master variables can be systematically acted upon to restore ecosystem integrity and prevent losses where the ecosystem's health is threatened.

The Fund also knows that there will be project opportunities in areas that we have not anticipated. The Fund welcomes innovative projects that improve the ecological well being of the basin. Characteristics of successful projects include tangible ecological outcomes, a pragmatic work plan, and a project team that includes all affected interests. Project teams are encouraged to contact the Fund and discuss their ideas.



PHOTO COURTESY OF S.D. MACKEY, GLPF

G R A N T S  
A W A R D E D  
I N 2 0 0 0

The Great Lakes Protection Fund's Board of Directors approved the following projects, representing a \$2,347,000 investment in the future of the Great Lakes. These projects continue the Fund's efforts to promote Restoration of Natural Flow Regimes, prevent Biological Pollution, and use Market-based Mechanisms to enhance and restore the health of the Great Lakes ecosystem.

For more information, contact the project manager listed below:

**\$1,123,000** Cooperative Institute for Limnology and Ecosystem Research

A multi-national project team led by the Cooperative Institute for Limnology and Ecosystem Research will perform a series of laboratory experiments and ride aboard ships during their transoceanic journeys to take samples and resolve two critical issues concerning the introduction of invasive species into the Great Lakes ecosystem via ships—the risks posed by empty ballast tanks and the effectiveness of open sea ballast exchange. It is

estimated that 75 to 95 percent of the vessels entering the Great Lakes declare "no ballast on board" (NOBOBs) and are exempt from regulations set to reduce the risk of exotic invasions. This project will provide 1) the first scientifically-based characterization of the biological contents of ballast tanks in NOBOB ships, 2) the first evaluation of how ballast management practices affect the biological and sediment contents in NOBOB vessels, and 3) the first measurements of the effectiveness of open-sea ballast exchange.

*Contact: Thomas Johengen 734-764-2426*

**\$154,000** Institute for Agriculture and Trade Policy

The objective of this project is to expand investment in resource management practices that benefit the Great Lakes ecosystem. The Institute for Agriculture and Trade Policy will: 1) evaluate the range of opportunities and financial mechanisms to induce management changes beneficial to Great Lakes watersheds, 2) develop a framework to "bundle" a number of innovative investment strategies together in

order to increase adoption of beneficial practices, 3) design a series of pilot projects that would test the “bundling” concept and its ability to achieve specific ecological outcomes, and 4) develop a proposal to implement three pilots within the basin.

*Contact: Mark Ritchie 612-870-3400*

**\$745,000** Great Lakes Commission

The Great Lakes Commission will lead a project team to: 1) inventory the sources of existing information on Great Lakes water resources and begin initial collection of new information, 2) assess the use of those water resources and update the Commission's existing database to include information on water withdrawal and use, and 3) collect and present preliminary information on the ecological effects of inventoried water uses. The project management team includes representatives from each of the Great Lakes states and provinces, the Great Lakes Commission, the Council of Great Lakes Governors, USGS, NOAA, the Army Corps of Engineers and Environment Canada.

*Contact: Mike Donahue 734-665-9135*

**\$325,000** Michigan State University

Michigan State University will lead a team of scientists to improve the effectiveness of the sea lamprey sterilization program by increasing the potency of the sex pheromone that sterile males release. The team will deploy the technique at scale by developing a procedure to generate large numbers of pheromone-potentiated sterile males and a protocol for releasing them.

Preliminary data indicates that a successful project would be roughly equivalent to doubling the effectiveness of the current sterile release program.

*Contact: Weiming Li 517-353-9837*

## A P P L I C A T I O N P R O C E D U R E S

Individuals, not-for-profit organizations, government agencies, and businesses which identified a significant regional opportunity to improve the health of the Great Lakes and have a pragmatic plan to exploit that opportunity are encouraged to apply to the Fund for support. The Fund also welcomes projects that are designed to test, manage, or demonstrate how certain “master variables” when acted upon, will result in tangible improvements to the health of the Great Lakes ecosystem.

The first step in the Fund’s formal review process is the submission of a brief preproposal that summarizes the proposed project. The Fund will accept preproposals at any time. Preproposals can now be submitted electronically. After a favorable evaluation of a preproposal by a committee of the Fund’s Board of Directors, a full project proposal is invited. Full project proposals can also be submitted electronically. Fund staff and independent technical experts review all proposals. The Fund’s Board of Directors expects to make award decisions at their March, June, September and December meetings.

Complete funding guidelines can be obtained from the Fund’s office or found at the Fund’s website: <http://www.glpf.org>.

S T A T E  
S H A R E S  
R E P O R T

In addition to the Fund's support of regional projects, one third of the corporation's net earnings are paid to member states in proportion to their share of the permanent endowment. In 2000, the Fund returned a total of \$6,284,398 to its member states. Each state uses its share to support local projects that are consistent with that state's Great Lakes priorities. Additional information, including funding guidelines and application procedures can be obtained from the individuals listed.

*Illinois*

Rick Coffman  
217-524-9914

*Michigan*

Emily Finnell  
517-241-7927

*Minnesota*

Gretchen Sable  
651-296-0676

*New York*

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716-851-7130

*Ohio*

Jeffrey Busch  
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*Wisconsin*

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608-264-9220

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