

An Evaluation of Sustain Our Great Lakes



**A Report Prepared for the
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Prepared by

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Abstract

The Headwaters Group Philanthropic Services, in partnership with Edward W. Wilson Consulting and Coastal Restoration Consultants, Inc., conducted an evaluation of Sustain Our Great Lakes (SOGL) covering the period 2006 through 2011. The research included site visits to 20 selected project sites, a survey of grantees, and interviews with SOGL's partners and informed observers of the program. The evaluation concluded that SOGL's strategic decisions have been sound and strategic and that its grantmaking program has been well executed. Among the grants that are likely to yield the greatest long-term environmental benefits are those supporting the conversion of uplands to wetlands and hydrological modifications to existing wetlands. Of the many weed control projects supported by SOGL, the ones that are most likely to be effective are those that detect and eradicate early stage invasions before they become established. SOGL has also funded a range of connectivity projects that are likely to confer important environmental benefits as long as they are properly maintained and as long as sufficient care is taken to assure that non-native invasive species are not allowed to extend their ranges. By funding relatively labor-intensive habitat restoration projects, SOGL is helping to create jobs and in the longer term is making economic contributions by strengthening sport fisheries, enhancing opportunities for outdoor recreation, and lowering water treatment costs. In some cases, SOGL investments are playing important roles in larger community and economic development efforts. The evaluation offered a series of recommendations aimed at: improving project planning and design, ensuring adequate post-project maintenance, removing barriers to funding complex projects, building knowledge about effective restoration approaches in the Great Lakes region, and helping grantees prepare for the effects of climate change.

Executive Summary

Introduction

Sustain Our Great Lakes (SOGL) is a public/private partnership dedicated to sustaining, restoring, and protecting fish, wildlife, and habitat in the Great Lakes. Administered by the National Fish and Wildlife Foundation (NFWF), SOGL distributes money from several agencies and a major corporation in the form of grants to support habitat restoration projects throughout the basin.

Our evaluation of SOGL focused on the period 2006 through 2011 and included:

- ◆ A review of documents, including grant proposals and reports, and a compilation of grant data from SOGL's files.
- ◆ A series of 19 interviews with SOGL partners as well as a set of "informed observers" recommended by SOGL.
- ◆ An Internet-based survey of grantees, which yielded information on 74 of the 132 projects that were funded during the study period.
- ◆ A series of site visits to 20 selected projects in seven states and the province of Ontario, including interviews with project managers and community stakeholders in addition to field observations by experienced restoration ecologists.

An Overview of SOGL's Program

Created in 2006, SOGL is a partnership that includes NFWF, the US Environmental Protection Agency (EPA), the US Fish and Wildlife Service, the USDA Forest Service, the National Oceanic and Atmospheric Association, and the Natural Resources Conservation Service, as well as ArcelorMittal, the world's leading steel and mining company. While SOGL's grant budget varied between about \$0.8 and \$1.5 million between 2006 and 2009, it jumped to \$8.5 million in 2011, thanks to new federal funding made available by the Great Lakes Restoration Initiative (GLRI).

Beginning in 2010, SOGL introduced a distinction between the Community Grant Program (offering grants of \$25,000 to \$150,000) and the Stewardship Grant Program (offering grants of \$150,001 to \$1.5 million). SOGL's four main priorities include:

- ◆ Restoring Aquatic Connectivity
- ◆ Restoring Stream and Riparian Habitat
- ◆ Restoring Wetland Habitat
- ◆ Restoring Coastal (Near-shore/Shoreline) Habitat

By pooling money from several funder organizations into a single program administered by NFWF, SOGL can take advantage of NFWF's expertise in habitat restoration and also serve as a one-stop-shop for habitat restoration funding, matching grantee requests to the appropriate funding sources. The presence of a private partner, ArcelorMittal, has facilitated the support of a limited number of projects in Canada.

SOGL's Grantmaking Strategy

The Range of SOGL's Grantmaking

From 2006 through 2011, SOGL has supported a wide variety of habitat restoration projects throughout the Great Lakes basin. By far the most commonly supported activity, according to our survey, was the removal or control of invasive species. Other supported restoration activities included, in order of frequency: fish passage restoration; streambank stabilization; culvert repair or replacement; shoreline stabilization; and the installation, restoration, or protection of buffers.¹ With respect to types of habitat, wetlands were the most frequently targeted, followed by riparian habitat, upland habitat, near-shore or off-shore habitat, and dunes. Many projects include efforts to protect habitats for specific species of concern, most commonly brook trout, Blanding's turtle, piping plover, and Pitcher's thistle.

Balancing Focus and Flexibility

Among SOGL partners, as in many grantmaking programs, there is an ongoing debate about the extent to which the program should focus on a relatively narrow set of priorities where it can make clear contributions, as opposed to maintaining more flexible funding criteria that preserve options for responding to a range of opportunities. The debate has played out in two areas:

- ◆ **On-the-Ground Restoration vs. Capacity Building.** Although SOGL's current guidelines advise grantees to apply at least 90 percent of their grant funding to on-the-ground habitat improvement, the program has supported a variety of "capacity building" activities, including plans, studies, inventories, volunteer engagement, network building, and public education. Some SOGL partners continue to regard capacity building activities as important to the program, particularly with respect to smaller organizations that are often funded by the Community Grants program; and survey results suggest that the program has strengthened grantee capacities in such areas as partnership building, restoration expertise, and setting and evaluating goals. *While we approve of SOGL's emphasis on tangible projects, we suggest that the 90 percent rule should be relaxed in some cases to facilitate increased ecosystem monitoring and support for the upfront work associated with large, complex projects.* (See the recommendations.)
- ◆ **Geographical Targeting and Areas of Concern.** While some partners would like to see SOGL concentrate investments in targeted areas where they are most likely to have cumulative impacts, SOGL's grantmaking has been relatively dispersed, with grants scattered throughout the US portion of the basin (and a few in Canada as well). To an extent, this reflects a politically motivated desire to avoid the appearance of regional inequity in the distribution of funding. With the influx of GLRI funding, SOGL has come under increasing pressure to invest in projects that will contribute to the delisting of beneficial use impairments within Areas of Concern (AOCs). While this has introduced an element of geographical targeting, some partners are concerned that it compels SOGL to make more grants in highly impaired, urbanized areas, where the costs per acre are high and the ecological benefits are sometimes questionable. However, we note that some of SOGL's high-impact investments address AOC impairments, and we believe that *SOGL's current approach, in which it balances funding between more and less impaired habitats, is appropriate.*

¹ Note that these categories are not mutually exclusive. For example, there is considerable overlap between fish passage projects and culvert repair and replacement projects, though there is an important distinction between them—fish passage projects include projects other than culvert repair (e.g., dam removal or fish lift installation) and culvert repair projects may have benefits besides fish passage (e.g., hydrological improvement and sediment reduction).

The Effectiveness of SOGL's Program

Measuring Overall Impact

SOGL measures the cumulative progress of its grantmaking primarily in terms of acres and miles of habitat restoration. According to data from the grant files, from 2006 to 2011, SOGL-supported projects have produced the following results:

- ◆ Miles of restored aquatic connectivity: 769.7
- ◆ Miles of restored stream and riparian habitat: 104.0
- ◆ Acres of restored wetland habitat: 16,205.7
- ◆ Acres of restored coastal habitat: 1,904.3

Our survey compared expected acreage and mileage goals to actual accomplishments and found that, for completed projects, grantees have exceeded initial expectations with respect to aquatic connectivity, stream and riparian habitat, and wetland and associated upland habitat. Only with respect to coastal habitat restoration does it appear that they have failed to meet expectations, though this is based on a small number of responses.

The acreage and mileage totals should be regarded as rough approximations, because they mix actual reported results with projected results and are based on grantee reports that are prone to be inconsistent and ambiguous. Moreover, these measures conflate restoration techniques that are qualitatively different and have very different environmental effects. We caution that, while acres and miles are useful in communicating the program's progress, it would be a mistake to make decisions with the aim of maximizing these totals.

Indicator Species as an Alternative Way to Measure Progress

Recognizing the limitations of using acres and miles to measure progress, SOGL's partners have debated using changes in the populations or ranges of selected species to measure SOGL's progress in habitat restoration. This approach is appealing because it would place the focus squarely on biological outcomes, and progress is obviously appropriate for some sorts of projects—in particular, connectivity projects and other projects aimed at improving or opening up habitat to particular species. In general, however, we are skeptical of using indicator species to judge the success or failure of restoration projects because: 1) the presence of target species on a particular site is an unreliable indicator of healthy habitat; 2) species adapted to mature habitats might not show up for decades; 3) the populations and ranges of target species are likely to fluctuate due to weather conditions and other factors that have nothing to do with SOGL's grantmaking; and 4) focusing on a small set of species might set up incentives to prioritize projects designed to meet the specific needs of the target species at the expense of projects aimed at a more holistic approach to habitat restoration. Nevertheless, we acknowledge that the use of indicator species to evaluate habitat restoration projects is an ongoing topic of debate among ecologists. To the extent that SOGL does invest in the indicator-species approach, we suggest that it do so in cooperation with a range of other partners involved in Great Lakes restoration as part of a "collective impact" approach, as described below.

Toward Measuring Collective Impact

The onus of developing better ways to measure progress in habitat restoration is not entirely on SOGL. Many agencies and organizations are engaged in implementing GLRI and related efforts to restore the Great Lakes. It makes little sense for each to come up with its own unique performance measures. What is needed instead are regional indicators of ecosystem performance that measure joint progress toward

goals shared by many different actors. Efforts to develop measures of ecosystem performance for the Great Lakes are already underway under the leadership of such groups as the International Joint Commission and a new Great Lakes research center at the University Michigan. *We encourage SOGL to engage in such efforts and, as such measures are developed, work with grantees to ensure that relevant data are being collected.*

Environmental Benefits

The 20 projects we chose for our case studies covered a wide range of project types and habitats, but they generally sorted themselves into just a few different types, with environmental benefits that varied greatly depending on the approach, scope, and focus of the project.

Wetland and Riparian Restoration

We have classified wetland and riparian restoration (by far the most common type of project funded by SOGL) into the following six categories, which are ranked in order of decreasing environmental benefits.

- ◆ **Conversion of upland to wetland.** Projects of this type usually convert agricultural land to wetlands by removing fill or breaching levees and are considerably more complicated and expensive than most other projects. Although these projects represent the most desirable type of wetland restoration, SOGL's current policies make them difficult to fund. The planning and permitting that is required makes completing such projects within the usual two-year time frame extremely difficult, and preparing engineering and construction plans can be very expensive and may exceed SOGL's policy of restricting planning activities to less than 10 percent of the grant budget.
- ◆ **Hydrologic modifications to existing wetlands.** Such projects are important because restoring more natural hydrology to an impaired system, usually in tandem with non-native control and native planting, is likely to lead to self-sustaining habitats in the long term. There are many methods for effectively altering hydrology, but we generally prefer approaches that simply remove impediments and do not require human intervention (e.g., valves and pumps).
- ◆ **Mapping and eradicating early-stage invasives.** This is the most cost-effective way to fight invasives and is an effective use of SOGL resources. However, there was a feeling among some grantees that, since the actual acreage treated tends to be low with these types of projects, they might be seen as a lower priority than projects that simply treat huge infestations of cattail or phragmites.
- ◆ **"Weed bashing" followed by planting.** We saw many projects that had significant weed control components, but few of these had any extensive plans for re-introducing native plants after control efforts ceased. We would like to see more SOGL projects that either include active re-vegetation or justify (with strong evidence) the lack of need for active re-vegetation.
- ◆ **Successional suppression.** In the western Great Lakes region, invasion of wetland habitats by woody shrubs and trees is a natural successional process that was historically controlled through fire regimes associated with land use practices of Native Americans. Most of the projects in this category used SOGL funds to clear woody species, with plans to use periodic burning to control future re-invasion. We think SOGL should continue to support projects of this type in cases where the landowner can demonstrate a long-term commitment and the necessary resources to continue prescribed burning.
- ◆ **Pure "weed bashing."** Where there are dense infestations of rhizomatous wetland weeds like hybrid cattails, phragmites, or reed canary grass, treatment is likely to be followed by reinvasion because the native plants will have been squeezed out. SOGL should avoid funding pure "weed bashing" projects that lack viable strategies to prevent reinvasion.

Upland (Non-wetland) Restoration

Upland areas that are adjacent to wetlands and streams are important to wetland functioning in many ways. We support SOGL's policy of funding upland restoration where there is a clear connection to wetland and aquatic resources.

Connectivity Projects

The connectivity projects that SOGL has funded seem to have very meaningful environmental benefits. While projects of this type typically benefit fish that move from the Great Lakes into streams and rivers to spawn, they must also screen out invasive species (non-native fish, invertebrates, and pathogens). Although we generally favor the simple removal of dams and other barriers over the installation of passage structures, in the Great Lakes, with its great load of non-native aquatic species, selective barriers that limit the movement of undesirable species may be preferred in many cases.

Projects With an Educational Emphasis

Despite SOGL's emphasis on on-the-ground restoration, we did see projects with significant educational components. In at least one case, the on-the-ground components were not nearly as strong as the educational components; and, in general, we think projects that spend substantial time and resources on volunteer training or school outings are unlikely to have great or enduring environmental benefits. However, some educational projects—those designed to demonstrate and test restoration techniques—deserve SOGL support.

General Conclusions Applicable to All Types of Projects

The majority of the projects probably would not have been funded by other sources, according to our survey. SOGL funding commonly provided a catalyst for grantees to obtain further funding and expand the footprint and scope of the work in very positive ways. To a degree, then, SOGL is responsible for environmental benefits above and beyond the projects they actually funded. However, we did identify several aspects of projects that we felt were not consistently addressed to an appropriate level:

- ◆ Very few projects had written restoration plans that detailed the work that was to be carried out.
- ◆ Few projects had thorough management plans for the land on which restoration had occurred.
- ◆ We saw few examples of adaptive management, which should be a part of every restoration project.
- ◆ Too few projects had thorough pre- and post-project ecosystem monitoring systems in place.
- ◆ Provisions for post-project maintenance were often inadequate, as evidenced by the survey and our own observations.
- ◆ It is often difficult to plan, permit, and implement the most meaningful restoration projects within SOGL's usual two-year time frame.
- ◆ Few projects anticipate or plan for the effects of climate change.

Socioeconomic and Community Benefits

Primary Economic Impacts

Since habitat restoration projects tend to be labor-intensive, one direct benefit of SOGL's spending is in generating employment. Based on studies of habitat restoration in other parts of the country, it is reasonable to expect that SOGL's \$20.7 million in investments from 2006 through 2011 have created between 270 and 600 jobs and, when multiplier effects are considered, has generated on the order of \$45 million in economic activity.

Secondary Economic Impacts

In the longer term, SOGL is making substantial contributions to environmental improvements that have been valued at between \$18 and \$31 billion. Such contributions include increased fish abundance, leading to economic values for anglers and the sport fishery industry; more abundant birds and wildlife, with obvious benefits for birders, wildlife watchers, and other outdoor recreationists; and reduced sedimentation, leading to lower water treatment costs.

Characteristics of Communities Hosting SOGL Projects

Although survey responses indicate that most SOGL investments have been in rural areas, our own GIS analysis shows that population densities within five miles of SOGL projects tend to be high relative to the eight-state region as a whole and have relatively high concentrations of minority residents. Per capita incomes and poverty rates are more or less representative of the region as a whole.

SOGL Projects and Community Development Initiatives

SOGL-sponsored habitat restoration projects sometimes play important roles in community plans for green infrastructure, tourism promotion, and economic development, as illustrated by three examples from our case studies.

SOGL's Partnership and Grantmaking Processes

The SOGL Partnership

Partners see great advantage in bringing together various federal agencies and a corporation to share, not just resources, but differing perspectives and areas of expertise. Outside observers echoed the praise for the SOGL partnership, suggesting that it should serve as a model for other programs.

Grantmaking Systems and Processes

SOGL earns high marks from grantees and observers with respect to the clarity of its policies and communications, the smoothness of its operations, and the ease of negotiating the entire grant process. In particular:

- ◆ Grantees find SOGL easy to work with, especially in comparison to government grant programs.
- ◆ SOGL communicates effectively with the grantee community, and grantees find SOGL's webinars especially useful.
- ◆ Many grantees like SOGL's online proposal submittal and reporting process.
- ◆ Grantees appreciate SOGL's flexibility in helping projects fit the guidelines, allowing modifications, and granting extensions as necessary.
- ◆ Grantees find SOGL staff to be helpful and accessible.

Conclusions and Recommendations

SOGL is a unique bi-national grantmaking program that has fostered a process of inter-agency and public/private dialogue that can serve as a model for other programs. While SOGL emphasizes measurable, on-the-ground results, it covers a broad geographical area and must be responsive to internal and external political constraints and pressures. SOGL and its partners have dealt thoughtfully with all these tensions, and by and large we believe the strategic decisions they have reached have been sound and strategic.

SOGL's grantmaking is well executed and is supporting a variety of high-quality restoration projects. The following recommendations are offered to help make a good program even better.

- ◆ **Improve project planning and design** by ensuring that funded projects include restoration plans, management plans, and input from restoration ecologists. Also, consider requiring more detailed proposals from grantees.
- ◆ **Ensure adequate post-project maintenance** by requiring proposals to include a plan for long-term maintenance, and when maintenance plans depend on the cooperation of other organizations, requiring letters of commitment from those entities. Consider follow-up grants for capacity-building in post-implementation maintenance on a selective basis.
- ◆ **Remove barriers to funding complex projects** by considering longer-term grants of, say, three to five years. Or, alternatively, provide planning grants to support design, assessment, permitting, and other upfront activities, with the understanding that successful progress during this preliminary phase would lead to follow-up funding for project implementation.
- ◆ **Build knowledge about effective restoration approaches in the Great Lakes region** by supporting experimental and demonstration projects designed to build knowledge about the long-term effectiveness of restoration approaches. Also, consider commissioning future "cluster evaluations" focused on assessing the long-term effectiveness of "clusters" of related grants, such as weed control projects.
- ◆ **Help grantees prepare for the effects of climate change** by requiring that project plans anticipate and account for expected changes such as lower lake levels or shifting ranges of rare species. Provide information and guidance for grantees through web-based resources and webinars on the likely effects of climate change and ways to address them.

Introduction

Containing more than 20 percent of the world's surface freshwater, the Great Lakes are among North America's most important natural resources, hosting more than 3,000 species of plants, 150 species of native fish, and a wide variety of birds, mammals, and other wildlife. Yet the region is also home to more than 30 million people, and centuries of industrial development and urbanization have taken a heavy toll on the Great Lakes, as pollution, invasive species, and the loss of habitat have placed mounting stress on sensitive ecological communities. In recent decades, with growing recognition of the importance of the Great Lakes ecosystem, the United States and Canada, together with the region's states, provinces, and local countless communities, have taken important steps to protect and restore this international treasure.

Among the key programs that has emerged is Sustain Our Great Lakes (SOGL), a public/private partnership dedicated to sustaining, restoring, and protecting fish, wildlife, and habitat in the Great Lakes. Administered by the National Fish and Wildlife Foundation (NFWF), SOGL distributes money from several agencies and a major corporation in the form of grants to support habitat restoration projects throughout the basin. After seven years of operation, having grown ten-fold since its inception in 2006, SOGL has decided to commission a comprehensive evaluation to help it take stock of past accomplishments, learn from its experiences, and obtain recommendations on how to strengthen the program as it moves forward.

The evaluation was undertaken by Headwaters Group Philanthropic Services in partnership with Edward W. Wilson Consulting and Coastal Restoration Consultants, Inc. Covering the years 2006 through 2011, the evaluation was conducted from June 2012 through March 2013 and included the following research components:

- ◆ A review of documents, including grant proposals and reports, and a compilation of grant data from SOGL's files.
- ◆ A series of interviews with SOGL partners as well as a set of "informed observers" recommended by SOGL. Partners include both staff and advisors of SOGL. Informed observers included other individuals who are familiar with and have worked with SOGL, including agency personnel and representatives of non-governmental organizations with expertise in Great Lakes restoration. The report includes selected excerpts from these interviews. To preserve the anonymity of the interviewees, the names have been omitted and the sources of comments have been identified as either SOGL partners, observers, or grantees. A list of the partners and observers who were interviewed is presented in Appendix C.
- ◆ An Internet-based survey of grantees was conducted in November 2012. The survey was sent to 107 project managers, 66 of whom returned completed surveys, for a response rate of 62 percent. The survey yielded information on 74 of the 132 projects that were funded during the study period. Detailed findings from the survey, together with additional information from SOGL's grant files, are presented in Appendix B.
- ◆ A series of site visits to 20 selected projects, including interviews with project managers and community stakeholders in addition to field observations by experienced restoration ecologists from Coastal Restoration Consultants, Inc., was conducted in the course of two tours of the Great Lakes region in September and October 2012. The site visits were selected to include a variety of projects with respect to geographical coverage, urban vs. rural setting, and approaches to on-the-ground restoration. Our choices were also informed by interviews with SOGL partners. Although our sample

included both earlier and later grants, we emphasized more recent projects because they were deemed to be more representative of the sorts of grants SOGL is likely to make in the future. Case studies describing the 20 projects we visited are presented in Appendix A.

This report is organized into the following sections:

- ◆ A brief overview of SOGL's program.
- ◆ A discussion of SOGL's general grantmaking strategy, describing the variety of grants that have been made and addressing issues such as the balance between on-the-ground restoration vs. capacity building and targeting particular geographical vs. distributing grants equitably across the region.
- ◆ A review of the effectiveness of SOGL's program. After addressing questions about how to measure SOGL's overall impact, we assess the program's environmental benefits, drawing largely on observations from the site visits, and then discuss its socioeconomic benefits.
- ◆ Analysis of SOGL's partnership arrangement as well as its grantmaking systems and processes.
- ◆ Summary of our main conclusions and a series of recommendations aimed at strengthening the program.

An Overview of SOGL's Program

In 2006, the National Fish and Wildlife Foundation joined with several federal agencies to pool resources to create a new grantmaking program in support of Great Lakes habitat restoration. Originally called the Great Lakes Watershed Restoration Program, the partnership was intended to advance the goals of the Great Lakes Regional Collaboration, an inter-governmental partnership established in 2004, and the Great Lakes Water Quality Agreement, a commitment between the US and Canada dating back to 1972.

In 2007, the agencies were joined by ArcelorMittal, the world's leading steel and mining company with assets in both Canada and the US. The result is a unique bi-national public-private partnership known as Sustain Our Great Lakes, whose mission is "to sustain, restore, and protect fish, wildlife, and habitat in the Great Lakes basin by leveraging funding, building conservation capacity, and focusing partners and resources toward key ecological issues." The current partners include the US Environmental Protection Agency (EPA), the US Fish and Wildlife Service (USFWS), the USDA Forest Service, the National Oceanic and Atmospheric Association (NOAA), and the Natural Resources Conservation Service (NRCS), as well as NFWF and ArcelorMittal.

In 2009, President Obama announced the Great Lakes Restoration Initiative (GLRI), which has provided \$475 million in funding for Great Lakes restoration in 2010 and \$300 million in 2011. GLRI has led to a major infusion of additional funds for SOGL. While the grant budget varied between about \$0.8 and \$1.5 million between 2006 and 2009, it jumped to \$7.4 million in 2010 and \$8.5 million in 2011 (Table 1). Most of that increase was a result of EPA's decision to channel nearly all of its GLRI funding for habitat restoration through SOGL.

Beginning in 2010, SOGL also introduced a distinction between Community Grants and Stewardship Grants. The Community Grants Program emphasizes improving local habitat conditions and conservation capacity and offers grants of \$25,000 to \$150,000, with an average grant size of about \$79,000. The Stewardship Grants Program emphasizes large-scale habitat restoration and offers grants of \$150,001 to \$1.5 million, averaging about \$650,000.

Table 1. Yearly Grant Totals²

Year	Number of Grants	Annual Grant Totals
2006	14	\$830,231
2007	22	\$1,080,500
2008	16	\$1,026,321
2009	26	\$1,526,344
2010	24	\$7,444,445
2011	30	\$8,508,708
Total	132	\$20,416,549

Another impact of GLRI was to prompt SOGL to realign its grant priorities. In its first few years, SOGL funded a broad array of projects related to habitat restoration, including management plans, assessments, and public education efforts, as well as on-the-ground restoration projects. Following a strategic planning process in 2010, SOGL strengthened its commitment to on-the-ground restoration and defined the following four priorities:

- ◆ **Restoring Aquatic Connectivity** (e.g., dam removal, bridge and culvert replacement, fish passage structures).
- ◆ **Restoring Stream and Riparian Habitat** (e.g., streambank stabilization, invasive species control, placement of in-stream structures, restoration of native vegetation, hydrological restoration).
- ◆ **Restoring Wetland Habitat** (e.g., invasive species control, restoration of native vegetation, hydrological restoration).
- ◆ **Restoring Coastal (Near-shore/Shoreline) Habitat** (e.g., restoration/enhancement of spawning reefs, removal of artificial structures, restoration of natural beach topography, invasive species control).

There are several advantages to the arrangement whereby SOGL pools money for Great Lakes habitat restoration from other funders. As an organization dedicated to conservation grantmaking, with nearly three decades of experience supporting habitat restoration throughout the United States, NFWF brings deep expertise to the agenda of Great Lakes restoration. Partner agencies can reduce their own workload by delegating grantmaking oversight to an organization that specializes in the area. And NFWF can make grants more efficiently than most federal agencies. According to NFWF staff, while it costs the federal government 22 cents for each dollar in grant money it allocates, the costs for NFWF are only about six cents per grant dollar. Moreover, SOGL benefits the grantee community by

As the GLRI has matured, there's been a recognition that NFWF has been able to address the habitat focus better than the EPA. It fills a niche.

—Observer

² These figures exclude one grant that was cancelled.

servicing as a one-stop-shop for habitat restoration funding. While federal agencies each have statutory limitations that restrict their funding options, SOGL can act as a broker, matching grantee requests to the appropriate funding sources.

Another clear advantage of SOGL is its ability to span the national border. GLRI funds cannot be spent outside the US; and although some of the funding from SOGL's federal partners could be legally invested in Canada, there are political obstacles to doing so. The presence of a private partner, ArcelorMittal, has opened the door to Canadian funding, at least on a limited basis. To date, nearly all the Canadian grants have been underwritten by ArcelorMittal. By 2011, only nine grants representing 3.8 percent of the total grantmaking budget had been made in Canada, and the choice of project locations has been influenced by ArcelorMittal's justifiable interest in supporting projects in or near the communities where its plants are located. SOGL would like to enlist Canadian federal and provincial agencies as funding partners, and outreach efforts have been made. Canadian officials profess support for SOGL, and the Ontario Ministry of Natural Resources already assists by reviewing grant applications, but Canadian sources are pessimistic about prospects for funding contributions in the near term given current fiscal and political realities in their country.

SOGL's Grantmaking Strategy

The Range of SOGL's Grantmaking

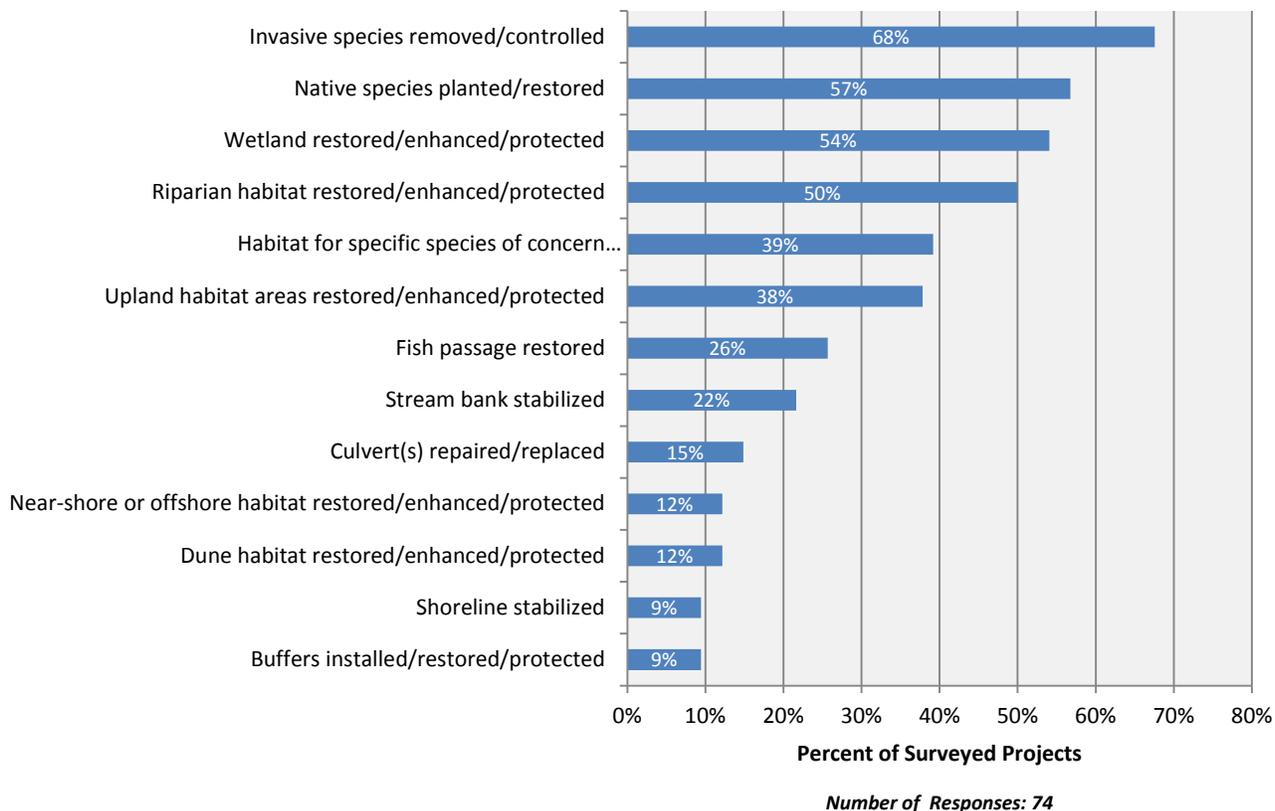
From 2006 through 2011, SOGL has supported a wide variety of habitat restoration projects throughout the Great Lakes basin. Because most projects have involved more than one type of restoration activity, they do not easily fall into discrete categories. In our survey of grantees, we asked respondents to select from a list of restoration activities all that were relevant to their projects. By far the most commonly supported activity was the removal or control of invasive species. More than two-thirds (68 percent) of the sampled projects included invasive species control as at least one component, and more than half (57 percent) included the planting or restoration of native species (Figure 1). Other supported restoration activities included fish passage restoration (26 percent); streambank stabilization (22 percent); culvert repair or replacement (15 percent); shoreline stabilization (9 percent); and the installation, restoration, or protection of buffers (9 percent).³

Regarding the types of habitat SOGL projects were seeking to restore, enhance, or protect, wetlands were the most common, being targeted by more than half (54 percent) of the surveyed projects. Half the projects (50 percent) were working in riparian habitats. Relatively few projects were focused on near-shore or off-shore habitat (12 percent) or dunes (12 percent). Thirty-nine percent of the projects included efforts to improve or protect habitats for specific species of concern, most commonly brook trout, Blanding's turtle, piping plover, and Pitcher's thistle. Somewhat surprisingly, 38 percent of the projects included efforts to restore, enhance, or protect upland habitat, despite the fact that upland habitats are not among SOGL's restoration priorities. We do not consider this a problem, however, since well functioning wetlands often depend on the integrity of surrounding upland habitats, and since

³ Note that these categories are not mutually exclusive. For example, there is considerable overlap between fish passage projects and culvert repair and replacement projects, though there is an important distinction between them—fish passage projects include projects other than culvert repair (e.g., dam removal or fish lift installation) and culvert repair projects may have benefits besides fish passage (e.g., hydrological improvement and sediment reduction).

upland restoration activities were usually just one part of projects that were primarily focused on wetland or riparian environments.

Figure 1. Habitat Restoration/Enhancement Activities Supported by SOGL Grants (from survey)



More than three quarters (76 percent) of SOGL's grants, and 70 percent of the grant budget, have gone to nonprofit organizations. Government entities account for 19 percent of the grants and 28 percent of the grant budget. A small proportion of SOGL's support (5 percent of the grants and 2 percent of the grant budget) has gone to institutions of higher education.

Further details on the nature and distribution of SOGL's grants can be found in Appendix B.

Balancing Focus and Flexibility

Among SOGL partners, as in many grantmaking programs, there is an ongoing debate about the extent to which the program should focus on a relatively narrow set of priorities where it can make clear contributions, as opposed to maintaining more flexible funding criteria that preserve options for responding to a range of opportunities. Favoring a greater focus are those arguing that SOGL should be supporting more than "random acts of conservation"—that SOGL's grantmaking should be directed toward a limited number of tangible, region-wide outcomes that demonstrate to the public and decision-makers that cumulative progress is being made. On the other side are those who see SOGL's flexibility

We went through a strategy session and tried to define priorities. Are the projects cumulatively adding up to something big? It's a huge geographic area. Lots of different project types. How does it all add up?

—SOGL Partner

relative to government agencies as a hallmark of the program and suggest that, for practical reasons, SOGL cannot be too narrowly focused, given the political forces pulling the program in different directions. Two areas in which this debate plays out are in questions about geographical targeting and the degree to which SOGL should confine itself to funding on-the-ground restoration.

On-the-Ground Restoration vs. Capacity Building

Despite SOGL's emphasis on tangible habitat restoration, the program has supported a variety of activities besides restoration, including: plans, studies, inventories, volunteer engagement, network building, and public education. SOGL staff and partners often refer to such activities collectively as capacity building.⁴ Although SOGL was more open to funding capacity building before it tightened its guidelines in 2010, capacity building was secondary to on-the-ground restoration even in the early years of the program. This is illustrated by responses to a question in the grantee survey that asked project managers to list the single primary purpose of their project. Sixty-two of the 74 responding projects (84 percent) were primarily focused on "on-the-ground or in-the-water habitat restoration, enhancement, or protection." Capacity-building projects were more common prior to 2010; but even during that period, about 70 percent of the projects were primarily focused on tangible habitat improvements, according to surveyed project managers.

Nevertheless, most SOGL-supported projects have included substantial capacity building components. According to our survey, of the 74 projects in the sample:

- ◆ 58 percent have included the training or utilization of volunteers
- ◆ 46 percent have created or strengthened partner networks
- ◆ 43 percent have included outreach to landowners or residents
- ◆ 42 percent have conducted classes, training sessions, or workshops

⁴ NFWF defines "capacity, outreach, and incentive" activities to include "establishment of incentives to encourage specific behaviors/activities that support restoration, management, and species-specific strategies." Another category of NFWF-supported projects is "planning, research, and monitoring," which includes "activities aimed at gaining knowledge used to improve conservation activities." As shorthand, SOGL partners tend to use "capacity building" to encompass organizational capacity building, public outreach, planning, research, and other activities besides on-the-ground habitat restoration, and we follow the same practice in this report.

I spoke to a grantee who said that because of this funding they have been able to build their capacity—their administrative capacity, thinking more strategically and partnering with others. They are a small non-profit. They are admired and respected. I hope our grant had something to do with that.

—SOGL Partner

[The SOGL grant] gave us the spur [to do monitoring]. We always wanted to do monitoring, but grants to do it are hard to come by. There have been local monitoring programs getting established, that helped too. But it's definitely a focus now. Our capacity has grown.

—Grantee

The SOGL grant pushed us to look at a broader approach to conservation. It was an effective lever.

—Grantee

- ◆ 38 percent have surveyed or inventoried habitat
- ◆ 27 percent have trained or utilized teachers or students
- ◆ 20 percent have developed educational programs or curricula
- ◆ 19 percent have included outreach to user groups
- ◆ 19 percent have hosted conferences or meetings⁵

Without disputing SOGL's focus on actual restoration activities, some SOGL partners continue to regard capacity building activities as important to the program, particularly with respect to smaller organizations that are often funded by the Community Grants program. The survey provides evidence that SOGL has indeed helped build grantee capacity in critical areas. Many respondents indicated agreement or strong agreement with the following statements:

- ◆ SOGL has helped our organization forge partnerships that are important to our success (90 percent agreement)
- ◆ SOGL has helped our organization build capacity in habitat restoration (83 percent agreement)
- ◆ SOGL has helped our organization set specific goals and evaluate our progress toward those goals (73 percent agreement)
- ◆ SOGL has helped share information about effective approaches to habitat restoration (67 percent agreement)
- ◆ SOGL has helped build the skills and knowledge of our staff (65 percent agreement)
- ◆ SOGL has helped our organization hire additional staff members (31 percent agreement)⁶

SOGL's current guidelines advise grantees to "apply the bulk (>90 percent) of grant funding to on-the-ground habitat improvement work, with the option of using the remaining funds for planning, design, engineering, outreach, or education." Given that SOGL's primary strength is in physical restoration projects, and that capacity building, broadly defined, is at most a secondary goal, we support the strong emphasis on on-the-ground habitat improvement. Nevertheless, we suggest that the 90 percent rule should be relaxed in some cases, especially when it can be argued that increased support for activities other than on-the-ground restoration will in the long run lead to more effective restoration. In particular, we propose increased support for planning, design, and other upfront activities preliminary to large projects, as well as more support for pre- and post-project ecosystem monitoring. We will have more to say about this in the concluding section of the report.

Geographical Targeting and Areas of Concern

Another possible way to focus SOGL's grantmaking is to concentrate grants geographically on the rationale that more intensive investments in selected areas are more likely to yield measurable outcomes. As in any grantmaking program, there is the danger that "spreading the money too thin" will result in investments that are too scattered to produce cumulative impacts.

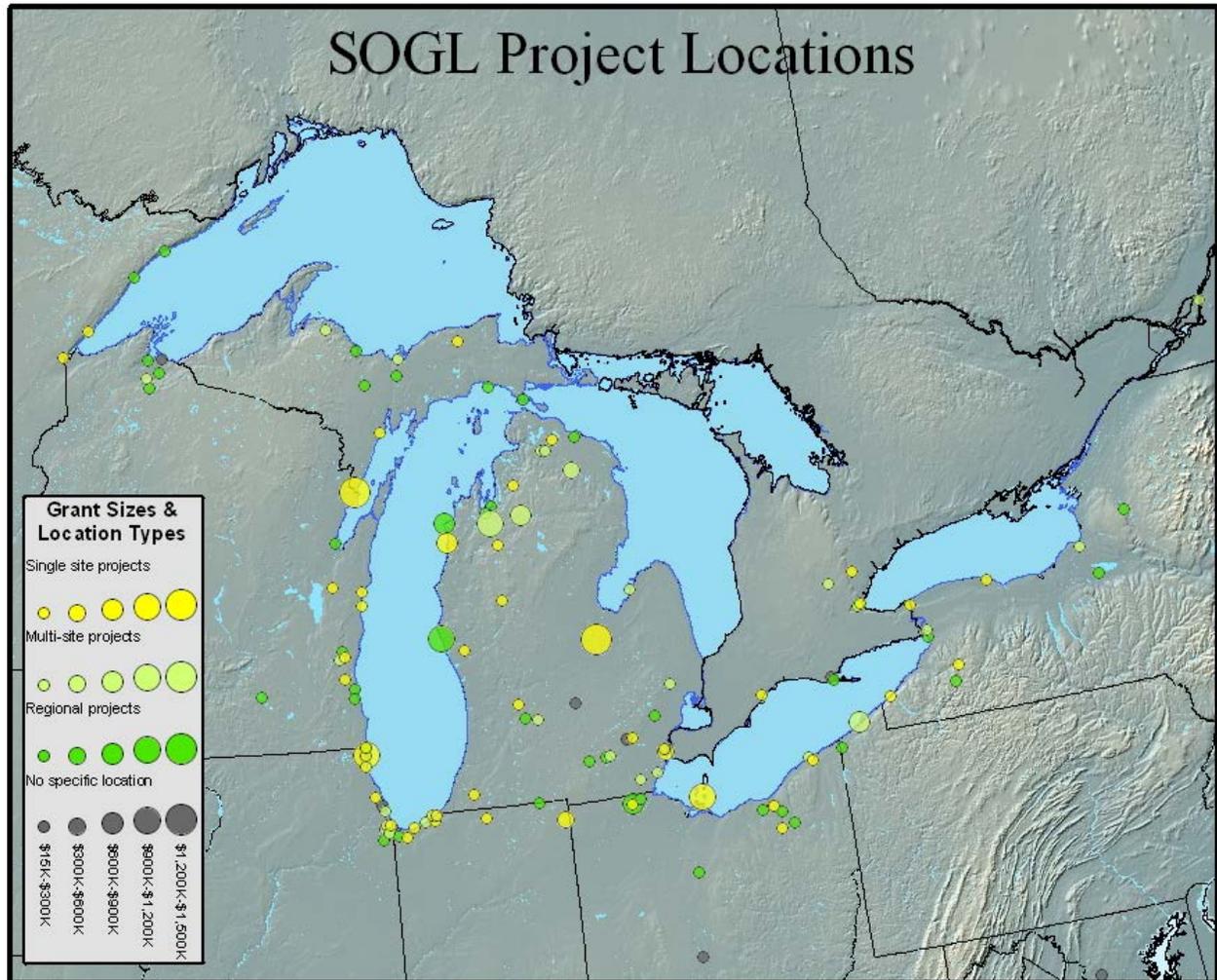
As Map 1 suggests, SOGL's grantmaking has been relatively dispersed, with grants scattered throughout the US portion of the basin. Some clustering is apparent in the densely populated regions of southern

⁵ See Appendix B, Figure 3.

⁶ See Appendix B, Figure 12.

and western Lake Michigan and, to lesser extent, in relatively rural northwestern Lower Michigan and in an arc around the southern shore of Lake Erie, from greater Detroit to the Niagara Frontier. Some areas are largely devoid of grants, notably Ontario west of Lake Erie (for reasons noted above). But, for the most part, the map of SOGL projects conveys the impression of grants spread more or less randomly over a very large area.

Map 1. SOGL Project Locations



To an extent, this is deliberate. The large proportion of federal funding creates some pressure to avoid the appearance of regional inequity in the distribution of funding. Staff report that they try to make at least one grant per state each year, though this can create challenges since grantee capacities and the quality of proposals vary somewhat from state to state. And of course, it is inevitable that states with large areas within the Great Lakes watershed, such as Michigan, will receive more funding than those with small areas, such as Pennsylvania. Nevertheless, there is a politically driven need to spread the money broadly that counterbalances the desire of some SOGL partners for more strategically targeted investments.

The influx of GLRI funding has increased the focus on Areas of Concern (AOCs), a major GLRI priority. A large portion of SOGL’s grants are supported by GLRI funds apportioned by the federal government specifically for projects that contribute to the delisting of beneficial use impairments within AOCs. On average, 60 percent of SOGL’s GLRI funding must be directed toward these priority AOC projects. Table 2, which is based on data supplied by SOGL staff, shows that between 2006 and 2011, just under half of the SOGL’s total grant dollars have gone to projects that address AOC priorities. The proportion is somewhat higher for the years 2010 and 2011 (54 percent), but still just shy of the 60 percent goal.

Table 2. SOGL Projects and Investments Addressing AOC Priorities

Years	AOC Projects		AOC Investments	
	Number	Percent	Amount	Percent
2006-2009	23	29%	\$1,517,843	34%
2010-2011	19	35%	\$8,688,433	54%
Total	42	32%	\$10,206,276	49%

SOGL partners are ambivalent about the requirement to make more grants within AOCs. They recognize the need to respond to GLRI priorities and understand that the delisting of AOC impairments is a concrete accomplishment that can help earn continued political support for Great Lakes restoration. Some also welcome the fact that AOCs introduce an element of geographical targeting into SOGL’s grantmaking. But since AOCs encompass highly impaired areas, they are often close to population centers, mainly in the southern part of the Great Lakes basin, and do not usually include pristine habitat areas. While some partners welcome the increased emphasis on urban areas, others argue that urban projects are more expensive on a per-acre basis and less likely to yield large ecological benefits compared to projects in more rural, less impacted areas. In part, this reflects the diversity of the partners and their varying agency missions. It also raises a question with which many conservation programs struggle: Is it more important to save the best remaining places or to improve those that are most impaired? Strong arguments can be made on both sides, and how a program answers this question is fundamentally a matter of choice.

The reality is that AOCs are on the forefront of what we need to accomplish, and if the majority of the money is from GRLI, we need to make progress in that area. And in my mind it's a way to geographically target the work, which is a good thing.

—SOGL Partner

AOCs are not about having brook trout jump out of the stream... They are making something that's terrible a little less terrible.

—SOGL Partner

The projects we get from the AOCs are not those that we would ideally like to fund. But does add that urban component that we want.

—SOGL Partner

General habitat-based priorities probably won us more favor in terms of funding. I do wonder, though. Maybe this is the best we can do. Or is there another way to be strategic about this large area?

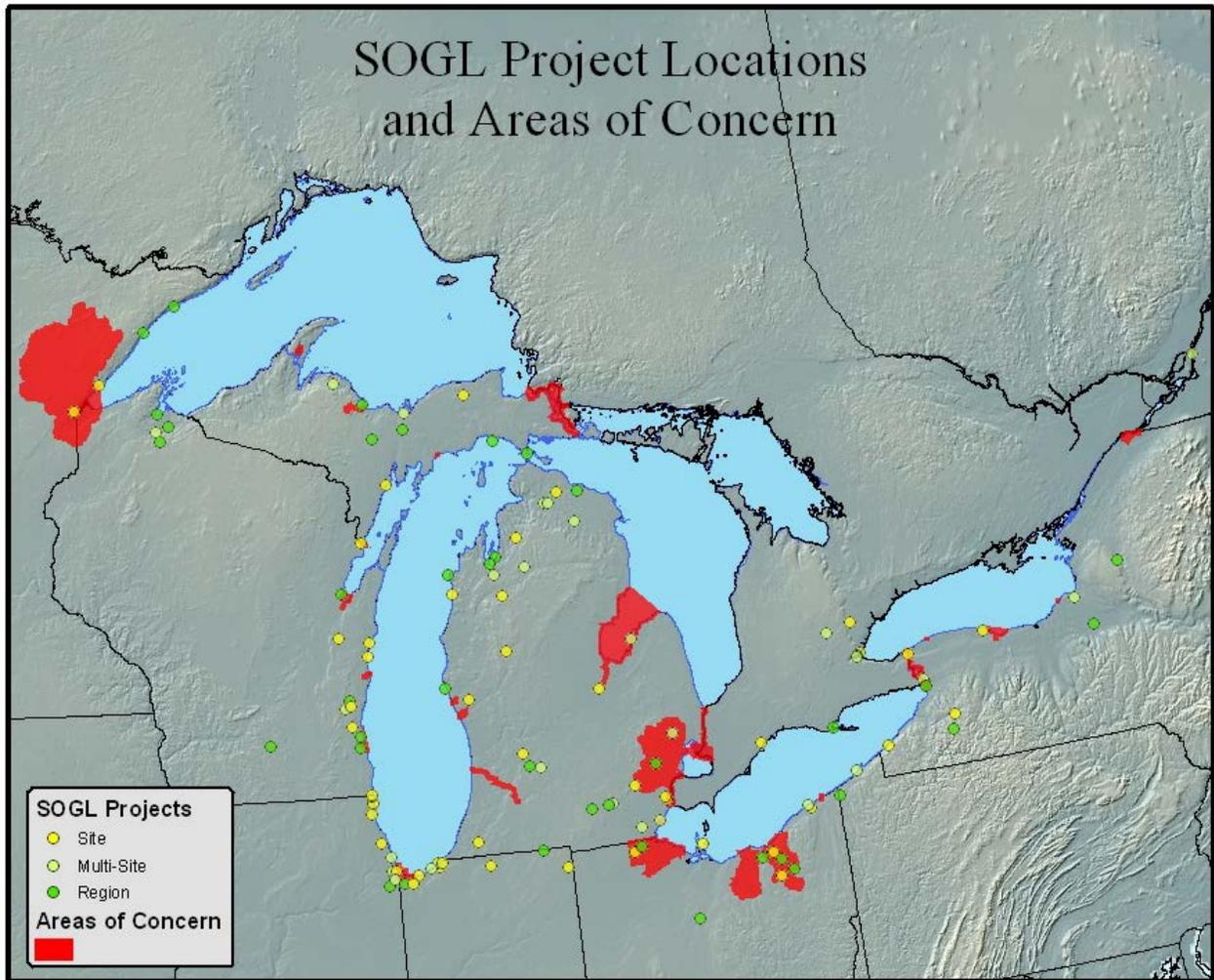
—SOGL Partner

It's true that these projects [in urban areas] cost more. But these areas are a lot more visited... The ecological outcomes are more expensive, but social outcomes are greater.

—Grantee

SOGL has opted for a balanced approach in which resources are divided between more and less impaired habitats. The need to focus more on AOCs has nudged the program in the direction of more impaired areas, but we see no evidence that this is interfering with the program's desire to make high impact investments. Two of the most ambitious projects we profiled in our case studies—wetland restoration in the Shiawassee Flats and the effort to restore sturgeon passage in the Menominee River—both promise to contribute to AOC delisting. Nor do we think there is a need for SOGL to concentrate more on AOCs, especially since NOAA's Great Lakes Habitat Restoration is more explicitly focused on delisting AOC impairments. Therefore, we believe SOGL's target of investing roughly 60 percent of its resources in AOCs is appropriate.

Map 2. SOGL Project Locations and Areas of Concern



The Effectiveness of SOGL's Program

Measuring Overall Impact

SOGL currently measures the cumulative progress of its grantmaking primarily in terms of acres and miles of habitat restoration or enhancement for each of its four focal issues. For example, in its 2006-2010 progress report,⁷ SOGL reported the following outcomes:

- ◆ Miles of restored aquatic connectivity: 474.5
- ◆ Miles of restored stream and riparian habitat: 54.7
- ◆ Acres of restored wetland habitat: 6,739.6
- ◆ Acres of restored coastal habitat: 1,604.8

We have updated these figures by adding data from 2011 grant files to arrive at Table 3.

Table 3. Acres and Miles of Restored Habitat, 2006-2011 (from grant files)

State/Province	Miles of Restored Aquatic Connectivity	Miles of Restored Stream and Riparian Habitat	Acres of Restored Wetland Habitat	Acres of Restored Coastal Habitat
State				
Illinois	1.0	1.3	1,804.6	0.0
Indiana	0.0	0.4	1,313.0	10.0
Michigan	693.5	64.9	4,656.0	1,390.5
Minnesota	0.0	0.9	0.0	500.0
New York	0.0	2.7	152.0	0.0
Ohio	3.0	3.8	579.5	0.0
Pennsylvania	0.0	0.0	392.0	0.0
Wisconsin	32.2	7.3	2,893.6	3.0
Province				
Ontario	40.0	22.5	4,415.0	0.8
Quebec	0.0	0.2	0.0	0.0
TOTAL	769.7	104.0	16,205.7	1,904.3

The figures in Table 3 should be regarded as rough approximations. They were obtained from grantee reports, and when final reports were not available, from grantee proposals. Thus they mix actual

⁷ Sustain Our Great Lakes 2006-2010 Progress Report, Table 2, p. 8.

reported results with projected results that have yet to be realized. It should also be noted that the grantee reports are prone to be inconsistent and ambiguous. In some cases, the acreage may be double-counted. For example, if the grantee reports that 90 acres was chemically treated for invasives and 100 acres were subjected to a controlled burn, it is often unclear to what extent the two treatment areas overlap.

In an alternative effort to measure cumulative results, our survey of grantees included questions about the restored acreage and mileage for each of the four focal issues (with respect to coastal habitat, respondents were given the choice of reporting either acres or linear miles). The results are summarized in Table 4. Because the survey yielded data on only 74 of the 132 supported projects between 2006 and 2011, the figures in Table 4 understate SOGL's total accomplishments. However, the survey findings allow us to compare grantees' initial expectations with their actual results. When all projects in the survey sample are considered, it appears that grantees have fallen somewhat short of their expectations. But when only projects that have been completed are considered, grantees have actually exceeded expectations with respect to aquatic connectivity, stream and riparian habitat, and wetland and associated upland habitat. Only with respect to coastal habitat restoration does it appear that they have failed to meet initial expectations, though it should be noted that this is based on a small number of responses.

Table 4. Acres and Miles of Restored Habitat, 2006-2011 (from survey)

	Number Responding		Expected		Actual		Actual as percent of expected	
	All projects	Completed projects	All projects	Completed projects	All projects	Completed projects	All projects	Completed projects
Miles of aquatic connectivity restored or enhanced	15	7	445	85	294	102	66%	120%
Miles of stream and/or riparian habitat restored or enhanced	24	10	2,274	15	2,238	17	98%	114%
Acres of wetland and associated upland restored or enhanced	35	16	11,833	1,923	7,772	2,376	66%	124%
Linear miles of coastal habitat restored or enhanced	4	2	8	4	5	1	63%	25%
Acres of coastal habitat restored or enhanced	9	6	274	199	157	84	57%	42%

SOGL should be commended for requiring grantees to measure their progress in terms of quantitative indicators. In our survey of grantees 73 percent of the respondents agreed with the statement, "SOGL has encouraged our organization to set specific goals and evaluate our progress toward those goals." Each application includes a set of numeric targets on which grantees are expected to report upon completion of their projects. Many of the indicators are specific to each grant and cannot be aggregated across projects; but most projects include numerical goals that relate to at least one of SOGL's four focal issues, thus allowing tabulations such as those presented above. The running totals of acres and miles of restored habitat provide an indication of the scale of SOGL-supported activities and are useful for communicating the program's progress to decision makers and the wider public.

However, as SOGL and its partners are aware, raw acres and miles are blunt instruments for measuring the program's ecological impacts and, if misused, can be quite misleading. The chief problem is that such measures conflate restoration techniques that are qualitatively different and have very different environmental effects. For example, burning 50 acres of wetland to control invasive plants is weighted the same as creating 50 acres of new wetland on a formerly agricultural field, yet in most cases the ecological benefits of the latter would be vastly greater. That is to say that projects that are small in area can yield greater benefits than those covering many more acres.

The danger is that, if the acreage and mileage measures are taken too seriously, there may be a temptation to pass over small but impactful projects in favor of larger projects that can add significantly to the acreage totals without producing much environmental benefit. We have not seen strong evidence that SOGL has actually done this. We simply caution that, while acres and miles are useful in communicating the program's progress, it would be a mistake to make decisions with the aim of maximizing these totals.

Indicator Species as an Alternative Way to Measure Progress

Recognizing the limitations of using acres and miles to measure progress, SOGL's partners have debated the use of an alternative set of indicators that would focus more on desired environmental outcomes. Some partners have advanced the idea of using changes in the populations or ranges of selected species to measure progress in habitat restoration. After all, acres and miles of restored habitat are not ends in themselves, but means toward the end of healthier populations of endemic plants and animals. Measuring changes would shift attention from the means to the ends, and presumably it would allow SOGL to point to specific biological outcomes that are easy to understand.

In SOGL's progress report, a lot of what they reported on was miles and acres and dollars. Those numbers are impressive. But it's hard to articulate what kind of difference you are really making... My guess is even people who know a lot more than me about this still don't have a great answer.

—Observer

We can say we restored a certain number of acres. We aren't able to say with confidence what that means in terms of ecosystem processes in a way that's understandable by decision makers.

—Observer

Currently SOGL staff tend to focus on four species when they give presentations: piping plover, lake sturgeon, brook trout, and Blanding's turtle. But the roster of potential indicator species is much broader than this. Survey respondents were given a list of species whose populations their projects were intended to expand or protect. Their responses, in order of decreasing frequency, were as follows: Brook trout, Blanding's turtle, piping plover, pitcher's thistle, Michigan monkeyflower, lake sturgeon, Houghton's goldenrod, eastern prairie white fringed orchid, northern pike, common tern, common loon, black tern, wood turtle, eastern massasauga, walleye, golden-winged warbler, dwarflake iris, Karner blue butterfly, lake whitefish, and lake herring. (See Appendix B, Figure 4.) In an open-ended question, grantees were given an opportunity to list additional species with which their projects were concerned, and they named another 37 species. It is unlikely that SOGL could arrive at a small list of species that could serve as useful indicators of the ecological health of the entire Great Lakes basin. This is not to say that useful indicator species could not be identified for particular habitats within particular sub-regions of the Great Lakes.

The use of specific species as indicators of progress is obviously appropriate for some sorts of projects—in particular, connectivity projects aimed at opening up new habitat to aquatic species (e.g., sturgeon or brook trout) and projects focused on particular species (such as piping plover). Excepting these cases, we are generally skeptical of using indicator species to judge the success or failure of restoration projects for several reasons:

- ◆ The presence of a target species on a particular site is an unreliable indicator of healthy habitat. For example, one would need to know if the organisms on the site represent a viable population or just a sink (i.e., a population that is not viable on its own, but a collection individuals moving onto the site from some viable source population). Determining the viability of a population is generally very technical work that takes lots of time, effort, and expertise. Similarly, the absence of an indicator species is not necessarily an indication of unhealthy habitat. The habitat could be functioning perfectly, but the species could fail to colonize it for reasons unrelated to habitat quality.
- ◆ Restoration projects evolve over time. Disturbance-adapted species will move in early and then leave as habitats mature. Species adapted to mature habitats might not show up for decades. Given this dynamic, it may be difficult to use indicator species to judge the effectiveness of restoration in the short-term.
- ◆ The populations and ranges of target species are likely to fluctuate due to weather conditions and other factors that have nothing to do with SOGL's grantmaking. Climate change adds to the uncertainties associated with targeting particular species. For example, research has suggested that future climate changes are likely to shift the optimal geographic range of Pitcher's thistle from the Lake Michigan and Lake Huron basins, where it is currently most common, to areas where it does

The species side did not prevail. When it comes to funding, that was a good thing. For example, if we had chosen piping plover, it would have excluded a lot and we would have denied ourselves a lot of political and popular support.

—SOGL Partner

General habitat-based priorities probably won us more favor in terms of funding. I do wonder, though. Maybe this is the best we can do. Or is there another way to be strategic about this large area?

—SOGL Partner

not currently occur in the Lake Ontario basin, hundreds of miles away.⁸ If so, measuring changes in the population of the species where it is currently found would say little about its long-term viability. We would expect indicator species to be especially sensitive to climate change since they tend to be adapted to rather specific ecological conditions. (Indeed, this very trait might make them good indicators.)

- ◆ Focusing on a small set of species would tend to prioritize projects designed to meet the specific needs of the target species at the expense of projects aimed at a more holistic approach to habitat restoration. Although the program guidelines could be written in such a way to avoid narrowly focused projects such as translocation or captive rearing, we suspect that selecting certain species as indicators would set up an incentive to favor projects targeting those species. While SOGL has made some grants to protect species with unique habitat requirements, such as the piping plover or the lake sturgeon, most pursue more general goals such as eliminating invasives or restoring more natural hydrological conditions to create healthier wetlands whose ecological functions are intact. A well functioning wetland would be expected to host a diverse biological community, even if future climate change alters the community's species composition. And a network of healthy wetlands throughout the basin should increase the resilience of Great Lakes ecologies by assuring that there are refugia for species whose ranges must shift in response to climate change.
- ◆ There are also political considerations that should not be ignored. Focusing on a few target species would narrow SOGL's scope, reducing options for supporting high-quality projects that could help gain recognition and support for the program.

Relevant to climate change... we're hoping to build some resiliency into these systems. We know that diverse systems are more resilient.

—Grantee

For all these reasons, we believe that SOGL was wise to decide against using target species as its primary means of measuring progress. Yet we understand that the potential use of indicator species continues to be discussed within NFWF, and it remains a topic of debate among ecologists. Beneficial impacts on the populations of endemic species are clearly expected outcomes of SOGL-supported restoration projects. The points we are making suggest that there are substantial practical and methodological constraints that make it hard to use species' populations as reliable indicators. We are not saying that SOGL should abandon the claim that its funding will have beneficial effects on species; we are simply arguing that attempting to measure those effects rigorously may not be very cost effective or reliable in terms of evaluating SOGL's accomplishments.

To the extent that SOGL does invest in the indicator-species approach, we suggest that it do so in cooperation with a range of other partners involved in Great Lakes restoration as part of a "collective impact" approach, which we describe in the following section. That is, we would urge SOGL to engage with other agencies and organizations to determine if a focus on selected species might make sense as regional measures of ecosystem performance. Such indicators would not be used to gauge the effectiveness of individual restoration projects, or to track the progress of single agency, but to assess the effectiveness of the full range of Great Lakes restoration efforts—an approach that we believe makes much more sense.

⁸ Vitt et al., 2010. Assisted migration of plants: Changes in latitudes, changes in attitudes. *Biological Conservation* 143: 18-27

Toward Measuring Collective Impact

The above observations beg the question: Is there a better way to measure SOGL's impact besides simply counting acres and miles? In our interviews, many SOGL partners and observers noted the importance of performance indicators in light of GLRI's emphasis on measuring impact and the need to show decision-makers that progress is being made. However, as one observer noted, the onus of developing better performance measures is not entirely on SOGL. Many agencies and organizations are engaged in implementing GLRI and related efforts to restore the Great Lakes, such as Remedial Action Plans for Areas of Concern. It makes little sense for each to come up with its own unique performance measures. What is needed instead are regional indicators of ecosystem performance that measure joint progress toward goals shared by many different actors. Given the size of the of the Great Lakes basin, these indicators should vary from one region to the next, depending on specific needs and conditions.

In fact, efforts to establish such regional measures of ecosystem performance are underway. For example, the amendment to the Great Lakes Waters Quality Agreement signed in September 2012 commits the US and Canada to adopt common objectives for the Great Lakes ecosystem and assigns responsibility to the International Joint Commission for "assessing progress to restore and protect the Great Lakes" and advise the governments on effective research and monitoring priorities.⁹ In October 2012, the University of Michigan announced the creation of a new Great Lakes research center whose objectives will include strengthening GLRI through science-based assessment of environmental outcomes and "more effective restoration efforts based on a deeper understanding of potential cumulative impacts of currently funded GLRI projects."¹⁰ At a smaller geographical scale, collaborative efforts are underway to develop better ways to measure progress toward AOC delisting.

Performance measurement is probably the biggest concern I have right now... But those are regional conversations. It's not just on the backs of SOGL. SOGL should be at the table to advance the conversation about indicators.

—Observer

Rather than trying to isolate the ecosystem impacts of its own program, SOGL's efforts would be better spent contributing to these and similar efforts in which multiple actors are working together to develop common sets of indicators to measure their collective impacts on regional ecosystems. SOGL staff and partners could add a valuable perspective to these discussions, drawing on NFWF's deep experience with on-the-ground restoration projects. Once common indicators are agreed upon, SOGL could work with grantees to ensure that projects are monitored and evaluated in ways that produce data relevant to the shared regional indicators.

Such an approach would be consistent with a trend in philanthropy toward measuring *collective impact*. The idea is that solving complex problems requires multiple actors working toward a common agenda, and that performance should be assessed using a shared measurement system that gauges progress toward collective goals.¹¹ Great Lakes restoration, we believe, lends itself to the collective impact approach, especially since GLRI has gone a long way toward defining a common agenda for multiple agencies and organizations.

⁹ http://www.ijc.org/en_/news?news_id=31#

¹⁰ http://www.snre.umich.edu/news/10-30-2012/um_launches_9_million_effort_to_strengthen_great_lakes_restoration_while_advancing

¹¹ http://www.ssireview.org/articles/entry/collective_impact

In short, we recommend that SOGL continue using acres and miles as progress measures that are easily understood and useful for communicating the scale of its accomplishments. At the same time, SOGL should engage in ongoing efforts to develop more meaningful measures of regional ecosystems and, as such measures are developed, work with grantees to ensure that relevant data are being collected.

Environmental Benefits

Accurately assessing the environmental benefits of a given restoration project is difficult; comparing different projects with different goals in different habitats is even trickier. Nevertheless, there are certain types of restoration actions that would be expected to have greater benefits than others. Further, there are preferred approaches to implementing projects that help assure the environmental benefits are realized and sustained over time. The following discussion provides a framework for comparing the environmental benefits of general types of restoration actions that are commonly funded by the SOGL program.

We use "environmental benefits" as an intentionally broad term that encompasses a wide range of positive impacts on resources and processes such as biodiversity, rare species, and ecosystem services that are associated with conservation goals. These benefits are realized, in the context of this report, by improving the functioning of degraded habitat through ecological restoration. To be effective, ecological restoration must focus on restoring natural ecosystem processes. A few of the physical processes and structures that can be restored to support healthy ecosystems include hydrology, landform, soils, and fire regimes. Actions that restore biological processes include invasive species removal and re-introduction of native species. When important ecosystem processes required to support the target habitats are effectively restored, the natural result will be self-sustaining habitat that provides many, if not all, of the ecosystem services and benefits to biodiversity that reference natural areas provide. To the extent that a project attains these goals, we consider it to have greater environmental benefits. Importantly, we make no judgment as to which types of habitats provide greater benefits than others. For this discussion we are concerned only about how effectively restoration projects recreate natural, self-sustaining habitats.

The 20 projects we chose for our case studies intentionally covered a wide range of project types in a wide range of habitats over a broad geographic area. The relatively small sample size precludes quantifying the environmental benefits of the SOGL program as a whole. However, over the course of our visits it became clear that projects generally sorted themselves into just a few different types, with environmental benefits that varied greatly depending on the approach, scope, and focus of the project. In a broad sense, projects could generally be classified as 1) wetland and riparian restoration, 2) aquatic connectivity, 3) upland restoration, and 4) educational. Most, if not all, the projects we visited blurred the lines between these categories; but, in general, most projects focused the majority of the funds and efforts in one of these four categories.

We see little point in trying to rank or compare the environmental benefits of these four categories because they are all integral parts of a comprehensive program that, when taken as a whole, generates benefits greater than the sum of the parts. However, within each category there are some clear distinctions between types of projects that are expected to yield the greatest environmental benefit and those that will have less. The following discussion is based on site visits and interviews associated with the 20 case studies described in Appendix A, information gleaned from our survey of grantees, and general principles of restoration ecology.

Wetland and Riparian Restoration

This was by far the most common type of project we saw and is indeed the type most often funded by SOGL. Many different types of habitats and approaches have been covered, and some projects have covered multiple habitat types using a wide range of approaches. We have classified the types of restoration actions we saw into six categories:

1. Conversion of upland to wetland
2. Modification of physical processes such as hydrology in existing wetlands
3. Mapping and eradicating early-stage invasive plants
4. Weed control followed by planting native plants
5. Successional suppression
6. Pure "weed bashing" of widespread invasive plants

In general, we expect an incremental decrease in environmental benefits as one moves down this list. That being said, there may be cases where even pure "weed bashing" projects might be desirable given local conditions, non-ecological factors, and the type of management in place at the site. There are many nuances within each of the six categories that deserve discussion.

1. Conversion of Upland to Wetland

This is by far the most desirable type of wetland restoration project. The importance of wetlands to the overall health of the Great Lakes region is a central tenet of the SOGL program. It follows that projects that lead to an increase in wetland area can be expected to help SOGL reach its overall goals most effectively. Projects of this type usually convert agricultural land to wetlands by removing fill or breaching levees and are considerably more complicated and expensive than most other projects. Commonly they involve acquiring the land, preparing engineering plans and construction drawings, and obtaining permits before on-the-ground work can begin. The actual construction can be very expensive as well. Impounded wetlands with managed water levels can be expected to have a subset of the functions of systems experiencing the natural water level dynamics, but with appropriate infrastructure and ongoing management commitments they may also have the ability to limit the movement of non-native species.

The best example we saw of this type was the project at Shiawassee Flats National Wildlife Refuge near Saginaw, MI (Appendix A, Project 18), which will convert several hundred acres of farmland into a managed wetland by pumping water into and out of a basin behind a river levee. This was also among the most expensive projects we observed (\$1.5 million from SOGL). It is worth noting that a great deal of the expense was incurred by the construction of expensive and complicated water control structures (pumps, canals, and additional berms). An alternative would have been simply removing or breaching the levee (an approach we would have preferred). Nevertheless, the project should have significant and enduring environmental benefits. The Lake Ontario Sedge/Grass Meadow Restoration project near Rochester, NY (Appendix A, Project 15) also converted former agricultural land to wetland, but on a much smaller scale.

The SOGL program in its current configuration makes supporting this type of project difficult for several reasons. First, SOGL does not fund land acquisition. Second, the planning and permitting usually required by this type of project makes completing the project within the usual two-year time frame extremely difficult. Third, the planning process (including engineering and construction plans) can be

very expensive and may exceed SOGL's policy of restricting planning activities to less than 10 percent of the grant budget.

2. Hydrologic Modifications to Existing Wetlands

Many of the remaining wetlands in the Great Lakes region are degraded due to altered hydrologic regimes. Wetland types are defined, in large part, by differing hydrologic conditions. The most common alterations are to the amount of water that reaches the wetlands (too much or too little), though factors such as increased flashiness of runoff and seasonal timing and duration of flooding and sediment loading may also be important. Such alterations play a significant role in degrading natural wetland functioning and often lead to loss of native biodiversity and increased vulnerability to invasion by non-natives. Restoring more natural hydrology to a system, usually in tandem with non-native control and native planting, is likely to lead to self-sustaining habitats in the long term.

We saw a few projects where efforts were made to restore more natural hydrology. The Lake County Forest Preserve District project at Spring Bluff near the Wisconsin/Illinois border (Appendix A, Project 7) made modifications to a channelized creek to decrease flooding of adjacent degraded sedge meadow habitat. The excess water in the meadow was allowing cattails to invade. Decreasing flooding at the site should make the meadow too dry for cattails but wet enough to once again support sedge meadow. Long-term maintenance will be required to keep the creek clear, but this type of maintenance is preferable to simply killing cattails continuously as they re-invade. The Centerville Creek project at Cleveland, WI (Appendix A, Project 5) is restoring stream and floodplain habitat by removing sediment and recreating natural landforms in a former reservoir. This is another good example of restoring natural processes and was one of the few projects we saw that was restoring riparian habitat. On a much smaller scale, The West Creek Reservation project near Cleveland, OH (Appendix A, Project 20) altered hydrology to restore vernal pool habitat, and the Bowens Creek restoration near Arcadia, MI (Appendix A, Project 1) replaced perched culverts to restore more natural stream flow.

We encourage SOGL to support more projects that alter hydrology (or other physical processes) in order to restore more natural wetland functioning. There are many methods for effectively altering hydrology, but we generally prefer approaches that simply remove impediments and do not require human intervention (e.g., valves and pumps). Since altering hydrology usually means moving dirt and changing drainage patterns, these projects are often more complicated to plan and permit than simple "weed bashing" programs. Again, SOGL's policies (the two-year time frame and limited spending on planning) may be limiting the ability to support such projects.

3. Mapping and Eradicating Early-stage Invasives

The most cost-effective way to fight invasive species is to detect and eradicate early-stage invasions. Early-stage invasions come in three main forms: 1) species that are newly arrived in a region and can reasonably be expected to become invasive (e.g., kudzu vine along eastern Lake Michigan); 2) common invasives moving into new regions (e.g., phragmites in northern Michigan); and 3) isolated patches of invasives within preserves that are expected to spread. The first two types of invasion must be addressed using widespread regional programs. The third type may make sense even on very small preserves.

The Eastern Lake Michigan Invasive Plant Control Project, spearheaded by TNC (Appendix A, Cases 12 and 13), is doing early detection and treatment on a regional scale. The detection

The strike team allowed us to focus on a different suite of species with a different strategy. We had only a crew of one or two or three. That flexibility to work across property boundaries has worked really well. We used contractors. They used GPS to keep track of where they went.

—Grantee

phase uses a combination of methods that focus on using local expertise through collaboration with other conservation groups. This project is also exemplary in its use of publicly accessible web-based mapping that allows the detection database to grow in multiple ways. We are impressed by this project and think it could serve as a model for other regions.

On more local scales, the most efficient way to manage invasives on preserves is to detect and eradicate new invaders. Reserve managers often already know where small infestations are and can provide a starting point for these programs. Teams sent out to treat these known infestations, if well trained, can detect and treat new infestations they find while in the field. This approach was used effectively at the Chiwaukee Illinois Beach Lake Plain Restoration project (Appendix A, Project 8) on the scale of about 1,000 acres and on smaller parcels as part of the Chicago Lake Plain Restoration project (Appendix A, Project 6). The Chiwaukee Illinois Beach Lake Plain Restoration project also utilized a strategy of defensible boundaries, which should allow an efficient transition into their long-term maintenance phase.

We believe programs that detect, map, and treat early-stage invasives are an effective use of SOGL resources. There was a feeling among some grantees that, since the actual acreage treated tend to be low with these types of projects, they might be seen as a lower priority than projects that simply treat huge infestations of cattail or phragmites. Some grantees reported the acreage surveyed rather than the acreage treated, though this measure, too, may not always be appropriate.

4. "Weed Bashing" Followed by Planting

We saw many projects that had significant weed control components, but few of these had any extensive plans for re-introducing native plants after control efforts ceased. Most grantees assumed that desirable native plants would re-colonize areas once the aggressive non-native plants (most commonly cattail, phragmites, and reed canary grass) were killed. While natural re-colonization may indeed occur on some sites, we found little evidence that this belief was based on either first-hand experience or published research. While this is probably a subject that needs more study in the Great Lakes region, a general paradigm in restoration ecology holds that re-introducing native plants from seed or nursery stock after invasive control leads to more rapid development of desirable levels of native cover and structure. This is important because the sooner the native plant community recovers, the less prone the habitat is to re-invasion by non-natives. This effectively decreases the need for long-term maintenance and increases sustainability. In the best scenarios, intact native vegetation can virtually exclude invasive plants.

We did not see any examples where grantees planned to restore native plant communities after large-scale "weed bashing." We did see a few examples of re-vegetation from seed and nursery stock on small scales that we feel will be effective, including the Buffalo River Oxbow project (Appendix A, Project 3), the Lake Ontario Sedge/Grass Wetland Restoration project (Project 15), the Bur Oak Savanna Restoration project (Project 4), Centerville Creek Restoration project (Project 5), and the Joseph Davis State Park project (Project 14). All of these projects are still in their early stages, and native plant recovery can be a slow process. Planting can entail many challenges, including herbivory, uncooperative weather (especially lack of rainfall), and lack of available seed or nursery stock. This means that including substantial re-vegetation components may add significant time and cost to projects.

We would like to see more SOGL grantees either: 1) include active re-vegetation or 2) justify, with strong evidence, the lack of need for active re-vegetation. It might also be instructive for SOGL to fund studies that go back and look at older weed control projects to see the extent to which native plant communities are recovering on their own in different types of habitats. While weed bashing followed by planting can be self-sustaining, these projects will require long-term maintenance to assure re-invasion

does not occur. Since the weed control components of a project typically take at least two seasons, the SOGL two-year grant cycle leaves little time for planting, and almost no time to assess the success of the planting. Some method for extending the length of grants would be useful for supporting more re-vegetation efforts in conjunction with weed bashing.

5. Successional Suppression

We saw several projects that were seeking to remove woody invasives (both native and non-native) from wetland habitats that should be dominated by sedges, grasses, and forbs (e.g., wet prairie and sedge/grass meadow). In the western Great Lakes region, invasion of these habitats by woody shrubs and trees is a natural successional process that was historically controlled through fire regimes associated with land use practices of Native Americans. If fire is suppressed for too long, these types of wetlands, which harbor considerable biodiversity, will be lost. Further east, habitat patch dynamics were controlled by different processes, but the role of grasslands and shrub habitats in supporting breeding and resident birds is recognized as an important conservation element.

Most of the projects in this category, including the Chicago Lake Plain Restoration (Appendix A, Project 6), Interdunal Wetland Restoration at Indiana Dunes (Project 11), Bur Oak Savanna Restoration (Project 4) and Chiwaukee Illinois Beach Lake Plain Restoration (Project 8), used SOGL funds to clear woody species out of areas where fire has been suppressed for many years. Once cleared, the sites can be burned to control re-invasion. To be sustainable, these types of projects will require prescribed burning (approximately every other year) in perpetuity. Using prescribed burns to control invasive plants is cost effective compared to other methods. The Avian Restoration project at Joseph Davis State Park (Project 14) planned to use mowing to prevent woody shrubs from invading grassland and trees from invading shrubland. This project will need significant long-term management to artificially retard natural succession processes.

We think SOGL should continue to support projects of this type in cases where the landowner can demonstrate a long-term commitment and the necessary resources to continue prescribed burning. Even with assurances, though, there is considerable potential for burning programs to be disrupted or ended by safety concerns from neighbors, funding interruptions, changing public sentiment, and so forth. In such cases, all the efforts might be for naught unless alternatives to burning can be implemented (though these will typically cost more and be less effective). Prescribed burning is the best way to preserve these fire-dependent habitats, but it should be remembered that they are highly managed environments that are not self-sustaining.

6. Pure "Weed Bashing"

The majority of the wetland projects we saw were primarily concerned with controlling or eradicating invasive non-native plants. While weed control is integral to most habitat restoration projects, simply killing weeds does not necessarily, in itself, constitute habitat restoration. In cases where there are limited infestations with significant populations of native plants still intact, a weed-only strategy may be appropriate. However, where there are dense infestations of rhizomatous wetland weeds like cattails, phragmites, and/or reed canary grass, it is likely that all native plants will have been squeezed out. Any remaining natives will likely be killed by herbicide treatments targeting the weeds. This means that, for native vegetation to recover by natural means, propagules of native species will have to reach the site faster than invasives and/or natives will have to grow more vigorously than then invasive plants. By and large, these are unlikely scenarios.

There are some good arguments for controlling large-scale infestations of plants like phragmites and hybrid cattail, though the benefits often relate mainly to aesthetics or recreation, as we saw in the Presque Isle project near Erie, PA (Appendix A, Project 19). Such efforts are better considered

management actions than restoration actions. In Wisconsin, for instance, aerial spraying of phragmites was being done by, among others, the state Department of Natural Resources, apparently to limit the spread of these species to adjacent private properties.

We feel that SOGL should fund pure "weed bashing" projects only if there is a viable strategy for ensuring non-native plants (either the same species or other species) do not simply re-invade the site. A strategy employed by a few of the grantees was to follow-up with repeated treatments of non-natives, assuming that native plants would get established. As we mentioned above, there is little or no evidence that we are aware of that this is a viable strategy. Better strategies include those discussed above, altering hydrology, re-introducing natives from seed or nursery stock, or concentrating on light infestations with some intact native vegetation.

Upland (Non-wetland) Restoration

We visited only one purely upland restoration project, and in general SOGL has not funded many projects of this type. Upland areas that are adjacent to wetlands and streams are important to wetland functioning in many ways. We especially favor upland projects that: 1) support wildlife that needs both aquatic and upland habitat (most often amphibians and reptiles); 2) reduce sedimentation in streams (e.g., converting farmland to forest or prairie); 3) provide a buffer between development and wetland/aquatic habitats; and 4) also focus on restoring wetland-upland ecotone habitat (i.e., transitional areas). To support viable populations of target species, appreciably reduce sedimentation, or provide a meaningful buffer, we would generally recommend that projects with an upland focus be rather large, on the order of hundreds of acres. The Holden Property Restoration in northeast Indiana (Appendix A, Project 10) was a very good example of a large-scale upland restoration project that will have clear benefits for aquatic and wetland resources.

We support SOGL's policy of funding upland restoration where there is a clear connection to wetland and aquatic resources. Many upland restoration projects, while worthwhile in their own right, are probably not a good match for SOGL funding (e.g., killing garlic mustard in forests). The importance of adjacent uplands to wetland functioning is often overlooked, and we feel that SOGL's recognition of this is a particular strength of the program.

Connectivity Projects

The second most common type of project we saw was restoration of aquatic connectivity through removal or modification of dams. This type of project typically benefits fish that move from the Great Lakes into streams and rivers to spawn. This includes native species such as lake sturgeon, as well as introduced (yet desirable) species such as coho and chinook salmon and rainbow trout. The native brook trout usually do not venture into the lakes but can benefit from connectivity projects that open up passage within streams. There are, of course, several introduced fish species in the Great Lakes that are not desirable, including sea lamprey and carp. In-stream barriers have, in many cases, protected reaches of streams and rivers from these destructive species. Thus, projects that restore connectivity need to carefully weigh both the benefits and the potential harm that barrier modification or removal might have.

There are two main approaches to restoring aquatic connectivity—installing passage structures (fish ladders or some equivalent) and removing a dam or barrier completely. Passage structures may be the preferred alternative in many cases since they can be designed to let only certain fish move upstream (i.e., filter out the undesirable species). We visited an example of this on the Menominee River at Menominee, MI/Marinette, WI (Appendix A, Project 9) that was focused on getting lake sturgeon past two power generating dams to spawning grounds and then safely back down stream. The approach being used includes a fish elevator where sturgeon (and other desirable species) will be hand-sorted and

moved up-stream. This is an expensive project that will require ongoing management as long as the dams remain in place. In this case, the owner of the dams will probably be required to continue operating the bypass structures as part of their upcoming FERC certification. SOGL funded the installation of a more traditional fish ladder on Norval Dam on Ontario's Credit River (Appendix A, Project 16). In this case, the owner of the dam was not interested in removing it, but would allow installation of the bypass structure. This type of structure requires less management, but it will require regular maintenance to keep it free of debris. An active and dedicated fishing club will take on the long-term operation of the structure. Both of these projects had a clear rationale for how the target fish species would benefit from the barrier modifications. Specifically, both had studies showing that the barriers, as they were, would not pass fish and that the modification would lead to access to high-quality spawning habitat upstream. In the case of the Menominee River, it was also important to get young sturgeon downstream without going through the turbines.

We saw a third type of barrier modification project, part of the Arcadia Marsh Restoration project in the northwest Lower Peninsula of Michigan (Appendix A, Project 1). In this project, small culverts under rural roads were improved to reduce the downstream drops so that brook trout could move up stream. Anecdotal evidence suggests that the trout are moving into parts of the upper watershed where they had not been seen in many years.

We did not visit any project that removed a dam or barrier completely, though we know that SOGL has funded several projects of this type as well. The benefits of removing a structure are obvious—unimpeded passage for fish and little or no long-term management or maintenance. Almost anywhere else in the country, we would say that barrier removal is usually preferred over passage structures. In the Great Lakes, however with such a huge load of non-native aquatic species (including fish, invertebrates, and pathogens), selective barriers that limit the movement of undesirable species may be preferred in many cases.

We approve of the range of connectivity projects that SOGL has funded, all of which seem to have very meaningful environmental benefits. An interesting issue we encountered on the Menominee River project is worth noting. The dams that were being modified are scheduled to undergo FERC recertification in just a few years. It is likely that this process would have mandated that the dam owners install bypass structures of some type, at their own expense. Though we did not see an example of this, there could also be cases where the Army Corps of Engineers (or some state entity) declares a dam unsafe and mandates its removal at the owner's expense. Whether it is a passage modification or removal project, SOGL should be careful about funding projects that might otherwise be financed by someone else under some regulatory framework.

Projects With an Educational Emphasis

Currently, SOGL funding encourages projects to spend less than 10 percent of the grant amount on project activities not directly related to on-the-ground restoration, including education and outreach. Nevertheless, we did see projects with significant educational components that were equally or more prominent than the on-the-ground components. These projects can broadly be classified into three types: 1) teaming with a school to develop restoration related curriculum, 2) research- or demonstration- driven restoration, and 3) restoration where a bulk of the work is done by volunteers and school groups. We are strongly in favor of the first two types of project and much less so of the third.

The Riverwatch Academy Project in Buffalo, NY (Appendix A, Project 17) was a collaboration between the Buffalo Niagara Riverkeeper and two local colleges. The educational aspect of this project was strong; curricula were developed and college level courses were offered. A wide range of guest lecturers

was used and many important topics seemed to be addressed. There was also a field component to the courses, which yielded on-the-ground results. Unfortunately, the on-the-ground aspects of this particular project were not nearly as strong as the classroom aspects seemed to be. Nevertheless, students were not only being exposed to restoration; they were receiving training that was directly applicable to jobs in the ecological restoration field.

The second type of project was exemplified by the Lake Ontario Sedge/Grass Meadow Restoration project (Appendix A, Project 15). This project combined on-the-ground restoration with a rigorous experimental approach, including hypothesis testing, data analysis, and dissemination of the results. The project was overseen by Dr. Douglas Wilcox at SUNY/Brockport and included support for a graduate student. The research is likely to lead to practical information that will improve the outcomes and benefits of future restoration projects of this type. We think SOGL can be an important funding source for projects testing restoration techniques. Owing to a somewhat surprising dearth of research related to ecological restoration for most wetland habitats in the Great Lakes region, there is great need for testing the efficacy of existing techniques and working to develop new ones. SOGL is in a position to support research that has on-the-ground environmental benefits and far reaching benefits related to improving outcomes of other projects funded by SOGL. SOGL should insist on publication and other forms of dissemination for the results of these types of projects.

We did not see a clear example of the third type of project, in which volunteers or students do the bulk of the work. Such projects seem to be less common under the revised SOGL guidelines. We think projects that spend substantial time and resources on volunteer training and one-off school trips are not likely to have great or enduring environmental benefits. We saw examples, especially projects in urban areas, where outreach and education were very important for fostering support among the local communities. We think it is appropriate that SOGL's current guidelines limit these activities to a minor portion of the grant budget.

General Conclusions Applicable to All Types of Projects

Over the course of our case studies, we identified several general themes that applied to all types of projects. First, the majority of the projects we saw probably would not have been funded by other sources. This was borne out in the survey, in which 88 percent of project managers agreed with the statement "SOGL has allowed us to undertake projects which otherwise would not have been possible." Therefore, we believe that the overwhelming majority of the environmental benefits generated by SOGL-funded projects would not have been realized without this program. Second, SOGL funding commonly provided a catalyst for grantees to obtain further funding and expand the footprint and scope of the work in very positive ways. To a degree then, SOGL is responsible for environmental benefits above and beyond the projects they actually funded.

The money from SOGL was the first serious money for the whole restoration project. Because of SOGL, it has acted as a catalyst. All the other things happened as a result of the initial support.

—Grantee

We did identify several aspects of projects that we felt were not consistently addressed to an appropriate level:

- ◆ **Restoration Plans.** Very few projects had written restoration plans that detailed the work that was to be carried out. A restoration plan should, at the very least, identify: 1) project goals, 2) actions needed to accomplish the goals, 3) appropriate techniques to be used, 4) a monitoring strategy, 5) an adaptive management strategy, and 6) long-term maintenance needs. In several cases, all of this existed only in the head of the project manager. In such cases, if that project

manager were to leave their job, there would be almost no way of continuing the work in any cohesive manner. In other cases, some of these aspects had not even been addressed.

- ◆ **Management Plans.** Similarly, few projects had thorough management plans.¹² Management plans should address issues that could impact the restoration project, especially in the longer term. Important aspects of such plans include: the legal status of the property (e.g., ownership, zoning, easements); management authority (who is responsible for what); future plans for development or other restoration projects; and, generally, threats that could lead to the restoration work being either undone or poorly maintained.
- ◆ **Restoration Ecologists.** Many of the projects we observed had input from professional restoration ecologists, but some did not. While we understand that there are individuals out there who are qualified to design and implement restoration projects and are not trained restoration ecologists, in our experience this is rather uncommon. Having a good restoration ecologist involved in every project will lead to better outcomes, increased environmental benefits, and in some cases less damage to existing biological resources.
- ◆ **Adaptive Management.** This should be a part of every restoration project, though we saw few examples in the course of our case studies. Ecological restoration projects, almost by definition, are full of uncertainty. No restoration plan, no matter how carefully construed, will ever lay out the most appropriate or efficient strategy for accomplishing project goals from the outset. Instead, plans need to be flexible and there needs to be processes in place to alter strategies in order to accomplish the goals. This usually means either careful on-the-ground observations of how the project is proceeding or systematic collection of monitoring or experimental data along the way. This information is used to inform the project managers on what is working and what is not and to adjust accordingly. Good project managers often do this intuitively, even if they are not calling it adaptive management. However, in many cases, when strategies do not work and a project fails to meet its goals, the goals of the project get changed (often for the worse) to fit the outcome.
- ◆ **Ecosystem Monitoring.** For the most part, we were surprised at the general lack of pre-project and post-project ecosystem monitoring. We are mainly referring to quantitative monitoring of biotic (e.g., native and non-native vegetation cover and populations of target species) and abiotic (e.g., hydrology and pollutant levels in water) factors that are expected to change over the course of a project. There may often be quantified outcomes associated with these factors that represent targets for the project. While most SOGL-funded projects involve monitoring of some sort, many grantees are aware that they are not doing as much monitoring as is necessary. Indeed, in our survey, the managers of nearly half of the projects sampled acknowledged that more monitoring may be needed for their projects. Some of the grantees we spoke with felt limited by SOGL's reluctance to fund monitoring. Further, many of the environmental benefits of projects are not realized for several years after a project is installed. SOGL's two-year grant cycle currently does not allow for the longer-term monitoring that will reveal the extent to which the program is meeting its overall goals. Requiring robust monitoring, preferably for at least three years post-installation, as part of each project is an excellent way for SOGL to more accurately assess how projects are performing in achieving their desired outcomes.
- ◆ **Post-project Maintenance.** Most ecological restoration projects require short-term (1-5 years) and longer-term maintenance. This may include, for example, retreatment of invasive species that re-

¹² A notable exception was Avian Restoration at Joseph Davis State Park (Appendix A, Project 14).

colonize areas, prescribed burns to control woody invasives, or removing debris from culverts or channels. According to our survey, 60 percent of the project managers felt their projects may require more provisions for long-term maintenance, and only 20 percent of them felt that "all the necessary provisions for ongoing maintenance have been made." Since many projects only just manage to get implemented within SOGL's two-year window (plus an extension, which is usually granted), any short- or long-term maintenance is usually left to other funding sources. Many grantees have provisions in place to take on this work. It is a struggle for others, however, and we fear that in such cases it might not be prioritized and therefore be left undone. Nevertheless, post-project maintenance can make the difference between a project realizing its desired environmental benefits or failing to do so.

- ◆ **Time Frame.** As mentioned or implied in several contexts within this discussion, it is very difficult to effectively plan, permit, and implement the most meaningful types of restoration projects on a two-year time line. Even less complex projects cannot usually be sufficiently monitored and maintained on this type of time frame. Although SOGL has been generous in granting extensions upon request, grantees would benefit from less pressure to compress their projects into the usual two-year schedule.
- ◆ **Climate Change.** Applicants should be given resources for climate change adaptation planning and should demonstrate that their projects meet minimum standards for the coming decades. Climate change will have the potential to influence the sustainability of many projects in the region in over the course of a few decades. The projected environmental benefits of various project types will respond differently to forecast changes. First and foremost, lakeshore projects need to accommodate projections for changing lake levels. Projects involving special status species should use guidance on projected changes in climate *per se* from the appropriate agencies in their proposals. We return to this point in the recommendations section.

Socioeconomic and Community Benefits

While SOGL's mission is primarily to improve the natural environment, partners are also interested in the program's economic and social impacts. They understand that ongoing support for Great Lakes restoration depends in part on the ability to show that restoration projects are cost-effective investments that produce measurable benefits for human as well as natural communities. Although our evaluation project was not designed to quantify the economic impacts in a rigorous way, our survey, interviews, and field observations allow us to draw some general conclusions about the economic and social benefits of SOGL's funding.

In discussing economic impacts, it is useful to distinguish between primary and secondary impacts. The primary impacts result directly from construction or implementation of the projects themselves—people are hired, materials are purchased, and the spending on labor and goods produces multiplier effects as it flows through the economy. The secondary impacts are the long-term socioeconomic benefits that accrue from the amenities and ecological services produced by the projects.

Primary Economic Impacts

More than many grantmaking programs, the funds paid to SOGL grantees are passed through to external contractors and suppliers. According to data in SOGL grant files, fully 50 percent of SOGL's grant money has been used pay for contractual services, and another 18 percent has gone to pay for supplies, materials, and equipment. Only 19 percent has been used to pay for salaries and benefits of project staff (Appendix B, Table 5). Surveyed grantees estimate that, on average, external paid contractors accounted for about 45 percent of the total work time that went into their projects. Internal staff performed about

39 percent of the work, with unpaid volunteers performing the remaining 16 percent (Appendix B, Table 4).

These figures show that SOGL is not only supporting the nonprofits and government entities that receive most of the grants; it is also helping to create jobs in the private sector—for engineers, restoration biologists, and other professionals who help design projects; for construction workers who are hired for earthmoving and building operations; for laborers who remove vegetation, spray herbicides, and manage controlled burns; and for supporting businesses such as native plant nurseries, building supply firms, and heavy equipment sellers. In some areas, companies specializing in the labor-intensive aspects of habitat restoration have emerged. In Greater Chicago, for instance, we interviewed the manager of a firm that specializes in invasive plant control and works regularly for Friends of the Forest Preserves, a SOGL grantee. The firm's 15-person workforce is composed mainly of Latinos from the Calumet City area.

Studies have indicated that habitat restoration projects, because they tend to be labor-intensive, are particularly efficient in creating jobs. For example, a recent study of coastal restoration projects supported by NOAA in 2009 estimated that 17 jobs were created for every \$1 million spent—much higher than such industries as coal, gas, and nuclear energy generation.¹³ Another study of forest and watershed restoration projects in Oregon estimated that each \$1 million invested created from 13 to 29 jobs, with the highest number of jobs being created by labor-intensive upland and riparian restoration projects.¹⁴ The same study estimated that, due to multiplier effects, the total economic activity generated by each \$1 million invested varied from about \$2.1 million (for labor-intensive riparian and upland restoration) to \$2.3 million (for equipment-intensive aquatic and road restoration).¹⁵ Applying these figures to SOGL, we can estimate, very roughly, that the \$20.7 million invested from 2006 to 2011 has created between 270 and 600 jobs and generated on the order of \$45 million in total economic activity.

Secondary Economic Impacts

More significant in the long run, but more difficult to quantify, are the secondary impacts of restoration projects—the values people enjoy over time from healthier habitats and associated environmental improvements. In an effort to elicit grantees' thoughts about how their projects benefit people, our survey included a question that listed an array of stakeholder groups and asked respondents to rate on a three-point scale how likely each group was to benefit from their project. The results are displayed in Figure 2. Not surprisingly, many of the groups considered likely to benefit were those with direct interests in the enjoyment of nature and the outdoors—birdwatchers and wildlife enthusiasts; users of parks and public lands; boaters, hikers, and other outdoor recreation users; and hunters and anglers. The likelihood that these groups will be able to enjoy the improvements created by SOGL-funded projects is enhanced by the fact that 76 percent of the surveyed projects occurred (entirely or in part) on public land, and 45 percent included work on private land with at least some public access. Only 34

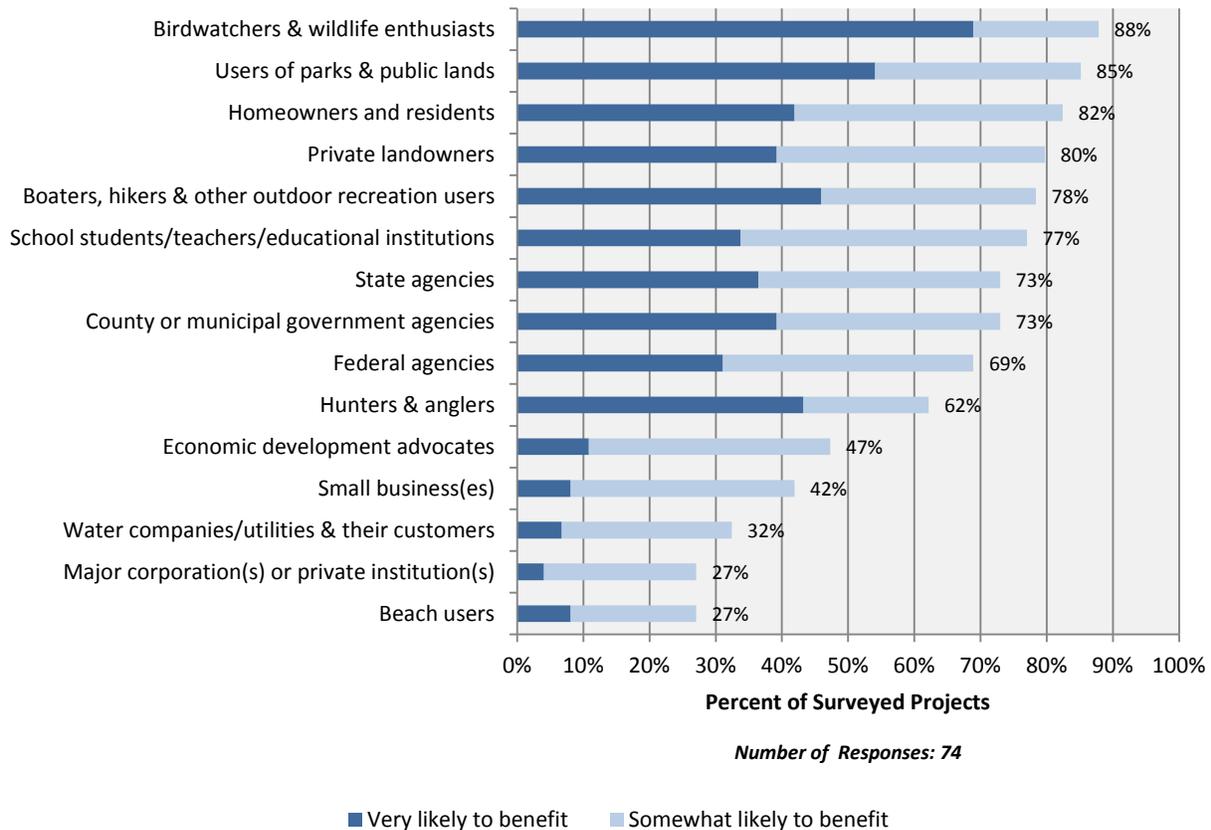
¹³ http://www.habitat.noaa.gov/partners/toolkits/restorationjobs/national/economic_reports/abstract_investing_in_nature.pdf

¹⁴ <http://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/downloads/BP14.pdf>

¹⁵ An even higher multiplier was estimated for projects that employed air transportation (e.g., for log removal), but such activities do not seem relevant to the sort of restoration SOGL supports.

percent included work on private land with no public access¹⁶ (Appendix B, Figure 6). Moreover, over 50 percent of the surveyed projects included work on land where hiking, fishing, boating, canoeing, and kayaking were permitted activities (Appendix B, Figure 7). It is also significant that homeowners and residents; private landowners; and school students, teachers, and educational institutions were also expected to benefit from more than half of the surveyed projects.

Figure 2. Stakeholder Groups Expected to Benefit from SOGL Projects (from survey)



The most comprehensive and widely cited effort to quantify the long-term economic value of Great Lake Restoration was completed in 2007 by a team of scholars from the Brookings Institution and the University of Michigan. Entitled *America's North Coast: A Benefit Cost Analysis of a Program to Protect and Restore the Great Lakes*,¹⁷ the report examined the projected impacts of implementing the Great Lakes Regional Collaboration strategy and estimated that the resulting environment improvements in the US portion of the Great Lakes region could be valued at \$18 to \$31 billion. It arrived at this estimate by focusing on the value of eight categories of environmental improvement. While we will not attempt to quantify SOGL's contributions to each of these categories, we can offer qualitative comments based on our research and observations.

¹⁶ These percentages do not sum to 100 because the categories are not mutually exclusive, as a single project can occur on different parcels of land with different ownership.

¹⁷ http://www.healthylakes.org/site_upload/upload/America_s_North_Coast_Report_07.pdf

- ◆ **Increased fish abundance**, leading to improved catch rate for anglers (valued at \$1.1 to 5.8 billion or higher for the US portion of the Great Lakes).
- ◆ **Avoided dislocation of sport-fishery workers and assets**, resulting in the maintenance of sport fishery wages (\$100 to 200 million or higher).

SOGL can be expected to make a significant contribution to these two improvements. More than a quarter of the surveyed projects include fish passage restoration (Appendix B, Figure 2), which opens up new habitat and increases the populations of fish species, many of them important game species. And fishing is a permitted activity on land improved by 62 percent of the surveyed projects (Appendix B, Table 7). Examples from our case studies include: "Clearing a Path" for lake sturgeon (Appendix A, Project 9) on the Menominee River, which once served as spawning habitat for roughly half Lake Michigan's iconic sturgeon population; the Norval Dam fish ladder on Ontario's Credit River (Appendix A, Project 16), contributing to a fishery that has been valued at \$48 million; and Arcadia March/Bowen's Creek project (Appendix A, Project 1), which has opened up new habitat for brook trout in a community that hopes to make fishing accessible to people of all ages and ability levels.

- ◆ **Reduced sedimentation**, leading to lower water treatment costs for municipalities (\$50 to \$125 million).

SOGL is likely to make at least moderate contributions in this area. Nearly a third of the surveyed project managers thought their projects would be of some benefit to water utilities and their customers. Many wetland restoration projects will increase their ability to sequester sediments, and many riparian restoration projects should reduce sediment loads in streams. The extent to which these improvements will translate into reduced costs for water treatment is unclear. However, one of the projects we visited—TNC's reforestation of the Holden Property in Indiana (Appendix A, Project 10)—can be expected to benefit water consumers in Fort Wayne by reducing sediment in the creek that runs through the property and feeds into that city's main water source. Reduced sediment from the project site should also help reduce the need for dredging at the mouth of the Maumee River.

- ◆ **Reduced bacterial and other contamination**, leading to few beach closings and advisories and more swimming activity (\$2 to 3 billion).
- ◆ **Improved water clarity at beaches**, leading more to swimming and improved enjoyment of swimming activity (\$2.5 billion or higher).

SOGL is likely to make modest contributions this area. Somewhat surprisingly, beach users were ranked at the bottom of our list of potential beneficiaries in Figure 2, although more than a quarter of the surveyed projects were expected to confer some benefits to them. Better functioning wetlands can be expected to absorb contaminants and sediments that could make their way to swimming beaches, and stream restoration can sometimes decrease contamination and improve water clarity at beaches near their mouths. A good example is the Centerville Creek in Cleveland, WI (Appendix A, Project 5), where restoration of a deeply incised creek is expected to reduce phosphorus-rich sediments that wash into Lake Michigan and periodically foul the local beach with excessive blooms of *Cladophora* algae.

- ◆ **Improved wildlife habitat**, leading to more birds and improved opportunities for birding (\$100 to \$200 million or higher).
- ◆ **Improved wildlife habitat**, leading to more waterfowl and improved opportunities for waterfowl hunting (\$7 to 100 million).

SOGL's contributions to these improvements are obvious and substantial. Birdwatchers and wildlife enthusiasts top the list of potential beneficiaries as rated by survey respondents. More than half of the projects we visited were likely to benefit birds, birdwatchers, and waterfowl hunters at least to some extent. Notable examples were the project at New York's Joseph Davis State (Appendix A, Project 14), which was explicitly geared toward avian habitat restoration, and creation of a new wetland at Shiawassee Flats which will allow refuge managers to manage water levels to the benefit of waterfowl and other species.

- ◆ **Removed contaminated sediment in Areas of Concern**, leading to direct and indirect benefits for basin residents (\$12 to 19 billion).

While SOGL will likely contribute to the delisting of some AOC impairments, the removal of contaminated sediments is not a focus of the program.

This list of improvements is far from exhaustive. Missing are the very real improvements in the quality of life to be derived from living near cleaner and more attractive lakes, streams, and wetlands. Sometimes these amenities can translate into increased property values for homeowners. One SOGL grantee, the Nature Conservancy's Michigan office, has recently commissioned a study of the extent to which phragmites infestations can reduce the value of nearby properties. Preliminary results suggest some effects up to a distance of 500 feet.¹⁸ It is interesting to note that homeowners tend to be especially concerned about phragmites because of its density and height and its tendency to obstruct views. Other invasive plants are less likely to be of concern to property owners.

Characteristics of Communities Hosting SOGL Projects

In considering socioeconomic impacts, it is useful to consider the types of communities in which, or near which, SOGL projects are located—whether they are predominantly urban, suburban, or rural. Although strong arguments can be made for targeting relatively healthy habitats in rural areas, it is reasonable to assume that projects in more densely populated areas will reach and benefit more people. Our survey asked respondents to characterize the communities in which their projects were located as rural, suburban, or urban (and they were permitted to choose more than one category if their projects spanned different community types). Most of the surveyed projects (62 percent) were conducted either partly or entirely in rural communities. Less than half of the grants supported work in urban and suburban areas (38 percent in both cases). Note, however, that projects located partly or entirely in urban areas constituted nearly half of SOGL's total funding (47 percent), even though they represented only 38 percent of the surveyed projects. This may reflect the larger cost of habitat restoration in urban areas (Appendix B, Figure 5).

While these findings suggest that SOGL is mainly supporting rural projects, a different picture emerges from our own analysis. Using GIS software we drew circles of 1-mile and 5-miles around the point locations of SOGL projects, and then examined characteristics of the census tracts intersected by those circles (Appendix B, Table 8).¹⁹ We found that population density within one mile of SOGL projects is relatively low compared to the overall regional density. However, population density within five miles of SOGL projects is high compared the region as a whole. This suggests that, while the immediate vicinity of SOGL projects tends to be sparsely populated (as would be expected, since the projects often occur in

¹⁸ Paul Isely, Grand Valley State University, person communication. Note that SOGL funds were not used for this study.

¹⁹ This analysis excludes Canadian projects as well as those that were not confined to a specific location. The point locations of regional and multi-site projects are approximations.

wetlands or forest patches), they are commonly located near urban or suburban communities that are far from isolated. Among the other conclusions that can be drawn from this analysis are the following:

- ◆ The census tracts within five miles of SOGL projects have relatively high concentrations of minority residents (defined here as persons who consider themselves non-white and/or Hispanic). Again, this suggests that the program is not primarily funding projects in ethnically homogeneous rural areas.
- ◆ Per capita incomes and poverty rates in the vicinity of SOGL projects are more or less representative of the region as a whole.
- ◆ An estimated 10 percent of the population in the eight-state Great Lakes region (Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York) resides within five miles of SOGL-funded projects.

SOGL Projects and Community Development Initiatives

Not captured in the discussions above are the roles SOGL-sponsored habitat restoration projects sometimes play in community plans for green infrastructure, tourism promotion, and economic development. Our case studies provided several good examples:

- ◆ The Arcadia Marsh/Bowens Creek restoration in Michigan's Manistee County (Appendix A, Project 1) is an important part of a larger initiative to develop the Arcadia area for recreation, tourism, and economic development. With major funding from the C. S. Mott Foundation, a group called Explore Our Shores has developed a plan "to make Manistee County a premier destination for universal access for people of all ages and abilities to enjoy, use and learn from the County's lakes, Rivers, and Lake Michigan shoreline."²⁰ Within Arcadia Marsh, the plan includes several facilities designed to be accessible to elders and people with disabilities, such as a pedestrian/wheelchair path, several small fishing piers, and a canoe and kayak launch. The Arcadia community is enthusiastic about the project and has mobilized in support of it, and local business owners are reportedly optimistic that implementation of the plan will make Arcadia an important destination for tourists and recreationists in northwest Michigan. Explore the Shore's leader describes the SOGL-funded restoration project as "the catalyst for putting all these pieces together."
- ◆ The Shirley Heinze Land Trusts' Bur Oak Woods property (Appendix A, Project 4) is part of a wetlands complex known as the Hobart Marsh, on the western edge of the City of Hobart, Indiana. Much of the area is already in public and conservation ownership. Recognizing that the Hobart Marsh constitutes a green infrastructure network with considerable potential for recreation as well as conservation, the City has brought public agencies together with the Shirley Heinze Land Trust and other landowners to develop a joint plan for the area. The Bur Oak Woods restoration provides a model for the other landowners in the area, who can look to the site for examples of how to manage invasive species. It also serves as an example of land management for passive recreation, as it is one of the few properties in Hobart Marsh that currently has trail access.
- ◆ In the town of Cleveland, WI, on the western shore of Lake Michigan, the restoration of Centerville Creek (Appendix A, Project 5) is part of a larger effort to improve the town's natural amenities. The project site itself, which until now was too overgrown with weeds for the public to enjoy, will be converted into a more park-like environment. Observation decks and walkways are being

²⁰ <http://www.allianceforeconomicsuccess.com/userfiles/file/Fact%20Sheet%20-%20Explore%20the%20Shores%202009%20Biz%20Expo.pdf>

constructed to improve public access. In addition, by reducing the amount of sediment entering Lake Michigan, community members expect the restoration project to improve water quality and reduce *Cladophora* blooms, thus making Cleveland's public beach, Hika Park, more attractive to visitors. The SOGL-funded project has involved considerable public participation. The advisory committee formed to oversee the project has evolved to become a more permanent group called Friends of Hika Bay, which is working with the municipality to improve the town's public spaces and attract tourism.

SOGL's Partnership and Grantmaking Processes

The SOGL Partnership

When SOGL partners were asked to name the program's most important success to date, most began by speaking about the strength of the partnership itself. Partners see great advantage in bringing together various federal agencies and a corporation to share, not just resources, but differing perspectives and areas of expertise. They believe the variety of knowledge and viewpoints at the SOGL table makes for better grantmaking. Partners are particularly proud of the inclusion of ArcelorMittal, noting that collaboration between a major corporation and environmental regulators has led to better understanding on both sides.

SOGL's partnership arrangement has attracted attention beyond the program itself. Political decision-makers are impressed by SOGL's success in leveraging private contributions and the fact that interagency collaboration reduces the risk of wasteful duplication. Several outside observers echoed the praise for the SOGL partnership, suggesting that it should serve as a model for other programs. One observer recommended that the partnership be extended even further to include state agencies. And, as noted above, there is strong interest in attracting Canadian partners.

There is a cost to partnership, however, as a few interview respondents acknowledged. Broader participation means more competing interests and greater potential for disagreement. The diversity of SOGL's partners is one factor that militates against greater focus in grantmaking. Nevertheless, our interviews make it clear that so far SOGL has done a good job of managing its partners to arrive at a level of collaboration that many find remarkable.

Grantmaking Systems and Processes

SOGL earns high marks from grantees and observers with respect to the clarity of its policies and communications, the smoothness of its operations, and the ease of

The success is clearly the partnership and being able to work together. It's not done anywhere else in GLRI the way we do it. There is no other place where everyone works together so clearly.

—SOGL Partner

What's valued internally is that we have a broader understanding of how things fit together. The network we have within the agencies, that gives us great strength in targeting how we spend our money.

—SOGL Partner

I sometimes worry a bit about how we keep going, because the more people or agencies you add, the more complicated it gets.

—SOGL Partner

Some groups are intimidated in dealing with the government apparatus. We are government grants with training wheels.

—SOGL Partner

negotiating the entire grant process, especially in comparison with other sources of government funding. In particular:

- ◆ **Grantees find SOGL easy to work with**, as evidenced by many open-ended comments from the grantee survey, such as the following:

It's not as cumbersome as many other grant programs. The dollars are allowed to be used for on-the-ground results, rather than lots of administrative hoops to jump through.

Straightforward proposals and grant agreement. Appropriate amount of paperwork.

The reporting and payment systems work well. I recall the application process being straightforward—of course, this is in direct comparison to that of EPA, which we did at the same time.

We had a great experience with SOGL. The application process and the administration of the grant were relatively easy. The complexity was 'middle of the road' compared with other granting agencies that we have worked with.

One of the best grantmaking programs I have ever worked with (in 20 years of doing [this])!

- ◆ **SOGL communicates effectively with the grantee community.** Ninety-two percent of the survey respondents agreed with the statement, "I have a clear understanding of SOGL's purposes and grant guidelines," and 91 percent agreed that "I am very familiar with the Sustain Our Great Lakes (SOGL) program." Open-ended comments also attested to the program's clear communications:

Clear communication about grant programs and application requirements.

The program goals and expectations have been clearly communicated to grantees.

In cases where pre-proposals are required, we find it helpful to get that preliminary assessment of our project idea before pulling together the complete proposal.

- ◆ **Several grantees remarked on the usefulness of the webinars hosted by SOGL:**

I especially like the pre-proposal webinar that explains what makes a good SOGL grant proposal and provides examples of successful projects. This helped us design a grant that was in-line with SOGL's priorities.

I feel the informational webinars that have been hosted by Todd Hogrefe prior to grant application deadlines have been very helpful to me. I [feel] the individual presentations by prior successful grantees which were incorporated into these webinars were extremely helpful...

A lot of my questions about the application process, the types of match sources that can be utilized, and how to clarify the goals of my projects were answered during these webinars.

- ◆ **Many grantees like SOGL's online proposal submittal and reporting process:**

The Easygrants system has made it easy to keep track of our grant activities and documentation.

The Easygrants system is user-friendly and easy to use. I think the reporting requirements are reasonable and do a good job of balancing necessary reporting without being onerous for a small non-profit to complete.

They have one of the best application software packages I've seen in my life. I want it, but I don't have it. They are asking the right kind of questions. Kudos for them.

—Observer

Online reporting and proposal submittals are easy to use, online tracking of when reports are due is a great tool, reporting requirements are reasonable, staff is available to assist with whatever issues or questions arise.

Reporting is very streamlined.

◆ **There were, however, some contrary opinions:**

Easygrants can be tricky to navigate for anything outside the box.

Under Easygrants the information when writing needs to be linked in a way so there is no duplication. It should be automatically linked to other people and agencies who are involved with the grants.

The only thing that I've had trouble doing during the grant process is in the uploading of some of the supporting documentation.

Easygrants has presented a few technical snags, but staff has been very responsive and has accommodated practical work-arounds that allow us to get the proposal materials to reviewers in spite of the glitches.

◆ **Grantees appreciate SOGL's flexibility** in helping projects fit the guidelines and allowing modifications and granting extensions as necessary:

The flexibility of funding allocated to the project. As funds are more flexible it allows more in-depth conservation work to be accomplished, while still meeting larger goals, shared by all organizations.

The ability to request extensions has been helpful.

Compared to state and federal granting agencies, SOGL was extremely easy to work with, allowed easy amendments to the program, did not require extraordinarily difficult record keeping, was friendly and flexible.

The flexibility the grant has allowed [us] to accomplish our goals.

◆ **Grantees find SOGL staff to be helpful and accessible.** Eighty-six percent of the survey respondents agreed (and 50 percent agreed strongly) with the statement, "SOGL staff are accessible, responsive, and easy to work with," and this was backed up by numerous open-ended comments:

Staff are super responsive and answer questions fully.

Staff responses to questions have been quick and excellent.

SOGL staff are very willing to answer questions applicants may have about a particular grant or application process, and helpful throughout the grant period when a project is funded.

Willingness of staff to engage in discussion and assist in crafting a proposal that fits guidelines.

Staff have been exceptionally responsive to questions and to help solve minor problems that are on the critical schedule path.

Further evidence of the quality of SOGL's grantmaking processes comes from the fact that Healing Our Waters Coalition (an alliance of 120 organizations that advocates for Great Lakes restoration) has, according to one of its leaders, repeatedly commended SOGL for its clear and well targeted RFPs, its collaborative relationships with grantees, and the transparency of its management system, as well as its

insistence on seeing results. Coalition members regard SOGL as an exemplary program that should be emulated by other grantmakers in the region.

Conclusions and Recommendations

Conclusions

SOGL is a unique bi-national grantmaking program that pools money from federal agencies and a private corporation to make grants in support of habitat restoration throughout the Great Lakes basin. The SOGL partnership not only draws on the diverse perspectives and expertise of its partners to inform its grantmaking, but also has fostered a process of inter-agency and public/private dialogue that can serve as a model for other programs. By delegating the bulk of GLRI money for habitat restoration, along with other funding, to a program run by NFWF, SOGL can take advantage of that organization's specialized expertise in restoration, as well as its streamlined and efficient approach to grantmaking. SOGL's operational processes, its ease of access relative to government grant programs, its open communications, and the quality of its staff all earn praise from the grantee community.

Like other NFWF programs, SOGL emphasizes measurable, on-ground-results. At the same time, it covers a broad geographical area and must be responsive to external political constraints and pressures, as well as to the diverse interests of its own funding partners. Consequently, the program has had to balance competing demands for focus and flexibility in several areas—in emphasizing on-the-ground restoration without neglecting demands for planning and other capacity building activities, in concentrating resources where they will produce tangible impacts while also responding to pressure to spread the money equitably among states and geographical areas; in supporting restoration in rural areas where habitats are still largely intact while also investing substantial resources in projects near population centers where they will reach more people and contribute to the important goal of delisting AOC beneficial use impairments. SOGL and its partners have dealt thoughtfully with all these tensions, and by and large we believe the strategic decisions they have reached have been sound and defensible.

The scale of SOGL-restoration efforts, as indicated by reported acreage and mileage figures, is impressive: approximately 16,200 acres of restored wetland habitat, 770 miles of restored aquatic connectivity, 100 miles of restored stream and riparian habitat, and 1,900 acres of restored coastal habitat from 2006 through 2011. Of course, as we have noted, these figures conflate qualitatively different approaches to restoration whose environmental benefits are likely to vary significantly. Based on our field observations, as well as the principles of restoration ecology, we have identified the main categories of restoration supported by SOGL and commented about the likely environmental benefits of each.

Within the broad category of wetland and riparian restoration, which represents the bulk of SOGL's grantmaking, the strategies that are likely to yield the greatest long-term benefits are the conversion of uplands to wetlands and hydrological modifications to existing wetlands. While SOGL has supported some ambitious projects of these types whose environmental payoffs will likely be substantial, we believe that changes to some of the program's policies (described below) could reduce obstacles to supporting more large-scale projects involving hydrological changes. Other wetland and riparian restoration projects focus primarily on combating invasive plants, but they do so in different ways. Probably the most effective weed-control programs are those that detect and eradicate early stage invasions before they become established. A number of projects we observed were focused on successional suppression, removing woody invasives from wetlands that were formerly dominated by sedges, grasses, and forbs. The long-term success of such efforts depends on the commitment of land-

owners to ongoing maintenance, which usually takes the form of periodic controlled burns. Many of the projects we saw devoted significant effort to the control of firmly established invasives such as phragmites, hybrid cattail, and reed canary grass, but few had extensive plans for subsequent reintroduction of native plants. We believe it is unwise to support pure "weed bashing" projects in the absence of a viable strategy to ensure that aggressive non-natives do not simply reinvade the sites.

Despite SOGL's focus on wetlands, the program has also supported some restoration of upland sites. Since well functioning wetlands often depend on adjacent uplands, we support this approach as long as there is a clear connection between the targeted uplands and wetland or aquatic resources.

SOGL has funded a range of connectivity projects that open up new aquatic habitat for desirable species by installing fish passage structures, reconstructing barriers such as culverts, or simply removing dams. Such projects are likely to confer important environmental benefits as long as they are properly maintained and as long as sufficient care is taken to assure that non-native invasive species are not allowed to extend their ranges (a particular concern in the Great Lakes region).

Although SOGL's primary mission is to improve the natural environment, it is also important to consider the socioeconomic benefits of the program. Since habitat restoration projects tend to be labor-intensive, one direct benefit SOGL's spending is in generating employment. Based on studies of habitat restoration from other parts of the country, it is reasonable to expect that SOGL's \$20.7 million in investments from 2006 through 2011 has created between 270 and 600 jobs and, when multiplier effects are considered, has generated on the order of \$45 million in economic activity. In the longer term, SOGL is making substantial contributions to environmental improvements that have been valued at between \$18 and \$31 billion. Such contributions include increased fish abundance, leading to economic values for anglers and the sport fishery industry; more abundant birds and wildlife, with obvious benefits for bird and wildlife watchers and other outdoor recreationists; and reduced sedimentation, leading to lower water treatment costs. In addition, we have observed several cases in which SOGL's investments are playing important roles in larger community and economic development efforts.

Recommendations

SOGL's grantmaking is strategically sound and well executed and is supporting a variety of high-quality restoration projects. The following recommendations are offered to help make a good program even better by improving project planning and design, encouraging better monitoring and adaptive management, removing barriers to funding complex projects, ensuring that projects benefits are sustainable, building knowledge about effective restoration approaches in the Great Lakes region, and helping grantees prepare for the effects of climate change.

Improve Project Planning and Design

As detailed above, we believe SOGL-funded projects would benefit from more thorough planning and professional input in the design stage. In particular, we would like to see all SOGL projects include:

- ◆ **Restoration plans** identifying project goals, actions needed to accomplish the goals, techniques to be used, strategies for monitoring and adaptive management, and long-term maintenance needs.
- ◆ **Management plans** for the land on which restoration has occurred, addressing such issues as the legal status of the property, future plans for development, other restoration projects, and threats that undermine the sustainability of project benefits.
- ◆ **Input from restoration ecologists** to ensure that the restoration plans are sound and will not inadvertently damage biological resources.

- ◆ In addition, we suggest that SOGL consider **requiring more detailed proposals from grantees**. The relatively brief proposals currently in use may not allow grantees to adequately address all relevant considerations, especially for larger and more complex projects. For example, SOGL grantees could be asked to:
 1. Describe the existing biological resources on the site.
 2. Describe the impacts of the project (positive and negative) to existing biological resources on site.
 3. Describe the goals of the project, the actions needed to accomplish those goals and the techniques that will be used to implement the actions.
 4. Describe the basis for expecting restoration success (e.g., are the techniques you have chosen been proven to work elsewhere?).
 5. Describe how the project will be sustainable in the long-term, including the effects of climate change.
 6. Describe specific monitoring protocols that will be used to assess the extent to which the project achieves its proposed outcomes.
 7. Describe how the project will benefit from the use of adaptive management during implementation.

To be sure, grantees appreciate SOGL's relatively simple proposal format, but the number of grant requests is rapidly growing and may soon exceed staff capacity. More rigorous proposal requirements could help screen out less worthy projects and reduce the number of proposals that must be reviewed.

Encourage Better Project Monitoring and Adaptive Management

While most SOGL-funded projects involve monitoring of some sort, provisions for monitoring are often inadequate. SOGL can address this problem by earmarking a certain percentage of its grantmaking budget to support monitoring. We suggest that 5 to 10 percent of SOGL's total budget should be devoted to project monitoring. And for some projects, particularly those that are experimental in nature, monitoring may deserve a larger portion of the project budget (see below). Each proposal should include a solid monitoring plan, as well as a budget line item for monitoring, which could support either the grantee's own monitoring activities or, when the grantee lacks the capacity, subcontracting with another organization to conduct monitoring.

Closely related to monitoring is adaptive management, which, as we have suggested, should be a part of every restoration project. To the extent possible, monitoring systems should be designed to provide real-time feedback on restoration activities so that corrective actions can be taken when problems are detected.

Ideally, monitoring should continue after SOGL's funding for implementation ends. Although SOGL would not be able to hold a grantee accountable for continued monitoring after the grant period ends, it could at least require a credible plan for post-project monitoring. And for some projects in which ongoing monitoring is considered particularly important—for example, to test an innovative approach to restoration—we suggest that SOGL consider awarding follow-up monitoring grants to assure that data collection activities continue and the results are shared with the wider field.

Ensure Adequate Post-Project Maintenance

Incomplete provision for long-term maintenance was an issue that emerged from our field observations and was confirmed in our survey as a concern for many grantees. While we understand that SOGL is limited in its ability to provide ongoing financial support for post-implementation maintenance, we do think that greater emphasis should be placed on planning for long-term maintenance up front. Grant proposals should include a plan for long-term maintenance, and when maintenance plans depend on the cooperation of other organizations, SOGL should require grantees to submit letters of commitment from those entities. SOGL should also consider providing follow-up grants for capacity-building in post-implementation maintenance, especially when maintenance will become the responsibility of landowner or public agency with little experience in the area.

Remove Barriers to Funding Complex Projects

The relatively short two-year time frame of most SOGL grants makes it difficult for many grantees to plan, permit, and implement their projects. This is especially a problem for the large, engineering-intensive restoration projects that are supported through the Stewardship Grant program. Careful planning and environmental review is essential to make sure the intensive activities do not damage existing resources and are compatible with surrounding land uses.

One way to address the problem is simply to consider longer-term grants of, say, three to five years in duration. But if SOGL is reluctant to make such long-term commitments, an alternative would be to provide planning grants to support design, assessment, permitting, and other upfront activities, with the understanding the successful progress during this preliminary phase would lead to a follow-up funding for project implementation.

Build Knowledge about Effective Restoration Approaches in the Great Lakes Region

Large-scale restoration projects should be designed and implemented using tested and proven strategies. As SOGL grantee Douglas Wilcox has argued,²¹ many investments in habitat restoration are made without sufficient understanding of whether they will produce lasting benefits. Too often, funders invest large amounts of money in projects that involve many acres when there is little scientific foundation for the approaches they use. Wilcox maintains that "innovative, experimentally based restoration proposals should be given ... equal footing with projects that involve many acres," and we agree. We support SOGL's emphasis on on-the-ground restoration and do not suggest that the program make major investments in pure research. But we do think SOGL should be willing to support experimental and demonstration projects designed to build knowledge about the long-term effectiveness of restoration approaches. While such projects would involve on-the-ground restoration, they would also include substantial research components, which SOGL should support, even if such research consumes a large portion of the project budget.

Another way SOGL can help build knowledge about the effectiveness of restoration projects is to sponsor outcome-oriented evaluations of groups on related grants, or grant "clusters." For example, it could sponsor a cluster evaluation focused on the long-term effectiveness of weed control projects, examining a carefully selected set of related projects several years after implementation to determine whether the SOGL supported activities have produced lasting benefits. Such a study would lack the rigor

²¹ Douglas A. Wilcox, Acres Versus Outcomes: Criteria for Funding Wetland Restoration. National Wetlands Newsletter, 34(2): 6-7.

of a controlled experiment, but we believe it would still be useful in producing information about the long-term effectiveness of SOGL's weed control investments.

Help Grantees Prepare for the Effects of Climate Change

Climate change is bound to affect species and habitats around the Great Lakes in profound ways, altering such factors as lake water levels, ice cover, harmful algal blooms, precipitation patterns including more frequent and extreme droughts, and climate zones. The anticipated lowering of lake levels may bring opportunities for biodiversity and restoration in areas that are currently shallow water, but shifting climate patterns will also challenge marginal wetland habitats. To ensure lasting benefits from restoration projects, project plans should anticipate and account for such expected changes. In California, for example, restoration plans for coastal areas are required to account for the effects of sea level rise, and the state provides guidance on how to do so. SOGL could do something similar by requesting that grantees address the anticipated effects of climate change in their proposals. For example: 1) Because of the anticipated lowering of lake levels, projects proposed directly on lake shores should consider the consequences of changing water levels on their proposed actions and goals. What are the target habitats? Will altered hydrological regimes make the habitat more suitable for woody species or invasive plants? Will stream gradients steepen? Will spawning habitats still be available? Will water control structures or fish passage infrastructure be at appropriate elevations? 2) For projects targeting rare species or vegetation types sensitive to climate per se, some consideration of the long-term sustainability of the population/community at the project site would be worthwhile.

Since many grantees will need guidance in how to address the effects of climate change, SOGL should provide them with relevant information. For example, it could post information about the expected impacts on its website or refer to grantees to other web-based resources,²² and it could also sponsor webinar sessions on the subject.²³

²² See for example the Great Lakes Environmental Assessment and Mapping project maps and references: <http://www.greatlakesmapping.org>

²³ For example: Douglas Wilcox on lake level fluctuations controlling shoreline vegetation types, or Pati Vitt on the effects of climate change on rare plant species and modeling range shifts of plants under climate change.