



## **GREAT LAKES PROTECTION FUND**

### **SUPPLEMENTAL REQUEST FOR PREPROPOSALS: MEASURES AND METRICS**

Preproposals Due: April 17, 2007

## **SUPPLEMENTAL REQUEST FOR PREPROPOSALS: MEASURES AND METRICS**

### **SUMMARY**

The Great Lakes Protection Fund seeks preproposals for projects that design and test new ways to measure the health of the basin ecosystem and the effectiveness of actions undertaken to make it healthier. Projects should create the tools that integrate healthy ecosystem outcomes and impacts into everyday, real world decisions. These measurement systems, accounting frameworks, performance metrics, and forensic tools should catalyze changes in behaviors to benefit the Great Lakes. Projects should lead to verifiable and quantifiable ecosystem improvements for the basin. The Fund expects to support a portfolio of complimentary projects. Preproposals should be submitted before April 17, 2007.

### **BACKGROUND**

A common set of rules for sampling, monitoring, and analyzing contaminants have helped governments and the private sector successfully address important Great Lakes water quality challenges. However, these same protocols do not appear to be as effective for many current ecosystem stressors. Without new testing procedures, measurable ecosystem objectives, and validation protocols that help integrate healthy ecosystem outcomes into management frameworks, the Great Lakes ecosystem bears the cost of invasive species, non-point source pollution, continued hydrologic modification, and other increased stress on basin resources.

The challenges faced by the Great Lakes are well researched but the set of tools to identify, evaluate, and determine the effectiveness of solutions is not completely developed.

By using rigorous standards and testing protocols, the basin has improved its understanding and control of point source pollution. Over three decades these standards and protocols reduced the impacts of major industrial and municipal discharges on the health of the Great Lakes basin. However, the region continues to struggle with negative impacts of so-called non-point source pollution. While cities, farmers, and landowners struggle with measures derived from point source protocols to remedy urban stormwater runoff, agricultural impacts, and changing land uses, the damages to our ecosystem continue. Few tools exist to determine the impact of land-applied remedies on the basin's water quality.

Practitioners are even less prepared to deal with the emerging challenges and opportunities faced by the Great Lakes ecosystem. The region in and around the basin is quickly becoming a major location for biofuel research, production, and other energy generation facilities. These processes along with other current and future practices are likely to impact the basin's land, coast, and water. However, the tools to identify, compare, and understand the footprint of these activities on the water resource do not exist.

Rather than depend upon protocols and metrics developed for first generation, “point source” issues, the Fund wishes to support projects to build new metrics that will help make the biggest difference on the landscape tomorrow. We want to invest in work that provides the metrics, tools, languages, and frameworks to begin to answer these questions, shape behavior, and ultimately improve the health of the Great Lakes ecosystem. The Fund believes that multi-institutional project teams that bring together researchers, practitioners and resource managers can help create and test better methods to describe and evaluate changes on the land and link them with measurable improvements in the ecosystem.

## **PROJECT CRITERIA**

The Fund wishes to support a portfolio of projects that develop tools to support changes on basin lands, and in waters, that improve the ecological integrity of the ecosystem. Projects may also assess activity outside the basin that affects Great Lakes’ health. The Fund is interested in developing the following categories of “tools,” where possible in the context of on-the-ground projects, and where necessary in research and planning investigations.

**Measures and measurement systems:** describe the state of a stressor or conditions of all or a part of an ecological system. These include the techniques that are used in the field to collect samples, holding and preservation protocols, analytical protocols (for the collected samples), and related quality assurance and quality control protocols. This work should build on but not duplicate existing measures and the extensive investment the region has made in “environmental indicators” for current government programs.

**Descriptive/accounting frameworks:** integrate various measures of stress and condition into a complete description of the stress or ecological condition. These can include footprint frameworks, value chain outlines, and lifecycle analysis.

**Performance/design metrics:** are target conditions for a stressor, ecological condition, or management system. They must be both measurable and meaningful. Useful metrics translate narrative requirements to numeric measures that drive behavior.

**Forensic tools:** compare the actual conditions to those desired to identify gaps, determine the reasons for those shortfalls, and identify parties who may be able to close them. These may utilize analytic, synthetic, or forensic tools to spot deficiencies and identify improvement opportunities for a specific, desired outcome.

The Fund wishes to support multi-institution and multi-sector project teams. Teams that design and run projects should possess scientific, metrological, transactional, statistical, financial, and management expertise and include members that represent the entities that will ultimately use and benefit from the tools. Projects

that rely on a “create and disseminate” approach are not encouraged. Users must be included on the teams, and projects that meet an existing demand are encouraged. As with all Fund-supported work, these teams must be collaborative in nature and represent the full suite of interests relevant to improving the health of water resources. Supported teams must be willing to collaborate with other grantees, Fund staff, and others in the basin to capture and share the lessons learned from the supported projects.

The Fund wishes to encourage an array of innovative strategies to design the next generation of measurement and metric infrastructure to improve the health of the Great Lakes ecosystem. As usual, the Fund will consider regional projects that target multiple sites, but with this supplemental request, the Fund will also consider supporting innovative local projects that add value to the larger body of work supported. Projects could be financed with outright cash grants, convertible grants, debt, equity, or some combination.

Each individual project should:

- Identify a significant, testable hypothesis to describe, measure, and catalyze ecologically beneficial changes on basin lands and in basin waters;
- Demonstrate an innovative and scalable strategy;
- Create one or more exportable tools or methods that meets an important and existing demand;
- Be a collaborative effort by a multi-institution and multi-sector team that includes users of the tools to be developed;
- Include sufficient monitoring to verify and quantify project results and test the hypothesis; and
- Make maximum use of existing efforts and leverage Fund support as much as possible.

An ideal project takes action to establish a specific set of innovative protocols, measurement standards or accounting systems that describe a specific ecological condition, works with practitioners and managers in the field to ensure its usefulness, and validates the ability of the tool to link actions or behaviors to ecosystem impacts. Project teams would evaluate the success of each element: how effectively the protocols or metrics describe the ecological condition, how useful they are to practitioners, and how the protocol or metric changes behaviors. The Fund hopes to test strategies throughout the range of environs in the basin.

## **ELIGIBILITY**

The Great Lakes Protection Fund can support a wide variety of applicants. Non-profit organizations (including environmental organizations, trade associations, and universities), governmental agencies, individuals, and for-profit businesses are eligible for Fund support. Successful applicants must maintain open access to certain project data, records and information.

All applicants must show that the proposed work has clear public benefit and that any related financial benefits will accrue to the public good. Government agencies must show that Fund support is not being used to replace or duplicate funds.

### **CONTENT OF PREPROPOSALS**

Preproposals should include an [applicant cover sheet](#), no more than five pages of narrative (including the project budget), and a copy of the project manager's resume. No other attachments are permitted. The Fund prefers that preproposals be submitted via e-mail.

All preproposals must be delivered to the Fund's offices no later than Midnight, April 17, 2007. The Fund will begin review upon receipt. In May, 2007, the Fund expects to request more fully developed project proposals from a subset of teams submitting preproposals. Fund staff and other technical experts will review these full proposals prior to a funding decision by the Fund's Board of Directors.

In your preproposal, please address the following issues in the order below:

#### **Ecosystem Impacts**

Identify how the proposed work will improve ecosystem health and why it is important for the Great Lakes. Be as specific as possible. Please include a testable hypothesis for the project's on-the-ground work, describe the specific, exportable "tools" the team expects to create, identify how success will be measured, and explain what—if anything—must happen beyond the work proposed to ensure that these outcomes are realized.

#### **Proposed Work**

Outline the work to be carried out. Include a project timeline that contains the major interim objectives. Show how the work will lead to the expected environmental outcome identified above. Describe the target audiences for the project and identify their role. Discuss how the exportable tools and other results matter to the target audiences, and lay out a strategy to communicate those results, even if projected environmental outcomes are not achieved.

#### **Key Personnel**

Identify the project team members (those supported by the request, by other funding sources, and volunteers), and indicate their roles, responsibilities and qualifications. By the time a full proposal is submitted (and ideally well before) the team should reflect meaningful collaboration among all interests affected by the project and include members from entities that will ultimately use the tools and approaches developed.

## **Financial Plan**

Present the estimated costs of the proposed work in summary categories: personnel, equipment and supplies, travel, consultants, overhead, etc. The Fund will not support overhead costs in excess of 15% of the direct project costs (excluding travel and sub-contracts.) Identify the type and amount of support requested of the Fund. Identify how other monies will be raised to support the proposed work.

Submit a single copy via e-mail to:  
[measuresandmetricsrfp@glpf.org](mailto:measuresandmetricsrfp@glpf.org)

If electronic submission is not possible, submit six (6) copies via mail to:  
Preproposal: Measures and Metrics  
Great Lakes Protection Fund  
1560 Sherman Ave., Suite 880  
Evanston, IL 60201  
Fax: 847.424.9832

## **CALENDAR**

*March 2007*  
Requests for Preproposals

*April 17, 2007*  
Preproposal Submissions Due  
(Note—Preproposals will be reviewed as received. Early submissions are encouraged, particularly if project teams are not fully assembled)

*May 2007*  
Full Proposals Invited

*Summer 2007*  
Full Proposal Review and Revision

*September 2007*  
Announcement of Awards

## **POSSIBLE PROJECT IDEAS**

These ideas are illustrations to stimulate thinking and do not serve as the final word on what might work or what the Fund might choose to support. Teams are encouraged to think broadly and creatively about tools to support changes on basin lands and in basin waters that move ecological outcomes and impacts into the mainstream of decision-making processes and ultimately improve the health of the Great Lakes ecosystem.

Specific projects could address (and definitely should not be limited to):

**Ballast tank/water monitoring protocols:** technical support documents that establish the number, location, type, and frequency of monitoring required to reliably establish the load of invasive species released by an individual vessel, or set of vessels. This effort would include the identification and validation of sample collection techniques, holding protocols, data analysis and interpretation support.

**Safe operation metrics:** the technical and scientific criteria for opening locks to allow potential vectors into the Great Lakes. These could be used as an operational guide for canal systems or as underwriting criteria for insurance and warranty products related to shipping or canal system operation.

**Ballast discharge metrics:** new benchmarks or success metrics that supplement existing regulatory programs by translating existing and likely future narrative standards to numeric targets that vessels must meet at the time of ballast discharge or uptake. Coupled with sampling and monitoring protocols, this information will help ship owners determine if the biota in their discharge meets standards prior to ballasting operations.

**Compliance monitoring and enforcement metrics:** the technical support manuals that describe the sampling, holding and analysis protocols that harmonize all state and federal requirements. These metrics would allow various agencies to use one another's information and minimize the burden of sampling and analysis.

**Program evaluation metrics:** the technical and programmatic tools to assess how well current laws are applied, and the extent of compliance by the regulated community. The project team should include all relevant stakeholders, including federal, state, and local managers and provide them with the tools to incorporate current and emergent ecosystem metrics, measures, and results into their daily work. The Fund is particularly interested in metrics for invasive species control, bottomland management, and flow restoration efforts.

**Surrogate inventory:** a compilation of measures that are surrogates for stresses or desired ecological outcomes and a scientific evaluation of their usefulness. Such an analysis may help public health officials better communicate environmental health issues to the community.

**Flow restoration metrics:** an inventory of stream and river types in the basin with a description of flow success metrics for each type. This work would build upon previous Fund-supported flow restoration efforts to build a collection of targets that allow managers to track the success of improved flow regime within the basin.

**Beach ecology metrics:** a set of ecological success measures that will complement the public health standards for beaches. This would allow managers to better coordinate the preservation and restoration of ecological functions with the protection of recreational uses.

**Coastal process metrics:** a set of benchmarks for critical coastal processes, such as sand transport, wetland function, and others, to inform choices about the future of the Lakes' coastline. Such a project might help decision makers to better understand how much erosion is natural along the shoreline or how to apply public health standards to beaches.

**Forensic measures:** a series of protocols to identify the sources of biological pollution, dumped cargo, airborne pollutants and/or new, emerging pollutants. Such techniques might include DNA analysis, chemical fingerprinting, and mixture analysis.

**Green infrastructure assessment techniques:** measures and performance metrics for so-called "green" infrastructure including filter/buffer strips, constructed wetlands, stormwater swales, etc. These projects would identify methods to connect perceived land use improvements with realized and measurable ecological outcomes. Ideally, these would be designed and tested as underwriting criteria or as pay-for-performance systems.

**Ecosystem accounting standards:** a system that allows the region to track the different categories of monetary transactions that affect the ecosystem, and how money flows between those categories. Ideally, a set of draft standards would be applied to the creation of a first of its kind "Great Lakes ecosystem budget."

**Measures of foreign direct investment:** and an assessment of the consequences of change. Much of the economic capacity of the Great Lakes is owned by entities outside of the US and Canada, and may be subject to different rules governing the use of the resource. One project could assess the magnitude of that issue and



identify how local, state, federal, and international safeguards could be strengthened to help restore the Great Lakes.

**Footprint/value chain analyses:** an assessment of the ecological impacts of each “link” in the chain of economic activities that support the production of a good or service. The Fund is particularly interested in understanding the footprint of the expanding production of biofuels in the region, and the footprint of dominant water uses in the basin.

**Water conservation metrics:** the technical tools that link the magnitude, timing, location, and nature of water efficiency improvements to the health of specific, water-dependent, natural resources in the Great Lakes basin. Such metrics could be used as conservation objectives, or as underwriting criteria for insurance and/or performance warranty products related to water conservation requirements.

**Monetization protocols:** methods to capture the value of existing or potential environmental credits and contingent or existing liabilities for physical, chemical, and/or biological pollution or remediation; as well as performance metrics to identify levels of exposure that should trigger concern for employees, managers, and fiduciaries.

**Ecosystem service district metrics:** performance requirements for real or virtual districts created to restore ecological integrity to the Great Lakes. Such metrics could be used as design objectives, or underwriting criteria for insurance and/or performance warranty products. Such projects might answer the question *“What has the ecosystem service district achieved with its money?”*

**Trading/environmental exchange validation techniques:** protocols to assure buyers of resource improvements that the specified nutrient reductions, carbon sequestration, or emission reductions are real, permanent and secured.

## **RESOURCES AND ADDITIONAL BACKGROUND**

Are available on the Fund’s website:

<http://www.glpf.org/resources/index.html>

## RESOURCES AND ADDITIONAL BACKGROUND

The Great Lakes Protection Fund

[www.glpf.org](http://www.glpf.org)

Six Sigma

[http://en.wikipedia.org/wiki/Six\\_Sigma](http://en.wikipedia.org/wiki/Six_Sigma)

<http://www.motorola.com/content.jsp?globalObjectId=3074-5804>

Metrology

<http://en.wikipedia.org/wiki/Metrology>

National Institute of Standards and Measures

<http://www.nist.gov/>

American National Standards Institute

<http://www.ansi.org/>

The Natural Flow Regime: A New Paradigm for Freshwater Conservation, BioScience, 1997.

[http://www.snre.umich.edu/riverflows/flow\\_regime/naturalflow.pdf](http://www.snre.umich.edu/riverflows/flow_regime/naturalflow.pdf)

Anthropogenic Impacts on the Hydrology of Rivers and Lochs, University of Dundee, 1999

Wisconsin Buffer Initiative

<http://www.drs.wisc.edu/wbi/>

Criteria for Sustainable Biomass Production

<http://www.forum->

[ue.de/bioenergy/txtpdf/project\\_group\\_netherlands\\_criteria\\_for\\_biomass\\_production\\_102006bonn.pdf](http://www.forum-ue.de/bioenergy/txtpdf/project_group_netherlands_criteria_for_biomass_production_102006bonn.pdf)

Scoping report for the Great Ships Initiative

<http://www.nemw.org/scopingreport.pdf>

Institute for Agriculture and Trade Policy – Environment & Agriculture

<http://www.iatp.org/enviroag/>

Sandia National Laboratory: The Energy -- Water Nexus

<http://www.sandia.gov/energy-water/>

ISEAL Alliance – Code of Good Practice

<http://www.isealalliance.org/index.cfm?fuseaction=page.viewpage&pageid=502>

Environmental Compliance Consortium

<http://www.complianceconsortium.org/>

## RESOURCES AND ADDITIONAL BACKGROUND

The Great Lakes Protection Fund

[www.glpf.org](http://www.glpf.org)

Six Sigma

[http://en.wikipedia.org/wiki/Six\\_Sigma](http://en.wikipedia.org/wiki/Six_Sigma)

<http://www.motorola.com/content.jsp?globalObjectId=3074-5804>

Metrology

<http://en.wikipedia.org/wiki/Metrology>

National Institute of Standards and Measures

<http://www.nist.gov/>

American National Standards Institute

<http://www.ansi.org/>

The Natural Flow Regime: A New Paradigm for Freshwater Conservation, BioScience, 1997.

[http://www.snre.umich.edu/riverflows/flow\\_regime/naturalflow.pdf](http://www.snre.umich.edu/riverflows/flow_regime/naturalflow.pdf)

Anthropogenic Impacts on the Hydrology of Rivers and Lochs, University of Dundee, 1999

Wisconsin Buffer Initiative

<http://www.drs.wisc.edu/wbi/>

Criteria for Sustainable Biomass Production

<http://www.forum->

[ue.de/bioenergy/txtpdf/project\\_group\\_netherlands\\_criteria\\_for\\_biomass\\_production\\_102006bonn.pdf](http://www.forum-ue.de/bioenergy/txtpdf/project_group_netherlands_criteria_for_biomass_production_102006bonn.pdf)

Scoping report for the Great Ships Initiative

<http://www.nemw.org/scopingreport.pdf>

Institute for Agriculture and Trade Policy – Environment & Agriculture

<http://www.iatp.org/enviroag/>

Sandia National Laboratory: The Energy -- Water Nexus

<http://www.sandia.gov/energy-water/>

ISEAL Alliance – Code of Good Practice

<http://www.isealalliance.org/index.cfm?fuseaction=page.viewpage&pageid=502>

Environmental Compliance Consortium

<http://www.complianceconsortium.org/>