Great Lakes Protection Fund

2017 Annual Report

Background

In 1989, the governors of the Great Lakes states created the Protection Fund to help them protect and restore their shared natural resources. The Fund is the first private endowment created to benefit a specific ecosystem. It is designed to support the creative work of collaborative teams that test new ideas, take risks, and share what they have learned. It is a source of financial support for groups that value innovation and entrepreneurship, focus on tangible benefits for the Great Lakes ecosystem, and learn by doing. Seven Great Lakes states contributed $81.0 million to the Fund's permanent endowment.

The Fund does three things. First, it invests the endowment to produce income. This income supports regional projects, member states' individual Great Lakes priorities, and operations. Second, it designs and finances regional projects. These projects identify, demonstrate, and promote regional action to enhance the health of the Great Lakes ecosystem. Third, it monitors those regional projects to ensure that they are successful, modified when necessary, or terminated if they are not creating value for the ecosystem.

From its inception through December 2017, the Fund has made a total of 271 grants and program-related investments, representing an $81.1 million commitment to protecting and restoring the ecological health of the Great Lakes ecosystem. Additionally, the Fund has paid $50.3 million directly to its seven member states to support their Great Lakes priorities. Over the course of the past 28 years, the Great Lakes ecosystem has benefited from the States' initial investment of $81.0 million with an overall commitment of $131.5 million.

Governors' Ongoing Priorities

From time to time the governors establish, modify and renew their ongoing Great Lakes priorities. Currently, the Fund's goals are responsive to the governors' stated priorities including the following:

- Ensure the sustainable use of our water resources while confirming that the States retain authority over water use and diversions of Great Lakes waters.

- Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem.

- Control pollution from diffuse sources into water, land and air.

- Continue to reduce the introduction of persistent bioaccumulative toxics into the Great Lakes ecosystem.

- Stop the introduction and spread of non-native aquatic invasive species.

- Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.

- Restore to environmental health the Areas of Concern identified by the International Joint Commission as needing remediation.

- Standardize and enhance the methods by which information is collected, recorded and shared within the region.

- Adopt sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes.

Activities During 2017

In the past year, the Fund generated over $5.3 million in investment income from the endowment. The Fund returned $1.1 million to its member states to support their Great Lakes priorities. The Fund paid $2.5 million to support regional projects. Audited financial statements can be found in Appendix 1.

The Fund entered 2017 with 21 active projects focused on efforts to prevent biological pollution, restore natural flow regimes, stimulate market forces to adopt best practices and promising technology solutions, and provide leadership for ecosystem restoration in the Great Lakes Basin. These projects represented an investment by the Fund of $14 million.

Over the course of the year, work was completed on four of these projects. These projects are identified in Appendix 2. All projects generated new and useful tools that will ultimately improve the health of the Great Lakes ecosystem. Each project provided a unique and positive mission-related return on the Fund's investment.

During 2017, the Fund developed and supported two new projects, maintaining the portfolio of active, supported work at over $14.5 million. The new projects for 2017 include a pilot of new passive sediment management strategies at river mouths that will create critical wetland habitat, improve water quality, support local economies, and greatly reduce the cost and environmental impacts from dredging. The second project includes 31 shoreline community foundations, community water managers, regional leaders, and technical experts who will work together to identify infrastructure challenges, accelerate innovation, explore new financing strategies, and build community will to support necessary improvements to grey and green infrastructure. The Fund also expanded its support of an ongoing project during 2017.

These projects will help to achieve the Governors' objectives of controlling pollution from diffuse sources into water, land and air; continuing to reduce the introduction of persistent bioaccumulative toxics into the Great Lakes ecosystem; and, adopting sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes. The complete portfolio of supported work, including new projects awarded in 2017, can be found in Appendix 3.

Evaluation of the Corporation's Performance

The Fund accomplished its objectives in 2017. Regional projects were designed and funded to address key gubernatorial priorities. Ongoing regional efforts were monitored, adjusted when required, and closed out when appropriate. Significant funds totaling $1.1 million were paid directly to the member states to support their individual priorities.

Emerging Trends and Future Needs

The Governors have identified their priorities for Great Lakes Basin ecosystem protection and restoration. The Fund will continue its multi-year research agenda in support of these priorities. In the near term, the Fund will focus on ensuring the sustainable use of basin water resources, controlling diffuse pollution, and controlling invasive species.

Actions Taken by the Directors in Response to Public Comments

The Directors have sought, but not received, public comments on this report.

Members of the Corporation in 2017

Governor of Illinois

Bruce Rauner

Governor of Michigan

Rick Snyder

Governor of Minnesota

Mark Dayton

Governor of New York

Andrew Cuomo

Governor of Ohio

John Kasich

Governor of Pennsylvania

Tom Wolf

Governor of Wisconsin

Scott Walker

Board of Directors in 2017

Michael Batchelor (Fairview, PA) *through March*

Vita DeMarchi (Syracuse, NY)

Frederick Dudderar (Duluth, MN) *through May*

Kendra Fogarty (Chicago, IL)

Patricia Glaza (Royal Oak, MI)

Peter Gove (St. Paul, MN)

Richard Hylant (Ottawa Hills, OH)

Jill Jedlicka (Lancaster, NY)

Jeffrey Logan (Mechanicsburg, PA)

Richard Meeusen (Pewaukee, WI)

Don Ness (Duluth, MN) *Appointed, September*

Mark Meijer (Grand Rapids, MI)

Dan T. Moore (Cleveland Heights, OH)

Kevin Shafer (Milwaukee, WI)

Debra Shore (Skokie, IL)

Great Lakes Protection Fund Staff

Shannon Donley – Project Implementation Manager

Amy Elledge – Communications Manager

Mariela Lawrence – Office Administrator

Drew Pfeifer – Vice President of Operations

Janis Post – Business Manager

David Rankin – Vice President of Programs

Lee Swindall – Executive Director

The Fund thanks Russell Van Herik and Stephanie Lindloff for their contributions during 2017.

Appendix 1

2017 Audited Financial Statements

Great Lakes Protection Fund

Financial Report
December 31, 2017

Contents

RSM

Independent Auditor's Report

To the Board of Directors
Great Lakes Protection Fund

Report on the Financial Statements
We have audited the accompanying financial statements of Great Lakes Protection Fund (the Fund), which comprise the statements of financial position as of December 31, 2017 and 2016, and the related statements of activities and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Great Lakes Protection Fund as of December 31, 2017 and 2016, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

RSM US LLP

Chicago, Illinois
March 12, 2018

1

Great Lakes Protection Fund

Statements of Financial Position
December 31, 2017 and 2016

	2017	2016
Assets		
Cash and cash equivalents	$ 2,965,394	$ 4,355,107
Investments	135,365,740	121,126,676
Accrued interest	58,176	64,032
Other assets	13,963	14,670
Furniture, equipment and leasehold improvements, net of accumulated depreciation of $54,143 and $46,237 in 2017 and 2016, respectively	21,289	29,195
	$ 138,424,562	$ 125,589,680
Liabilities and Net Assets		
Liabilities:		
Member state shares payable	$ 1,148,801	$ 1,136,169
Accrued expenses	130,760	199,292
	1,279,561	1,335,461
Net assets:		
Unrestricted	5,153,235	5,135,102
Temporarily restricted	50,991,756	38,119,107
Permanently restricted	81,000,010	81,000,010
	137,145,001	124,254,219
	$ 138,424,562	$ 125,589,680

See notes to financial statements.

2

Great Lakes Protection Fund

Statements of Activities
Years Ended December 31, 2017 and 2016

	2017				2016			
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Revenue:								
Investment income	$ 79,385	$ 5,265,283	$ -	$ 5,344,668	$ 30,209	$ 5,289,795	$ -	$ 5,320,004
Miscellaneous revenue	-	1,338	-	1,338	-	5,288	-	5,288
Net assets released from restrictions	5,583,696	(5,583,696)	-	-	6,280,502	(6,280,502)	-	-
	5,663,081	(317,075)	-	5,346,006	6,310,711	(985,419)	-	5,325,292
Expenses:								
Program grants	2,546,264	-	-	2,546,264	3,228,767	-	-	3,228,767
Other program activities	870,548	-	-	870,548	1,018,449	-	-	1,018,449
Member state shares	1,148,801	-	-	1,148,801	1,136,169	-	-	1,136,169
Investment management and advisory fees	143,383	-	-	143,383	149,716	-	-	149,716
Administrative expenses	882,198	-	-	882,198	748,278	-	-	748,278
	5,591,194	-	-	5,591,194	6,281,379	-	-	6,281,379
Increase (decrease) in net assets before other items	71,887	(317,075)	-	(245,188)	29,332	(985,419)	-	(956,087)
Unrealized gains (losses)	(53,754)	13,189,724	-	13,135,970	(42,767)	1,936,442	-	1,893,675
Increase (decrease) in net assets	18,133	12,872,649	-	12,890,782	(13,435)	951,023	-	937,588
Net assets:								
Beginning of year	5,135,102	38,119,107	81,000,010	124,254,219	5,148,537	37,168,084	81,000,010	123,316,631
End of year	$ 5,153,235	$ 50,991,756	$ 81,000,010	$ 137,145,001	$ 5,135,102	$ 38,119,107	$ 81,000,010	$ 124,254,219

See notes to financial statements.

3

Great Lakes Protection Fund

Statements of Cash Flows
Years Ended December 31, 2017 and 2016

	2017	2016
Cash flows from operating activities:		
Increase in net assets	$ 12,890,782	$ 937,588
Adjustments to reconcile increase in net assets to net cash used in operating activities:		
Depreciation and amortization	7,906	7,563
Realized gain on sales of investments	(2,037,206)	(2,290,546)
Unrealized gain on investments	(13,135,970)	(1,893,675)
Changes in:		
Accrued interest	5,856	34,164
Other assets	707	(285)
Member state shares payable	12,632	(11,836)
Accrued expenses	(68,532)	(7,026)
Net cash used in operating activities	(2,323,825)	(3,224,053)
Cash flows from investing activities:		
Purchases of investments	(19,792,663)	(31,726,956)
Proceeds from sales of investments	20,726,775	30,014,861
Purchases of furniture, equipment and leasehold improvements	-	(6,336)
Net cash provided by (used in) investing activities	934,112	(1,718,431)
Decrease in cash and cash equivalents	(1,389,713)	(4,942,484)
Cash and cash equivalents:		
Beginning of year	4,355,107	9,297,591
End of year	$ 2,965,394	$ 4,355,107

See notes to financial statements.

4

Great Lakes Protection Fund

Notes to Financial Statements

Note 1.   Nature of Activities and Significant Accounting Policies

Great Lakes Protection Fund (the Fund) is a nonprofit organization designed to have as its members the governors of the eight states bordering on the Great Lakes. Seven of the states have joined the Fund and have made contributions, as specified in the Fund's articles of incorporation, to establish their membership in the Fund. Income earned on the contributions is used to provide grants which finance projects advancing the health of the ecosystem of the Great Lakes Basin.

Basis of accounting: Under accounting principles generally accepted in the United States of America, not-for-profit organizations report net assets in each of the three classes: permanently restricted, temporarily restricted, or unrestricted based on the existence or absence of donor-imposed restrictions.

Cash and cash equivalents: For purposes of the statements of cash flows, the Fund considers all highly liquid debt instruments purchased with a maturity of three months or less to be cash equivalents.

The Fund maintains cash accounts at financial institutions, which at times may exceed $250,000. A significant portion of cash equivalents is invested in interest-bearing money market accounts. Such amounts are insured by the FDIC up to $250,000 per taxpayer ID number. The Fund has not experienced any losses in such accounts. Management believes that the Fund is not exposed to any significant credit risk on cash and cash equivalents.

Investments: Investments are reflected at fair value based on quoted market prices. Realized gains on the sale of mutual funds are computed using the specific-identification method. Realized gains on the sale of other investments are computed using the first-in, first-out method. Interest is recorded on accrual basis. Dividend income is recorded on ex-dividend date. Endowment fund investment income or loss (including gains and losses on investments, interest and dividends) is recorded as increases or decreases in temporarily restricted net assets until appropriated for expenditure by the Fund. Other investment income or loss is included in the statement of activities as increases or decreases in unrestricted net assets unless the income or loss is restricted by donor or law. Changes in fair value are recorded as unrealized gains/losses in the statements of activities.

The Fund invests in various investments. Such investments are exposed to various risks such as interest rate, market and credit risk. Due to the level of risk associated with certain investments, it is at least reasonably possible that changes in the values of investments will occur in the near term and that such changes could materially affect the amounts reported in the statements of financial position.

Furniture, equipment and leasehold improvements: Furniture, equipment and leasehold improvements are stated at cost. Depreciation is recorded on a straight-line basis over the estimated useful lives of the assets ranging from three to seven years. Leasehold improvements are amortized over the lesser of useful life or lease term.

Grant commitments: Payment of grants beyond the initial installments is contingent on the satisfaction by the recipients of agreed-upon requirements. Unpaid amounts are accrued only if the contingencies have been met. Most grants cover a three to five year period.

Member state shares: In accordance with the articles of incorporation, the Fund is required to disburse to the member states one-third of its realized income after deducting operating expenses, excluding grants. Amounts paid to the states are to be used for the furtherance of the Fund's activities and are allocated on the basis of the state's respective contribution.

5

Great Lakes Protection Fund

Notes to Financial Statements

Note 1.   Nature of Activities and Significant Accounting Policies (Continued)

Use of estimates: The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions affecting the reported amounts of assets and liabilities and disclosures of contingent assets and liabilities at the date of the financial statements, as well as the reported amounts of revenue and expenses during the reporting period. Actual results could differ from the estimates.

Income taxes: The Fund is exempt from income taxes under Section 115(1) of the Internal Revenue Code and applicable state law.

The Fund follows the accounting guidance related to accounting for uncertainty in income taxes, which addresses the determination of whether tax benefits claimed or expected to be claimed on a tax return should be recorded in the financial statements. Under this guidance, the Fund may recognize the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by taxing authorities, based on the technical merits of the position. Examples of tax positions include the tax-exempt status of the Fund and various positions related to the potential sources of unrelated business taxable income. The tax benefits recognized in the financial statements from such a position are measured based on the largest benefit that has a greater than 50 percent likelihood of being realized upon ultimate settlement. At December 31, 2017 and 2016, there were no unrecognized tax benefits identified or recorded as liabilities.

Recent accounting pronouncements: In January 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-01, *Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*, which updates certain aspects of recognition, measurement, presentation and disclosure of financial instruments. ASU 2016-01 will be effective for the Fund in 2019. This standard impacts disclosures only and will not have a significant impact on the financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*. The guidance in this ASU supersedes the leasing guidance in Topic 840, *Leases*. Under the new guidance, lessees are required to recognize lease assets and lease liabilities on the balance sheet for all leases with terms longer than twelve months. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the statement of activities. The new standard is effective for the Fund in 2020; early adoption is permitted. The Fund is currently evaluating the impact of the adoption of this standard on its financial statements.

In August 2016, the FASB issued ASU 2016-14, *Not-for-Profit Entities (Topic 958): Presentation of Financial Statements of Not-for-Profit Entities*. Key elements of the ASU include a reduction in the number of net asset categories from three to two, conforming requirements on releases of capital restrictions, several new requirements related to expense presentation and disclosure (including investment expenses), and new required disclosures communicating information useful in assessing liquidity. The new standard is effective for the Fund in 2018; early adoption is permitted. The Fund is currently evaluating the impact of the adoption of this standard on its financial statements.

Subsequent events: The Fund has evaluated subsequent events for potential recognition and/or disclosure through March 12, 2018, the date the financial statements were available to be issued.

6

Great Lakes Protection Fund

Notes to Financial Statements

Note 2.   Investments

Investments consist of the following:

	2017	
	Cost	Fair Value
Exchange-traded funds:		
Global equity:		
Global equity index	$ 6,078,632	$ 7,414,458
Mutual funds:		
Domestic equity:		
Large cap index	19,283,472	42,723,474
Mid cap index	5,000,000	6,375,414
Small cap index	5,000,000	6,385,781
International equity:		
Emerging markets	5,800,000	6,345,207
Small cap index	3,800,000	3,982,142
International value	8,802,777	13,375,355
International growth	2,853,213	3,731,249
Options:		
Puts on S&P 500 Index	391,808	4,250
Fixed income:		
Core plus	13,900,000	13,741,572
Core	6,600,000	6,451,619
Strategic income	11,356,522	11,063,989
Short-term high yield	-	-
Short-term Treasury	3,800,000	3,763,532
Intermediate-term Government	5,000,000	4,930,044
U.S. government securities	5,174,364	5,077,654
	$ 102,840,788	$ 135,365,740

	2016	
	Cost	Fair Value
Exchange-traded funds:		
Global equity:		
Global equity index	$ 6,078,632	$ 6,085,635
Mutual funds:		
Domestic equity:		
Large cap index	19,283,472	35,769,020
Mid cap index	5,000,000	5,421,814
Small cap index	5,000,000	5,572,898
International equity:		
International value	8,802,777	11,343,809
International growth	11,208,550	11,730,245
Real estate:		
Real estate equity index fund	5,000,000	5,099,010
Fixed income:		
Core plus	13,900,000	13,525,033
Core	6,600,000	6,350,719
Strategic income	11,408,350	10,919,580
Short-term high yield	4,307,402	4,203,359
U.S. government securities	5,148,322	5,105,554
	$ 101,737,505	$ 121,126,676

7

Great Lakes Protection Fund

Notes to Financial Statements

Note 2.   Investments (Continued)

Components of investment income are reported as follows:

	2017		2016	
Interest and dividends	$	3,307,462	$	3,029,458
Mutual fund realized gains		2,037,206		2,290,546
Total investment income included in operating revenue	$	5,344,668	$	5,320,004
Unrealized gains	$	13,135,970	$	1,893,675

Note 3.   Fair Value Disclosures

The Fund follows Accounting Standards Codification (ASC) Topic 820, *Fair Value Measurements and Disclosures*, which provides the framework for measuring fair value. This Topic applies to all financial instruments that are being measured and reported on a fair value basis. As defined in the Topic, fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In determining fair value, the Fund uses various methods including market, income, and cost approaches. Based on these approaches, the Fund often utilizes certain assumptions that market participants would use in pricing the asset or liability, including assumptions about risk and/or the risks inherent in the inputs to the valuation technique. These inputs can be readily observable, market corroborated, or generally unobservable inputs. The Fund utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs. Based on the observability of the inputs used on the valuation techniques, the Fund is required to provide the following information according to the fair value hierarchy. The fair value hierarchy ranks the quality and reliability of the information used to determine fair values.

Financial assets and liabilities carried at fair value will be classified and disclosed in one of the following three categories:

Level 1. Valuations for assets and liabilities traded in active exchange markets, such as the New York Stock Exchange. Level 1 assets primarily include listed equities, money market funds, government securities, mutual funds, and exchange-traded funds. Valuations are obtained from readily available pricing sources for market transactions involving identical assets or liabilities.

Level 2. Valuations for assets and liabilities traded in less active dealer or broker markets. Valuations are obtained from third-party pricing services for identical or similar assets or liabilities. Level 2 assets primarily include equities traded in over-the-counter markets.

Level 3. Valuations for assets and liabilities that are derived from other valuation methodologies, including option pricing models, discounted cash flow models and similar techniques, and not based on market exchange, dealer, or broker-traded transactions. Level 3 valuations incorporate certain assumptions and projections in determining the fair value assigned to such assets or liabilities.

8

Great Lakes Protection Fund

Notes to Financial Statements

Note 3.   Fair Value Disclosures (Continued)

In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, an investment's level within the fair value hierarchy is based on the lowest level of input that is significant to the fair value measurement. The Fund's assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment, and considers factors specific to the investment.

For the years ended December 31, 2017 and 2016, the application or valuation techniques applied to similar assets and liabilities have been consistent. The following is a description of the valuation methodology used for assets measured at fair value:

Investments in securities traded on a national securities exchange, or reported on the NASDAQ national market, are stated at the last reported sales price on the day of valuation. These financial instruments are classified as Level 1 in the fair value hierarchy.

The Fund assesses levels of the investments at each measurement date, and transfers between levels are recognized on the actual date of an event or change in circumstances that caused the transfer. For the years ended December 31, 2017 and 2016, there were no such instances.

All of the Fund's investments are classified as **Level 1** as of December 31, 2017 and 2016.

The carrying amounts of financial instruments, including cash and cash equivalents, receivables, investments, accrued interest receivable, other assets, member state shares payable, and accrued expenses approximate fair value due to the short maturity of these instruments.

Note 4.   Grants Activity

Grants activity for 2017 and 2016 is as follows:

	Grants Approved	Grants Paid	Grants Payable
2017 Grants	$ 2,620,000	$ 2,538,964	$ -
2017 Amendment to 2015 grant	75,000	7,300	-
2017 Total	$ 2,695,000	$ 2,546,264	$ -
2016 Grants	$ 3,684,500	$ 3,228,767	$ -

As of December 31, 2017, total grants approved since the Fund's inception amounted to $81,128,615, of which $7,270,242 related to grants for which the contingencies have not been met and, therefore, the grant expenses have not been recognized. Upon satisfaction of the contingencies by the recipients, the Fund will recognize the grant expenses and disburse the remaining payments. The terms of most grants cover a three to five year period.

9

Great Lakes Protection Fund

Notes to Financial Statements

Note 5.   Net Assets

Unrestricted
Unrestricted net assets represent amounts that are not subject to externally-imposed purpose or time restrictions. Certain unrestricted net assets have been designated by the Board of Directors as a Sequestration Fund, representing an estimate of amounts sufficient to provide for commitments and obligations of the Fund. The balance of $5,153,235 and $5,135,102 in unrestricted net assets for 2017 and 2016, respectively, represents the unspent portion of the Sequestration Fund of $5,000,000 plus any interest earned.

Temporarily Restricted
Temporarily restricted net assets are comprised of endowment fund earnings that have not yet been appropriated for expenditure by the Fund.

Permanently Restricted
Permanently restricted net assets represent the contributions received from member states in accordance with the Fund's articles of incorporation. These amounts cannot be expended.

With the exception of Indiana, all states have made their required contributions, which were as follows:

Illinois	$ 15,000,000
Michigan	25,000,000
Minnesota	1,500,000
New York	12,000,000
Ohio	14,000,000
Pennsylvania	1,500,000
Wisconsin	12,000,000
	$ 81,000,000

There is no due date for the contribution payable by Indiana, which has not yet joined the Fund.

Note 6.   Endowment Net Assets

The Fund's endowment net assets are comprised of restricted contributions made by the member states, as well as the net effect of the realized and unrealized investment returns and losses on those investments and the operating expenses of the Fund. As the original contributions were made for the purpose of establishing a fund of assets to provide income for the Fund, the Fund's net assets are considered an endowment, as defined by accounting guidance related to financial statement presentation for not-for-profit organizations.

10

Great Lakes Protection Fund

Notes to Financial Statements

Note 6.   Endowment Net Assets (Continued)

Interpretation of Relevant Law – The Fund has interpreted the Illinois Uniform Prudent Management of Institutional Funds Act (UPMIFA) as requiring the preservation of the fair value of the original gift as of the gift date of the donor-restricted endowment funds absent explicit donor stipulations to the contrary. As a result of this interpretation, the Fund classifies as permanently restricted net assets (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the Fund. In accordance with UPMIFA, the Fund considers the following factors in making a determination to appropriate or accumulate earnings on donor-restricted endowment funds:

1) The duration and preservation of the Fund;
2) The purpose of the Fund and the donor-restricted endowment fund;
3) General economic conditions;
4) The possible effect of inflation and deflation;
5) The expected total return from income and the appreciation of investments;
6) Other resources of the Fund; and
7) The investment policies of the Fund.

The changes in endowment net assets for the Fund were as follows for 2017 and 2016:

	2017		
	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, beginning of year	$ 38,119,107	$ 81,000,010	$ 119,119,117
Investment income	5,265,283	-	5,265,283
Miscellaneous revenue	1,338	-	1,338
Unrealized gain on investments	13,189,724	-	13,189,724
Amounts appropriated for expenditure	(5,583,696)	-	(5,583,696)
Endowment net assets, end of year	$ 50,991,756	$ 81,000,010	$ 131,991,766

11

Great Lakes Protection Fund

Notes to Financial Statements

Note 6.   Endowment Net Assets (Continued)

	2016		
	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, beginning of year	$ 37,168,084	$ 81,000,010	$ 118,168,094
Investment income	5,289,795	-	5,289,795
Miscellaneous revenue	5,288	-	5,288
Unrealized gain on investments	1,936,442	-	1,936,442
Amounts appropriated for expenditure	(6,280,502)	-	(6,280,502)
Endowment net assets, end of year	$ 38,119,107	$ 81,000,010	$ 119,119,117

Return Objectives and Risk Parameters – The Fund has adopted endowment investment and spending policies that attempt to provide a predictable stream of funding to its programs while ensuring that the original value of the endowment contributions is preserved. Assets are invested in a manner intended to achieve an annualized nominal return of 5 to 7 percent. Actual returns in any given year may vary from this amount.

Strategies Employed for Achieving Objectives – To satisfy its long-term rate-of-return objectives, the Fund relies on a total return strategy in which returns are achieved through both capital appreciation (realized and unrealized) and current yield (interest and dividends). The Fund targets a diversified asset allocation that places a greater emphasis on equity-based investments to achieve its long-term return objectives within prudent risk constraints.

Spending Policy and How the Investment Objectives Relate to Spending Policy – The Fund has a policy of appropriating an estimate of expenditures each year as part of a formal, annual budget. Adjustments to appropriations are also approved during the year as unexpected changes arise.

Note 7.   Commitments

The Fund is obligated under an office lease expiring in December 2025 with an option to extend the lease for an additional five-year period.

Rent expense totaled $191,389 and $191,087 for 2017 and 2016, respectively.

Minimum payments required under the lease are as follows:

2018	$	177,934
2019		180,513
2020		183,093
2021		185,672
2022		188,252
Thereafter		580,233
	$	1,495,697

12

Great Lakes Protection Fund

Notes to Financial Statements

Note 8.   Retirement Plan

The Fund maintains a retirement plan under the provisions of Section 401(a) of the Internal Revenue Code applicable to governmental retirement plans. The Fund makes contributions under three provisions in the plan:

1) Contributions equal to 10 percent of each employee's compensation. All employees must participate upon commencement of employment.
2) Matching contributions in the amount of 100 percent of the employee's deferral contributions to the Fund's 457(b) deferred compensation plan (Note 9). The Fund's matching contributions are limited to 6 percent of the employee's compensation for the year. All employees contributing to the Fund's 457(b) deferred compensation plan are eligible to participate.
3) Board-designated contributions to provide additional compensation to maintain competitiveness with comparable positions in comparable organizations. Certain employees designated by the Board of Directors are eligible to participate. The retirement plan was amended to discontinue these contributions effective January 1, 2017.

All Fund contributions on behalf of employees are 100 percent vested when made. The Fund contributed $146,933 and $193,665 to the retirement plan for 2017 and 2016, respectively.

Note 9.   Deferred Compensation Plan

The Fund maintains a deferred compensation plan under the provisions of Section 457(b) of the Internal Revenue Code. All employees are eligible to voluntarily participate upon commencement of employment. Participants can elect to participate in the deferred compensation to the extent permitted by applicable contribution limits under Section 457(b) of the Internal Revenue Code.

The Fund makes discretionary matching contributions to the retirement plan (Note 8) in the amount of 100 percent of the employee's deferral contributions to the Fund's 457(b) deferred compensation plan. The Fund's matching contributions are limited to 6 percent of the employee's compensation for the year. Only employee contributions were made to the deferred compensation plan for 2017 and 2016.

13

Appendix 2

Projects Completed in 2017

Projects Completed in 2017

Great Lakes Green Infrastructure Finance Accelerator ($84,000)

This was a project design grant that explored and developed blueprints for financing options to facilitate private investment in the installation and operation of green infrastructure on both public and private property. Up to now, Great Lakes communities have largely focused on implementing green infrastructure on public properties and with public financing. Yet, considerable opportunities to reduce the environmental impacts of storm events exist on private properties in urban areas.

The team worked with municipal decision-makers, investors, insurers, service providers and other experts to analyze and develop green infrastructure financing approaches that are relevant to the needs of the Great Lakes region.

This planning grant successfully led to an implementation grant. The Fund's Board of Directors awarded a subsequent grant of up to $690,000 to test two new financing approaches available to Great Lakes municipalities. For this work the team will focus in the Northeast Ohio Regional Sewer District (NEORSD) service area in greater Cleveland and the City of Grand Rapids, Michigan.

American Rivers
Contact: Gary Belan | 202-347-7550 | gbelan@americanrivers.org

Reducing Phosphorus Loads from Agriculture: Creating a Pay-for-Performance Program Using Field-Specific Information ($957,000)

This project piloted an innovative approach to reducing phosphorus loss from agricultural land by providing flexible, performance-based incentives that will benefit both farmers and the environment. Working in the upper reaches of the Milwaukee River watershed, the team used a pay-for-performance approach to pay participating farmers based on the amount of phosphorus farmers kept on their fields and out of nearby streams and rivers.

The team established field-level baseline conditions (using models and interviews with farmers), assessed the cost effectiveness of status quo conservation, and created a portfolio of possible actions for each participating farmer to take to reduce phosphorus lost from specific fields. The team designed the structure of the program to identify what level of phosphorus removal could be attained for what cost, and designed simple contracts for each farmer. The farmers found this "let the farmer decide what's best for their land" approach appealing.

The team used the lessons learned from this work to create a detailed – yet easy to navigate – how-to toolkit for others to use to build pay-for-performance programs elsewhere in the Basin.

Winrock International Institute for Agricultural Development
Contact: Jonathan Winsten | 802-343-3037 | jwinsten@winrock.org

Using Active Management of Drain Networks to Improve the Great Lakes Ecosystem ($355,000)

This project explored the use of a novel, automated, real-time drain tile management network on agricultural lands to reduce nutrient and sediment inputs into the Great Lakes. The team examined techniques and potential environmental and agronomic impacts, explored the opportunities in the Great Lakes basin, identified the physical settings where a "smart drain network" can reduce nutrients, and evaluated the potential market for such services.

The team determined where in the basin the technology could be deployed, and determined the environmental and agronomic benefits. Phase two of the project focused on developing a path forward in increasing active drain management in the Great Lakes. The team identified knowledge gaps, assessed the legal, environmental and financial risk, and hosted a series of workshops and focus groups with drainage professionals and farmers.

This project was a collaborative effort of engineers, drain officials, public agencies, farm and conservation groups, legal experts, and researchers from across the Great Lakes basin working together to improve coordination of public and private drainage, which has historically been uncoordinated across farm fields, public drains and watersheds.

The Nature Conservancy
Contact: Dennis McGrath | 517-316-2251 | dmcgrath@tnc.org

The Great Lakes Clean Communities Network ($690,000)

The goal of this project was to develop a new collaborative approach to stormwater management in the region that would accelerate the local initiatives currently being implemented by single communities. By building Networked Neighborhoods for Eco-conservation (NECO), the team found that there was considerable local activity around the basin to promote and build decentralized stormwater solutions, but no collaborative network in place to allow for larger scale programs and results.

The Great Lakes Clean Communities Network (GLCCN) was designed to be an online learning laboratory that would empower communities around the Great Lakes with environmental tools and models to help them target effective types and placement of stormwater runoff practices, estimate pollutant reductions, and map and track positive environmental impacts.

The project used a combination of marketing and rollout strategies to build a community of practitioners in Indiana, Michigan, Ohio, Wisconsin, and New York. The completed GLCCN platform focuses on connecting people through established groups and a Great Lakes map and directory; sharing information; accessing tools; and tracking the ecological health of a community. Ultimately, the project created a vibrant learning community that will change the way stormwater is managed in the region.

Michigan State University
Contact: Jeremiah Asher | 517-432-5586 | asherjer@msu.edu

Appendix 3

Portfolio of Projects as of December, 2017

Portfolio of Projects as of December, 2017

Healthy Port Futures ($1,590,000)

Building on the work of their [project design award](#), this team will pilot new passive sediment management strategies at river mouths that will create critical wetland habitat, improve water quality, support local economies, and greatly reduce the cost and environmental impacts from dredging. Specifically, working with the US Army Corps of Engineers, a number of medium-sized port authorities and the Ohio EPA, the team will pilot passive sediment management (PSM) strategies in Ashtabula, Ohio creating over forty acres of new, publicly accessible wetland habitat. A second pilot port community will be added once Ashtabula is underway. PSM directs sediment through natural processes to shorelines and shallow zones and out of deep channels. This creates healthy wetland and benthic habitat benefiting both aquatic and terrestrial wildlife, creates recreational and tourism opportunities in the ports, and greatly reduces the need for dredging.

If successful basin-wide, this project will result in the adoption of landscape-based strategies and practices for PSM in the over forty medium-sized port communities through all states in the Great Lakes Basin.

University of Pennsylvania and Cornell University
Contact: Sean Burkholder | 215-898-6591 | seanburk@design.upenn.edu
          Brian Davis | 347-633-6530 | brd63@cornell.edu

Great Lakes Community Foundations Water Initiative – Phase 2

Developed through a [project design award](#), this project will expand the ability of the region's shoreline communities to address aging water and wastewater systems, and the water quality and human health challenges posed by these systems. The team includes 31 shoreline community foundations, community water managers, regional leaders, and technical experts—to identify infrastructure challenges, accelerate innovation, explore new financing strategies, and build community will to support necessary improvements to grey and green infrastructure.

The 31 community foundations will work together in six regional clusters to address the water infrastructure issues in their respective communities. These clusters are: Lake Erie, Lake Huron, Upper Lake Michigan, Lower Lake Michigan, Lake Ontario, and Lake Superior. During the project, each regional cluster will prepare an action plan that will identify infrastructure challenges—water quality, financing barriers, use of green infrastructure, rate structures, water literacy, etc.—that exist in each community.

The six clusters will activate and grow regional networks, advance water literacy, broker new financing strategies, recruit new local donors, and build new programs around water. As they begin to execute their action plans, they will document what works, and share the lessons they learn. The lessons (and the products and strategies) will be documented and shared via a basin-wide learning network.

Council of Michigan Foundations
Contact: Robert Collier | 616-842-7080 | rcollier@michiganfoundations.org

Accelerating the Shift to Environmentally Sensitive Electricity Through Collaborative Competition ($557,000)

Awarded in 2016, this project will improve the water quality of the Great Lakes Basin by reducing mercury emissions resulting from municipal water utility operations that depend upon electricity generation. This project builds upon the Fund's previous investments in developing the Locational Electricity Emissions Methodology (LEEM) and the Polluting Emission Pump Station Optimization tool (PEPSO).

LEEM interacts with the power grid to determine, in real-time, the fuel sources that are being used to generate electricity and the emissions from those sources, and signals when cleaner forms of energy are available. The LEEM-PEPSO combination enables utilities to tailor pump operation schedules to minimize mercury emissions while meeting their system constraints.

According to the most recent data (USEPA, 2011), coal-fired power plants in the Great Lakes states emit about 7 tons of mercury each year. The team believes that moderate (i.e., 9%) adoption of LEEM-PEPSO within the Great Lakes Basin public water supply sector would result in measurable, annual mercury reductions.

The team will conduct a collaborative competition for municipal water utilities across the Great Lakes region. Prospective contestants will receive detailed information about LEEM as well as free access to the software and technical assistance. Participants will be encouraged to work collaboratively to achieve individual and collective pollution reduction goals over a 12-month term. A panel of judges will select winners in various categories.

American Water Works Association
Contact: Chad Weikel | 202-628-8303 | cweikel@awwa.org

Addressing Nutrient Runoff from Leased Farmland in the Great Lakes ($1,087,000)

Awarded in 2016, this project will engage women non-operator farmland owners (WNOLs) and their tenant farmers in piloting creative lease arrangements that dramatically increase conservation practices on leased farmland. Previous work supported by the Fund estimated that over 48% of land farmed in the Great Lakes Basin is leased from owners who do not live on the land. An increasing proportion of that rental land is owned by women newly in a decision-making role after their husbands have died, but who are feeling poorly equipped and disempowered to be actively involved in the treatment of the land they own. Research shows that women owners take a long view of the land and place great value on leaving a legacy of health soils and healthy waters. Research also shows that women owners need gender-specific support, education, programs and tools to empower their conservation-based decision-making.

The pilot will increase awareness and understanding of conservation practices among WNOLs, stimulate actions that mutually benefit the landowner and tenant farmer while sharing the risks of those actions, and engage agricultural retailers in supporting those actions. The pilots will be conducted in the Portage and Toussaint River basins in northwest Ohio, and the Genesee River watershed in western New York. The three year project will directly reach 80 WNOLs and 160 tenant farmers and will scale across the basin by mobilizing a community of practice.

American Farmland Trust
Contact: Jennifer Filipiak | 309-808-3778 | jfilipiak@farmland.org

Advancing Systematic and Fundamental Changes in Agricultural Water Resources Management ($1,135,000)

Awarded in 2016, this project will reshape traditional agricultural operations by demonstrating approaches that merge drainage management authority objectives with conservation services that follow circular economy principles. The project aims to improve water quality, rebuild soil health and increase crop resiliency, while benefiting farm economics and creating new business opportunities throughout the region.

Specifically, the team will focus on reducing phosphorus, nitrogen and sediment loads to the Great Lakes Basin, and on increasing the ability of soils to hold water. The team projects that even a moderate level of uptake a few years beyond the project would greatly reduce agriculturally-derived nutrient loading to the Great Lakes.

Agricultural landowners in legal drainage districts must pay assessments to maintain and improve the public drainage systems that serve them. These assessments are generally based purely on acreage and/or linear extent of the adjacent drainage. This project will test new methods for calculating drain assessments that reward farmers who implement land management practices that improve soil and water quality. This adaptive drain fee assessment model presents the opportunity to test market-based approaches that work in support of the model.

Three treatment approaches will be tested in this project with pilot locations in Van Buren County, Michigan, Milwaukee River watershed, Wisconsin and a to-be-finalized location in Indiana. These pilots will yield information on both water quality benefits and economic opportunities associated with phosphorus capture. The project will create and propel a community of practice that includes drainage district authorities, conservation managers, agricultural retailers, commodity buyers, farmers, and food waste generators that will extend this work beyond the initial Great Lakes pilot locations.

Kieser and Associates, LLC
Contact: Mark Kieser | 269-344-7117 | mkieser@kieser-associates.com

Community Foundations Great Lakes Water Initiative ($137,000)

Awarded in 2016, this project design support will result in an implementation proposal for a network of new water initiatives led by community foundations on the coasts of the Great Lakes. The team expects to launch initiatives in 12-18 coastal cities and will emphasize "water literacy" as a means to increase the appetite for new water investments. The team plans to create new volunteer programs to assist local water authorities and/or watershed organizations and create a series of new funds to expand investment in local enterprises servicing green and distributed infrastructure.

This work builds on past Fund-supported Community Foundation Network which created environmental endowments in 26 communities, made successful by this team's leadership.

Council of Michigan Foundations
Contact: Robert Collier | 616-842-7080 | rcollier@michiganfoundations.org

Engaging Private Capital for Great Lakes Green Infrastructure Financing ($690,000)

Awarded in 2016, this team will test two new financing approaches available to Great Lakes municipalities to facilitate the installation of green stormwater infrastructure on both private and public property. Currently, Great Lakes communities have largely focused on implementing green infrastructure on public properties and with public financing. Yet, considerable opportunities exist to augment the public funds with private investment to reduce the environmental impacts of storm events in urban areas.

The team will focus in the Northeast Ohio Regional Sewer District (NEORSD) service area in greater Cleveland and the City of Grand Rapids, Michigan – two cities with distinctly different existing conditions and opportunity sets that represent a large cross-section of Great Lakes communities.

In Grand Rapids, the team will build and deploy a public-private stormwater credit trading program that will provide a market-based exchange for green infrastructure. Such a program will allow private property owners to meet stormwater requirements more cost-effectively, and achieve benefits beyond just volume retention. This program would be the first of its kind in the Great Lakes region.

In greater Cleveland, the team will optimize the NEORSD's significant public expenditures on green infrastructure by aggregating projects and leveraging private and additional public sector investment through their existing grant programs.

This pilot project is the result of a design grant where the team explored different financing options that would facilitate private investment in the installation and operation of green infrastructure on both public and private property in the Great Lakes region.

American Rivers
Contact: Jeff Odefey | 202-478-0206 | jodefey@americanrivers.org

Port Futures: (Modeling) Adaptive Strategies for Health Great Lakes Ports ($78,500)

Awarded in 2016, this project design support will result in an implementation proposal that will build new scenario-modeling tools for Great Lakes basin ports and small harbors to improve their ecological and economic sustainability. Many ports and small harbors of the Great Lakes Basin require recurring dredging to operate as they were historically intended. But the region's ability to maintain dredging and sediment disposal activities into the future is uncertain due to ecological concerns, large fluctuations in water levels, and increased costs paired with diminished funding. A diverse group called the Dredge Research Collaborative, co-chaired by this project's team leaders, recognizes the need for outside the box thinking for sustainable alternatives for our ports and small harbors—both ecologically and economically. However, it is recognized that the tools to evaluate these alternatives do not currently exist. This team seeks to develop such tools in this project design effort.

The product from this work will be an integrated decision-making toolkit that will allow for the testing and evaluation of ecological, economic and urban potentials of port management alternatives across multiple temporal and spatial scales.

Cornell University and University at Buffalo
Contact: Brian Davis | 347-633-6530 | brd63@cornell.edu
        Sean Burkholder (formerly at UBuffalo) | 215-898-6591 | seanburk@design.upenn.edu

A Self-Scaling Market Mechanism to Reduce Indirect Electricity Pollution ($602,000)

Awarded in 2015, this team led by WattTime will reduce mercury and other air pollutants into the Great Lakes through software-guided reductions in energy use at times when electricity is being generated by high polluting sources. The team has piloted their software in California where they focused on carbon emissions. In this project, the team will build upon their existing software with the Locational Emissions Estimation Methodology (LEEM) developed by a prior Fund-supported team. LEEM signals when cleaner forms of energy are feeding the grid and will enable the team to focus on reductions in mercury emissions.

The team will approach these reductions with both an internet-based software product and a market scaling mechanism. The team believes that adding a mercury reducing feature to smart devices will allow manufacturers to differentiate themselves with virtually no up-front costs. Ultimately, mercury will be reduced (benefitting the Great Lakes ecosystem) and manufacturers who offer the service will stand out from their peers and receive a greater share of the market (benefitting them).

Smart devices, including energy management systems for large buildings, residential thermostats and refrigerators, have significant untapped capacity to reduce mercury emissions. The team estimates that at least 900,000 connected appliances and management systems are currently in use in the Great Lakes basin and they believe that they can reduce mercury pollution by two tons by the end of 2016, with a potential to reduce 41 tons of mercury pollution by the year 2020.

WattTime
Contact: Gavin McCormick | 857-540-3535 | gavin@watttime.org

Strategies to Engage Middle Adopter Farmers on Cover Crops ($653,000)

Awarded in 2015, this team, led by the National Wildlife Federation, will improve water quality in the Great Lakes by increasing adoption of conservation practices that improve soil health on agricultural lands throughout the basin. They will do this by identifying and testing strategies for engaging middle-to-late adopter farmers to implement conservation practices.

Current conservation outreach, policies and financial incentives strongly focus on innovators and early adopters, which comprises a small percentage (16%) of the farming population. This team will develop and test a series of outreach and communications strategies to engage the middle and late adopters (comprising 70% of farmers) that will address the fundamental cultural components of their decision making as it pertains to the implementation of conservation practices.

The project team is a collaboration of organizations that have had uncommon and notable success with this approach in localized areas. They seek to bring these lessons to scale in the Great Lakes basin.

National Wildlife Federation
Contact: Ryan Stockwell | 715-965-2538 | stockwellr@nwf.org

Green Infrastructure – Private Capital ($886,300)

Awarded in 2015, the project will execute first-ever green infrastructure public-private partnership agreements (P3s) in several Great Lakes municipalities as a demonstration of a new approach to financing and optimizing the performance of distributed green infrastructure. The P3s are expected to be large-scale (up to $50 million) and enable aggregation of services, and optimization of performance, with the goal of making it economically feasible for governments and utilities to greatly expand green infrastructure throughout the Great Lakes region. The team will organize a project advisory committee, identify pilot communities, create and execute business plans, and—based on actual experience—create an implementation toolkit for other communities.

The project will implement an approach developed through previous Fund-supported work—a well-received business model development tool that describes how to form, market and position aggregation services to deliver high-performing green infrastructure services.

Environmental Consulting & Technology, Inc.
Contact: Sanjiv Sinha | 734-272-0859 | ssinha@ectinc.com

An Intelligent Cyberinfrastructure for the Decentralized Sensing, Modeling and Control of Urban Stormwater ($800,000)

Awarded in 2014, this project will develop a novel, smart, stormwater control framework that, when deployed at scale, will reduce the occurrence of combined and sanitary sewer overflows thereby improving the water quality of the Great Lakes and its tributaries.

The framework will optimize the management of sump pumps, rain barrels and stormwater outlets by fusing real-time sensor data and location-specific weather forecasting with control algorithms. Customers for the computing framework are water utilities seeking to optimize the use of distributed green infrastructure assets to improve stormwater management decision-making. The framework will be pilot tested in in residential neighborhoods in Milwaukee, Ann Arbor and Toledo.

University of Michigan
Contact: Dr. Branko Kerkez | 734-764-4292 | bkerkez@umich.edu

Expanding Ag Retailer Roles in Resource Management ($759,000)

Awarded in 2014, this project is designed to reduce agriculture's contribution of nutrients, sediments, pesticides, and herbicides to the Great Lakes by adding key conservation products and services to the list of offerings marketed by agriculture retailers to farmers. The project will build upon the team's successes

in a prior Fund-supported project where they developed new revenue-generating conservation products and successfully activated a network of agricultural retailers in the Sandusky River watershed to sell those products and eliminate over 18,000 pounds of dissolved reactive phosphorus runoff in one year.

The team will expand their work to other nutrient-impaired priority watersheds including the Lower Fox River and Saginaw Bay. They will improve upon the innovative tools they developed in the prior project.

The IPM Institute of North America, Inc.
Contact: Dr. Thomas Green | 608-232-1410 | ipmworks@ipminstitute.org

Optical Technology to Efficiently Detect Sewage Contamination for Rapid Remediation ($1,424,000)

Awarded in 2014, this project will improve the water quality of the Great Lakes and its tributaries with the development of hand-held, real-time, optical sensors that will locate and accelerate repair of sources of human sewage contamination in streams and storm sewers. The team will do this by developing a new methodology for identifying the best optical signals to predict sewage contamination in water.

Optical properties of water are largely determined by organic matter and human sewage, as a form of dissolved organic matter, has distinctive characteristics. Through extensive field sampling and laboratory analysis, the team will determine those optical signals that consistently indicate human sewage and will work closely with partner sensor manufactures to expand the capabilities of existing sensors. The team will pilot the technology in Milwaukee, Macomb County (MI) and Monroe County (NY).

U.S. Geological Survey
Contact: Steven Corsi | 608-821-3835 | srcorsi@usgs.gov

Uncovering How Clean is Clean: Great Lakes Invasive Species ($542,000)

Awarded in 2014, this work will lead to fewer successful invasions of the Great Lakes by aquatic nuisance species. The team will do this by continuing the work that they began under a previous Fund project to develop methods that will determine how the invasion risks vary with the numbers of invasive organisms released into the environment. As these methods are established, work can begin to create receiving water standards that protect the Lakes from invasions.

This project will have two components: mesocosm studies and field surveys. The mesocosm studies will use the methods developed and refined in a prior project to characterize the relationship between inoculum concentrations and colonization success using a surrogate invader, the spiny water flea. The field survey work will focus on investigating the use of environmental DNA (eDNA) as a reliable, quick and affordable screening method to identify priority samples for analysis and will focus on Hemimysis species.

Northeast-Midwest Institute
Contact: Allegra Cangelosi | 202-544-5200

Implementation and Evaluation of Accurate Dairy Feeding ($690,000)

Awarded in 2013, this project will reduce the dairy industry's contribution of excess nutrients, particularly phosphorus, to the Great Lakes. With an estimated three million dairy cows in the Great Lakes region, the team expects to reduce annual contributions of phosphorus by 20,000 metric tonnes per year. (To put this into perspective, the Great Lakes Water Quality Agreement of 2012 specified the combined maximum phosphorus loading target for all of the Great Lakes at 31,360 metric tonnes per year.) The team will do this by developing a novel feed management and nutritional accounting system that will intervene directly in farm feed management practices to streamline dairy operations and reduce nutrient waste. The cloud-based system will interact with feeding systems already available in the market-place. In its final form, the system will consist of a series of modules (mixing, feed inventory, animal inventory and production), and a custom analytical engine that will perform statistical analysis and reporting and provide real-time feedback to on-farm decision-makers. The team will pilot the system on ten large dairy farms in Ontario, Ohio, Wisconsin, and New York.

AgModels LLC
Contact: Michael Barry | 607-423-9417 | mcb4@cornell.edu

Automated Ballast Treatment Verification Project ($823,000)

Awarded in 2012, this project will reduce the likelihood of new invasive species entering the Great Lakes. The team will accomplish this by creating an automated, shipboard, rapid-testing system that will be able report, in real time, the presence of any live organisms in ballast water following treatment. If successful, this effort will eliminate one of the greatest challenges facing invasive species control—the ability to capture sufficient volumes of water to properly assess the efficacy of ballast treatment methods and compliance with ballast standards.

The team will work closely with leaders in the ballast monitoring field including university experts, state and federal agency staff, shippers, carriers, and equipment manufacturers, and will convene at least annually a regional ballast verification management workshop. The team will also maintain an informal network of stakeholders and interested parties and will promote the work at regional, national and international meetings.

Wayne State University
Contact: Dr. Jeffrey Ram | 313-577-1558 | jeffram@med.wayne.edu

Vacant to Vibrant: Vacant Land as Green Infrastructure ($902,000)

Awarded in 2012, this project will lead to improved water quality in the Great Lakes by reducing stormwater runoff and the incidence of combined sewer overflows. To accomplish this, the team will establish a neighborhood-based network of small-parcel green infrastructure (GI) projects on vacant land in three Great Lakes cities. They will determine the potential for urban neighborhoods with an abundance of vacant land to serve as a GI network. This project will be the first to test the effectiveness of aggregated small parcels as a viable strategy for effective GI and stormwater management. It will also be the first to develop a simple GI portfolio that will be replicable across cities in the Great Lakes region. The

team will work with local community partners in the cities of Buffalo, NY; Cleveland, OH; and Gary, IN—cities with high commercial and residential land vacancy; aging sewer/stormwater infrastructure; and a demonstrated interest and capacity for an interdisciplinary approach to green infrastructure.

This project is the result of a successful convening and planning phase which brought together experts from fourteen cities around the Great Lakes to assess the regional interest of reusing vacant urban lands as green infrastructure. The team will continue to develop this network by holding at least two regional meetings and by creating a regional community of practice—a Great Lakes Vacant Land and Green Infrastructure Collaborative that will engage stakeholders from the original fourteen cities and be expanded to include other stake holders from around the Great Lakes.

Cleveland Botanical Garden
Contact: Sandra Albro | 216-707-2860 | salbro@cbgarden.org

Great Lakes Protection Fund

The Fund's mission is to identify, demonstrate, and promote regional action to enhance the health of the Great Lakes Ecosystem.

1560 Sherman Avenue
Suite 1370
Evanston, Illinois 60201
T 847-425-8150
F 847-424-9832

To start a conversation, discuss a project idea, or inquire about our proposal process, email at:
startaconversation@glpf.org
glpf.org
Twitter/Facebook: @GLPFund