Great Lakes Protection Fund

2016 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 2016, the Fund has made a total of 269 grants and program-related investments, representing a $78.4 million commitment to protecting and restoring the ecological health of the Great Lakes ecosystem. Additionally, the Fund has paid $49.2 million directly to its seven member states to support their Great Lakes priorities. Over the course of the past 26 years, the Great Lakes ecosystem has benefited from the States' initial investment of $81.0 million with an overall commitment of $127.7 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 2016

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 $3.2 million to support regional projects. Audited financial statements can be found in Appendix 1.

The Fund entered 2016 with 23 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 $14.3 million.

Over the course of the year, work was completed on eight 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 2016, the Fund developed and supported six new projects, maintaining the portfolio of active, supported work at over $13.9 million. The new projects for 2016 include an effort to improve Great Lakes water quality by reducing mercury emissions from electricity generation through a collaborative competition for municipal water utilities across the Great Lakes region. Competing utilities will be provided with software that will enable them to tailor pump operation schedules to minimize mercury emissions while meeting their system constraints. Another project will test new methods for calculating drain assessments that reward farmers who implement land management practices that improve soil and water quality. 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, 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.

These projects will help to achieve the Governors' objective of controlling pollution from diffuse sources into water, land and air; 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 2016, can be found in Appendix 3.

Evaluation of the Corporation's Performance

The Fund accomplished its objectives in 2016. Regional projects were designed and funded to address key gubernatorial priorities—especially the sustainable use of Great Lakes water and stopping invasive species. Ongoing regional efforts were monitored, adjusted when required, and closed out when appropriate. Significant funds totaling $1.1MM 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 continued development of significant, new technological tools to help protect and restore the resources of the Great Lakes as well as new innovations to catalyze a transition to a next

generation of water systems. These solutions will address the problems of nutrient-driven harmful algal blooms, excessive runoff from large rainstorm events, and changing economic and demographic conditions, and will provide better value for the money we will invest in them.

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 2016

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 2016

Michael Batchelor (Fairview, PA)

Patricia Birkholz (Saugatuck, MI)

Vita DeMarchi (Syracuse, NY)

Matthew Driscoll (Syracuse, NY)

Frederick Dudderar (Duluth, MN)

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)

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

Stephanie Lindloff – Project Development Manager

Drew Pfeifer – Director of Finance and Investment

Janis Post – Business Manager

David Rankin – Program Director

Russell Van Herik – Executive Director

Appendix 1

2016 Audited Financial Statements

Great Lakes Protection Fund

Financial Report
December 31, 2016

Contents

Independent Auditor's Report

To the Board of Directors
Great Lakes Protection Fund
Chicago, Illinois

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, 2016 and 2015, 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, 2016 and 2015, 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 9, 2017

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Great Lakes Protection Fund

Statements of Financial Position
December 31, 2016 and 2015

	2016	2015
Assets		
Cash and cash equivalents	$ 4,355,107	$ 9,297,591
Investments	121,126,676	115,230,360
Accrued interest	64,032	98,196
Other assets	14,670	14,385
Furniture, equipment and leasehold improvements, net of accumulated depreciation of $46,237 and $38,674 in 2016 and 2015, respectively	29,195	30,422
	$ 125,589,680	$ 124,670,954
Liabilities and Net Assets		
Liabilities:		
Member state shares payable	$ 1,136,169	$ 1,148,005
Accrued expenses	199,292	206,318
	1,335,461	1,354,323
Net assets:		
Unrestricted	5,135,102	5,148,537
Temporarily restricted	38,119,107	37,168,084
Permanently restricted	81,000,010	81,000,010
	124,254,219	123,316,631
	$ 125,589,680	$ 124,670,954

See notes to financial statements.

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Great Lakes Protection Fund

Statements of Activities
Years Ended December 31, 2016 and 2015

| | 2016 | | | | 2015 | | | |
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Revenue:								
Investment income	$ 30,209	$ 5,289,795	$ -	$ 5,320,004	$ 17,711	$ 5,232,391	$ -	$ 5,250,102
Miscellaneous revenue	-	5,288	-	5,288	-	737	-	737
Net assets released from restrictions	6,280,502	(6,280,502)	-	-	5,637,380	(5,637,380)	-	-
	6,310,711	(985,419)	-	5,325,292	5,655,091	(404,252)	-	5,250,839
Expenses:								
Program grants	3,228,767	-	-	3,228,767	2,683,297	-	-	2,683,297
Other program activities	1,018,448	-	-	1,018,448	972,478	-	-	972,478
Member state shares	1,136,170	-	-	1,136,170	1,148,005	-	-	1,148,005
Investment management and advisory fees	149,716	-	-	149,716	93,993	-	-	93,993
Administrative expenses	748,278	-	-	748,278	739,614	-	-	739,614
	6,281,379	-	-	6,281,379	5,637,387	-	-	5,637,387
Increase (decrease) in net assets before other items	29,332	(985,419)	-	(956,087)	17,704	(404,252)	-	(386,548)
Unrealized gains (losses) relating to assets still held at end of year	(42,767)	1,936,442	-	1,893,675	-	(4,745,399)	-	(4,745,399)
Increase (decrease) in net assets	(13,435)	951,023	-	937,588	17,704	(5,149,651)	-	(5,131,947)
Net assets:								
Beginning of year	5,148,537	37,168,084	81,000,010	123,316,631	5,130,833	42,317,735	81,000,010	128,448,578
End 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

See notes to financial statements.

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Great Lakes Protection Fund

Statements of Cash Flows
Years Ended December 31, 2016 and 2015

		2016		2015
Cash flows from operating activities:				
Increase (decrease) in net assets	$	**937,588**	$	(5,131,947)
Depreciation and amortization		**7,563**		2,214
Realized gain on sales of investments		**(2,290,546)**		(1,211,187)
Unrealized (gain) loss on investments		**(1,893,675)**		4,745,399
Changes in:				
Accrued interest		**34,164**		(2,095)
Other assets		**(285)**		1,629
Member state shares payable		**(11,836)**		(611,542)
Accrued expenses		**(7,026)**		(30,533)
Net cash used in operating activities		**(3,224,053)**		(2,238,062)
Cash flows from investing activities:				
Purchases of investments		**(31,726,956)**		(5,208,399)
Proceeds from sales of investments		**30,014,861**		6,954,333
Purchases of furniture, equipment and leasehold improvements		**(6,336)**		(28,868)
Net cash (used in) provided by investing activities		**(1,718,431)**		1,717,066
Decrease in cash and cash equivalents		**(4,942,484)**		(520,996)
Cash and cash equivalents:				
Beginning of year		**9,297,591**		9,818,587
End of year	$	**4,355,107**	$	9,297,591

See notes to financial statements.

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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.

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.

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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, 2016 and 2015, 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 9, 2017, the date the financial statements were available to be issued.

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Great Lakes Protection Fund

Notes to Financial Statements

Note 2. Investments

Investments consist of the following:

	2016	
	Cost	Market
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

	2015	
	Cost	Market
Mutual funds:		
Domestic equity:		
Large cap index	$ 21,896,360	$ 37,186,373
Large cap growth	3,459,112	4,112,500
Mid cap index	5,000,000	4,948,780
Small cap index	5,000,000	4,786,178
International equity:		
International value	8,802,777	11,587,108
International growth	11,208,550	12,157,532
Real estate:		
Real estate equity index fund	5,000,000	4,973,597
Fixed income:		
Total return	19,048,920	18,002,648
Strategic income	13,500,000	12,842,746
Short-term high yield	4,819,145	4,632,898
	$ 97,734,864	$ 115,230,360

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Great Lakes Protection Fund

Notes to Financial Statements

Note 2.   Investments (Continued)

Components of investment income are reported as follows:

	2016	2015
Interest and dividends	$ 3,029,458	$ 2,564,960
Realized gains on securities sold	-	1,211,187
Mutual fund realized gains	2,290,546	1,473,955
Total investment income included in operating revenue	$ 5,320,004	$ 5,250,102
Unrealized gains (losses) relating to assets still held at end of year	$ 1,893,675	$ (4,745,399)

Note 3.   Fair Value Disclosures

The Fund follows Accounting Standards Codification 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.

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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, 2016 and 2015, 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, 2016 and 2015, there were no such instances.

All of the Fund's investments are classified as Level 1 as of December 31, 2016 and 2015.

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

Grant activity for 2016 and 2015 is as follows:

	Grants Approved	Grants Paid	Grants Payable
2016	$ 3,684,500	$ 3,228,767	$ -
2015	2,313,300	2,683,297	-

As of December 31, 2016, total grants approved since the Fund's inception amounted to $78,493,615, of which $7,121,833 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.

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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 $5,135,102 and $5,148,537 in unrestricted net assets for 2016 and 2015, 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.

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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 2016 and 2015:

	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

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Great Lakes Protection Fund

Notes to Financial Statements

Note 6.   Endowment Net Assets (Continued)

| | 2015 | | |
	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets,			
beginning of year	$ 42,317,735	$ 81,000,010	$123,317,745
Investment income	5,232,391	-	5,232,391
Miscellaneous revenue	737	-	737
Unrealized loss on investments	(4,745,399)	-	(4,745,399)
Amounts appropriated for			
expenditure	(5,637,380)	-	(5,637,380)
Endowment net assets,			
end of year	$ 37,168,084	$ 81,000,010	$118,168,094

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 five to seven 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 $191,087 and $190,846 for 2016 and 2015, respectively.

Minimum payments required under the lease are as follows:

2017	$	175,354
2018		177,934
2019		180,513
2020		183,093
2021		185,672
Thereafter		768,485
	$	1,671,051

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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 $193,665 and $155,020 to the retirement plan for 2016 and 2015, 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 2016 and 2015.

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Appendix 2

Projects Completed in 2016

Projects Completed in 2016

Targeting Women Absentee Farmland Owners to Test Sustainable Agricultural Leases ($88,000)

This was a project design grant that enabled the team to develop a pilot project to identify and reach women non-operating farmland owners and improve how they lease their lands to tenant farmers. The team expects to equip women non-operating landowners with the tools needed to allow increased participation in conservation programs, accelerate adoption of water-friendly management practices, and remove lease terms that might harm waterways. Women are a strategic target because they play an increasingly important role in absentee farmland ownership. Research shows that they take a longer view of the land and place greater value on leaving a legacy of healthy soils and surface waters.

In the design phase the team identified, and explored ways to overcome, obstacles to the use of sustainable agricultural leases by completing a thorough literature review and engaging both owners and their tenants through a series of focus groups in New York and Ohio. After fully evaluating six watersheds to pilot their strategies, the team selected the Portage and Toussaint River Basins in Ohio; and the Black and Oatka Creek subwatersheds of the Genesee River in New York. They expanded the project team and developed a complete plan of work to test their approach.

This planning grant successfully led to an implementation grant. The Fund's board of directors awarded a subsequent grant of up to $1,087,000 to pilot the strategies they developed in the planning phase.

American Farmland Trust
Contact: Ann Sorensen | 815-732-2885 | asorensen@frontier.com

Great Lakes Information Technology (GLInT) Fellowship Program ($125,000)

This was a project design grant where the team: clarified and harmonized the relationships of the various technology initiatives and regional information portals in the basin; established a governance team and developed a business plan for the re-engineering of the Great Lakes Information Network; identified opportunities to bring technological talent to the Great Lakes through a Fellowship Program that would target talent at start-ups and technology firms; and laid the foundation and established governance structures in support of the Blue Accounting Initiative (http://glc.org/projects/water-econ/blue-accounting).

Great Lakes Commission
Contact: Stephen Cole | 734-971-9135 | scole@glc.org

A Phosphorus Soil Test Metric for Reducing Dissolved Phosphorus Loads ($947,000)

This team developed new ways to measure phosphorus levels in soil, helping farmers to limit unnecessary phosphorus additions on fields and save money in the process. They developed and finalized the protocols for stratified soil testing and developed a toolbox of management options that allow farmers to take action on the land based upon detected phosphorus levels. The team worked with hundreds of people representing all members of the ag supply chain to develop the largest soil data sets on the topic of phosphorus stratification (including analysis of 4,270 soil samples). They were among the first to understand that most dissolved reactive phosphorus (DRP) accumulates in the top two inches of soil. Their work resulted in soil stratification being incorporated into the revised Ohio Phosphorus Index and in the ag industry's 4R certification program (right rate, right time, right amount, right place).

The team made significant contributions to, and have become important voices on, the topic of phosphorus stratification in soils and on phosphorus transport and its impacts on water quality. The team carefully assessed changes to long-accepted practices – like reduced tillage agriculture – which had been assumed to be beneficial but, which instead, may be contributing to DRP loading to Lake Erie.

Team members were directly involved in the initiation of the Ohio Lake Erie Phosphorus Task Force. They also participated in the deliberations for the Ohio Lake Erie Phosphorus Task Force II and the Great Lakes Water Quality Annex 4 Objectives and Targets Task Force that included calling for a 40% reduction in the DRP target loads to the lake. Through all of these deliberations, the team conveyed the results of the stratified sampling program to task force members. With the 2014 Toledo water crisis and the most extensive algae blooms in 2015, team members were frequently called upon for interviews and for input into phosphorus control programs.

To learn more about phosphorus pollution and the health of Lake Erie visit: http://lakeeriealgae.com/.

The team's work on soil stratification can be found at: http://lakeeriealgae.com/phosphorus-stratification/.

Heidelberg College
Contact: David Baker | 419-448-2941 | dbaker@heidelberg.edu

Great Lakes River Mouths and the Region's Economic and Environmental Future ($65,000)

This was a 9-month planning grant that sought to develop a project to create a new regional approach to Great Lakes river mouth redevelopment founded on restoring hydrological and ecological services, creating sustainable economic activity, and managing Great Lakes river mouths as a network.

During this effort, the team collected and analyzed data, built in-house mapping expertise, catalogued the problems and opportunities in the Great Lakes St. Lawrence Seaway System, refined the conceptual basis for the project's implementation phase, and engaged experts from the Great Lakes Rivermouth Collaboratory.

Northeast-Midwest Institute
Contact: Allegra Cangelosi | 202-464-4014 | acangelo@nemw.org

Implementing Real-Time Resource Use Feedback to Motivate and Empower Conservation ($812,000)

The project team developed, deployed and evaluated a prototype system that provides users instant feedback on the consequences of their water and electricity use and motivates them to reduce consumption. They piloted the work in the Plum Creek watershed, which runs through Oberlin, OH and ultimately drains into Lake Erie. The team installed displays in student dorms, apartment buildings, and mixed-use housing that shows what is being consumed, how much it costs, and what the effect is upon local air and water resources. Users can also see how their use matches up against other users. The technology displays changes at the individual residence, neighborhood, city, and watershed scales.

In the pilot the team fitted 26 campus dorms, 33 apartments, 17 businesses & offices, the Oberlin Public Library, all four public schools, and four nonprofit organizations with meters and dashboard displays showing electricity and water use by building. The team worked closely with the Oberlin Municipal Light and Power System and the drinking water and wastewater treatment plants to connect to the utilities' SCADA systems and install meters in Plum Creek to measure water flows, electricity consumption and water quality parameters.

The team tested different modes of information delivery in shaping pro-environmental behavior including: websites, digital signage, and environmental orbs, and have tested the impact on empathetic characters on behavior. The team found that all of these different modes of display drive reduced use of energy and water. More importantly, these devices drive persistent and long-term drops in consumption that continue well beyond the use of these devices. The team has learned from this work how to better use technology and how to advance the social psychology of sustainable living.

The team piloted the first national competition among dorms to reduce electricity and water use. They supplied the strategy and technology backbone for the competition. The Campus Conservation Nationals has been taken up by the U.S. Green Building Council and the National Wildlife Federation. In the 2015 competition 125 colleges and universities (345,000 students and staff) participated.

For more on this project and to learn how to bring this feedback system to your community visit the team's website at http://environmentaldashboard.org/.

Oberlin College
Contact: John Petersen | 440-775-6692 | john.petersen@oberlin.edu

Real-Time Energy Impact Monitors for Residential, Industrial and Policy Use ($557,000)

The goal of this project was to refine, test and market a novel technology referred to as LEEM (Locational Electricity Emissions Methodology) that determines, in real time, the fuel sources that are being used to generate electricity and the emissions from those sources, and provides users the ability to reduce emissions by changing the timing of their electricity use.

The team pioneered LEEM in a prior Fund-supported project and embedded the technology in two distinct products: HERO, a phone and web application for individual consumers, and PEPSO, an open source software program designed to optimize pump operations at water utilities. In this project the team

improved the LEEM technology, explored the market potential for LEEM, and looked at the potential for embedding the technology into "smart" appliances and building systems, integrating it into the electric vehicle market, and incorporating it into energy standards, demand response/pollution credit programs, energy apps, and energy efficiency programs.

The project resulted in the commercialization of LEEM and the creation of a technology start-up called Energy Emissions Intelligence LLC (E2i). Based on this team's work, LEEM is supplying the data needed for two current Great Lakes Protection Fund grants, Accelerating the Shift to Environmentally Sensitive Electricity through Collaborative Competition and A Self-Scaling Market Mechanism to Reduce Indirect Electricity Pollution.

Wayne State University
Contact: Carol Miller | 313-577-3790 | cmiller@eng.wayne.edu

Watershed Ecological Sustainability Strategy – Transactions for Agricultural Ecosystem Services ($940,000)

In this project, the team designed and tested different transaction frameworks that would reward farmers by linking farmer payments to ecosystem improvements. Specifically the team: 1) designed and tested new ways to reduce drainage assessments for farmers keeping nutrients/soil on the land; 2) designed and tested new certification schemes for farmers and agricultural retailers to attract new payments for ecosystem services; 3) tested how watershed-based performance incentives can be added to Michigan's MAEAP program; and 4) tested the effectiveness of performance auctions at achieving ecosystem outcomes. The team piloted these transactions in the Saginaw Bay and Paw Paw River watersheds (MI), and in the Maumee River watershed in the western Lake Erie basin (MI/OH/IN).

The team developed many important tools and products that can be found on the project website at http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/wholesystems/greatlakes/watersheds/Pages/glwess.aspx.

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

Improving Water Management in the Great Lakes Basin – Phase II ($562,000)

This was a bi-national effort to introduce an integrated water management (IWM) (water supply, stormwater and wastewater) approach to six municipalities: three in Oakland County, MI and three in the Grand River watershed in Ontario. These communities were specifically selected by the team because they are small- to mid-sized communities that extract water from a variety of ground and surface water sources and face challenges (overuse of groundwater supplies, stormwater runoff impacts, etc.). The team explored and tested the environmental and financial impacts on these municipalities for adopting water conservation and green infrastructure practices and developed a set of management actions for each that will reduce environmental impacts and decrease costs. They also tested knowledge-transfer techniques to encourage adoption of such practices.

The team created an extensive toolbox (spreadsheet tools, how-to guides, case studies, reports, and videos all available on the project website http://glc.org/projects/water-resources/greater-lakes/) that will help other communities begin taking steps towards a more integrated approach to water management. They delivered an innovative marketing campaign with Issue Media Group (IMG) that resulted in four feature articles and two videos (http://glc.org/projects/water-resources/greater-lakes/greater-lakes-media/) that brought widespread exposure to the work.

This project was the result of a successful planning and convening phase supported by the Fund.

Great Lakes Commission
Contact: John Jackson | 716-886-0142 | jjackson@web.ca

Appendix 3

Portfolio of Projects as of December, 2016

Portfolio of Projects as of December, 2016

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

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)

A team led by American Farmland Trust 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: Ann Sorensen | 815-732-2885 | asorensen@frontier.com

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

This team 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: James Klang | 269-344-7117 | jklang@kieser-associates.com

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

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)

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)

This is a project design grant, co-led by Cornell University and the University of Buffalo, 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. A full proposal for an implementation phase will identify ports (or small harbors) that intend to apply the decision-making tool, and undertake activities that are ecologically and economically sustainable.

Cornell University and University at Buffalo
Contact: Brian Davis | 347-633-6530 | brd63@cornell.edu
          Sean Burkholder | 716-829-5905 | seanburk@buffalo.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

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

Awarded in 2015, this project design effort will explore, ground-truth and develop blueprints for financing options that facilitate private investment in the installation and operation of green infrastructure on both public and private property. Currently, 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 will work with municipal decision-makers, investors, insurers, service providers and other experts to analyze and frame-up private sector green infrastructure financing approaches that are relevant to the needs and opportunities in the Great Lakes Region. This project design phase will result in an implementation phase proposal to undertake these approaches in at least two communities.

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

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 | 202-464-4014 | acangelo@nemw.org

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

Awarded in 2013, this project will lead to reductions of harmful algal blooms in the Great Lakes by reducing levels of phosphorus in basin streams and rivers. The team will do this by designing and piloting a novel pay-for-performance program that will aggregate the conservation actions of farmers in a watershed and create a mechanism to reward those farmers for the amount of phosphorus they remove from surface waters. Through this work the team will create a series of organizing, modeling, negotiating, contracting, and assessment tools that will allow others to create their own "pay-for-performance" conservation program.

Building on their relationships with farmers in the pilot area, the team will facilitate the development of a farmer-led watershed council that will take on a leadership role in delivering phosphorus reductions. Working with and through the council, the team will establish field-level baseline conditions, assess the cost effectiveness of status quo conservation, and create a portfolio of possible actions for each participating farmer to take to reduce phosphorus. The team will design the structure of the pay-for-

performance program that will identify what level of phosphorus removal can be attained, and will design simple contracts for each farmer/producer.

Changes in phosphorus exports from participating farms will be measured through a network of in-stream and edge-of-field sampling locations. The team will use this monitoring information to refine its water quality models, its field assessments and its producer contracts. They will use the lessons learned to prepare a detailed tool kit for others to use available water quality models, coupled with minimal monitoring, to build pay-for-performance projects elsewhere in the basin.

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

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

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

Awarded in 2013, this project will lead to reductions in nutrients and sediment in Great Lakes tributaries and coastal areas with the development and application of a novel, automated, real-time drain tile management network. Regions around the Great Lakes with the most serious nutrient issues, such as Saginaw Bay and Western Lake Erie, have some of the densest drain tile networks in the U.S. Recent research indicates that drain tiles are often the largest single source of biologically available phosphorus but that active drain management can be an important practice for controlling that phosphorus.

The team will examine techniques and potential environmental and agronomic impacts, explore the opportunities in the Great Lakes basin, identify the physical settings where a "smart drain network" can reduce nutrients, and evaluate the potential market for such services. They will explore the feasibility of combining two different technologies: an active drain tile management technology and an optimization software that allows for real-time, wireless management of networks of sensors and control structures. In its final form the system will consist of a network of real-time sensors (installed at the field and sub-

watershed scales) and drain control structures that will be integrated with an optimization system and a wireless communication network.

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

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

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

Awarded in 2012, this team will develop a new collaborative approach to stormwater management in this region that will accelerate the local initiatives currently being implemented by single communities. For this project, the team will create a community of practitioners who will work together to implement stormwater projects at a larger scale than would be possible if working alone, and who will be supported by online resources. The team will pilot this approach in Grand Rapids, Michigan; Milwaukee, Wisconsin; Niagara Falls, New York; and in the Flint River watershed.

In addition to linking communities together, the project team will provide online information and guidance, as well as environmental tools and models to help communities target effective types and placement of stormwater runoff practices, estimate pollutant reductions, and map and track positive environmental impacts. The team will use a combination of marketing and rollout strategies to build a community of practitioners that will support and use the system. Ultimately, the project will create a vibrant learning community that will change the way stormwater is managed in the region.

Michigan State University
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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
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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.

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