

Great Lakes Protection Fund

1999 ANNUAL REPORT



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 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 \$84 million to the Fund's permanent endowment. Through December 1999, the Fund had committed over \$53 million to regional initiatives and in support of local priorities.

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Letter from the Board & Staff of the Great Lakes Protection Fund

To our members, our grantees, and potential project partners:

The Protection Fund was created to support innovation, encourage risk-taking, and catalyze action at a scale relevant to the world's largest freshwater ecosystem—the Great Lakes. The Fund has committed over fifty million dollars to this purpose since the Governors created it in 1989.

The portfolio of new work described later in this report, represents the largest single annual commitment made by the Fund, over five million dollars. More importantly, that portfolio undertakes action at over 100 locations to test genuinely new approaches to restoring the ecological integrity of the waters in the basin. By returning elements of natural flows to basin tributaries and coastal systems, these projects are testing how restoring the physical integrity to basin waters can lead to ecological improvements in the project areas and beyond.

The projects in this portfolio share characteristics that teams seeking Fund

support may find useful to include in their projects. The Fund is most interested in projects that:

Are designed to achieve ecological results. Each project team must be able to articulate how the Great Lakes will be better off, how they intend to measure the expected results, and what—if anything—must occur beyond the project to achieve the expected results.

Target new opportunities. Each project team must show that the strategy being tested takes advantage of a new or under-exploited opportunity to protect or restore the health of the Great Lakes ecosystem. The Fund is not interested in investing scarce resources documenting problems for others to solve, or taking on the responsibilities of governmental programs. The Fund remains committed to supporting identifying, testing, and refining new solutions.

Are designed and executed by teams.

The vast majority of projects supported are conceived, developed and executed by a group of organizations or individuals. These collaborative teams have diverse memberships that ensure that the work is scientifically sound, institutionally relevant and system-wide in scope. The Fund does support planning grants to build especially innovative collaborative projects.

Include robust communication and dissemination plans. Each project must identify its intended audiences and include strategies to communicate what was learned doing the work. Projects are not undertaken for the benefit of the Fund, but to improve the health of the Great Lakes— and must effectively reach beyond the project team to others who value, and will use, the project's results. Fund grantees have used peer-reviewed journals, popular media, the internet, film and video, speaking engagements and self-published documents to reach their target audiences.

Ultimately, the expected benefit to the Great Lakes ecosystem is what drives the Fund's decision to support a proposal. The Fund encourages those with innovative approaches to improving the ecological health of the lakes to seek support. Ideas can be submitted at any time.

This report represents a new effort by the Protection Fund. It is being primarily distributed electronically. We believe that our audiences can be effectively reached through the internet, and intend to make more use of this method in the future. We welcome your reactions, and your suggestions as to how better we can meet the needs of the Great Lakes ecosystem.

The Board and Staff of the Great Lakes Protection Fund

The Fund

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. The Fund uses its **grant making programs, research capacity and convening abilities** to accomplish this mission.

New Communities of Practice

During 1999, the Fund's endowment grew to over \$137 million, the highest level ever. Similarly, the Fund supported 15 new grants, at a level of \$5,332,000 — also the largest amount in any one year. Perhaps most importantly, the Fund's greatest asset — the number of active projects supported — grew to 36, representing an investment of some \$15.4 million. This portfolio of supported work focuses on preventing biological pollution, restoring natural flow regimes, using market forces to create environmental quality and a set of innovative projects submitted in response to the Fund's general guidelines.

Communities of Practice

During 1999, the Fund helped support a new community of practitioners who are testing the effectiveness and efficiencies of

restoring hydrological processes in key locations to enhance the health of the basin ecosystem.

A community of practice is a network of colleagues that emerges from a shared desire to work effectively on a shared problem or technique. Such communities have been described by the Xerox Corporation's chief scientist as “peers engaged in the execution of real work... held together by a sense of purpose and a real need to know what each other knows.”

The Great Lakes have benefited from a number of such communities of practice. The scientific research community has a formal network in the International Association for Great Lakes Research. The Great Lakes Pollution Prevention Roundtable provides a similar forum to

encourage sharing of information, dissemination of best practices, and mutual support among those who are promoting programs to prevent pollution before it is created and requires treatment. State professionals who implement surface water quality management programs exchange information through the Association of State and Interstate Water Pollution Control Agencies

A community of practice emerges because formal support systems do not meet the needs of practitioners. This often occurs when new work needs to be done, new approaches pioneered, or unexpected opportunities are identified. “Through collaboration, a community of practice generates a common shared understanding of events and an action orientation for dealing with such events the next

time they arise.” These communities serve to codify experience — making it accessible to the entire network, they organize knowledge — identifying best practices and common mistakes, and perhaps most importantly, they also organize ignorance — separating what is truly not known from what is not perfectly understood and both of these from what is generally accepted. These communities also provide a sense of human connection and group identity for the pioneering individuals they link together.

New opportunities, new practices

In 1999, the Fund invested in 13 flow regime restoration projects that will test a variety of innovative techniques in over 100 locations in the basin. This \$4.3 million in grants is the largest single

investment in a set of coordinated grants that the Fund has ever made.

This set of grants followed a series of consultations with experts that identified significant new opportunities to improve the health of the basin ecosystem. These insights were derived from two generally accepted notions. First, that the basin community had made great progress in eliminating the most obvious chemical pollution of the basin's tributaries and lakes. Second, that the ecological health of aquatic ecosystems, absent gross chemical or biological pollution, is driven primarily by their flow regime—the behavior of moving water.

The basin's flow regime has been significantly altered by changes in land use, water withdrawals, and structures such as dams and levies.

Pioneering work by Fund grantees, university scientists, and others, identified the promise of using flow regime restoration as a new water resource management tool. If a robust toolkit is developed, tested, improved, and institutionalized, the basin's health can be restored more quickly, more efficiently and more easily.

The Fund's programming focused in several related areas:

Restoring natural drainage

When water falls from the air as rain or snow, it either moves through the soil to become ground water or moves across the land to enter a stream or river. In relatively undisturbed watersheds of the Great Lakes basin, the vast majority of water will first move through the soil as ground water, then enter a stream or river, and finally enter

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one of the Great Lakes. This movement of water is relatively slow, as groundwater moves slowly when compared with how quickly water moves in a stream or river. The ground “stores” water, so that it can be released in the drier months of the year.

As precipitation falls on a city, much of it lands on man-made surfaces it cannot penetrate, such as roads, sidewalks, roofs, and parking lots. Water moves across these impervious surfaces very quickly and is transported to streams via storm sewers. When precipitation falls on most agricultural fields, it is similarly transported to surface waters through drainage tiles and ditches. When water is artificially moved this way, it cannot enter the soil to become groundwater. It cannot be stored for later use. At the point it is released into surface

waters, it carries pollutants and high amounts of energy that erode stream channels.

Fund grantees are exploring new ways to meet the same drainage needs without negative ecological consequences. To do this, grantees have designed new techniques that better imitate natural hydrology. In southeast Michigan, the Friends of the Rouge are working with homeowners to install a 21st century version of the rain barrel. These devices will store rainwater from down spouts and slow the rush of water into storm sewers. The stored water can be used to water gardens and lawns. A project in southeast Wisconsin is also applying innovative techniques to deal with storm water run off from residential property. The Fund supported team of builders,

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engineers, and scientists are incorporating more natural methods of treating storm water into the designs of new housing developments and will be testing the ecological impacts of such designs both during and after construction. In northwest Ohio, a team led by Ohio State University extension specialists will test new approaches to moving water from croplands. All of these projects evaluate the ecological consequences of relying on new methods of drainage that are designed to be more natural than their traditional counterparts (i.e. storm sewers, retention ponds, drainage ditches).

Reconnecting tributaries to their wetlands

Streams do not exist in isolation. Connected wetlands regulate rates of surface water flow, they act as

filters as water enters streams from adjacent land or from ground water, and they provide habitat for invertebrates, fish and migrating animals. For example, when draining a fen or filling a wetland alters these relationships, the ecological integrity of the stream system is impaired.

At several locations in southeast Wisconsin, a team led by scientists from the University of Wisconsin at Milwaukee is evaluating the success of efforts to reconnect small streams to wetlands in their floodplains. Dr. Tim Ehlinger, manager for this project, notes the need for changes in traditional approaches to water resources management. “When I work with civil engineers, they want to ‘construct stable meanders,’ which entails reinforced stream beds that don’t change over time,” says Ehlinger. “I try to convince

them that meander is something rivers need to do—meander is a verb not a noun.” These meanders help create connected riparian wetlands. By restoring wetlands in the historic flood plains of Great Lakes tributaries, the team expects to be able to measure the benefits of flood control, reduced sedimentation, and improved biological health.

Further up the Lake Michigan shoreline, The Nature Conservancy is leading a team to restore interdunal wetlands. The Conservancy will remove fill material and restore natural contours and native vegetation in a dune and swale complex that was altered by the construction of roads that were used for logging. The project will test the effectiveness of restoring more natural hydrologic conditions in removing exotic species and

increasing the number and variability of native species. The project is also working to restore flow regimes at a groundwater dominated wetland and the adjoining river in southeastern Michigan.

[Modifying in-stream structures](#)

When the course of a river or stream is interrupted by a structure, such as a dam, a reservoir, or a culvert, its ecological quality can be compromised. Structures can alter the movement of water, the movement of materials, and the movement of biota and can transform rivers into a series of disconnected ponds. In the Great Lakes basin, most of the tributaries that empty into the Lakes have been functionally separated from the waters of the open lakes. These structures were built to provide

power, create lakes, and allow roads to safely cross rivers. They were virtually all designed and built before the consequences were even remotely understood.

Three projects address how dams and reservoirs can be operated, or in some cases removed, to benefit the Great Lakes and their tributaries. At Big Rapids, Michigan, Fund grantees are working to remove a dam remnant and restore the longest, high gradient river in the Great Lakes. In eastern Wisconsin, Fund grantees are removing 11 dams and related structures in the headwaters of the Sheboygan River. Both projects will develop lessons about how dams can be removed, how local citizens can be best engaged, and how natural communities can be restored. In some cases, it may not be desirable or feasible to

completely remove a dam. A team led by American Rivers and the Hydropower Reform Coalition is altering the ways that 116 dams are being operated, impacting 53 locations in 19 rivers in the states of Michigan, New York and Wisconsin. By leading a collaborative effort to relicense dams that generate hydroelectric power, and participating in the implementation of requirements, the project expects to improve the health of Great Lakes tributaries through improved/increased stream flows, the creation and improvement of fish passage, and riparian habitat protection.

Building the Flow Restoration Toolkit

One defining characteristic of a community of practice is that the individuals involved share knowledge and innovate together to solve common problems. The

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remaining four flow regime restoration projects are together extending and testing the concepts of flow regimes as a central component of water quality impairment in tributaries of the Great Lakes basin. Cornell University faculty, in cooperation with a series of watershed interests, is working on a framework to identify geographic areas within the basin that offer the greatest potential for successful flow restoration efforts. The Ohio Department of Natural Resources is leading a team in developing risk assessment protocols for flow regime restoration at three hydrologically distinct watersheds in Ohio and Michigan's Lake Erie basin. Project teams led by the University of Michigan are documenting and modeling the extent of physical alterations, such as dams and land use, on flow

variations and fish habitat. The work of these projects will add to the community's of practice tool kit, which provides support and context for future flow restoration projects in the basin.

Advancing communities of practice

As the Fund began investing in these opportunities, it became clear that taking these high leverage opportunities to scale requires, at least in part, building new capacity in human institutions. When the efficient production of ecological benefits is "no one's job," economies of scale are available (e.g. the next benefit is easier to obtain), and strategies self-replicate and evolve, it only makes sense to consciously consider the social infrastructure in our work.

Every year, the Fund will sponsor a **networking session** to be sure that the projects are not only coordinated, but **mutually reinforcing** and have access to the **best scientific and technical expertise**.

To that end, the Fund awards included additional support to ensure that the project managers can visit with one another, share experiences, and transfer new learning as it is in progress. Every year, the Fund will sponsor a networking session to be sure that the projects are not only coordinated, but mutually reinforcing and have access to the best scientific and technical expertise.

Beyond this particular community of practice, the Fund has actively supported similarly networked learning in two other areas — preventing the biological pollution of the lakes and exploring how market mechanisms can be used to improve ecological health. At the end of 1999, the Fund had over \$2.4 million invested in a set of projects that are pioneering how to

keep biological contaminants out of the ballast tanks of ships. This set of projects has produced a number of important firsts — the first filtration system tested on a working vessel, the first set of biological test protocols for assessing performance, and a new generation sampling method that effectively collects samples in ballast tanks. Future work includes a design competition for a full-scale system to prevent contamination of ballast water and a ballast technology trade fair.

At the end of 1999, the Fund had over three million dollars invested in a series of projects testing market approaches to environmental problems. Fund grantees are exploring how markets can be used to reduce nutrient pollution in basin waterways, remove pollutants in the air, and how new retail markets for electric power can be

used to promote improved ecological health.

The Fund continues to seek project proposals to test the promise of flow restoration techniques, explore how to prevent biological pollution, and test how market forces can promote ecological improvement. These focus areas will be at the center of the Fund's programming. However, the Fund always remains open to all requests for support that are consistent with its mission and general guidelines. Successful requests will have a tangible ecological goal, a pragmatic work plan and be prepared by a team that includes all affected interests. Questions and inquiries are welcome.

Grants Awarded

In 1999, the Great Lakes Protection Fund's Board of Directors approved the following 15 projects, representing \$5,332,000 in support.

For more information, contact the project manager listed below.

\$255,000 American Rivers

American Rivers (in conjunction with the Hydropower Reform Coalition) will continue its cooperative hydropower relicensing efforts on Great Lakes tributaries. The coalition will employ a collaborative approach among state and federal agencies, licensees, non-government organizations, and communities in relicensing proceedings and will ensure that license conditions are implemented. The project will seek changes to instream flow amounts, flow timing, barriers to fish passage and riparian land protections. This project includes work on 116 dams in 19 drainage basins in New York, Michigan, and Wisconsin.

Contact: Andrew Fahlund
202-347-7550

\$369,000 Applied Ecological Services, Inc.

Applied Ecological Services will monitor the effectiveness of stormwater treatment trains in improving water quality and flow during and after construction of residential developments. AES will construct Stormwater Treatment Trains—vegetated swales that convey runoff, wetlands that remove nutrients and sediment, and sedimentation basins and stages release outlets— at three developments in southeast Wisconsin. The project will evaluate the ecological impacts of, and costs associated with, three watershed sensitive developments and compare them to pre- and post-development conditions and traditional residential developments.

Contact: Steven Apfelbaum
608-897-8547

\$755,000 City of Big Rapids

The City of Big Rapids will remove the Muskegon River dam remnant, restoring natural hydrological and ecological conditions to the largest free-flowing reach of the high-gradient river in Michigan. The dam removal work plan involves upstream sediment dredging, downstream sediment traps and restoration of natural flow and river bottom elevation. The Michigan DNR and USGS will evaluate the biological, chemical, and physical conditions of the river before and after removal. The project will reconnect upstream and downstream habitat and reestablish the riffle, pool, and run sequence of the river.

Contact: Steve Stillwell
616-592-4020

\$205,000 Cornell University

Cornell University will identify communities in the Great Lakes region of New York with the greatest potential to undertake successful flow restoration programs, conduct five case studies, and develop a GIS database of flow restoration opportunities in the eastern Great Lakes basin. New York tributaries will be mapped according to their need for restoration and the capacity of the communities to implement successful restoration projects. The team will determine restoration need based on a given tributary's deviation from its natural flow regime. Local governmental and NGO support will determine community capacity.

Contact: Mark Bain
607-255-2840

\$95,000 Friends of the Rouge

The Friends of the Rouge will implement a rain barrel demonstration and monitoring project in the Rouge River watershed. The project team will install rain barrels on residential downspouts to capture stormwater runoff and reduce overflows into the river.

Reducing stormwater discharge volumes will improve flow regime and reduce erosion, sedimentation and pollutants in the Rouge River.

Contact: James Graham
313-792-9900

\$207,000 Ohio Department of Natural Resources

The Ohio Department of Natural Resources will develop risk assessment protocols for flow regime restoration at three hydrologically diverse watersheds in Ohio and Michigan. The project sites represent highly variable surface water hydrology, moderately variable surface and groundwater hydrology, and stable groundwater hydrology. The protocols will be based on habitat quality, distribution, and connectivity. The methods and protocols developed through this project will be useful in identifying other potential restoration opportunities.

Contact: Ohio DNR
419-626-4296

\$394,000 The Ohio State University

The Ohio State University will develop an engineering approach to improve ecosystem function and maintain capacity of agricultural drainage channels. The ecological impacts of, and costs associated with, channel modification will be evaluated and compared with traditional ditches. The team will conduct an economic cost-benefit analysis related to the design, implementation, construction and maintenance of modified channels and will explore the use of state and federal farm conservation funds to provide additional incentive to interested farmers.

Contact: Larry Brown
614-292-3826

\$222,000 State University of New York

The State University of New York will restore seasonal hydrological cycles to coastal wetlands. This project will test the use of flashboards to block culverts and

ditches and prevent the artificial draw-down of water in the coastal marshes. The team will use the flashboards to mimic historical hydrological regimes at five wetland sites where small rivers and streams drain into Lake Ontario or the upper St. Lawrence River. The team will measure water levels and flows and evaluate ecological improvements by sampling plant communities, monitoring the spawning success of northern pike and walleye, and tracking muskrat populations.

Contact: John Farrell
315-470-6990

\$653,000 The Nature Conservancy

The Nature Conservancy will reestablish natural flow regimes through research, restoration, and monitoring activities at three conservation sites with different hydrology. At Ives Road Fen in Michigan and Shivering Sands in Wisconsin, TNC will reestablish groundwater/surface water flow connections, restore natural land contours and control exotic species. In the eastern Lake Ontario/St. Lawrence River, TNC will study the effects of lake level alterations on the shoreline and will identify changes that could be made to current dam operations and other processes that modify the flow regimes of the near-shore currents.

Contact: Heather Potter
312-759-8017

\$312,000 Trout Unlimited

Trout Unlimited will remove several small dams in the headwaters of the Sheboygan River in Wisconsin. Headwater springs and channels will be restored by removing as many as 11 small dams, most of which were constructed as part of a fish hatchery. Removal of the Franklin dam will restore over 10 miles of free flowing river and will improve native cold water fisheries and mussel populations in the Sheboygan River.

Contact: Laura Hewitt
608-250-3534

\$300,000 University of Michigan

The University of Michigan will document the extent and effects of physical alterations on flow and biological communities. Study sites will be selected in Michigan, Wisconsin, Minnesota, Ohio and New York. The project will identify geographical patterns of flow and evaluate them to determine the influence of land use and dams on flow variations. The information developed through this project will allow for better decision-making through greater understanding of the effects of flow alterations. Dr. Allan and his team will also provide coordination, technical support and assistance to the portfolio of projects.

Contact: David Allan
773-764-6553

\$212,000 University of Michigan

The University of Michigan will model the impact of dams on fish habitat, density, and production and create an analytical tool for predicting impacts of dams on watersheds. The team will quantify the amount of habitat and production that is lost from fragmentation and that can be gained through restoration. The dammed sites in this project are the same as the Ohio DNR project and the other University of Michigan project sites.

Contact: Edward Rutherford
773-663-3554

\$322,000 University of Wisconsin

The University of Wisconsin will monitor and evaluate flow restoration of two priority watersheds in southeast Wisconsin. Lincoln Creek and the North Branch of the Pike River will both undergo restoration projects this fall. The team will monitor and evaluate inputs and outputs to the systems before and after restoration and compare the results to similar, less altered river systems. The critical factors for restoring ecological functions of urban/urbanizing watersheds will be identified and the impact of changes in the physical character of a system on its biological components such

as fish and invertebrate diversity and abundance will be evaluated. The results will help to reveal the mechanisms by which watershed function is lost as a result of urbanization and would identify critical mechanisms of successful restorations.

Contact: Timothy Ehlinger
414-229-4358

\$750,000 Northeast-Midwest Institute

The Northeast-Midwest Institute will lead a team of scientists, engineers, ship owners, and policy experts to develop effectiveness criteria and conduct treatment trials to determine the effectiveness of post-filtration technologies in removing biological material from water entering ballast tanks in commercial vessels; orchestrate a full scale ballast treatment system design and installation competition; and hold a ballast technology trade fair and symposium. This work builds on the team's successful demonstration of filtration technology as a possible means of improving the quality of ballast water.

Contact: Allegra Cangelosi
202-544-5200

\$281,000 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service will lead a team of partner organizations to protect near-shore habitat on private lands. The team will work with private landowners and local government to increase productivity of the piping plover and ensure the protection of threatened, endangered and rare plant species. The team will negotiate conservation agreements with individual landowners and work with local planning and zoning boards to protect critical habitat.

Contact: Charles Wooley
612-713-5350

Application Procedures

Individuals, not-for-profits organizations, government agencies and businesses which have identified a significant 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 first step in the Fund's formal review process is the submission of a brief preproposal that summarizes the proposed project. The Fund accepts preproposals at any time. Following favorable review of a preproposal, a full proposal is invited. Staff and a panel of independent technical reviewers evaluate full 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 <http://www.glpf.org>

Fund Staff

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The Fund wants to thank former staff members Christine Newell, Gayle Raj and Karsen Wick for their contributions during 1999.

State Share Programs

To supplement 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 1999, the Fund returned a total of \$3,682,503 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 here.

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517-241-7927

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651-296-0676

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