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A National Program to Restore the Great Lakes

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Introduction

The Great Lakes - Superior, Michigan, Huron, Erie, and Ontario, and their connecting channels, form the largest fresh surface water system on earth. Covering more than 94,000 square miles and draining more than twice as much land, these Freshwater Seas hold an estimated six quadrillion gallons of water, about one-fifth of the world's fresh water supply. The basin is blessed with extensive forests and wilderness areas, rich agricultural land, hundreds of tributaries and thousands of smaller lakes, extensive mineral deposits, and abundant wildlife.

Source: http://www.great-lakes.net/places/places.html

However, as the study by Sedell, Steedman, Regier, and Gregory (1991) shows, the shorelines and watersheds of the Great Lakes Basin ecosystem have been widely degraded by urbanization and industrialization. In an attempt to protect and restore this diverse ecosystem, the Great Lakes National Program Office (GLNPO) of the U.S. Environmental Protection Agency (USEPA) administers and funds projects in three main research categories: pollution control, contaminated sediments, and habitat protection/restoration (Pranckevicius, b),

This paper will focus on the latter of these categories, namely the Ecological Protection and Restoration Program, which has been in existence as part of the Great Lakes National Program Office since 1992 (Bolattino, personal communication). From 1992 through 1995, the GLNPO of the USEPA awarded around $8.5 million in federal grants for 87 projects to 36 local, Tribal, State, and Federal agencies and non-governmental organizations to protect and restore the Great Lakes ecosystem (Pranckevicius, i).

The Ecological Protection and Restoration Program as part of the Great Lakes National Program

Intent, Scope, and Funding

"The mission of the Great Lakes National Program is to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem" (Pranckevicius, c). When the program was established in 1992, a five-year strategic plan was established. The plan asked for the reduction of toxic substances and restoration of the chemical integrity of the Great Lakes, the protection and restoration of vital habitats for the support of healthy and diverse communities of plants, fish, and wildlife, the protection of the region's biological integrity, and the restoration and maintenance of diverse living populations (Pranckevicius, c, j).

In response to this strategic plan, the GLNPO's Ecological Protection and Restoration Program was developed "to effectively and efficiently protect, restore, and enhance the habitats needed to sustain a healthy and diverse Great Lakes ecosystem" (Pranckevicius, j). The most important goals of the Habitat Protection/Restoration Program are:

1. An improvement in the ecological integrity of the Great Lakes Basin.

2. An improvement in the quality and increase in the size of biologically diverse

ecosystems.

3. A greater understanding by those involved in managing and protecting ecosystems of

ecosystem functions and processes (Pranckevicius, j).

In addition to those three main goals, the program also seeks to "protect ecosystems possessing ecological integrity, biodiversity, or rare ecological occurrences from adverse impacts of anthropogenic stressors, and to restore physical processes, ecological structures and functions to formerly degraded ecosystems that have the potential to be ecologically significant" (Pranckevicius, c).

In order to achieve the goals set forth in the program, the GLNPO sends out annual calls for proposals. The scope of those proposals is established at the Great Lakes Planning meeting every autumn. At this meeting, current issues regarding the Great Lakes ecosystem are addressed and a preliminary funding guidance is established by the GLNPO and its partners (Holland, phone

interview). The GLNPO has 243 partners, including 3 International Agencies, such as Environment Canada, 15 Federal Agencies, such as the Bureau of Indian Affairs or the Bureau of Land Management, 25 state agencies, such as the Illinois Department of Natural Resources or New York State Parks and Recreation, 3 Tribal Organizations, such as the Minnesota Chippewa Laboratory, and 71 Non-Governmental Organizations and Volunteers, such as the North Branch Prairie Project or the National Audubon Society (Pranckevicius, k). The scope of the proposals are further shaped by input from the proceedings of the SOLEC (State of the Lakes Ecosystem Conference) conference, communications with people attending the conference, and conversation with resource managers and partners. This additional input is also included in the final guidelines and scope of the proposals (Holland, phone interview).

After this information gathering process has concluded, the Great Lakes National Program Office issues a 'Request for Proposals' (RFPs) every year, including calls for Ecological Protection and Restoration projects (Bolattino, personal communication). In the RFPs, the scope of the projects is broadly outlined in order to stimulate new, creative, and inventive ideas (Holland, phone interview). Habitat Protection/Restoration proposals are of three kinds: projects which stimulate growth and the distribution of a wider variety of local plant genotypes, projects which restore biodiversity of coastal wetlands and reestablish critical habitat for native, non-game fish species, and projects which use native plants for landscaping to promote restoration of ecosystems (Pranckevicius, c, d, f).

In summary the RFPs not only lay out the purposes, scopes, and goals of future projects, but they also outline the GLNPO's goals. In addition, the RFPs encourage particular practices, like the use of native plants. However, beyond outlining the general scope of the project in the RFPs, the GLNPO cannot exercise any control over the way the project specifically is carried out by the grantee (Holland, phone interview).

In response to the RFPs, the GLNPO receives about 80-100 proposals for protection and restoration projects annually but funds only about 12 to 25 projects a year for a maximum of two years (Pranckevicius, j). In unusual cases, as in 1996, extension grants of one year for previously approved projects may be awarded (Holland, phone interview).

Year	Number of Projects Funded
1992	12
1993	35
1994	15
1995	25
1996	only extensions
1997	20

Targeted Ecosystems (refer to Table 1; Figure 1)

It is obvious from the name of the program that the geographic scope of the funded projects is the Great Lakes Basin (Pranckevicius, j).

Lake Basin	**# of Projects**
Ontario	9
Erie	18
Huron	6
Michigan	20
Superior	15

In addition to the lake-specific projects (e.g., St. Louis River Wild Rice Restoration, Lake Superior; Wihala Beach Dune Restoration, Lake Michigan), the GLNPO also awards grants for multiple-lake projects, such as the restoration of Michigan Lakeplain Natural Communities (Pranckevicius, a). In terms of the targeted ecosystems, projects are again grouped according to geographic scale, namely basinwide, bioregional, and local. According to the GLNPO, the targeted Great Lakes Ecological Systems are as follows:

Coastal Marsh: Includes extensive freshwater estuaries, lagoon, and deltas, and is dominated by large lake processes. An example of this targeted ecosystem is the Chequamegon Bay Aquatic Vegetation Restoration Project, which involves the re-establishment of aquatic vegetation in shallow water areas of the bay.

Coastal Shore: Includes dune communities, bedrock shores, and sand beaches, and is dominated by the effects of the Great Lakes. An example of this category of a targeted ecosystem is the Restoration of Habitat for the Endangered Karner Blue Butterfly in the Illinois Beach State Park Project, where native wild lupine is mapped and evaluated and restored as a critical step in restoring the endangered Karner Blue Butterfly. And, after sufficient recovery of the lupine, the Karner Blue Butterfly is introduced.

Inland Wetland: Includes fen communities, forested bogs, wet meadows, and permanent marshes. An example of this ecosystem is the Maumee River Basin Wetlands Restoration Project, which creates a database of potential restorable wetland sites. With the help of this data, 39 restored wetland sites in the Maumee River Basin were constructed.

Tributary Connecting Channel: Includes the entire drainage network of rivers and streams in the basin. An excellent example of this kind of target ecosystem is the Buffalo River Fish and Wildlife Habitat Restoration Project, which involves the restoration of a naturally vegetated shoreline, improving the dissolved oxygen condition of the river, and reducing the sewer point pollution to help recapture the biologic integrity of the river.

Lakeplain: Includes wet sand prairies, flatwoods, woodlands, savannas, and sand barrens, and is dominated by low topography. An example of this type of ecosystem is the Habitat Protection and Restoration at Grand Calumet Nature Preserves Project, which entails the removal of piles of trash in several swales. In addition, the project is attempting to control and eradicate exotic plant species, and to improve the water quality of the degraded dunes and swales that have been altered by the construction of roads and streets.

Inland Terrestrial: Includes dry southern forest, a variety of mesic forests, and is dominated by a glaciated landscape. An example in this category is the Fish Creek Watershed Stewardship Program Project. Improper agricultural practices are the primary threat to the widest array of fish and mussel species in the lower Great Lakes. Landowners are contacted to develop practical solutions to the problem and they are encouraged to participate in the reforestation program to provide a buffer against runoff from farmland.

Open Lake: This ecosystem is the Great Lakes - Superior, Michigan, Huron, Erie, and Ontario. Projects in this category include, for example, research to enhance the understanding of the protection, restoration, and/or conservation of physical habitats and biodiversity.

(Pranckevicius, j, l ; Table 1)

Grouping of Projects

In addition to grouping projects in terms of targeted ecosystems, the GLNPO also classifies projects by the scope of work: Categories in this group include, Assessment, Inventory/Classification, New Tool/Technology Demonstration, Planning/Coordination/Collaboration, and Protection and Restoration. Another classification is by common themes, specialized content, or focus. Examples of this include Agriculture Conversion to Wetland Projects, Coastal Marsh Protection/Restoration (e.g., Minnesota's Grassy Point), Environment Justice Considerations (e.g., Habitat Protection and Restoration at Grand Calumet Nature Preserves, IN), Inland Wetland Protection/Restoration (e.g., Saginaw Bay Watershed Wetland Restoration Project, MI), Stream Bank Protection/Restoration (e.g., Whithlesy Creek Stabilization and Rehabilitation Demonstration, WI), Urban Restoration (e.g., Buffalo River Fish and Wildlife Habitat Restoration Project, NY), and Volunteer Restoration Opportunities (e.g., Hearding Island Native Community Project, MN) (Pranckevicius, j; Table 1). The reasons for these groupings are to meet the different needs of people (project managers, restorationists, the public, and many more), as well as to simplify access to information (Holland, phone interview).

Criteria for choosing and deciding on certain proposals - program feasibility

In general, as previously discussed, award criteria vary from year to year based on the discussion with partners, results of previously-funded activities, newly emerging issues, and a desire to encourage innovative ideas (Pranckevicius, j). Yet they usually follow the same rules and procedures: The funding criteria in any given year are usually habitat protection and restoration, contaminated sediments, pollution prevention, exotic species, information management, assessment/indicators, and emerging issues. The criteria for deciding on projects are set out in the RFPs and in general represents a balance between scientific credibility and administrative requirements (Bolattino, personal communication). In addition, the GLNPO's evaluation will consider the design, objectives, and scientific viability of the individual project, the potential for the project to benefit the Great Lakes ecosystem, and the potential transferability across the Great Lakes Basin and beyond (Pranckevicius, c).

For Protection/Restoration projects, the GLNPO will assist its partners by funding habitat restoration and protection activities which will demonstrate practices and tools for protecting and restoring nearshore aquatic, terrestrial, and wetland habitats. In addition, a review of whether the general concepts outlined above are fulfilled in the proposed project will also be evaluated based on whether it "is located in an area supporting significant biodiversity, has biological importance on a regional or global scale, could lead to new ways of integrating economic growth with conservation, tests new biological management practices and new restoration techniques, and has potential for identifying and reporting demonstrated environmental results" (Pranckevicius, c; Holland, phone interview).

Evaluation of success and program effectiveness

The evaluation of success is determined on a case by case basis, with significant input from the grantee. Host grantees submit a final report to the project officer discussing the goals set out in the proposed work plan, and the successes and challenges of their projects (Bolattino, e-mail). The GLNPO not only closely oversees the work plans (project officer visits the sites and asks questions) of the projects but also reviews the work periodically. (Holland, phone interview). If problems occur, the GLNPO is not, according to the federal policy of a grant, allowed to tell the grantees how to solve them, but they can make referrals, or point them to possible solutions (Holland, phone interview).

Since there is no formal data collection pertaining to how successful the projects are, the process involved in evaluating the relative success of the projects entails having the project officer compare the final report by the grantee with the proposal. He or she determines whether the grantee has fulfilled and addressed all the objectives, and has achieved the goals outlined in the proposal (Holland, phone interview). And, according to project officer and GLNPO Ecological Protection and Restoration Team Leader Karen Holland, project failures are rare and are only considered failures in two instances: Either the grantees did not complete the project, or they did not do what they outlined in their proposals (phone interview).

Shortcomings of the program and suggested improvements

One shortcoming pertains to the review of the projects and to the evaluation of success. The lack of formal data collection for evaluating success greatly hinders the program's ability to accurately assess its own effectiveness in accomplishing its objectives. Another shortcoming is that the projects are not monitored, no mechanism exists to follow up, and grantees are not asked to share their failures or their problems with the GLNPO (Pranckevicius, j; Holland, phone interview). In addition, the GLNPO does not have enough money to address most of the needs of the Great Lakes Basin. Furthermore, there is a frequent inability within the GLNPO's team to balance the larger needs of the Great Lakes Basin with local and regional concerns (Holland, phone interview). Lastly, restoration takes years, yet the two-year funding cycle is too short to follow the ecological timetable necessary to be effective for restorations that need replanting.

It is readily apparent how these shortcomings might be resolved; however, implementing them is less feasible. The first issue which needs to be addressed is to get the grantees to look beyond the local perspective of their projects. Local grantees need to become aware of the impact of their local project to the Great Lakes Basin Ecosystem and how their local or regional project fits and connects to the general goals of improving the basin-wide ecosystem. Second, the evaluation procedure used to look at the final reports needs to be improved. These reports need to be made available to the public, along with extensive summaries of each individual project. One possible scenario is that they could go on-line, where communities, parties involved, scientists, and other researchers could provide feedback in the hopes that gaps in technology and science will be discovered. Third, the scientific results of the various projects need to be made available to scientists, engineers, and others through workshops and presentations at conferences, and peer-reviewed journal submissions, in order to improve the understanding of restoration and reclamation ecology, and to trigger an exchange of information (Holland, phone interview). In addition to those improvements, it is imperative to establish monitoring on complete projects to further succeed in continuing the projects. Spot monitoring consisting of project officers going to visit certain restored sites and conducting interviews with the managers and restorationists may be a realistic way to start this process.

Conclusion

Between 1992 and 1995 the Great Lakes National Program funded 87 projects, of which 30 were restoration projects. Some of the projects have been completed, but some of them are still in progress (Bolattino, e-mail). In 1996 funding was suspended due to budget constraints, yet eight extension grants of already intensively reviewed and funded projects were made (Holland, phone interview). And in 1997, 20 grants (see Table 2) were awarded (Holland, phone interview) and proposals for 1998 awards are awaiting review (Bolattino, e-mail).

A wealth of information and research findings is made available through the efforts of the Great Lakes National Program and its grantees. The basinwide, regional, and local approaches to restoring the Great Lakes ecosystems are promising, yet at the same time complex and laborious (Sedell, et. al., 118), The environmental benefits such as the control of exotic species,

improvement in water quality, protection/restoration of acreage/linear footage of habitat, and restoration of local hydrology make it worth the effort (Pranckevicius, j). Yet, it is imperative for every program to have an effective and efficient way to evaluate success and to have some kind of monitoring and maintenance system. In addition, each program and its approaches needs to bear in mind that "key ecological features of a land-water interface are not distributed evenly in space along ecotone" (Sedell et al. 1991) and that management techniques and restoration projects must recognize these regional differences.

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