Final Report for the Cooperative Agreement between the Great Lakes Commission and United States Department of Agriculture NRCS #68-3A75-13-179

A summary of benefits achieved through application of Great Lakes Restoration Initiative funding in controlling sediment and reducing nutrients in the Great Lakes

Acknowledgments

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Critical to the success of this cooperative federal-state effort over the years has been the guidance provided by the Soil Erosion and Sedimentation Task Force, which includes representatives from the eight Great Lakes states, NRCS, U.S. EPA, and the U.S. Army Corps of Engineers. The Task Force membership list is included as Appendix 1. The involvement of the Task Force members in all aspects of the project has been tremendously helpful to ensure that project activities meet the soil and water conservation needs of the Great Lakes states and address the priorities of the GLRI.

Special thanks go the following individuals from NRCS who have been involved with and supported this effort by serving as GLRI coordinators for NRCS: Jan Surface (2010), Vicki Anderson (2010-2011), Tom Krapf (2012-2013), Michael Moorman (2013-2015), Paul Youngstrum (2014-2015), Doug Deardorf (2016) and Lisa Duriancik (2016). Appreciation is also extended to Dan Lawson, who served as Branch Chief for Conservation and Watershed Planning (2010-2011); Angel Figueroa, Conservation Initiatives Team Leader (2011-2012); and Martin Lowenfish, current Conservation Initiatives Team Leader, for providing oversight to the project for NRCS headquarters. Additional thanks are extended to GLC staff who worked on this project, including Gary Overmier, Project Manager and Michael Schneider, Senior Program Specialist, who were involved in managing and coordinating the 2013 program while it was in process until their retirements in 2017. Program Manager Nicole Zacharda and Program Specialist Ken Gibbons have since assumed the project management and coordination roles, working closely with Grants and Contracts Manager Laura Kaminski. Thomas Crane, GLC's interim executive director, provides guidance to the staff and program oversight.

Finally, special acknowledgement goes to David Knight (GLC contractor), Laura Andrews, design manager, and Beth Wanamaker, communications manager, for their excellent work in the writing, design, and editing of this report.

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Executive Summary

The Great Lakes Commission (GLC) has a long history of providing grants to local entities to control nonpoint source pollution. The Great Lakes Basin Program for Soil Erosion and Sediment Control (Basin Program) began in the early 1990s as a cooperative federal-state program to reduce erosion and control sediment from entering the waters of the Great Lakes basin. The Basin Program was rebranded in 2015 as the Great Lakes Sediment and Nutrient Reduction Program (GLSNRP). For this report, the program is referred to as the Basin Program as that was the naming convention at the time the agreement was in place and awards provided to grantees.

Through support from its federal partners (U.S. EPA 1991-1993; and NRCS 1994-present) the Basin Program has supported the implementation of locally-led conservation practices to abate soil erosion and reduce the flow of sediment and nutrients into the Great Lakes. Between2010 through 2013, the program has supported 54 projects to reduce the input of sediment, nutrients, and other sediment-borne pollutants into the Great Lakes, reducing soil erosion by more than an estimated 1.2 million tons and particulate phosphorus loadings by 1.2 million pounds.

This report contains the results of the fourth round of Great Lakes Restoration Initiative (GLRI) funding, which supported 21 local projects in six Great Lakes states (Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin). Under this four-year agreement between the Great Lakes Commission and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), substantial reductions in both sediment and phosphorus have been achieved. The following report narrative provides an overview of these efforts, including documentation of program methodologies and aggregated results from the 21 projects, as well as lessons learned by GLC staff administering the program and suggestions for future program improvements.

The appendix contains details on program administration from the request for proposals and project selection process to the documents and methodology used to track progress and assure accountability. Each project's final report is also included, many with before and after pictures.

The aggregation of project results provides interesting insights into cost-effectiveness of the practices: permanent practices tended to provide more sediment reduction at a lower average cost than annual practices like cover crops and residue management. These latter two practices become cost-effective only if the farmer adopts the practice and continues to use it in the future without further assistance. The terms "practices," "best management practices (or BMPs)" and "conservation practices" all appear in this report. These terms are used interchangeably.

The cumulative results of projects funded through the 2013 program are as follows:

- **36,126 acres of land were treated with some type of conservation practice**
- **25 individual types of conservation practices were implemented across projects**
- **569 conservation practices in total were implemented**
- **130,459 (estimated) tons of soil will be kept on the land and out of the waters of the Great Lakes over the life span of practices implemented**
- **136,693 (estimated) pounds of particulate phosphorus will be kept out of the waters of the Great Lakes over the life span of practices implemented**
- **$1,164,572 in grant funding was spent on conservation practices benefiting the Great Lakes**
- **$682,127 was contributed as cost share for conservation practices**
- **Approximately 230 agricultural producers were reached**

The 21 projects funded in 2013 (with GLRI funds provided by NRCS) demonstrate measurable effectiveness and results in achieving GLRI objectives under its Nearshore Health and Nonpoint Source priority area. Basin Program projects are good examples of collaboration between the federal government, the states and local conservation organizations leading to reduced sediment and nutrient loadings to the Great Lakes as mentioned in the GLRI report to Congress.

“Reducing sediment pollution and phosphorus runoff into the Great Lakes has become increasingly challenging for managers and practitioners,” said Tom Crane, interim executive director of the GLC. “Now more than ever, programs that support effective and innovative conservation practices are critical to protect Great Lakes water quality. These GLRI funds are being put to good use to support conservation practices that control nonpoint sources of pollution in priority watersheds.”

Project Background

Efforts to restore and protect Great Lakes water quality by reducing agricultural runoff received a major boost in 2010 with Congress's enactment of the Great Lakes Restoration Initiative (GLRI). In August of that year, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) awarded $5 million in GLRI funds to the Great Lakes Commission (GLC) to implement a program for soil erosion and sediment control.

The GLC used an established federally authorized program, known as the Great Lakes Basin Program for Soil Erosion and Sediment Control (Basin Program) as the vehicle for the new GLRI funding. The goal of the Basin Program, which was initially funded by U.S. EPA Region 5 and later authorized under the 2002 and 2008 Farm Bills, is to protect and improve water quality in the Great Lakes by reducing sedimentation and nutrient runoff through financial incentives, information and education, and professional assistance.

Since its inception with U.S. EPA Region 5, more than $27 million dollars in federal funds have supported conservation activities in all eight Great Lakes states. Through GLRI support, between 2010 and 2013, the program supported 54 locally sponsored projects, which are estimated to have reduced soil erosion in the Great Lakes basin by more than 1.2 million tons and phosphorus loadings by over 1.2 million pounds. The program's impact has also been experienced in other ways, such as greater public acceptance of soil conservation practices, particularly among Great Lakes basin farmers and agricultural land owners - a group often reluctant to embrace change.

Under the 2013 Agreement[1], the GLC awarded grant funds totaling over $1.8 million to 21 regional projects aimed at helping farmers, municipalities, watershed groups, and other land stewards implement practices to keep soil on the land, thus reducing contributions of sediment, nutrients, and other sediment-borne pollutants into the Great Lakes and their tributaries.

"This grant was a great opportunity to encourage farmers who don't typically qualify for federal cost-share programs to try one small change in their operation," said Beth Landers, Portage River Watershed Coordinator with the Wood County (Ohio) Soil and Water Conservation District (SWCD). The Wood County SWCD used a $200,000 Basin Program grant in 2013 to initiate a cover crop planting project that treated 8,000 acres of land in a watershed that feeds directly to the Western Lake Erie Basin, which has been the focus of major concerns in recent years over excess nutrient loads which contribute to harmful algal blooms and serious public health issues.

"With the spotlight that the drinking water issues in Toledo have put on agricultural conservation, producers are looking for a way to be part of the solution, but they don't necessarily have the capacity to fund it themselves," said Landers. "It was nice to be able to offer the option of 'dipping a toe in' conservation to producers who weren't ready to take on all the practices required to have a successful Environmental Quality Incentives Program application."

[1] In 2015, the program was rebranded as the "Great Lakes Sediment and Nutrient Reduction Program" or GLSNRP. The former name, Basin Program, will be used throughout this report for consistency with program materials at that time.

Priority watersheds were identified to maximize impact of conservation practices

Priorities for the 2013 grant program were developed with input from the Great Lakes Soil Erosion and Sedimentation Task Force, which includes representatives from the eight Great Lakes states, NRCS, U.S. EPA, and the Army Corps of Engineers. The Task Force evaluated areas of need in the basin and directed grant support to address the most pressing needs. It also developed and employed a rigorous review and evaluation process to prioritize projects generating the highest environmental and economic returns on GLRI investments.

With an overall goal of reducing total sediment and phosphorus loadings to the Great Lakes from heavily farmed watersheds, the Task Force (upon the recommendation of NRCS) opted to consolidate resources into concentrated areas, versus funding projects scattered across the basin. This approach led to the targeting of priority watersheds in the initial request for proposals (RFP)[2].

The RFP was later expanded to include the entire Great Lakes basin through a second RFP because the initial request did not yield enough proposals.

The RFP focused on two pollutants: sediment and particulate phosphorus. Applicants in the priority watersheds were asked to develop their own implementation projects for funding. No specific conservation practices were required and applicants were given the flexibility to choose the practices that best addressed their circumstance.

A total of 45 proposals were submitted for the 2013 grant program and 21 projects in six states (Indiana, Michigan, Minnesota, New York, Ohio, and Wisconsin) were ultimately approved by the Task Force for funding. Factors considered included the potential for sediment and phosphorus reduction, appropriateness of practices to be implemented, the applicant's ability to complete projects on time and within budget, creativity in design of the practices, and innovation in approaches to cost sharing with landowners.

Most project timelines were at least three years in length with some projects extended to five years after the work had begun. Contracts between awardees and the GLC spelled out specific obligations of both parties, such as quarterly reporting requirements, adequate insurance coverage and assurance that all appropriate state and federal regulations would be met.

[2] See Appendix 2

Best management practices are many and varied

In 2013, many different types of BMPs were employed by the funded projects. Practices aimed at controlling erosion and sediment were most prevalent. These included varying forms of residue management, cover crops, streambank stabilizations, filter strips, and cropland-to-hayland conversions.

25 unique practices were implemented, including:

- Cover Crops (including overwintering complex and single blend)
- Fencing
- Filter Strip
- Gypsum
- Streambank and Shoreline Protection (including concrete cloth, rock rip rap, bluff stabilization)
- Sediment Basin
- Erosion Control Structure

However, while many of the funded projects involved implementation of multiple BMPs over broad acreages, some were as straightforward as the purchase of a single piece of equipment for use by many producers beyond the life of the initial grant.

This was true in Lenawee County, Michigan, where the Lenawee Conservation District received a $30,000 grant to purchase a "high boy" crop sprayer that was refitted to plant cover crops between rows of crops such as corn and soybeans. Eight farm operators took advantage of the opportunity and a total of almost 4,500 acres were treated as a result.

"The use of the high boy for applying cover crops has proven to be a cost-effective and timely method of application," said Blaine Baker, an owner of Bakerlads Farm in Lenawee County. "By getting the cover crop planted earlier, there is more plant growth going into fall and winter so more nutrients are absorbed leading to less nutrients available to run off from or leach out of the soil."

Finally, in addition to enabling the installation of conservation practices, a valuable side-benefit of the Basin Program has been the many new collaborative relationships that have developed because of it. In Sheboygan County, Wisconsin, the county's Planning and Conservation Department received an $8,539 grant to address an eroding bank of the Sheboygan River. The process to identify and construct the eventual response – a rock lined waterway – involved multiple federal, state and county interests, but the complex work was achieved through collaboration.

"The construction of a rock lined waterway across from the popular Sheboygan Marsh is not only significant for its erosion control and water quality benefits, but also as a reflection of what can come from partnerships," said Eric Fehlhaber, Sheboygan County Conservation Manager. "In this case, with the generous support of the Great Lakes Restoration Initiative, the Planning & Conservation Department worked cohesively with the Wisconsin Department of Agriculture, Trade, and Consumer Protection to create a project sure to benefit our community years into the future."

Lessons learned: Opportunities for maximizing program efficiency and efficacy

Importance of committing to schedules

Managing One challenge that emerged for some 2013 projects involved the lack of adherence to project schedules on the part of some landowner participants.

"Convincing landowners in the watershed of the importance of making a commitment and following through in a timely manner always seems difficult," said an SWDC field staff member. "Some landowners express an interest early on when contacted, but have trouble deciding exactly if, what, and when they are willing to do."

One SWCD project sponsor has decided that deadlines will be put in place for landowners to follow when installing a conservation practice in the future. Landowners will have 60 days from the time they receive all the final plans for the project until the project must be completed.

For a project to be successful, project managers and landowners must be in agreement about timelines.

Building trust in a unique cultural setting

One of the most interesting success stories of the Basin Program's GLRI-supported work has emerged in Indiana where a strong and productive relationship has been established between Amish farmers and Soil and Water Conservation District field personnel. In 2013, the LaGrange County SWCD was awarded $247,000 to support 36 conservation installations on Amish farms, including streambank stabilization, fencing cattle out of waterways, and developing filter strips. This work built upon similar work done through previous Basin Program awards, and highlights the importance of sensitivity and trust in addressing cultural differences. LaGrange SWCD District Manager Martin Franke related how the district approached an Amish community that shared a strong sense of stewardship for the land but had a deep-seated reluctance to seek outside help.

"The LaGrange County Soil & Water Conservation District has made every effort to maintain an Amish landowner as a supervisor on the SWCD board. Since he has been on the board, he has been instrumental in keeping in touch with all of the Amish bishops in the Little Elkhart watershed project area. The Amish community as a whole has not always been willing to take financial assistance for the installation of conservation practices on their properties, but have not had the funds to do it on their own. Each Amish church district has an Amish bishop who is responsible for setting the policies of his district. It is imperative those bishops buy into any kind of project like this one before the other members of the church will participate.

"The SWCD Amish supervisor, along with grant technicians, took the time to meet with the Amish bishops in this watershed to explain the importance of protecting the water quality for both the benefit of the river and the Great Lakes, plus the benefit to the animals and people living there. The Amish community has a tremendous love for natural resources and once the problems were pointed out to them, most are willing to help protect and improve them. Now there is a waiting list of individuals who would like assistance on their farms to improve the water. This was not always the case when the SWCD first began offering cost share funds for the installation of conservation practices in these watersheds. These efforts are proving to be very successful and we can credit that to the efforts of the Amish supervisor and the bishops in the watershed."

Building trust is critical to a project's success.

Continuing to learn from prior agreements

As a long-standing program, many additional lessons learned have been identified over the years. The two below were detailed in the last report to NRCS but are still valuable, especially as the program has transitioned to new leadership in 2018 after the retirement of the longstanding project manager and assistant:

- *Identifying shared interests among agricultural producers and conservation professionals maximizes benefits.*
- *Program flexibility and adaptability is extremely valuable.*

Summary of funds and practice implementation data – 2013

Total grant dollars spent on BMPs (USD)	1,164,572
Total cost share on BMP installation (USD)	682,127
Total dollars spent on BMP installation (USD)	1,846,699
Total number of BMPs installed	569
Number of different BMPs installed	41
Acres treated	36,126
Estimated tons of soil saved over the life span of the practices	130,459
Estimated pounds of phosphorus saved over the lifespan of the project	136,693
Average cost per ton soil saved (USD)	14.60
Average cost per pound phosphorus saved (USD)	13.93
Total grant dollars spent on BMPs (USD)	1,164,572

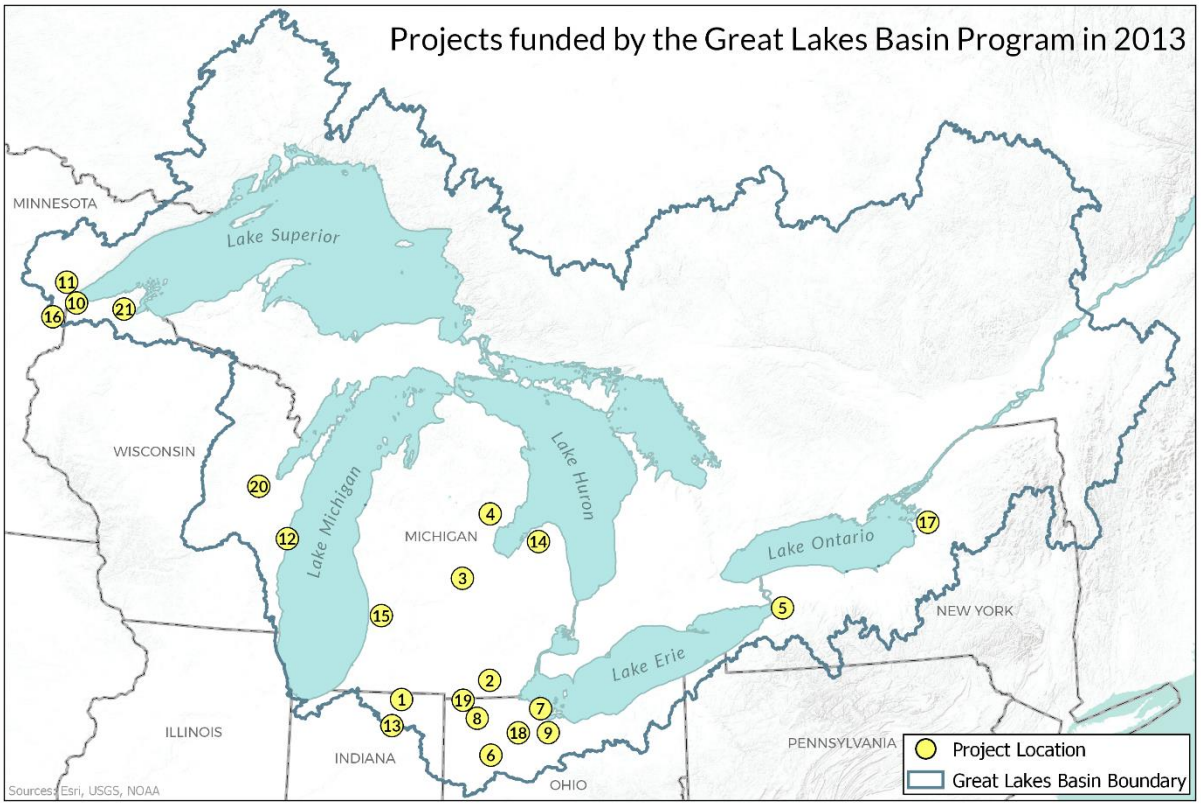
Average costs and soil and phosphorus savings for selected conservation practices – 2013

	Acres treated per BMP	Total costs of practices (USD)	Average cost per acre treated (USD)	Soil saved over life of practice (tons)	Particulate Phosphorus saved (pounds)	Average cost per ton soil saved (USD)
Cover Crops	23,691	792,628	33	21,023	19,528	38
Fencing	114	24,507	215	730	668	34
Filter Strips	19.1	4,452	233	1,285	1,335	3
Gypsum	1,518	86,072	57	687	665	130
Streambank Stabilization	21.7	287,931	13,269	27,907	30,140	10
Sediment Basin	130	67,875	522	4,535	4,353	15
Erosion Control Structure	1	23,800	1,400	12,880	13,243	2

Number of conservation practices installed – 2013

BMP	Individual sites/fields	Percent of Total
Concrete cloth	2	0.35
Conservation tillage	30	5.27
Cover crops	363	63.80
Culvert realignment	2	0.35
Excavation and rock rip rap	1	0.18
Fencing	9	1.58
Filter strip	13	2.28
Grassed waterway	6	1.05
Grassland establishment	6	1.05
Gypsum	26	4.57
Heavy use area	11	1.93
No till	46	8.08
Pipeline & water facility	1	0.18
Redlined waterway repair	1	0.18
Riparian forest buffer	1	0.18
Roof runoff structure	3	0.53
Sediment basin	1	0.18
Stream crossing	3	0.53
Streambank & shoreline protection	10	1.76
Erosion control structure	17	2.99
Subsurface drain	5	0.88
Tree revetment	7	1.23
Water well & watering facility	1	0.18
Waterway repair cover crop	1	0.18
Wetland restoration	3	0.53

Project location map – 2013



	Project Title
1	Little Elkhart River Sedimentation Reduction
2	River Raisin Retro-Fit High Boy to Apply Cover Crops
3	Bad River Watershed Sedimentation Reduction Plan
4	Rifle River Streambank Erosion Control
5	Buffalo River Watershed Erosion and Sediment Control
6	Lower Riley Creek in Allen County
7	Lake Erie Coastal Cover Crops
8	Under Cover in the Tiffin & Lower Maumee River Watersheds
9	Covering Erosion Concerns with Soil Savings
10	Kilner Bay Shoreline Restoration
11	Kelly Bay Shoreline Stabilization

	Project Title
12	Sheboygan River Streambank Stabilization Project
13	Thorpe Basin
14	Pinnebog River Bank Stabilization
15	Macatawa Watershed Sediment Control Project
16	Phase II Red Clay Dam: Skunk Creek Watershed Erosion Control
17	Sandy Creek Streambank Restoration
18	Reducing Agricultural Sediment in the Portage River
19	Flat Run-Tiffin River
20	On Farm Gypsum Demonstrations
21	Targeted Sediment Reduction to Chequamegon Bay, L. Superior

Project Summaries

The following summaries describe the individual projects and accomplishments.

State: Indiana

Project Title: Little Elkhart River Sedimentation Reduction

Grant Amount Awarded: $247,003.33

Sponsor: LaGrange County Soil & Water Conservation District

The Little Elkhart River system in LaGrange County is largely influenced by agricultural practices, one of the most significant of which is livestock having direct access to the ditch system and the main channel of the river. Water quality testing results over a 10-year period have revealed the Little Elkhart River as a major sediment contamination source. An updated land use inventory revealed many sites are totally denuded of all vegetation with some having large erosion gullies. Although many of the issues have been resolved through past grants, a change in land use policy has occurred with many of the Amish landowners, to whom 99 percent of the grant funds were awarded. The inventory revealed a major increase in calving operations, resulting in significantly increased sedimentation to the Little Elkhart River. The new increased sedimentation problem lies with landowners that have had small or no livestock operations before, which may have been addressed by previous grant implementations.

All 36 of the conservation practices implemented went a long way toward improving the water quality in the Little Elkhart River and subsequently, Lake Michigan. Once work began in the watershed and identifying resource concerns was accomplished, it was found that one major conservation practice useful in correcting some major problems had not been identified in the original work plan. That was the implementation and installation of Heavy Use Area Protection projects. There was a total of 12 installed throughout the sub-watersheds of the Little Elkhart River, which are estimated to save 844 tons of sediment from eroding into adjacent waterways.

Best Management Practices Applied

- **Fencing**
- **Filter Strip**
- **Heavy Use Area Protection**
- **Streambank & Shoreline Protection**
- **Stream Crossing Stabilization**
- **Roof Runoff Structure**
- **Water Well**
- **Watering Facility**
- **Subsurface Drain**

State: Michigan

Project Title: River Raisin Retro-Fit High Boy to Apply Cover Crops

Grant Amount Awarded: $30,000

Sponsor: Lenawee Conservation District

The objective of the cover crop High Boy applicator grant was to provide another avenue to implement cover crops on cropland. The Lenawee Conservation District has been working on an intensive promotion and implementation program targeting cover crops since 2008. The amount of acres grew but the ability to have them applied through aerial seeding (airplane) was reaching a saturation point.

The High Boy cover crop rig provided an opportunity to apply cover crops in a more timely manner, at the local level, at a reduced cost. To carry out the project, a local farmer purchased a High Boy sprayer that was then retro-fitted to apply cover crops. He then entered an agreement with Lenawee Conservation District for three years to help cover fuel, maintenance and material costs to apply cover crops at a reasonable price to local producers. A total of eight landowners contracted for the service and cover crops were planted on 4,475 acres. It should be noted that even after the three-year agreement, the rig owner has committed to continue to apply cover crops for local producers at a reasonable price.

Best Management Practices Applied

- **Cover Crop Seeding**

State: Michigan

Project Title: Bad River Watershed Sedimentation Reduction Plan

Grant Amount Awarded: $250,000

Sponsor: Gratiot Conservation District

As part of this project, some 15 land-users in the Bad River Watershed entered into a total of 43 contracts with the Gratiot Conservation District over a four-year period to 1) reduce sedimentation into streams feeding the Bad River and 2) control soil erosion. The project resulted in the installation of 73 management practices altogether on 9,622 acres. A total of 3,670 tons of soil erosion was prevented, and 610 tons of sediment was prevented from entering the streams of the Bad River Watershed.

Best Management Practices Applied

- **Alfalfa**
- **Cover Crops**
- **Filter Strips**
- **Grassland Establishment**
- **Mulch Till**
- **Mulch Till with Cover Crops**
- **No Till**
- **No Till with Cover Crops**

State: Michigan

Project Title: Rifle River Streambank Erosion Control

Grant Amount Awarded: $30,000

Sponsor: Huron Pines

Although the Rifle River is regarded as one of the highest quality tributaries to Lake Huron's Saginaw Bay, water quality and wildlife habitat in the river are threatened by excess inputs of sediment. Excess sediment and associated nutrients entering the Rifle River can smother gravel substrate, which is crucial for spawning fish and serves as a home to the aquatic invertebrates that form the base of the aquatic and terrestrial food webs. Excess sediment can also impair water quality and river recreation opportunities.

The original work plan for this project called for stabilization of six streambank sites on the lower Rifle River, for a total soil savings estimated at 2,000 tons over the life of installed best management practices (BMPs). The project also entailed pre- and a post-project media tours as well as ongoing communication of project updates through social media, and newspapers. As all of the grant obligations for the project were met before the deadline of September 30, 2016 and the project work was completed under budget, the Great Lakes Commission granted Huron Pines an extension of the project through an additional year so that remaining funding could be used to complete additional project work and increase the overall benefit of this project for the Rifle River Watershed. As a result, Huron Pines was able to achieve a total soil savings of 2,702 tons/year, completed eight streambank stabilization sites on seven properties, and raised $19,454.85 in non-federal cost-share contributions (exceeding the amount in the original agreement, which was $13,000).

Best Management Practices Applied

- **Streambank Stabilization**

State: New York

Project Title: Buffalo River Watershed Erosion & Sediment Control

Grant Amount Awarded: $25,000

Sponsor: Town of Elma

The target site was a streambank adjacent to a roadway heavily used to access the northern part of the Town and other communities north of Elma. Erosion had been so significant that the road shoulder was in danger of collapse. Moreover, the erosion was contributing significantly to the sediment in Cazenovia Creek, a Class "B" Stream. Sediment is a significant pollutant that causes impairments to the aquatic habitat throughout the Cazenovia Creek and Buffalo River Watershed.

Project funding allowed the Town of Elma to partner with Erie County Soil and Water Conservation District, the Buffalo Niagara Riverkeeper and the Western New York Stormwater Coalition to finalize the planning, implementation and post-construction monitoring to remediate this site and stop further erosion and discharge of sediment into Cazenovia Creek, the Buffalo River and ultimately, Lake Erie.

Project work included removal of existing debris and replacement of the corrugated metal pipe with smooth interior HDPE pipe. This was reconnected with the existing concrete headwall. The headwall was extended with approximately 25' of staked pinned rock riprap. The site was then backfilled to a stable/safe grade, seeded and mulched. Additional biotechnical slope stabilizing vegetation, such as streamco willow live stakes, were also added. Overall, this project will prevent an estimated 47 tons of sediment from eroding into the Buffalo River Watershed.

Best Management Practices Applied

- **Streambank and Shoreline Protection**

State: Ohio

Project Title: Sediment & Phosphorus Reduction in the Lower Riley Creek watershed in Allen County

Grant Amount Awarded: $29,898.99

Sponsor: Blanchard River Watershed Partnership

A 2009 TMDL Report identified sediment and phosphorus loading as two causes of impairments in the Lower Riley Creek watershed in northwest Ohio's Putnam and Allen Counties, which eventually feeds the Maumee River

flowing into Lake Erie. The Blanchard River Watershed Partnership (BRWP) had received a full grant for the Lower Riley Creek watershed's Putnam County portion in 2013. Significant interest shown by farmers in the smaller Allen County portion of the watershed led the BRWP to seek the opportunity to expand the program into Allen County.

As part of the project, four farmers had ten fields enrolled for the application of conservation tillage management, and cover crops were installed on an additional 26 fields. As a result, an estimated 107 tons of soil were kept on the land, and some 4,325 pounds of phosphorus prevented from entering the Lower Riley Creek watershed in Allen County.

Best Management Practices Applied

- **Conservation Tillage**
- **Cover Crops**

State: Ohio

Project Title: Lake Erie Coastal Cover Crops

Grant Amount Awarded: $30,000

Sponsor: Ottawa SWCD

The grant provided cost share funding to farmers in northwest Ohio's Ottawa County to adapt cover crops into their farming practices and to help prevent sediment and phosphorus from escaping the farm land to Lake Erie. Some 32 producers participated in the two years of the grant project and 1,281 acres were cost-shared through the program. In addition to cost-share funded acres, over 1,244 additional acres received cover crops by these producers, so the total acreage benefit of the program was actually 2,525 acres.

Promotion for the grant project by the SWCD included highlighting it at the annual SWCD banquet in 2013 and 2014, and at the annual Ag Breakfast. Newsletter ads were posted annually, and in March of 2014 a Lake Erie Farm Forum was held at the Ottawa County Fairgrounds. Speakers were brought in to talk to farmers about Lake Erie water quality and what they could do to help. The Great Lakes Basin grant was one of the options talked about by the district to get producers interested in cover crops.

Best Management Practices Applied

- **Cover Crops**

State: Ohio

Project Title: Under Cover in the Tiffin & Lower Maumee River Watershed

Grant Amount Awarded: $130,500

Sponsor: Conservation Action Project

The area targeted for this project, located in northwest Ohio's Tiffin and Lower Maumee Watershed, is highly agricultural with a typical crop rotation of corn and soy beans. The soils are high in clay and erode two to three times above the rate of tolerable soil loss. Also, most of the fields are tilled in the fall, leaving the ground subject to erosion by rain. The project was designed to showcase two practices: cover crops and erosion control structures with filter strips. A total of 54 installations of these two practices were completed involving almost 1,600 acres. By the third year of the project, the number of participating landowners had doubled from the first year, and by using the SWCD staff and advertising the programs, a waiting list had grown to implement these practices.

Best Management Practices Applied

- **Cover Crops**
- **Erosion Control Structures**
- **Buffer Strips/Filter Strips**

State: Ohio

Project Title: Covering Erosion Concerns with Soil Savings

Grant Amount Awarded: $252,990

Sponsor: Seneca SWCD

Ephemeral, or seasonal, gully erosion contributes significant amounts of sediment – and phosphorus - to the Sandusky River and Western Lake Erie Basin. This project was specifically targeted to reduce the amount of soil and phosphorus leaving farm fields through seasonal, temporary gullies by planting cover crops and repairing grassed waterways. It was also hoped that by providing incentives to implement these BMPs, with the incentive amount based on how much soil is saved, farmers would be motivated to select BMPs that deliver more protection to the land from ephemeral erosion.

To initiate the project, technicians developed high-priority areas to target for BMPs and then worked with landowners to develop conservation plans, specifying the cover crop plans and soil savings, which worked for

each operation. After farmers installed the BMPs (a total of 52 contracts were approved), SWCD staff and Board inspected, issued, and tracked the payments and progress. A total of some 3,840 acres were involved and soil savings were estimated at almost 8,000 tons. Agren software, specialized for conservation planning, was made available to Seneca County as a pilot resource in this project, and was evaluated for effectiveness during the life of the project.

Best Management Practices Applied

- **Cover Crops**
- **Grassed Waterway**

State: Wisconsin

Project Title: Kilner Bay Shoreline Stabilization

Grant Amount Awarded: $30,000

Sponsor: City of Superior

Billings Park Drive meanders through some of the largest topology changes within the City of Superior. The area of this roadway near the shoreline of Kilner Bay consists of very steep slopes leading down to the valley where a culvert connects a tributary stream to Kilner Bay. Each year this section of the road shoulder would wash out multiple times during rain events and all the material would end up in the inner most wetland area of the bay. The city would repair the deep gullies which formed from the eroded material by filling them in and compacting with more Class 5 rock material. This band aid approach to the problem would only last until the next substantial rain and then the process would be repeated. Over the years, this cycle lead to substantial deposition of the roadside material into the bay. In addition, the culvert connecting the tributary stream to the bay was installed at an angle and size that was not conducive to effective flow of water and disconnected the connection for fish and wildlife.

The project entailed the realignment of the culvert, affecting about 155 acres of tributary leading to the culvert, and saving an estimated 97 tons of soil from erosion. It also included installation of concrete cloth to line the ditch – which was estimated to save an additional 1,000 tons of soil over the lifetime of the project. – and installation of Flex-a-mat matting along the shoreline, for another 775 tons of soil savings. In general, the project provided the City of Superior with the opportunity to implement a robust solution to a chronic erosion issue, while also improving fish and wildlife connection between the bay and the tributary stream.

Best Management Practices Applied

- **Culvert Re-alignment**
- **Concrete Cloth**
- **Flex-a-mat**

State: Wisconsin

Project Title: Kelly Bay Shoreline Stabilization

Grant Amount Awarded: $30,000

Sponsor: City of Superior

The Kelly Bay Shoreline Stabilization project was conducted in tandem with the Kilner Bay Shoreline Stabilzation project. This project focused on a section of Billings Park Drive near Kelly Bay. Similar to the Kilner Bay project, this section of road would wash out during heavy rain events. Sediment from these rain events would deposit into Kelly Bay. To address this issue, the City of Superior used the exact same approach as the Kilner Bay project, which included culvert realignment, concrete cloth, and Flex-a-mat along the shoreline.

The Kelly Bay project entailed the realignment of the culvert, affecting about 100 acres of tributary leading to the culvert, and saving an estimated 97 tons of soil from erosion. It also included installation of concrete cloth to line the ditch – which was estimated to save an additional 1,000 tons of soil over the lifetime of the project. – and installation of Flex-a-mat matting along the shoreline, for another 1,000 tons of soil savings. In general, the project provided the City of Superior with the opportunity to implement a robust solution to a chronic erosion issue, while also improving fish and wildlife connection between the bay and the tributary stream.

Best Management Practices Applied

- **Culvert Re-alignment**
- **Concrete Cloth**
- **Flex-a-mat**

State: Wisconsin

Project Title: Sheboygan River Streambank Stabilization

Grant Amount Awarded: $8,539

Sponsor: Sheboygan County Planning & Conservation Department

About 0.3 mile downstream the Sheboygan River from the dam at the Sheboygan Marsh, a critical section of the streambank had been eroding for several years, exposing the river to hazardous particles and sedimentation. The soils of the eastern half of the Sheboygan River watershed are generally clay soils, which, by their very nature, carry high levels of phosphorus and are highly erodible. These eroding soil particles are the major transporter of phosphorus into the Sheboygan River and, ultimately, Lake Michigan. As time passed, the severe erosion in the project area grew and even threatened to pull a power pole down the steep slopes and towards the Sheboygan River.

Initially, the Department planned to install a grade stabilization structure. Engineers with the Department of Agriculture, Trade, and Consumer Protection – Natural Resources Conservation Service, who were responsible for

the ultimate design, decided after the plan sets were completed that this structure would not be suitable. In their opinion, the design at the time would not adequately be capable of managing the discharge; they felt that the integrity of the structure would suffer before its typical life cycle.

After several additional on-site meetings between Department staff and the State engineers, the group finally concurred on an appropriate solution: a rock lined waterway. The project area was surveyed and a new design was submitted, and the contractors (the Highway Division of the Sheboygan County Transportation Department) were consulted with during the process, as well. All parties agreed that the rock lined waterway would suit the needs of the site, resolve the current erosion issue, and prevent further erosion, while balancing cost constraints associated with any project. Throughout the life of this project, an estimated 356 tons of sediment will be kept on the land. Additionally, outreach was performed as part of the overall project.

Best Management Practices Applied

- **Rock Lined Waterway**

State: Indiana

Project Title: Thorpe Basin

Grant Amount Awarded: $30,000

Sponsor: Wawasee Area Conservancy Foundation

The Wawasee Area Conservancy Foundation (WACF) in Syracuse, Indiana purchased a 4.51 acre parcel – the Thorpe property - in Kosciusko County, Indiana for the purpose of developing a Best Management Practice for reducing sediment and controlling stormwater in the Martin Drain watershed area which flows into Lake Wawasee. The eventual objective of the project was to reduce sediment and nutrient inputs into Lake Wawasee and downstream to Turkey Creek and eventually Lake Michigan.

The entire Martin Drain watershed is approximately 240 acres, while the drainage area that includes the Thorpe property and above is approximately 120 acres. Approximately 80 acres of the drainage above the Thorpe parcel is row crop agriculture. The intermittently flowing Martin Drain empties into a manmade channel off Lake Wawasee in Leland Subdivision. That lake channel receives sediment laden water from Martin Drain following any rainfall that generates a discharge. The project was developed to intercept surface and tile drainage originating from 80 acres of occasionally tilled agricultural fields.

The project was implemented by hiring an engineering firm to complete final designs, conduct bidding, oversee construction and complete the reporting requirements. An earthwork contractor was selected to construct the basin and associated wetland filter. It is estimated that 4,532 tons of sediment will be kept on the land over the lifespan of the practices.

Best Management Practices Applied

- **Sediment Basin/Wetland Filter**

State: Michigan

Project Title: Pinnebog River Bank Stabilization

Grant Amount Awarded: $21,777

Sponsor: Michigan Department of Natural Resources Parks and Recreation Division

TBD The Pinnebog River bank eroded the entrance road to Michigan's Port Crescent State Park on Lake Huron in 2012 and continued to deposit sediment into the lake during heavy storm events. The project was planned to install a combination of vegetative cover and rip rap to reduce sediment deposit into the river/lake. Upon completion of a study, vegetative cover on the upland slope of the river bank proved to the most environmentally friendly method to stabilize the riverbank. While a more robust planting of erosion control vegetation for the riverbank was planned, the Department of Natural Resources (DNR) was constrained by the grant budget.

In 2016, work began to remove the remaining roadway and debris from the area. Once cleared, the area was prepped for seed. Mulch blankets and seed were ordered. In 2017, seed and mulch blankets were installed, watered, and monitored. The grow-in period continued until the end of the grant period. During that time, outreach materials were developed and installed on the park's kiosk to describe the measures taken to reduce sediment and soil erosion.

Best Management Practices Applied

- **Streambank Stabilization**

State: Michigan

Project Title: Macatawa Watershed Sediment Control Project

Grant Amount Awarded: $190,240

Sponsor: Macatawa Area Coordinating Council

Lake Macatawa, in southern Ottawa County and northern Allegan County, Michigan, is a 1,780 acre drowned river mouth that connects to Lake Michigan at Holland. The Macatawa Watershed covers 175 square miles and includes Lake Macatawa, the Macatawa River, and numerous small tributaries. The Macatawa Watershed is dominated by agriculture, which is 46% of the total land use. The primary cause of impairments to Lake Macatawa and adjoining tributaries is sedimentation/siltation. A secondary pollutant is phosphorus. Since 2000, the Macatawa Watershed has been operating under a phosphorus Total Maximum Daily Load. Despite numerous efforts, monitoring has shown that phosphorus levels continue to be unacceptable and are extremely variable on a monthly and annual basis.

The project work plan included objectives of implementing 1,000 acres of cover crops, 2,000 acres of residue management and 1,250 acres of gypsum application. Cover crop and gypsum acres exceeded this goal, 1,506 acres and 1,403 acres respectively, while the residue management acres fell short (1,300 acres). To assist in identifying potential land user participants, MACC staff completed stream walks and road-stream crossing visual surveys within the three priority subwatersheds. This allowed them to identify fields where conservation practices would help reduce sediment and phosphorus losses.

Once land users were identified and willing to implement conservation practices, a technician developed best management practice agreements and contracts for each. A total of 17 contracts were supported by the project. Once implemented, the MACC's Agricultural Technician was notified and then visited each field to confirm that practices were implemented according to the contract.

Best Management Practices Applied

- **Cover Crops**
- **Residue Management**
- **Gypsum**

State: Minnesota

Project Title: Phase II Red Clay Dam: Skunk Creek Watershed Erosion Control

Grant Amount Awarded: $30,000

Sponsor: Carlton County Soil and Water Conservation District

The Red Clay Project was a 1970s project that encompassed Lake Superior Basin watersheds focusing on erosion control efforts in Northeastern Minnesota and Northern Wisconsin. In Minnesota and specifically Carton County, projects were focused on the construction of sediment retention structures, named Red Clay Dams, in the Skunk Creek and Deer Creek subwatersheds of the Nemadji River Basin. These structures had an engineered design life of 10-25 years, depending on the structure, and they all have exceeded their lifespan. Many of these structures are now failing, and the goal of this project was to develop plans to address this legacy practice.

As part of this project, five dam evaluations and engineering cost estimates were developed on the highest priority Red Clay Dams in the Skunk Creek Watershed. The dam evaluations provide options for addressing the sediment pollution from the Red Clay Dams, and the cost estimates will be vital in applying for grants to fund future restorations. Discussions with landowners and permitting agencies were started so that the SWCD will be better prepared to work on future projects. In addition, remaining grant funds were approved to be used in construction of a Deer Creek Stream Restoration. The scope of this project was increased due to a 2012 flood, increasing the original scope and therefore cost of the project.

Best Management Practices Applied

- **Streambank and Shoreline Stabilization**

State: New York

Project Title: Sandy Creek Streambank Restoration

Grant Amount Awarded: $29,975

Sponsor: Jefferson County Soil & Water Conservation District

A 300-foot, privately owned section of the Sandy Creek bank was severely eroding. The bank walls were continually being undercut and collapsing into the stream, adding silt and sediment to the trout stream. Two BMPs, riparian forested buffer and streambank stabilization, were in the original work plan and were completed as anticipated. The work was designed by the Jefferson County SWCD and permits were obtained. The work was put out to bid, awarded to the lowest qualified bidders and was overseen by the SWCD. Additional funding was secured, since the bids were higher than originally estimated but progress on the project was not delayed. Over the lifespan of the Riparian Forest Buffer and Streambank and Shoreline Protection, an estimated 4,360 tons of sediment will be kept out of Sandy Creek.

Best Management Practices Applied

- **Riparian Forest Buffer**
- **Streambank and Shoreline Protection**

State: Ohio

Project Title: Reducing Agricultural Sediment in the Portage River

Grant Amount Awarded: $200,000

Sponsor: Wood Soil and Water Conservation District

When the grant application was made, the South and East Branches of the Portage River were scheduled for a major log jam removal project. Though the entire Portage watershed is impacted by sediment, there were concerns about additional sediment being dislodged when log jams were removed. The log jam removal still has not happened, and perhaps never will, but the river system still benefitted from the sediment reduction. The entire Portage watershed also contributes sediment and phosphorous to the Western Basin of Lake Erie, and this project was also expected to have an impact on the Western Basin at Port Clinton and beyond.

The project's budget and work plan provided cost sharing to producers for up to 8,000 acres of cover crops at $25/acre. These were planted in the fall of 2014, 2015, and 2016. After the 2014-2015 season, the Wood SWCD

was also asked to modify the contract to require cover crops to over-winter. This shifted what fields were planted for some producers, but did not seriously impact the 8,000 acres planted.

The project ended up being part of a larger push to deploy conservation practices across the Western Basin in Ohio, due to the contamination of the water treatment plant in Toledo in 2014. Project sponsors were thus able to take advantage of USDA-NRCS program promotion, and also publicity from the Ohio Department of Natural Resources. Over the grant duration, multiple field days were held to help farmers understand how to use cover crops and how to manage some of the issues that can come up with cover crops in rotation. An outreach effort was also initiated to reach non-farmers to help them understand what producers are doing to protect water quality.

Best Management Practices Applied include:

- **Cover Crops**

State: Ohio

Project Title: Flat Run – Tiffin River

Grant Amount Awarded: $25,217

Sponsor: Fulton SWCD

This project addressed the problem of soils and sediment eroding into the Tiffin River due to older, failing grassed waterways. The project work plan entailed installation of newly designed grassed waterways and sub-surface drainage for six landowners with riverbank frontage. These grassed waterways were graded and shaped to form a smooth trapezoidal-shaped channel. The area was seeded with sod forming grasses including ryegrass, bluegrass, and red fescue. This design will allow runoff water flowing down the drainage way to flow across the grass, rather than tearing away soil and forming a larger gully. Straw bales were placed perpendicular to the waterway every 300 feet to alleviate potential erosion damage before the seed could be fully established. Sod was also placed at the top, middle, and bottom end of the grassed waterway to meet retardance requirements until the vegetation was established. Also used were straw erosion control re-vegetation blankets, an innovative product with a light weight design which bonds to the soil, degrades completely, and accelerates germination. Over the life of the BMPs installed through this project, an estimated 20,898 tons of sediment will be saved.

Best Management Practices Applied

- **Grassed Waterways**
- **Sub-surface Drainage**

State: Wisconsin

Project Title: On Farm Gypsum Demonstration

Grant Amount Awarded: $28,933.71

Sponsor: Glacierland Resource Conservation & Development

Soil erosion from farm fields in the Lower Fox River Basin has resulted in significant downstream sedimentation and phosphorus loading to Lake Michigan. Since the beneficial effects of gypsum applications on heavy clay soils such as those in the Lower Fox River Basin have not been well-documented, the objective of this project was to provide more experience with this BMP in an agricultural watershed setting.

Gypsum demonstrations were conducted on four farms in the Lower Fox River Basin. Two gypsum applications were completed on each farm with fields divided into treatment and control sites. Gypsum was applied at a rate of 2000 pounds per acre at three farms, and at 1000 pounds per acre at the fourth.

The outreach/media strategy included a kick-off campaign with in-person meetings, written and verbal communications regarding the project announcement. Presentations on the project were made to several agricultural and conservation organizations.

Four field days were held on the participating farms, focusing on such topics as soil health, gypsum and water quality, and preliminary results related to decreases in water extractable phosphorus concentrations in the soil after gypsum application.

Best Management Practices Applied

- **Gypsum Application**

State: Wisconsin

Project Title: Targeted Sediment Reduction to Chequamegon Bay, Lake Superior

Grant Amount Awarded: $173,172

Sponsor: Bayfield County Land and Water Conservation Department

The largest non-point pollution concern affecting the health of Lake Superior's Chequamegon Bay area watersheds is excess sedimentation, which increases harbor maintenance and drinking water treatment costs for communities such as the City of Ashland; reduces recreational fishing, swimming, and boating opportunities in the bay; and negatively impacts fish habitat within tributaries and the bay. As studies have identified Fish Creek as the largest sediment contributor directly to Chequamegon Bay, management recommendations thus indicated that a

combination of in-stream bluff stabilization and upland surface runoff attenuation practices in that watershed would be effective in reducing erosion and sedimentation to North Fish Creek and Chequamegon Bay.

This project sought to slow the flow of surface runoff in priority areas of the North Fish Creek watershed by constructing wetlands and similar practices on private property. In addition, in-stream sediment sources were to be addressed by stabilizing one or two of the approximately 19 eroding bluffs contributing about 2/3 of the annual sediment load from Fish Creek to Chequamegon Bay.

The components of the project that have been completed will save an estimated 100 tons of sediment from reaching Chequamegon Bay. Although the total sediment reduction rate is less than initial targets due to delays from weather and difficulty getting approval from some landowners, project managers viewed this is as a significant step in reducing excess sedimentation to Fish Creek and Chequamegon Bay. Once the entire project is completed, soil savings are estimated at some 600 tons a year.

Said Project Manager Matt Hudson of Northland College, “I’m proud that I’ve been a part of such a dedicated team of professionals who pulled together and achieved true success in terms of implementing conservation on the landscape driven by science. In the face of repeated challenges, this group persevered and achieved efforts that are among the most measurable positive impacts to reducing excess sedimentation, the number one non-point pollution issue currently facing the Chequamegon Bay region of Lake Superior.”

Best Management Practices Applied

- **Wetland Restoration**
- **Lined Waterway or Outlet**
- **Bluff Stabilization/Log Cribwall**

Appendices