

**GREAT LAKES BASIN PROGRAM FOR SOIL
EROSION AND SEDIMENT CONTROL**

ANNUAL REPORT

**PROGRAM YEAR 1999
September 1, 1998 through August 31, 1999**

**PRESENTED TO:
U.S. DEPARTMENT OF AGRICULTURE - NATURAL RESOURCES CONSERVATION SERVICE**

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I. INTRODUCTION

Nonpoint source pollution has been identified as a major cause of water quality degradation in the Great Lakes basin. The movement of sediment is a major pathway for the addition of nutrients and toxic chemicals that are bound to soil particles. Beyond water quality degradation, soil erosion and sedimentation reduces agricultural productivity, degrades fish and wildlife habitat, limits water-based recreation, and damages water treatment and transportation facilities.

In late 1987, a regional task force assembled by the Great Lakes Commission released a report titled *Soil Erosion and Sedimentation in the Great Lakes Region*. The report documented the serious nature of the basin's nonpoint source pollution problems, analyzed and interpreted soil erosion and sedimentation data, and presented a series of findings and recommendations that were endorsed by the eight member states of the Commission. Recommendations addressed funding issues, program development, standards and control programs, education/coalition-building, and research and evaluation.

Principal among those recommendations was the establishment of a federal/state "Great Lakes Basin Program" for comprehensive, basin-specific soil erosion and sedimentation control. In offering the recommendation, the task force recognized the Great Lakes system as a "special and unique international resource that deserves special attention and protection." The task force also recommended that a linkage with the federal Clean Water Act, Section 319 nonpoint source pollution control program be made to ensure coordination of activities with the U.S. Environmental Protection Agency (U.S. EPA).

The task force subsequently developed the framework for the Great Lakes Basin Program and, in 1988, secured the unanimous endorsement of the member states of the Great Lakes Commission. The Basin Program became reality in late 1990, when the U.S. Congress appropriated \$1 million through the budget of U.S. EPA Region 5 to support program activities. Funding levels for fiscal years 1991 and 1992 were \$1 million. FY1993 funding was \$1.2 million. In FY1994, the funding source for the Great Lakes Basin Program shifted from U.S. EPA to the U.S. Department of Agriculture-Soil Conservation Service (now Natural Resources Conservation Service). Funding levels for FY1994 and FY1995 were \$250,000. Fiscal year funding levels for 1996, 1997 and 1998 were \$350,000. Programmatically, the Great Lakes Basin Program has operated on a schedule slightly different than the federal fiscal year. Therefore, resources and products are reported on a Great Lakes Basin Program Year (PY), which is September 1 through August 31. For this 1999 program year report, the period covered is September 1, 1998 through August 31, 1999.

II PROGRAM GOALS AND OBJECTIVES

The goal of the Great Lakes Basin Program is to protect and improve the basin's water quality by controlling soil erosion and sedimentation; limiting the input of associated nutrients and toxic contaminants; and minimizing off-site damages to harbors, streams, fish and wildlife habitat, recreational facilities and the basin's system of public works. Objectives associated with the goal, as adopted by the Great Lakes Commission, follow:

1. To achieve special legislative recognition for the water quality problems associated with soil erosion, sedimentation, and the delivery of nutrients and toxic contaminants to the Great Lakes;
2. To provide dedicated, reliable, long-term funding for erosion and sediment control programs in the Great Lakes basin;
3. To coordinate efforts, roles and initiatives among federal, state, and local soil conservation and pollution control agencies and groups in the Great Lakes basin;
4. To recognize sediment as an important pollutant and its role in the transport of chemicals and degradation of habitat and to improve the linkage between erosion control and water quality programs;
5. To support the development and implementation of urban and rural nonpoint source management programs and sediment components of Remedial Action Plans under terms of the U.S.-Canada Great Lakes Water Quality Agreement;
6. To build coalitions and networks to support a Great Lakes Basin Program and to share information and educate groups and individuals with similar interests and goals;
7. To protect and enhance the region's water quality for the benefit of all economic and environmental interests.

As designed, the Great Lakes Basin Program is comprised of three elements: 1) program and technical assistance; 2) demonstration projects; and 3) information and education.

In FY1998, a sum of \$350,000 was appropriated through the budget of the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS). Of this amount, \$250,000 was applied to the competitive demonstration grants program with \$100,000 being retained by the Great Lakes Commission for program administration and regional information and education activities. Since program inception in 1991, \$4.75 million have been applied to the program, \$3.2 million from U.S. EPA and \$1.55 million from USDA-NRCS. Program oversight is provided by a regional Soil Erosion and Sedimentation Task Force. The task force includes representation from the eight Great Lakes states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin), U.S. EPA, USDA-NRCS, National Association of Conservation Districts (NACD), Conservation Technology Information Center (CTIC), and the International Joint Commission (IJC). Under the leadership and guidance of the Soil Erosion and Sedimentation Task Force, the following activities, tasks and products were completed in PY1999:

III ACCOMPLISHMENTS

A. PROGRAM GRANTS - INSTITUTIONAL ARRANGEMENTS AND PROGRAM COORDINATION

1. The Great Lakes Commission convened two meetings of the Soil Erosion and Sedimentation Task Force (September 15, 1998 in Toledo, Ohio, and March 18-19, 1999 in Chicago, Illinois) to discuss and act upon issues related to the implementation of the Great Lakes Basin Program.

2. At the Sept. 15 meeting, the task force received an update on Great Lakes Basin program progress and activities; reviewed the draft 1999 request for proposal (RFP) packet; approved the timeline for RFP mailing, application deadline and proposal review; and reviewed and discussed the draft 1997 annual report. Great Lakes Commission staff also discussed plans for the completion of the 1998 annual report and introduced a schedule for developing a Great Lakes Basin Program web page that would feature online write-ups for the completed projects for each state.
3. RFPs were mailed to more than 1,100 potential applicants on Nov. 13, 1998. RFPs were sent to state agencies, tribal governments, municipalities, soil and water conservation districts, drain commissioners, watershed councils, Resource Conservation and Development area councils, colleges and universities, and conservation and environmental groups.
4. The Commission facilitated the review, ranking and the selection of proposals received by Jan. 15, 1999, in response to the RFP. The Commission received 55 proposals totaling \$994,385. After each task force member prioritized proposals from his/her state, 31 proposals totaling \$585,483 advanced to the full task force for final review.
5. On March 18, 1999, the task force met in Chicago, Ill. to review and discuss the top proposals and recommend final funding decisions. The task force selected 22 projects to receive \$350,000 in funding.
6. In April, the Commission received word from the USDA-NRCS that FY 2000 funds for the Great Lakes Basin Program had been secured. The total amount to be received from NRCS was \$500,000 the same amount as FY 1999. Of this amount, \$350,000 will be designated for the competitive grants program, with the balance directed largely to regional information/ education activities and program administration.
7. Commission staff worked with the project officers of previously funded projects to develop reports for this annual report and articles for the Great Lakes Basin Program newsletter, *Keeping it on the Land*. Slides, photographs, reports, manuals and other materials have been accumulated from project officers to promote and publicize the program.
8. The NACD–Great Lakes Committee convened a meeting on Sept. 15, 1998 in Toledo, Ohio in conjunction with the regional soil erosion conference. There committee members discussed the need for a regional soil erosion newsletter. They heard presentations on the federal Clean Water Action Plan. They also discussed their future, given the restructuring of NACD which pulled Bill Horvath from North Central Regional representative to director of the NACD National Policy Center. At that time, Tom Crane offered to explore opportunities where the Great Lakes Commission might be able to provide support. Soon after, the Commission began to provide staff support to the NACD–Great Lakes Committee through the Great Lakes Basin Program.

The NACD – Great Lakes Committee also met in conjunction with the Soil Erosion and Sedimentation Task force in Chicago on March 17 and 18, 1999. Committee members reviewed their charter and discussed priority issues. They received updates on various soil erosion and water quality-related programs from representatives of the U.S. Army Corps of Engineers, the U.S. EPA, and the USDA, the Great Lakes Commission and the NACD.

B. INFORMATION AND EDUCATION ACTIVITIES

1. The Great Lakes Commission, through its staff, member states and the Soil Erosion and Sedimentation Task Force, continues to promote the Great Lakes Basin Program through its newsletter, the *Advisor*, and through various information and education activities directed at researchers, state legislatures and the U.S. Congress.

Additionally, in March 1999, a long-recognized unmet need was answered with the publication of the first edition of *Keeping it on the Land: Information for the soil erosion and sediment control community in the Great Lakes basin*. This newsletter is an eight-page quarterly publication which provides updates on district, state and regional/federal agency activities and programs, includes two to three feature articles, supplies a calendar of events and, most importantly, features two to three projects funded under the Great Lakes Basin Program. In addition, one four-page special edition is issued annually to announce the new Basin Program grantees. The newsletter is sent to approximately 2,300 recipients and has been well received among the soil erosion and sediment control community. It has already proved to be a valuable tool for communicating information developed under the program.

In May 1999, Commission staff began a determined effort to place completed Great Lakes Basin Program projects on-line on the program's web page. This will be an important resource for individuals and organizations working to reduce soil erosion and sedimentation throughout the Great Lakes basin and beyond. It will include photos, charts/graphs, maps and synopses of innovative demonstration, technical assistance and information/education projects addressing the range of erosion problems experienced in the basin. The site will provide exposure for new erosion control techniques and increase the opportunity for these techniques to be applied on a broad basis.

2. Commission staff, in cooperation with state and federal partners, organized a basinwide conference, titled *Keeping it on the Land...and out of the Water!* on soil erosion and sediment control in Toledo, Ohio, Sept. 16--18, 1998. Building partnerships that span government agencies, community organizations and private citizens was a theme that emerged from the conference. The conference featured reports on opportunities to promote erosion control in the Great Lakes basin, including the Clean Water Action Plan and Lakewide Management Plans. Case study presentations highlighted demonstration projects funded under the Great Lakes Basin Program covering topics such as shoreline and streambank stabilization, buffer strips, and habitat protection and restoration.

C. DEMONSTRATION GRANTS AND SPECIAL PROJECTS

Approximately \$350,000 was available via the cooperative agreement with the USDA for demonstrations and special projects in PY1999. Twenty-two new projects were awarded grants beginning on June 1, 1999. Short descriptions of these projects are provided at the end of this report. Extended project summaries and results are provided for those projects that were ongoing as of Sept. 1, 1998. For information on completed projects, please refer to earlier Great Lakes Basin Program annual reports and to the Great Lakes Basin Program web page: www.glc.org/basin/projects.html.

IV PROGRAM BENEFITS

Between 1991 and 1999, the Great Lakes Basin Program has provided the resources to gather technical information to help evaluate soil erosion and sediment problems, demonstrate various best management practices (BMPs) for controlling in soil erosion and sedimentation, and educate the public on both the impacts and solutions for controlling soil erosion. Over that period, 140 grants were awarded totaling \$4.26 million. All eight Great Lakes states have received Great Lakes Basin Program support to date.

In evaluating the success of the program, four types of measures are used:

- Tons of soil and other nutrients saved (In some cases the actual pollutant load, e.g. sediment delivery, to streams has been calculated);
- Total acreage involved in some form of soil erosion and sediment control practice;
- Audiences reached; and
- Additional resources that the Great Lakes Basin Program funds have leveraged.

These tools were applied to the 118 projects completed between 1991 and 1998. The 22 projects awarded in this program year have not been included in the results measurements since they have just begun and do not yet have results to report. (Figure One is a map of the active projects during PY1999.)

Figure One



KEY TO FIGURE ONE

Map #	Project Title	State	Grantee
1	Apollo Erosion Control Project	IN	NE Indiana Solid Waste Mgmt Dist.
2	Incentive for Construction Erosion Control	IN	St. Joseph County SWCD
3	Agricultural Soil Erosion Reduction Project	MI	Michigan Ag. Stewardship Assoc.
4	Great Lakes Better Backroads Education Project	MI	Huron Pines RC&D
5	Lakeshore Erosion Demonstration Project	MI	City of Boyne City
6	North Branch of the Bad River Adopt-a-Stream	MI	Gratiot Soil Conservation District
7	Protecting Headwater Streams from Soil Erosion	MI	Livingston County Drain Commission
8	Riparian Homeowner's Stewardship Project	MI	Mid-MI Enviro. Action Council
9	Soil Erosion Control in Grand Traverse Bay	MI	Grand Traverse Watershed Initiative
10	Use of the WWW for Watershed Management	MI	Michigan Tech University
11	Veg. & Biological Pest Control to Prev. Soil Erosion	MI	MSU Entomology Dept.
12	Baptism River Streambank Stabilization Demo.	MN	Tettegouche State Park
13	Knife River Watershed Education Project	MN	Laurentian RC&D Council
14	Lake Superior Shoreline Protection Project	MN	Lake Superior Assoc. Of SWCDs
15	Soil Testing for Lake Superior Shoreline Stabil.	MN	Minnesota Board of Water and Soil Res.
16	Watershed Guardian Program	MN	St. Louis River CAC
17	Critical Area Seeding — Road Banks	NY	Cayuga County SWCD
18	Erosion, Sediment Control Ordinance Pilot Proj.	NY	Wayne County SWCD
19	Honeoye Lake Public Awareness and Education	NY	Ontario County SWCD
20	Monroe Cty. Highway Water Quality Improvement	NY	Monroe County SWCD
21	Oswego River Erosion Control Project	NY	Oswego County Planning
22	Road Ditch Stabilization Demonstrations	NY	Yates County S&WCD
23	Seneca County Grazing Land Initiative	NY	Sullivan Trail RC&D
24	What's the Dirt?	NY	Aquarium of Niagara
25	Yates County Model Site Plan Review	NY	Yates County Planning Dept
26	Black River Stream Bioengineering for Riparians	OH	Lorain SWCD
27	Cost Shares for Urban Streambanks	OH	Lake County S&WCD
28	Cost Study of Stormwater Erosion Control BMPs	OH	Seventh Generation
29	Construction Site Erosion Control Incentive	OH	Geauga SWCD
30	Strip-Till Equipment Lease Program	OH	Toledo Metro Area COG
31	Demo. Of Skimmers for Dewatering Sed. Basins	PA	Penn State University
32	Grazing/Water Supply Erosion Control Demo.	PA	Penn Soil RC&D
33	Erosion Control on Lake Erie Shoreline	PA	Presque Isle State Park
34	NPDES/Erosion Control Project and Workshop	PA	Erie County Conservation District
35	Construction Site Erosion Control Demo for Roads	WI	Land Conservation Dept
36	Sediment Control Basin/Grassed Waterway	WI	Fond du Lac Cty Land Conservation Dept
37	Agricultural Impact Reduction Program	MI	Michigan Agricultural Stewardship Assoc.
38	Improving Muskegon Lake Water Quality	MI	Muskegon Co. Conservation Dist.
39	Lake Michigan Shoreline Erosion Project	MI	Antrim Co. Conservation Dist
40	Psutka Lake Crossing Project	MI	Conservation Resource Alliance
41	Michigan Water Trail	MI	Michigan Dept of Agriculture
42	Sauk River/Adopt-a-Stream	MI	Branch Co. Conservation Dist
43	Miller Creek Sediment Trap Maintenance Demo	MN	South St. Louis Co Conservation Dist
44	Multi-Agency GIS Database & Planning Tool	MN	Minnesota Board of Water and Soil Res.
45	Knife River Watershed Education Project	MN	Laurentian RC&D Council
46	Management Intensive Grazing in the GL Basin	NY	Cayuga Co Conservation Dist
47	Remedial Erosion & Sed Control for Salmon Creek	NY	Tompkins Co Conservation Dist
48	St. Lawrence Rv Shoreline: Biotech Shore Stab	NY	St. Regis Mohawk Tribe
49	Penfield Watershed Mgmt Education Brochure	NY	Town of Penfield
50	Protected Shores: Enhancing Shoreline Property	NY	Ontario Co Conservation Dist
51	Lorian Co Urban Sediment Erosion Control Prog	OH	Lorain Co Board of Commissioners
52	Sudden Soil Density Change Training Session	OH	Conservation Action Project
53	Chagrin River Sediment and Erosion Mgmt Guide	OH	Chagrin River Watershed Partners, Inc.
54	Determination of Sediment Loading Potential	PA	Edinboro University of Pennsylvania
55	Cascade Creek Sed Control and Educ Project	PA	Lake Erie Arboretum at Frontier Park
56	Pensaukee Rv Watershed Riparian Buffer Project	WI	Shawano Co Land Conservation Dept
57	Bad River Integrated Resource Mgmt Plan	WI	Bad River Band / Chippewa Indians
58	Forest Road Building Workshops	WI	Forest Industry Safety and Training Alliance

Map #	Project Title	State	Grantee
46	Management Intensive Grazing in the GL Basin	NY	Cayuga Co Conservation Dist
47	Remedial Erosion & Sed Control for Salmon Creek	NY	Tompkins Co Conservation Dist
48	St. Lawrence Rv Shoreline: Biotech Shore Stab	NY	St. Regis Mohawk Tribe
49	Penfield Watershed Mgmt Education Brochure	NY	Town of Penfield
50	Protected Shores: Enhancing Shoreline Property	NY	Ontario Co Conservation Dist
51	Lorian Co Urban Sediment Erosion Control Prog	OH	Lorain Co Board of Commissioners
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58	Forest Road Building Workshops	WI	Forest Industry Safety and Training Alliance

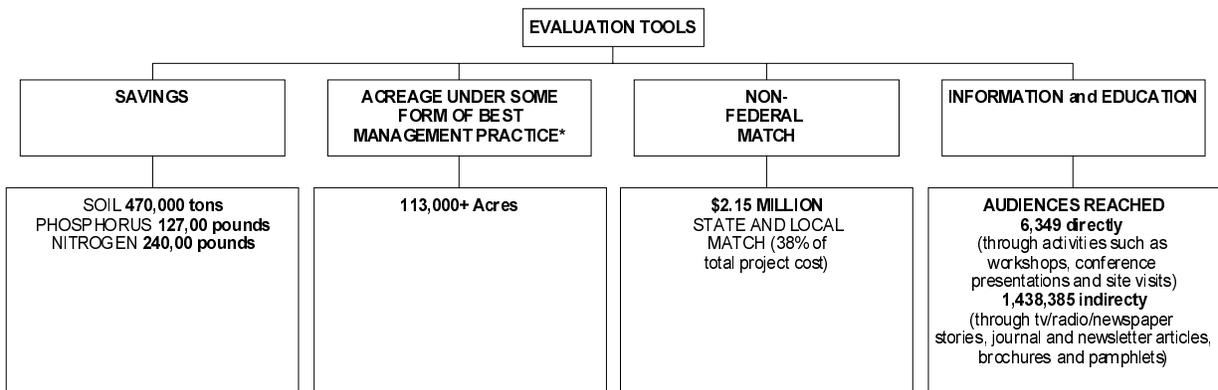
As a result of grants completed between PY1991 and PY1998, the total savings from erosion control measures implemented amounts to more than 470,000 tons of soil, more than 127,000 pounds of phosphorus and more than 240,000 pounds of nitrogen over the project period, alone. These are very conservative estimates, as many of the BMPs installed will continue to prevent soil from eroding from the land many years after the project has been completed. These savings reflect Great Lakes Basin Program sites only and exclude additional acreage treated by other farmers/landowners throughout the basin influenced by the projects. Many projects funded under the Great Lakes Basin Program have provided the technical background information necessary, through one-on-one communication, site visits, and aerial assessments, for future soil erosion and sediment control projects. Although no soil savings can be attributed directly to this information and technical transfer activity, the potential savings from future projects is enormous. (See Figure 2)

GREAT LAKES BASIN PROGRAM

RESULTS MEASUREMENTS

SEVEN YEAR SUMMARY,
PY 1991 THROUGH PY1997

Figure 2



This figure represents cumulative totals over the life of projects funded between 1991 and 1997.

* For example, buffer strips, conservation tillage, reforestation, streambank planting, toe stabilization and construction site erosion control practices.

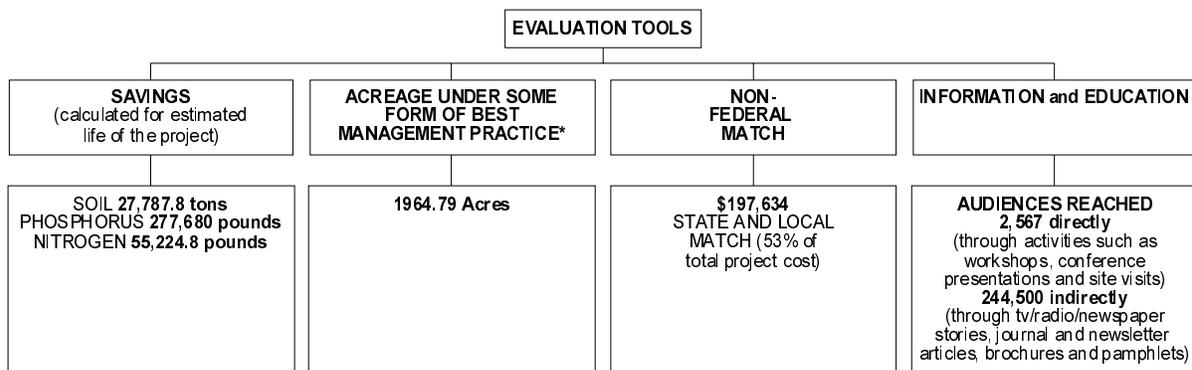
This past year, grantees began reporting savings over the estimated life of their projects. Thirteen demonstration projects completed in PY1999 reported results over an expected project life. Over this period, an estimated 27,787.8 tons of soil, 277,680 pounds of phosphorus and 55,224.8 pounds of nitrogen will be saved. As with the projects reported above, these numbers reflect only the acreage directly affected by Great Lakes Basin Program funds and exclude additional areas treated as a result of information and technology transferred from these projects. (See Figure 3)

Topography varies among the eight Great Lakes states, which leads to varying types of BMPs to control soil erosion and sedimentation. Shoreline stabilization, conservation tillage, urban construction, streambank stabilization and filter strips are the most common types of BMPs demonstrated as a result of the program. More than 115,000 acres are under some form of conservation treatment. Almost 2,000 acres were added from projects completed during PY1999.

Through the information and education projects reporting during PY1999, more than 2,500 farmers, landowners, students, consultants and other parties had direct contact with technical professionals to solve soil erosion and sedimentation problems through site visits, workshops and tours. More than 244,000 others were informed of the benefits of soil erosion and sediment control through various outreach activities, such as newsletters; brochures/flyers; billboards; displays; newspaper articles; radio; cable TV; and special events such as trade shows, and festivals. Many projects used several of the above methods in community outreach efforts to reduce soil erosion and sedimentation. Target audiences under this program are landowners, farmers, zoning officials, planning officials, students, teachers, developers and contractors, and agribusinesses.

**GREAT LAKES BASIN PROGRAM
RESULTS MEASUREMENTS
1998 SUMMARY**

Figure 3



This figure represents totals over the estimated life of projects completed during PY1999.

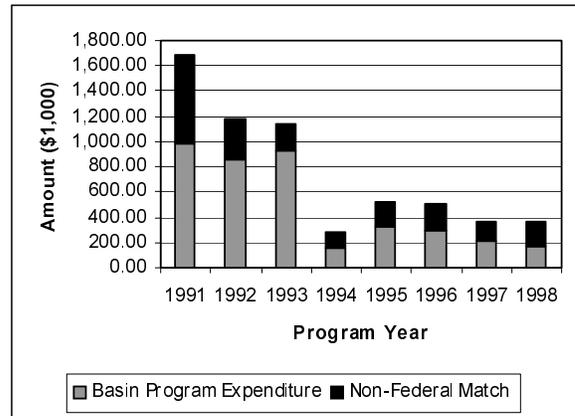
* For example, buffer strips, conservation tillage, reforestation, streambank planting, toe stabilization and construction site erosion control practices.

Another indication of the program's success is the numerous local/state contributions to the individual projects. The Basin Program is acting as a springboard for others to become involved and share their expertise. Over the nine-year life of the program, an additional \$2.34 million (39 percent of total project costs) have been contributed from state and local sources. This is \$837,500 more than the minimum nonfederal match required under the program. (See Figure 4)

Figure 4

**Great Lakes Basin Program Summary Comparison
of
Grant Awards and Non-Federal Match Funds
(1991 through 1998)**

Note: Basin Program expenditures for PY1991 through PY1993 do not include three \$600,000 non-competitive annual grants to the Saginaw Bay Soil Erosion and Sedimentation Control Program.



V. FUNDED PROJECTS

INDIANA

PROJECT TITLE:	APOLLO EROSION CONTROL PROJECT
GRANTEE:	NORTHEAST INDIANA SOLID WASTE MANAGEMENT DISTRICT AND WOOD-LAND-LAKES RESOURCE CONSERVATION AND DEVELOPMENT, INC.
BASIN PROGRAM FUNDS:	\$15,000 (APPROVED)
NONFEDERAL FUNDS:	\$19,000 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 –
PROJECT TYPE:	TECHNICAL ASSISTANCE
STATUS:	ONGOING

PROBLEM STATEMENT

An abandoned 18-acre landfill on the Black Creek, in northeastern Indiana's St. Joseph River watershed, is a chronic source of sediment and contaminated leachate. It drains to Fish Creek which contains the greatest diversity of freshwater mussels in the Great Lakes basin and, further downstream, the St. Joseph River flows into Fort Wayne, Indiana and provides drinking water for over 200,000 people.

BACKGROUND

Agency jurisdiction over the landfill is unclear and, as such, the project offered an opportunity to develop a unique approach to environmental remediation. A new partnership has emerged to address the problems associated with the site, building trust and a working relationship among representatives of public, private, local, state and federal groups. This project exemplifies Wood-Land-Lakes Resource Conservation and Development mission of "volunteers working together for responsible stewardship of our natural resources." Local citizens are having a direct impact on water quality by adopting the abandoned, 18-acre landfill site, while all partners participated in developing and implementing the remediation plan.

The goal of the Apollo Erosion Control Project is to control erosion, sedimentation and surface run-off from the highly erosive landfill site. The Apollo Erosion Control Project will have an impact on recreation, biodiversity, economic sustainability, human health and grassroots partnership issues. Improved water quality will ensure continued use of the creek for water-based recreation and will improve habitat for fish and wildlife populations.

This project is a component of a larger landfill closure plan which involves implementing erosion control and establishing vegetative cover. The partnership has already assessed current erosion rates, determined the number and type of erosion control structures required and selected the vegetative practices best suited to the site.

ACTIVITIES

The project team began work on the landfill site in October 1998. The first step was to construct a permanent service road to ensure adequate access to the site. Due to a delay in securing the initial clay cap for the landfill site, project personnel had to secure an additional 12,000 to 12,500 cubic yards of clay to re-cap it. This work also included placing a limited quantity of topsoil on the surface. Approximately eight acres were hydroseeded with annual and perennial grasses during November.

During the summer of 1999, project personnel prepared the site by grading the north and east gullies. They installed 30 tons of rip-rap with a subsurface tile along the gullies. The top of the site, approximately 8 acres, required approximately 12,500 cubic yards of soil. Project personnel used a hydroseeder to overseed with a grass-legume and wheat cover crop. They also constructed a sediment retention basin covering approximately 1/4 acre. The basin required an additional 15 tons of rip-rap and is approximately three feet deep.

INDIANA

PROJECT TITLE: EVALUATION OF ECONOMIC INCENTIVE FOR
CONSTRUCTION SITE EROSION CONTROL:
INDIANA STUDY

GRANTEE: ST. JOSEPH COUNTY SOIL & WATER CONSERVATION
DISTRICT

BASIN PROGRAM FUNDS: \$14,948

NONFEDERAL FUNDS: \$ 7,322

PROJECT DURATION: JUNE 1, 1996 – MARCH 1, 1999

PROJECT TYPE: DEMONSTRATION

STATUS: COMPLETE

PROBLEM STATEMENT

One of the most frequent complaints of those working in the erosion and sediment control field is that it is like “pulling teeth” to get most developers to apply erosion control measures promptly. For most developers, erosion control is both a nuisance and a perceived non-recoverable economic cost, and therefore is simply ignored. While educational and regulatory efforts have had some successes, economic incentives may be the best approach to controlling soil erosion and sedimentation at construction sites. If early seeding and mulching increases the lot value and/or sale time, then developers/builders may voluntarily implement control measures, seeking to gain a competitive edge and increase profits.

BACKGROUND

Soil erosion and sedimentation problems often occur at construction sites. Despite education and regulatory efforts targeting developers, soil erosion and sedimentation control measures are often ignored. This project evaluates whether there is an economic incentive for developers to use good erosion control practices. This project established a “real world” experiment to measure objectively the impact that seeding and mulching a site has on lot value and sale time. Increased lot value and/or increased sale time will result in increased profits for developers and builders. If it can be demonstrated rigorously that the economic benefits of controlling erosion and sedimentation from construction sites are greater than the costs of seeding and mulching, then this information could be widely publicized in the building/development community. Appealing to increased profitability seems to be a good way to develop voluntary application of seeding and mulching on construction sites.

ACTIVITIES

The plan of proposed work included two tasks: (1) develop an approach that establishes the impact that seeding and mulching has on lot value, and (2) address the issue of lot sale time. Both tasks involved randomly selecting sites for treatment and then evaluating them using standard statistical methods.

Because of the nature of the project, there were no appropriate measures of soil loss prevented or beneficial uses improved as a result of the project. Sites were randomly selected and half were seeded and mulched. The first task of the evaluation then involved two approaches. First, a questionnaire was distributed to developers, realtors, and home buyers, asking them to value homes with both brown and green lots. Second, actual sale prices were tracked to determine if there was a real difference in the value of green lot versus brown lot homes. For the second task, the time to home sale was tracked from a starting point when all homes were fully constructed. The data from both tasks was then statistically analysed.

RESULTS

Through this project 2,200 farms and members of the agricultural business community were reached by the LaPorte County SWCD and St. Joseph County SWCD annual reports. Erosion control workshops reached 450 engineers, architects, and construction managers and 1,000 developers, consultants, and SWCD staff received flyers. Two hundred members of the conservation community were reached at the Indiana SWCD annual meeting. University researchers were reached in both the United States and abroad through conferences and published papers.

MICHIGAN

PROJECT TITLE:	AGRICULTURAL SOIL EROSION REDUCTION PROJECT
GRANTEE:	MICHIGAN AGRICULTURAL STEWARDSHIP ASSOCIATION
BASIN PROGRAM FUNDS:	\$15,000
NONFEDERAL FUNDS:	\$26,680
PROJECT DURATION:	JUNE 1, 1998 –
PROJECT TYPE:	DEMONSTRATION
STATUS:	ONGOING

PROBLEM STATEMENT

Michigan has close to one half of the 22 million acres of agricultural land in the Great Lakes basin and, as such, Michigan farmers are responsible for a significant portion of the agriculturally induced soil erosion and resulting water quality degradation within the basin. The challenge is to retain the valuable agricultural base by empowering Michigan farmers to reduce nonpoint source pollution from agricultural erosion.

BACKGROUND

According to the Great Lakes Commission's *Agricultural Profile of the Great Lakes Basin* (1996) there are over 22 million acres of agricultural land in the Great Lakes basin. Michigan reported 10.7 million agricultural acres under the 1992 Census of Agriculture. It is therefore possible that Michigan farms contribute up to one half of the basin's agriculturally induced soil erosion. Agricultural erosion is significant because it carries associated nutrients, phosphorus and nitrogen, as well as pesticides and herbicides, which negatively impact water quality.

Recently, the Michigan Agricultural Stewardship Association (MASA) undertook a needs assessment which identified specific topic areas which MASA members believed required research and investigation. These included soil health/tilth, integrated crop management, biological pest controls, whole farm planning, rotations, alternative nitrogen sources, reduced herbicide systems, manure use and applications, alternative tillage systems and streambank protection. In an initially unrelated exercise, Dr. George Bird of Michigan State University assembled a group of individuals to develop a series of training modules for the Sustainable Agriculture Research and Education Professional Development Program. The training modules developed by the Michigan State work group closely paralleled the issues identified during the MASA exercise and, when coupled with the Great Lakes Basin Agricultural Profile, suggested an erosion control focal point. Soil erosion can be reduced through demonstration and education initiatives directed toward sustainable production.

ACTIVITIES

MASA developed a demonstration/education delivery system including on-farm research, education and community-based dissemination. MASA chose eleven farms on which to conduct relevant research or demonstrate practices to enhance soil quality, reduce the need for chemical inputs or

reduce sediment loading. Among these were trials to determine the benefits of various types of clover cover crops, discover the quality of compost made from municipal yard waste including assessment of residual herbicides and insecticides, and determine the long-term effect of different

The Kellog Biological Station cosponsored three education meetings in Kalamazoo, Frankenmuth and Big Rapids. These meetings emphasized promoting soil quality as a way to reduce soil erosion and contamination. In addition, MASA produced seven monthly newsletter inserts to the *Farm and Country Journal* which reaches 6,000 readers each month. An additional 20,000 copies of the July 1998 issues were distributed through the Ag Expo trade show at Michigan State University. MASA also mailed 11,000 farmers a summary of the projects as a mechanism for promoting better soil quality.

MICHIGAN

PROJECT TITLE: GREAT LAKES BETTER BACKROADS EDUCATION PROGRAM
GRANTEE: HURON PINES RESOURCE CONSERVATION
AND DEVELOPMENT AREA COUNCIL, INC.
BASIN PROGRAM FUNDS: \$ 15,000
NONFEDERAL FUNDS: \$ 10,500
PROJECT DURATION: JUNE 1, 1997 – SEPTEMBER 30, 1998
PROJECT TYPE: INFORMATION AND EDUCATION
STATUS: COMPLETE

PROBLEM STATEMENT:

Northern Michigan's high quality, cold water streams are vulnerable to high levels of sand sedimentation, especially in the location of road stream crossings. Many of these erosion problems can be controlled with little expense by a combination of minor structures and consistent maintenance.

BACKGROUND:

The transportation network across northern Michigan has provided the area with important infrastructure to support local economies but can prove detrimental to fast flowing, cold water streams if not properly maintained. The region's sandy soil creates problems where these roads cross sensitive streams by eroding into the water, slowing its flow and allowing it to warm up. Many of these eroded areas can be controlled at minimal expense.

A comprehensive educational training tool, such as a workshop and manual, is required to instruct road commission employees about the various techniques and strategies available to minimize sedimentation. The project will also provide techniques and materials useful in other parts of the Great Lakes basin where these high quality streams are endangered by road construction.

ACTIVITIES:

The project steering committee, under the lead of the Huron Pines Resource Conservation and Development Council, established document review and workshop presentation subcommittees. The document review subcommittee reviewed the model manual, *Vermont Better Backroads* and incorporated suggested changes into the *Great Lakes Better Backroads Guidebook: Water Quality by Design*. After publishing the guidebook, the workshop subcommittee developed an education session directed to road commission associations and individual commission employees which they presented on seven occasions.

RESULTS:

The project committee convened seven workshops beginning in May 1998. The first, held in conjunction with the 37th Senatorial District Council meeting, included representatives from 11 counties. Kalkaska Conservation District hosted a meeting and demonstration in June for local watershed agencies and road commissions. Two meetings of the County Road Commission Association Vacationland District Council in June and July also included workshops. Workshops were

also held with the Retired Seniors Volunteer Program in June, and two meetings in July, including the Regional Wood in Transportation Program. In total, 166 individuals were reached through workshops, while an additional 585 persons received *Great Lakes Better Backroads Guidebook: Water Quality by Design*. Additionally, this project enabled the Huron Pines Resources Conservation and Development Area Council to obtain an additional Michigan Department of Environmental Quality Section 319 Grant to continue and expand efforts initiated under this project.

MICHIGAN

PROJECT TITLE: LAKESHORE EROSION DEMONSTRATION PROJECT
GRANTEE: BOYNE CITY, MICHIGAN
BASIN PROGRAM FUNDS: \$ 7,871 (APPROVED)
NONFEDERAL FUNDS: \$ 2,642 (PROPOSED)
PROJECT DURATION: JUNE 1, 1998 –
PROJECT TYPE: DEMONSTRATION
STATUS: CANCELED AT REQUEST OF GRANTEE

PROBLEM STATEMENT

Lake Charlevoix, in Michigan's upper Lower Peninsula, drains into Lake Michigan through Little Traverse Bay. Boyne City, Michigan is located on Lake Charlevoix's southeastern shoreline. This area, particularly along Lakeshore Drive, had been subject to a number of factors which increase the area's susceptibility to erosion. In addition to adding to the lake's sediment burden, this threatens the stability of Lakeshore Drive and presents a potential safety hazard.

BACKGROUND

Over the past 15 years, Lake Charlevoix has been subject to extremely high water levels which, in combination with prevailing northwest winds, have resulted in significant erosion along Lakeshore Drive. The soils in this area are gravelly sand and loam with slopes from 0 to 18 percent. Several of the steepest areas abut the lake directly and constant wave action has undercut the banks. Erosion has also been hastened by wakes raised by an increased use of personal watercraft and speedboats. This area is also residential. It has very little natural vegetation and lacks deep rooted trees and shrubs which would lend greater stability to the area.

Boyne City intended to construct a 290-foot biotechnical shoreline erosion control demonstration project on Lake Charlevoix would have protected the lake from sand, salt and toxics eroding into the water from Lakeshore Drive. The community was not able to secure a contractor that could undertake the work within the proposed budget. At Boyne City's request, the project has been canceled.

MICHIGAN

PROJECT TITLE:	NORTH BRANCH OF THE BAD RIVER ADOPT-A-STREAM PROGRAM
GRANTEE:	GRATIOT SOIL CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$ 6,000 (APPROVED)
NONFEDERAL FUNDS:	\$ 2,284 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 –
PROJECT TYPE:	PROGRAM AND TECHNICAL ASSISTANCE
STATUS:	ONGOING

PROBLEM STATEMENT

Despite inroads into watershed management in the Bad River, traditional streambank erosion continues to be a problem, especially in areas inaccessible by large machinery. In order to address problems in these areas, a large number of dedicated individuals willing to do the restoration work must be energized to undertake this initiative. This project will benefit the river by reducing streambank erosion and associated sedimentation, while providing an opportunity for hands-on education about the causes, effects and techniques for reducing sedimentation.

BACKGROUND

The North Branch of the Bad River is a third order stream located within the eastern headwaters of the Saginaw River/Bay Area of Concern. It is over 67,000 acres in size, with 93 percent intensively cultivated. The river is an important contributor to the Shiawassee National Wildlife Refuge, a significant regional wetland habitat for migratory birds. The river also has an impact on the water quality of the Saginaw River which is an important economic benefit to the area. Reduction of streambank erosion and the associated sedimentation will be a great benefit to all these areas. In 1993, the Michigan Department of Natural Resources conducted water quality tests on the watershed which indicated that sediment was the primary pollutant impairing several functions of the river ecosystem.

The Gratiot Soil Conservation District has been very active in trying to resolve the problems of soil erosion and sedimentation in the Bad River watershed. Among other initiatives, the district has promoted wetland restoration, promoted the installation of over 20 miles of filterstrips and encouraged the adoption of no-till farming. Despite these efforts, traditional streambank erosion is still causing a considerable amount of sedimentation in the watershed. The district will develop an Adopt-a-Stream program to energize a critical mass of volunteers who will use bioengineering techniques to address erosion problems in areas inaccessible by heavy machinery

ACTIVITIES

A total of 3.5 miles of streambank have been adopted and targeted for logjam removal. A permit for work areas has been obtained while equipment and volunteers have been secured. The project manager spoke to a St. Charles High School biology class on the effects of sedimentation on rivers, lakes and wetlands.

MICHIGAN

PROJECT TITLE: PROTECTING HEADWATER STREAMS FROM SOIL EROSION AND SEDIMENTATION THROUGH STORMWATER MANAGEMENT, EDUCATION, COOPERATION AND INNOVATIVE POLICY

GRANTEE: LIVINGSTON COUNTY DRAIN COMMISSIONER

BASIN PROGRAM FUNDS: \$ 15,000 (APPROVED)

NONFEDERAL FUNDS: \$ 15,209 (PROPOSED)

PROJECT DURATION: JUNE 1, 1998 –

PROJECT TYPE: PROGRAM AND TECHNICAL ASSISTANCE

STATUS: ONGOING

PROBLEM STATEMENT

Livingston County anticipates a population growth rate of 90 percent between 1990 and 2020, an expansion from 115,645 to over 219,000 people. The construction phase of the associated development can be expected to contribute 65 to 70 tons of soil per acre to nearby water bodies annually if not properly managed. The Livingston County Drain Commissioner intends to develop a model program to provide an understanding of soil erosion and stormwater impact on chemical transportation and habitat degradation. The project will be directed at residents as well as the development community, including state and local officials, land owners, builders and contractors.

BACKGROUND

Livingston County contains the headwaters of three Great Lakes tributaries: the Shiawassee River, which drains to the Saginaw River and eventually to Saginaw Bay; the Red Cedar and Looking Glass rivers which both empty into the Grand River, thence to Lake Michigan; and the Huron River which drains to Lake Erie. These headwaters provide significant aquatic habitat supporting a diversity of aquatic species. For instance, the Livingston County portion of the Huron River provides habitat to wavy-rayed lamp mussels, eastern sand darters, snuffbox and gravel pyrg, all of which are endangered, threatened or species of concern.

The construction phase of development, if unchecked, can generate as much as 70 tons of soil per acre to nearby water bodies annually. Associated impacts of construction include changes to stream hydrology and morphology, loss of existing stormwater storage capacity, loss of wetlands, and an increase in impervious surfaces resulting in more and stronger run-off. These changes lead to an increase in the magnitude and frequency of severe flood events, an increase in bankfull flooding, ongoing streambank disturbance and erosion, channel widening and downcutting, dramatically increased sediment loads, and the elimination of pools and riffles. All of these contribute a greater amount of fines and other suspended material downstream, eventually to the Great Lakes.

The Livingston County Drain Commissioner has broad regulatory authority over soil erosion and sedimentation control as well as stormwater conveyance through state law and county and local ordinance. This makes the commissioner ideally situated to influence the current infrastructure for

nonpoint source pollution activities in the county and to strengthen existing erosion and sedimentation control programs.

ACTIVITIES

The Drain Commissioner invited volunteers from three key stakeholder groups — builders/developers, environmental/agricultural interests and government officials — to participate in an initial meeting where he introduced the issues of concern. Thirty-three attendees took part in the meeting where the problems, goals and expectations associated with the project were outlined. The importance of a healthy headwater system to overall riverine health was explained. Participants identified the unique and valued aspects of Livingston County as well as perceived challenges to these amenities. After the meeting, the results were compiled and sent to the participants.

Following the initial stakeholder meetings, thirty participants volunteered to sit on the Technical Advisory Committee (TAC). The Drain Commissioner prepared *TAC Notebooks* for each committee member which brought together the existing county and local ordinance, example ordinance from other counties, other articles and references of potential interest and application. At the same time, the Drain Commissioner polled various Great Lakes enforcement agencies requesting summary information of drainage and sedimentation control policies. These data will be used to develop a draft soil erosion and sedimentation control program for the consideration of the TAC.

MICHIGAN

PROJECT TITLE:	RIPARIAN HOMEOWNER'S STEWARDSHIP PROJECT
GRANTEE:	MID-MICHIGAN ENVIRONMENTAL ACTION COUNCIL
BASIN PROGRAM FUNDS:	\$ 9,500
NONFEDERAL FUNDS:	\$ 7,250
PROJECT DURATION:	MAY 1, 1997 – JUNE 1, 1999
PROJECT TYPE:	INFORMATION/EDUCATION
STATUS:	COMPLETE

PROBLEM STATEMENT:

Riparian homeowners in the Red Cedar River watershed are not aware that their activities have an impact upon the river's water quality. An information/education program designed to promote the economic benefits of riparian best management practices could help energize homeowners as a good source of coordination, leadership and labor for riparian projects.

BACKGROUND:

Red Cedar River riparian homeowners do not realize that their activities, such as composting too close to the river's edge, misuse of pesticides and fertilizers, or maintaining a riverside lawn with no buffer strip, combine to degrade the quality of Red Cedar River water. Homeowner Associations (HOA) formed along the Red Cedar River enjoy both economic and quality of life benefits from a healthy river. With this impetus, HOAs have the potential to be active guardians of the river which is both a natural and economic resource. HOAs are potentially the most effective forum for completing projects that require significant coordination, leadership and labor because they are established groups accustomed to working together and are more experienced at developing consensus than an ad hoc volunteer group.

ACTIVITIES:

Mid-Michigan Environmental Action Council (Mid-MEAC) drew upon the labor, coordination and leadership potential of four homeowner associations (HOA) along the Red Cedar River – Indian Hills HOA, Riverwood HOA, Sylvan Glenn HOA and Tacoma Hills HOA. Through a variety of fora, including canoe trips, walking tours and seminars with HOAs, project staff informed riparian homeowners about potential threats to Red Cedar Creek water quality. They outlined actions individual homeowners could undertake, including environmentally sensitive lawn care and home maintenance procedures. In addition, project staff conducted 15 individual on-site consultations with interested homeowners to provide recommendations for buffer strip design and water resource protection.

RESULTS:

Project staff completed and distributed the *Red Cedar River Riparian Homeowner's Handbook* to over 300 individual homeowners, local government officials, and other interested groups. In total, they produced and distributed more than 1,800 copies. In addition, project staff conducted 15 indi

vidual, on-site consultations with interested homeowners and provided recommendations for buffer strip design and water resource protection. With volunteers, project staff designed and constructed three major riparian buffer strips over 300 feet along the river.

MICHIGAN

PROJECT TITLE: SOIL EROSION AND SEDIMENT CONTROL
EDUCATION, GRAND TRAVERSE BAY WATERSHED

GRANTEE: GRAND TRAVERSE BAY WATERSHED INITIATIVE

BASIN PROGRAM FUNDS: \$ 7,105 (APPROVED)

NONFEDERAL FUNDS: \$ 4,105 (PROPOSED)

PROJECT DURATION: JUNE 1, 1998 –

PROJECT TYPE: INFORMATION AND EDUCATION

STATUS: ONGOING

PROBLEM STATEMENT:

Soil erosion reduction and prevention activities on the Boardman River in the Grand Traverse Bay watershed, are not fully appreciated by the people who reside in and use the watershed. If the clear, sand-bottomed streams are to be preserved, a significant education effort must be undertaken in the watershed. This project will support other Great Lakes Basin Program projects in the watershed by constructing interpretive display panels and conducting teacher training workshops to educate Boardman River users about soil erosion control practices.

BACKGROUND

This project builds upon successfully completed Great Lakes Basin Program projects designed to protect the Grand Traverse Bay watershed from excessive soil erosion and sedimentation. One component of the project will enhance the Grand Traverse Bay Initiative's Water Watch Program, an information/education program that teaches teachers and students about the value of soil erosion control. Another phase is intended to assess segments of smaller Boardman River tributaries for sediment loading. Support for this task will come from the conservation district, the U.S. Department of Agriculture's Natural Resources Conservation Service and graduates of the Water Watch Program. This component will identify priority sites for future monitoring and give Water Watch participants an opportunity to use their newly gained knowledge. Finally, project personnel will develop an exhibit on erosion control best management practices to display at the Initiative's Land and Water Resource Center.

ACTIVITIES

Project personnel held a series of program development and workshop planning meetings, during which teachers were recruited to participate in the program and arrangements to host a sediment monitoring training workshop were made with Grass River Natural Area. The group held a sediment monitoring workshop in April, 1999. In May, a riverbank restoration workshop utilized the knowledge taught at the April workshop. Twenty-five students helped restore streambank integrity on the Boardman River in downtown Traverse City. At the same time, they learned about the impact of sedimentation on aquatic insects and fish spawning beds.

A Geographic Information System (GIS) base map of the Boardman River has been developed by a consultant and will be used by resource specialists to design the interpretive display.

MICHIGAN

PROJECT TITLE:	USE OF THE WWW FOR WATERSHED MANAGEMENT
GRANTEE:	MICHIGAN TECHNOLOGICAL UNIVERSITY
Basin Program Funds:	\$ 9, 080
Nonfederal Funds:	\$ 5, 198
PROJECT DURATION:	JUNE 1, 1998 – JUNE 30, 1999
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	COMPLETE

PROBLEM STATEMENT

It is anticipated that the Otter River watershed located in Houghton County in Michigan's Upper Peninsula, will experience increased development for recreational use in the near future, including boating, skiing, hiking, snowmobiling, off-road vehicles and a considerable sport fishery. The fishery has declined recently due, in part, to degraded habitat from excessive sedimentation. The watershed is 89 percent forested and road crossings are a major contributor of the sediment degrading water quality. Michigan Technological University proposed the development of an Internet education tool to familiarize Otter River watershed users with land-use impacts in their watershed.

BACKGROUND

The watershed has a complex drainage pattern with a number of small streams that are both perennial and intermittent with varying slopes and geomorphic characteristics. There are 18 lakes in the watershed ranging from 6.3 to 933 acres in size. Only two, Otter and Sand lakes, have significant residential development, while the remainder have little or none. This lack of residential development makes these other areas of the watershed excellent recreation space.

A 1993 Michigan Department of Environmental Quality study identified poor conditions at road crossings in the Otter River watershed as a major contributor to erosion and sedimentation problems in the basin. A Michigan Department of Natural Resources study, based on a survey of 60 miles of watershed, found many severe "trouble" spots. For instance, at one location almost 14,000 cubic feet of sand had been deposited over 15,000 linear feet of stream. There is a layer of sand up to 10 feet deep in the final 7-8 miles of the Otter River above Otter Lake. In the lake itself, a large delta stretches more than half way across the lake bottom estimated at more than 54,000 10-yard dump truck loads of sand!

Michigan Technological University proposed developing an interactive web site to educate school children and members of the general public about the processes and effects of erosion and sedimentation in a watershed. The site is intended to raise awareness about these issues and identify ways people can address and control sedimentation.

ACTIVITY

Michigan Technological University personnel developed an Internet site framework for *Michigan Technological University's Water Web* (www.cce.mtu.edu/projects/watershed). The theme of this site is watershed management. Water Web information is organized to appeal to a range of ages and backgrounds. For instance, information for children in kindergarten through sixth grade is presented primarily in images, while that aimed at middle school and high school students builds conceptually and is more detailed depending upon the level. Information presented at the college and professional levels is based upon professional papers, books and academic theses. The site also has information on meteorology, with a section on remote sensing and monitoring expected to be added soon.

The underlying purpose of the web site is education, nevertheless it has also been used to aid in stream rehabilitation through the Otter River Improvement Project. This "real-time" project involves several agencies and groups and illustrates a cooperative effort of watershed rehabilitation to reduce sediment and erosion. The site allows a virtual tour of the Otter River and can be seen at www.cce.mtu.edu/projects/watershed/otter_river/index.

The project managers have found it a challenge to find personnel with the requisite expertise in both web page design and natural systems. There are also difficulties associated with communication between programmers and those working in the field.

RESULTS

The project team developed a range of educational modules on watershed management directed at all age groups, Kindergarten through college levels. The project team has coordinated their work with a number of schools and modules from the site will be used in conjunction with local "Adopt-a-Stream" programs as part of Michigan Technological University's outreach programs. In addition, a graduate hydrology class has agreed to provide hydrologic analyses for several basins located throughout the western Upper Peninsula. Involved faculty and staff intend to keep developing the site, including modules on water quality, remote sensing, watershed management and pollution.

MICHIGAN

PROJECT TITLE: VEGETATIVE BARRIERS TO PREVENT SOIL EROSION AND INCREASE BIOLOGICAL PEST CONTROL IN AGRICULTURAL LANDSCAPES

GRANTEE: MICHIGAN STATE UNIVERSITY, DEPARTMENT OF ENTOMOLOGY

BASIN PROGRAM FUNDS: \$ 14, 860

NONFEDERAL FUNDS: \$ 13, 301

PROJECT DURATION: DECEMBER 1, 1997 – JANUARY 1, 1999

PROJECT TYPE: TECHNICAL ASSISTANCE

STATUS: COMPLETED

PROBLEM STATEMENT:

Soil erosion and sedimentation from crop lands has been identified as a major source of nonpoint source pollution in the Great Lakes basin. The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) identified vegetative barriers as an effective measure for reducing sedimentation and nonpoint source pollution. Recent Michigan State University, Department of Entomology research has demonstrated that vegetative barriers also provide habitat for weed seed and crop pest predators. The relative influence of this benefit, however, has not yet been quantified.

BACKGROUND:

In addition to creating a significant source of nonpoint source pollution, agricultural land-use disturbs habitat, overwintering sites, refuge from pesticide application and food resources for arthropods which prey on crop pests. The lack of these habitats has been linked to increased crop losses which can, in turn, lead to increased pesticide use and an attendant rise in nonpoint source pollution. Including adequate habitat management in agricultural land-use planning is the key to an ecosystem-based approach to managing these problems. Properly managed vegetative barriers, such as cross wind trap strips within fields and filter strips bordering fields, may serve multiple purposes including wind and water erosion control and increased habitat for beneficial life forms.

In the Saginaw Bay region, high crop and tillage intensity combined with inherent soil and landscape characteristics make soil erosion and associated nutrient and pesticide loading in surface waters an acute problem. Annual soil erosion into the Saginaw Bay watershed is estimated at nine million tons. Under the Great Lakes Water Quality Agreement the watershed has been designated an Area of Concern and become the focus of the U.S. Environmental Protection Agency's first National Watershed Initiative Program. Under this program, the NRCS is developing vegetative barriers as a component of a Conservation Management System. These include technical guidelines for cross wind trap strips to induce soil deposition and trap pollutants before they are deposited downwind. At the same time the reduction in non-crop habitats, such as fence and hedgerows, wood lots and riparian buffers has limited the abundance and diversity of crop pest predators. One means of reintroducing the required habitat into the landscape is through vegetative barriers. Michigan State

University research has developed natural enemy resource habitats comprised of perennial grasses, legumes and flowering herbs most of which have also been approved for use in vegetative barriers.

ACTIVITIES:

Three field test plots of varying composition, legume, switch grass and crops (soybean in 1997 and corn in 1998), were established in Midland County, Bay County and Tuscola County. At each site, researchers conducted bi-weekly pitfall trapping for carabid ground beetles which are important insect and weed seed predators. In addition, researchers conducted seed predation studies at the Midland County site.

RESULTS:

The research demonstrated that filter strips can contain a more diverse and abundant carabid (ground beetle) community than the adjacent field. A total of 36 species of carabids and 3360 individuals were found in the crop strip, 43 species and 4330 individuals in the legume plot and 50 species and 5247 individuals in the switch grass test site with corresponding abundance following similar trends. Carabids and other invertebrates were responsible for a significant removal of weed seed. For instance, in one week they removed 84 percent of foxtail seeds in the switch grass filter strip compared to 42 percent and 17 percent in the legume and soybean filter strips respectively. An unexpected finding was that crickets also consume large quantities of weed seeds.

The project team produced the following articles:

Landis, Douglas and Lawrence Dyer, "Conservation Buffers and Beneficial Insects, Mites and Spiders," 1998, USDA--NRCS Conservation Information Sheet. 4 pp.

Menalled, Fabian and Landis, "Carabid Beetles, Filter Strips and Biological Control of Annual Weeds," *Midwest Biological Control News* 5 (December 1998): 4-5;

www.wisc.edu/entomology/mbcn/weed512.html

Landis, et.al., "Habitat Management to Enhance Biological Control in IPM," International Conference on Emerging Technologies in Integrated Pest Management: Concepts, Research and Implementation. March 8-10, 1999 (in press).

Menalled, et.al., 2000. "Ecology and Management of Weed Seed Predators in Michigan Agroecosystems," MSU Extension Bulletin E 2716.

Additionally, project personnel hosted three field days which attracted approximately 100 farmers, extension agents, and highschool students. *Midwest Biological Control News* is received by all county extension offices and extension entomologists in the 11 state north-central region meaning more than 2,000 people saw the article. Another 2,000 people received the USDA--NRCS conservation information sheet as well.

MINNESOTA

PROJECT TITLE:	BAPTISM RIVER STREAMBANK STABILIZATION DEMONSTRATION
GRANTEE:	MINNESOTA DEPARTMENT OF NATURAL RESOURCES, TETTEGOUCHE STATE PARK
Basin Program Funds:	\$ 14,500 (APPROVED)
Nonfederal Funds:	\$ 10,000 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 –
PROJECT TYPE:	DEMONSTRATION
STATUS:	ONGOING

PROBLEM STATEMENT

Traditional erosion control projects that are structural, such as bulkheads, gabions and sandbags, are not aesthetically pleasing for natural areas such as parks. In such settings, an aesthetic approach could be achieved by using bioengineering techniques. Unfortunately, these types of projects have been few in number and poorly documented in Minnesota's Great Lakes watershed.

BACKGROUND

The Baptism River is known to anglers as one of the better gamefish streams along Minnesota's North Shore. The stream supports steelhead and rainbow trout spawning in the spring and chinook salmon and brook trout in the fall. It has been characterized as "supporting, but threatened" for its ability to support aquatic organisms. Sedimentation degrades stream fisheries by abrading and suffocating organisms, reducing light penetration and photosynthesis, disrupting respiration and feeding efficiencies of invertebrates and fish and filling required hiding space for fry. Sediment also disrupts aquatic plants, warms water and transports nutrients attached to the soil, increasing undesirable plant and algae growth.

Bioengineering techniques to control soil erosion and sedimentation are aesthetically pleasing alternatives to structural solutions composed of concrete, sandbags and other "hard engineering" processes. There are relatively few examples of bioengineering for the north shore of Lake Superior available for those undertaking such projects. Therefore Tettegouche State Park personnel propose to develop a bioengineering project which will provide long-term protection of the Baptism River but also be aesthetically appealing. This demonstration project will also be used for the park interpretative program.

ACTIVITIES

In the fall of 1998 project personnel identified and assessed potential sites, eventually choosing a 3/4 acre site with a slope ration of 2:1. In the spring, they consulted with Minnesota Board of Soil and Water Resources staff on an action plan. The group decided to use fascine bundles of willow as well as dormant stakes of willow, red osier dogwood and balsam poplar. A fast-growing native vegetation called blue joint grass and erosion control mat were used for protection while the site was under construction.

The stakes and wattles were prepared by staff members but the planting involved several volunteer groups. Two groups from Wolf Ridge Environmental Learning Center took part in the project to learn about the process with the intention of applying it to some of their own problem sites. Another group was part of the University of Minnesota – Duluth's Outdoor Recreation Program. Both groups were experienced climbers and had the required climbing gear to work well on the steep slope.

The group used approximately 2,500 dormant stakes, 400 feet of wattles, 11 pounds of blue joint grass, two bushels of seed oats, and 40 rolls of erosion control mats. The project is helping to foster relations between the park and the local groups who are volunteering their time to help with the project.

RESULTS

The project remediated a 3/4 acre site. Project personnel estimate a 20 year life for the project, during which time they expect up to 12,000 tons of soil, 129,000 pounds of phosphorus and 25,800 pounds of nitrogen to be kept on the land and out of the water. Additionally, the site will be visited by several hundred college students and teachers as well as landowners and personnel from local environmental learning centers.

MINNESOTA

PROJECT TITLE:	KNIFE RIVER WATERSHED EDUCATION PROJECT
GRANTEE:	LAURENTIAN RESOURCE CONSERVATION AND DEVELOPMENT COUNCIL
BASIN PROGRAM FUNDS:	\$9, 229
NONFEDERAL FUNDS:	\$6, 500
PROJECT DURATION:	JUNE 1, 1996 – JANUARY 1, 1999
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	COMPLETE

PROBLEM STATEMENT:

Tree planting, seeding and other habitat enhancement activities in the Knife River Watershed are occurring as a result of a Forest Stewardship Watershed Project initiated in 1992. For these activities to continue, develop, and endure over the long-term, an educational program targeting the citizens in the watershed is also needed. To address this need, the Laurentian Resource Conservation and Development Council initiated the Knife River Watershed Education Project.

BACKGROUND:

The Knife River Watershed is a unique system among Minnesota's Lake Superior/North Shore tributaries. It encompasses an area of approximately 60,000 acres split evenly between private and public ownership. The Knife River has the North Shore's only naturalized wild steelhead population and is the only North Shore tributary that has no natural barriers preventing fish migration. However, the river is also a major source of sedimentation to Lake Superior. According to the North Shore Steelhead Plan, land-use changes have resulted in the acceleration of streambank erosion and sedimentation, and excessive fluctuations in stream flow and water temperature. Furthermore, cumulative hydrologic effects have combined to produce a negative impact on the Knife River system's quality and quantity.

The goal of this project was to minimize and/or prevent soil erosion and sedimentation in the Knife River Watershed, which directly impacts Lake Superior, and thus protect and improve water quality as well as wildlife and fish habitat. This goal was reached through information and education activities.

ACTIVITIES:

The project goal was accomplished by meeting both short-term and long-term objectives. The short-term objectives completed include producing four issues of *Edge of the Knife* newsletter during the project year. This newsletter educated readers about the necessity of riparian tree establishment, existing tree species, historical data on the Knife River, and protection of wildlife and fisheries habitat in the Knife, as well as acknowledging landowners that have currently implemented stewardship plans in the watershed. The project has been disseminated to over 1,000 landowners, residents, students and elected officials through two tree plantings, two tours of the watershed projects and four *Edge of the Knife* newsletters. Over 600 people in the watershed received the newsletters. One edition of the newsletter included a pull-out Knife River Watershed factsheet that was also distributed by other means. Educational signs were developed and posted at six strategic locations

throughout the watershed. These signs attract attention year-round, as they are placed at popular fishing, swimming, and picnic spots, as well as along hiking, skiing, and snowmobile trails.

Over 1,700 trees were planted on private and public lands to stabilize streambanks and prevent erosion. This is well over the 750 trees originally proposed. A total of 31 acres of public and private land were planted as part of the "Riparian Tree Cost Share" program, where landowners received 50 percent cost share for trees, mats, and mulch. Furthermore, eight landowners received Forest Stewardship Plans.

The long-term goal of creating a Geographic Information System (GIS) is underway. Maps of political boundaries, national wetlands, highways and roads, rivers and streams, and/or watershed boundaries can already be generated. GIS maps have been produced and included in the *Edge of the Knife* newsletters. So far, the GIS has been a tool to give the landowners a visual idea about how large the watershed is, where beaver dam sites are located, the location of tributaries and sub-tributaries, and property boundaries in the watershed. The GIS will eventually be used for community-wide, landscape-level planning purposes and will generate important information about the watershed for local professionals, local units of government, and landowners for future planning and decision-making activities.

RESULTS:

An estimated 20 tons of soil will be saved per year as a result of 1,800 feet of forested filter strips, 300 feet of vegetative stabilization, and 3,000 feet of riparian tree planting over some 31 acres. Eight editions of the newsletter, *Edge of the Knife*, were produced and mailed to 650 landowners, elected officials and other interested parties. Additionally 2,000 fact sheets were produced and circulated. Student volunteers also participated in two tree plantings.

Additionally, several smaller watersheds along Lake Superior's North Shore have started watershed projects based on the information generated by this project. Thus the potential for improvement and protection of Lake Superior water quality is ever expanding.

MINNESOTA

PROJECT TITLE: LAKE SUPERIOR SHORELINE PROTECTION PROJECT

GRANTEE: LAKE SUPERIOR ASSOCIATION OF SOIL AND
WATER CONSERVATION DISTRICTS

BASIN PROGRAM FUNDS: \$ 20,000 (APPROVED)

NONFEDERAL FUNDS: \$ 20,000 (PROPOSED)

PROJECT DURATION: JUNE 1, 1998 –

PROJECT TYPE: PROGRAM AND TECHNICAL ASSISTANCE

STATUS: ONGOING

PROBLEM STATEMENT:

Minnesota's Lake Superior shoreline has approximately 60 miles of pockets of highly erodible red clay and silt. Red clay is made of very small particles which are easily eroded and suspended into the water. The clay degrades nearshore water quality and aquatic habitat when it settles on the substrate. Shoreline development has accelerated erosion in many areas, typically through both the removal of stabilizing vegetation and more concentrated runoff.

BACKGROUND:

The North Shore of Lake Superior is often perceived as being entirely rocky. There are, however, approximately 60 miles of Minnesota shoreline on the lake where the bedrock dips to or below the lake level and red clay and silt deposits from banks up to 70 feet high. Over geologic time, cobbles and sand veins in the clay eroded into bolder-strewn and cobbled bays which provide excellent habitat for fish and other aquatic life.

Nonpoint source pollution is one of the major threats affecting water quality in Lake Superior. These threats are due to the erosion and sedimentation of the area's red clay soils. Tourism and development is increasing at a rapid rate along the north shore of Lake Superior in Minnesota and is imposing increasing pressures on the resource. Approximately 36 miles of Minnesota's Lake Superior shoreline have been identified as high erosion hazard areas.

Many of the eroding shoreline areas are landslide prone and must be stabilized in order to control erosion and maintain water quality. Engineering solutions to stabilize these problem areas are quite expensive and existing cost-share programs will not be sufficient to meet current needs.

ACTIVITIES:

The project team developed a grant program by combining the Great Lakes Basin Program grant and a Clean Water Act, Section 319 grant. The two-cycle grant program complemented Minnesota's Clean Water Partnership (CWP) program. The first cycle of the grant was competitive and designed for counties to have their own CWP programs developed and implemented before they were eligible to apply. Each county established a technical advisory committee and reviewed proposed projects for soil erosion savings. The project team reviewed several potential project sites and selected two eroding clay banks for grant assistance. These two sites have had project site surveys completed and design work has begun. The second grant cycle will not be competitive but only those counties with CWP programs in place will be eligible to apply.

MINNESOTA

PROJECT TITLE:	SOIL TESTING/PHREATIC INVESTIGATION -- LAKE SUPERIOR SHORELINE STABILIZATION
GRANTEE:	MINNESOTA BOARD OF WATER AND SOIL RESOURCES
BASIN PROGRAM FUNDS:	\$ 9,700
NONFEDERAL FUNDS:	\$ 4,600
PROJECT DURATION:	JUNE 1, 1998 – MAY 31, 1999
PROJECT TYPE:	PROGRAM AND TECHNICAL ASSISTANCE
STATUS:	COMPLETE

PROBLEM STATEMENT

There is very little applicable soil testing and phreatic, or groundwater, surface information available for the red clays and silts that compose a significant portion of the non-rock Lake Superior shoreline in Lake, Cook and St. Louis Counties, Minnesota. Without this information, conservative assumptions must be made for slope stability analyses which, in turn, lead to relatively uncertain and conservative slope stabilization designs. The goal of this project is to create a base of information to address these situations, reduce the costs of shoreline stabilization designs and stretch cost-share funds to more projects.

BACKGROUND

The North Shore of Lake Superior is often perceived as being entirely rocky. There are however, approximately 60 miles of Minnesota shoreline on the lake where the bedrock dips to or below the lake level and red clay and silt deposits from banks up to 70 feet high. Over geologic time, cobbles and sand veins in the clay eroded into bolder-strewn and cobbled bays which provide excellent habitat for fish and other aquatic life.

Nonpoint source pollution is one of the major threats affecting water quality in Lake Superior. These threats are due to the erosion and sedimentation of the area's red clay soils. Tourism and development is increasing at a rapid rate along the north shore of Lake Superior in Minnesota and is imposing increasing pressures on the resource. Approximately 36 miles of Minnesota's Lake Superior shoreline have been identified as high erosion hazard areas.

Many of the eroding shoreline areas are landslide prone and must be stabilized in order to control erosion and maintain water quality. Engineering solutions to these problems are restricted by a lack of readily or directly applicable information on soil composition, stability and other relevant characteristics. This situation makes it more difficult for North Shore landowners to compete for state-wide cost-share funding for conservation practices. This project is intended to develop a database of information to help in these situations.

ACTIVITIES

The project team reviewed potential project sites and selected three demonstration sites with high, eroding clay banks. They installed 18 piezometers (devices that measure water level in the soil) at the project sites. The team reviewed several designs and installation methods and chose the most effective, low-cost design. During installation, approximately 62 soil samples were collected. The team reviewed soil logs and initial piezometer performance in order to determine which samples to send to the lab for a range of tests including plasticity index, sieve analysis, direct shear and water content. At the same time, the team took weekly piezometer readings during the project period.

RESULTS

The team held an informal project workshop discussing the results with Dr. Peter Bosscher, University of Wisconsin. Dr. Bosscher specializes in static and dynamic soil-structure interaction modeling. Site design has been revised given the results of the slope stability analysis. If projects on the three demonstration sites are implemented, project personnel estimate a total of 16,420 tons of soil saved over the projects' estimated 20 year life-span. An additional 164,200 pounds of phosphorus and 32,840 pounds of nitrogen will also be saved. The project team has met with seven landowners during four site visits during the project period. They estimate contacting at least an additional 20 landowners whose property will benefit in the future from the knowledge gained here.

MINNESOTA

PROJECT TITLE: WATERSHED GUARDIAN PROGRAM
GRANTEE: ST. LOUIS RIVER CITIZENS ACTION COMMITTEE
C/O MINNESOTA POLLUTION CONTROL AGENCY
BASIN PROGRAM FUNDS: \$ 10,000
NONFEDERAL FUNDS: \$ 3,335
PROJECT DURATION: MAY 1, 1997 — OCTOBER 31, 1998
PROJECT TYPE: DEMONSTRATION
STATUS: COMPLETE

PROBLEM STATEMENT:

Unique topography and soils, including low permeable red clay and impervious urban surfaces, in the St. Louis River/Lake Superior watershed at Duluth, MN and Superior, WI have led to substantial erosion difficulties. There are 29 high quality streams and small watersheds which dissect Duluth's escarpment and act essentially as stormwater conduits carrying associated point and nonpoint pollutants to the St. Louis River and Lake Superior.

BACKGROUND:

Changes in land cover since European settlement have increased the stormwater impact on water quality. The pre-Contact coniferous and mixed forest coverage has changed to predominantly deciduous forests dominated by early succession tree species, such as aspen, which has resulted in higher peak stream flow and greater streambank erosion and sedimentation. As well, urbanization has increased impervious surfaces adding to peak flows and erosion. A reduction in peak storm flows, due to increased coniferous coverage, as well as activities undertaken as a result of riparian education in best management practices, should help reduce nonpoint source pollution to the St. Louis River/Lake Superior watershed.

The St. Louis River Citizens' Action Committee (CAC) is lead on a multi-organization funded project to carry out stream restoration projects and cultivate public awareness of stormwater impacts on water quality. This portion of the project is designed to protect Miller Creek, an urban stream in Duluth, which has a naturally reproducing brown trout population. The restoration project will establish herbivore exclosures to protect stream side northern white cedar, white pine and other conifers from predation from deer and rabbits. The conifers will increase on-land retention time for stormwater by slowing snowmelt in the spring and reduce stream water temperature in an area of thermal stress for brook trout.

ACTIVITIES:

The St. Louis Citizens Action Committee selected a site of high thermal stress and erosion along Miller Creek to plant with northern white cedar, white pine and other conifers appropriate for the site. The intention is to ensure a thick stand of native tree species providing multiple benefits to the stream. On May 16, 1998, more than 70 volunteers planted 460 trees along Miller Creek, of those,

60 were planted at the selected sites. The volunteers also installed cylindrical exclosures designed to keep browsing rabbits, beaver and deer away from the young trees. The Citizens Action Committee also designed and installed interpretive signs at the stream-side plantings in order to inform the public about the purpose and need for the improvements.

RESULTS

As a result of their work the Citizens Action Committee planted 60 conifers on about 1/2-acre along the stream and protected 80 trees from browsers with exclosures. The exclosures will be removed from the trees when they are no longer in danger from browsers. Over the estimated life of the project, approximately 29 tons of soil, 294 pounds of phosphorus and 59 pounds of nitrogen will be prevented from entering the stream. Over 100 people, students, anglers and senior citizens, were reached through the various components of the project, ranging from direct involvement in the planting to viewing the results as they visit and use the stream.

NEW YORK

PROJECT TITLE:	CRITICAL AREA SEEDING — ROAD BANKS
GRANTEE:	CAYUGA COUNTY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$15, 000 (APPROVED)
NONFEDERAL FUNDS:	\$15, 000 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 —
PROJECT TYPE:	DEMONSTRATION
STATUS:	ONGOING

PROBLEM STATEMENT

According to a New York state Department of Environmental Conservation report, road banks in Cayuga County contribute an average of 60 tons of sediment per mile to the county's Lake Ontario sub-watershed. With over 3,000 miles of road banks in the county, this is potentially a significant source of sediment and nutrients to the watershed.

BACKGROUND

In a 1975 report, "Erosion and Sediment Inventory," the Department of Environmental Conservation's Division of Water found that road bank erosion can contribute a significant amount of sediment with attached nutrients and chemicals to the Lake Ontario watershed. In the water, sediment and associated chemicals degrade water quality, fish and wildlife habitat. The degree of erosion varies according to the state of the road bank, the type of soil, the amount of cover and the slope of the bank, however, the average loss in Cayuga County is 60 tons per mile. This means degraded water quality, the potential for flooding because of decreased stream capacity, as well as increased maintenance costs for the county highway department.

Many of the most highly erodible areas in Cayuga County have been identified. The remainder of the sites must be identified and appropriate best management practices (BMPs) implemented. For this type of erosion, critical area seeding is an inexpensive and successful BMP to use. Established seeding will stabilize highly erodible areas, preventing further erosion. Permanent vegetative cover can reduce surface run-off by 50 to 90 percent depending on vegetation type and density. Corresponding soil loss in surface run-off can be reduced by up to 95 percent and nitrogen loss by up to 90 percent.

ACTIVITIES

The conservation district developed partnerships with town and county highway departments to identify road banks most in need of seeding and develop an inventory for future projects. The partnership seeded 6.85 acres of highly erodible road bank, choosing two locations as demonstration sites. At these areas, located in the town of Aurelius, signs have been installed to draw public attention to the project site. The conservation district included an article on the seeding project in its monthly newsletter, *Conservation Highlights*, which is distributed to the county legislature, other conservation districts and the general public. A picture of the demonstration site is also available on the district's web site www.co.cayuga.ny.us/soilcon.

NEW YORK

PROJECT TITLE:	EROSION AND SEDIMENT CONTROL ORDINANCE PILOT PROJECT
GRANTEE:	WAYNE COUNTY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$5,000 (APPROVED)
NONFEDERAL FUNDS:	\$1,670 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 —
PROJECT TYPE:	PROGRAM AND TECHNICAL ASSISTANCE
STATUS:	ONGOING

PROBLEM STATEMENT

Water quality monitoring has demonstrated that close to 4,000 tons of sediment annually enter Sodus Bay contributing to degraded water quality and fish and wildlife habitat in Lake Ontario. In order to address this problem, the Wayne County Conservation District will develop a local ordinance requiring erosion and sediment control measures for construction and new development in Wayne County.

BACKGROUND

The Wayne County Soil and Water Conservation District plays an integral role in assisting local governments with natural resource management issues. For instance, the conservation district developed and facilitated the adoption of a common ordinance for septic systems in Wayne County. The conservation district proposes a similar ordinance to address soil erosion and sedimentation control during construction. The application of such an ordinance will reduce the amount of sediment entering Sodus Bay annually and lead to improved water quality, and fish and wildlife habitat.

The goal of this project is to facilitate the adoption of an erosion and sediment control ordinance in fifteen Wayne County towns located in the Lake Ontario basin. This pilot project will demonstrate the kind of interagency cooperation that integrates soil erosion and sedimentation control efforts with water quality initiatives and can be adopted throughout the region.

District personnel will draft an erosion and sediment control ordinance. They will then develop supporting educational materials which outline the need for and benefit of erosion and sediment control. This will most likely take the form of a video and accompanying brochure. District staff will then attend town board meetings to promote the ordinance, in the process disseminating information to town councils, planning committees and, through council reports, to the larger community.

ACTIVITIES

District staff drafted a model stormwater erosion and sediment control ordinance and conveyed it to the Director of the County Planning Department and two town supervisors for review and comment. The ordinance was also posted on the district's web site for review by the community at large and other communities contemplating similar measures. At the same time, District staff made municipalities aware of technical support at the District that can reduce the burden of site review for municipal officials. Project personnel developed an educational brochure that can be used throughout the Great Lakes basin to promote the importance and benefits of the ordinance. They also developed press releases for county newspapers. The articles informed the public about the District's campaign to promote stormwater management and erosion control. The District expects this multi-phase response will help protect freshwater resources.

NEW YORK

PROJECT TITLE:	HONEOYE LAKE WATERSHED PUBLIC AWARENESS AND EDUCATION PROJECT
GRANTEE:	ONTARIO COUNTY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$12, 000
NONFEDERAL FUNDS:	\$ 6, 000
PROJECT DURATION:	JUNE 1, 1998 — JUNE 30, 1999
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	COMPLETE

PROBLEM STATEMENT

Public information surveys indicate that there is considerable concern about water quality in the Honeoye Lake watershed. Despite this concern, the level of watershed and water quality knowledge is minimal. The Ontario County Soil and Water Conservation District proposed developing a comprehensive publication for the watershed to be used as an educational guide to protect the watershed's natural resources. The book promotes landowner commitment to specific soil erosion and sedimentation reduction actions.

BACKGROUND

The Honeoye Lake Watershed Management Committee formed as a result of a public survey carried out by a local college. The survey indicated concern among the public about water quality issues related to recreation, such as sedimentation and aquatic vegetation control. Despite concern about these issues, the level of watershed and water quality knowledge was minimal. Most respondents suggested short-term solutions to the problems, such as dredging or weed harvesting. The management committee intends to develop a watershed plan, however, the lack of a strong public understanding of the intricacies of these issues could inhibit the success of a plan.

Given strong community concern about water quality issues in the Honeoye Lake watershed and public interest in learning more about them, the conservation district proposed developing an education strategy to raise public awareness. The primary focus of the strategy will be a book outlining the impact of human actions on water quality issues and provide information on issues such as water supply, testing and treatment, drainage and runoff, household chemicals, private septic tanks and shoreline development.

ACTIVITIES

The conservation district recruited a sub-committee of the Honeoye Lake Watershed Task Force to develop an outline and contents for the *Honeoye Lake Book*. Technical members of the Task Force reviewed the data and research while other members of the team sorted graphics, digitized maps,

illustrations and photographs for the publication. The final product, 1,000 copies of the *Honeoye Lake Book* was completed on June 30, 1999.

Much of the information developed for the *Honeoye Lake Book* was also presented in fact sheet form and used at conferences, forums and local meetings. The fact sheets were also distributed throughout the watershed.

The process of developing the book enhanced public awareness about water quality impacts even before the final product was available. The project also involved the collaborative efforts of a diverse range of stakeholders within the watershed. In the process, it created a number of new and healthy working relationships that will be required for future projects. All the involved Task Force members have gained a strong working knowledge of water quality issues from their work and interpretation of the data.

RESULTS

The Honeoye Lake Watershed Public Awareness and Education Project has produced positive results. Over 1,000 residents of the watershed received copies of the *Honeoye Lake Book*. Public interest generated by this process has made possible several workshops on shoreline concerns through a recent Protected Shores grant. Five of the six watershed townships support the watershed management process and have contributed funds to a tributary sampling and monitoring program and other research projects. In addition, existing ordinances are being reviewed by the Honeoye Lake Watershed Trust and new models drafted addressing stormwater management, septic systems and logging controls. These models will be offered to watershed municipalities for approval and adoption. The conservation district anticipates ongoing educational opportunities including workshops on forestry and additional public meetings.

NEW YORK

PROJECT TITLE:	MONROE COUNTY HIGHWAY WATER QUALITY IMPROVEMENT PROJECT
GRANTEE:	MONROE COUNTY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$24, 600 (APPROVED)
NONFEDERAL FUNDS:	\$12, 240 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 —
PROJECT TYPE:	PROGRAM AND TECHNICAL ASSISTANCE
STATUS:	ONGOING

PROBLEM STATEMENT

Roads and road construction contribute significant sediment and other pollutants to the Rochester Embayment of Lake Ontario which is designated an Area of Concern under Annex 2 of the Great Lakes Water Quality Agreement. The Monroe County Department of Transportation requires technical support in order to design water quality protection features into county highway projects.

BACKGROUND

The Rochester Embayment of Lake Ontario is one of 43 Great Lakes Areas of Concern designated under the Great Lakes Water Quality Agreement. Urban stormwater and/or construction site erosion are known sources of pollutants, responsible for 8 of 112 use impairments in the Embayment. Additional sources of sediment and pollutants, however, are roads and road construction.

The Monroe County Department of Transportation (MCDOT) owns and operates over 650 miles of roads in the county. Approximately \$15 million is spent annually on repairing, rebuilding or maintaining these roads and 4 associated bridges. Given the size of MCDOT's operations, a full-time water quality professional is required to review plans and inspect construction sites in order to identify and mitigate nonpoint source pollution associated with roadway construction.

In 1994, a group of staff from the MCDOT, Monroe County Department of Health, the municipalities and the Monroe County Conservation District addressed water quality concerns related to road construction. The group developed a "Highway Project Water Quality Improvement Strategy" which was designed to include water quality objectives in road construction projects. The strategy integrates water quality concerns early in the design phase of all highway projects that could have a potential impact on water quality.

MCDOT has already begun to implement water quality initiatives. These include improved construction-phase erosion and sediment control practices during county highway construction, incorporating stormwater management practices, such as the use of stormwater wetlands, into county

highway projects and active participation on the county's Water Quality Coordinating Committee. This project will provide MCDOT with the additional technical support it requires to ensure water quality initiatives continue to be incorporated into road repairs and new projects. A civil engineering intern will be trained in roadway erosion and sediment controls and water quality by the certified erosion control technicians from the Monroe County Soil and Water Conservation District.

ACTIVITIES

The Monroe County Conservation District met with the county Director of Transportation to discuss the scope of the project and role of the water quality highway engineer. The conservation district began the process to hire the engineer to fill this position. In the interim, conservation district personnel reviewed the status of current highway projects in the county, toured recently constructed projects and met with county DOT personnel to discuss maintenance issues related to water quality. Conservation district personnel also attended three county Water Quality Committee meetings and attended a water quality seminar sponsored by local soil and water conservation districts. In house, conservation district staff reviewed proposed best management practices for practicality and implementation and reviewed standard details used on MCDOT projects.

RESULTS

To date, project personnel have reached 160 highway designers and consultants in field and office meetings as well as a two-day workshop. They discovered that highway personnel are not well versed in the need for compliance with the National Pollutant Discharge Elimination System (NPDES) permit. The primary construction issue appears to be the need for controlling erosion and developing an understanding about the importance of timing, sequence and scheduling as it affects construction erosion control. Best management practices need to be expanded or modified because the traditional practices, such as straw bales, silt fences and check dams, are the only ones being employed when alternative practices are now available. These include channel protection down stream of culvert pipes and directing water along the toe of fill slopes.

Project personnel estimate that their efforts have affected 60 acres of land. Over the year they estimate that 600 tons of soil with an associated 6,000 tons of phosphorus and 1,200 tons of nitrogen have been saved. They anticipate that almost 140 additional highway designers and consultants will be contacted through outreach efforts.

NEW YORK

PROJECT TITLE: OSWEGO RIVER EROSION CONTROL PROJECT
GRANTEE: OSWEGO COUNTY PLANNING AND COMMUNITY
DEVELOPMENT
BASIN PROGRAM FUNDS: \$ 13,058 (APPROVED)
NONFEDERAL FUNDS: \$ 6,529 (PROPOSED)
PROJECT DURATION: MAY 1, 1997 —
PROJECT TYPE: INFORMATION AND EDUCATION
STATUS: ONGOING

PROBLEM STATEMENT:

Residential development along the Oswego River, in New York state's Lake Ontario watershed, has removed both native ground cover vegetation and trees. This causes accelerated soil loss and streambank erosion while increasing the amount of sediment and pollutants, such as fertilizers and pesticides, that enter the river. Boats with excessive wakes also add to streambank erosion problems. As a result, fish and wildlife habitats are disrupted and the canal's aesthetic appeal is reduced. Nonpoint source pollution from this source impacts the river, Oswego Harbor and Lake Ontario.

BACKGROUND:

Numerous studies have identified sediment problems along the Oswego River and in the Harbor. For example, the Oswego County Water Quality Strategy concluded that the Oswego River upstream from the Harbor to the junction at Three Rivers is impaired due to silt and sedimentation. The Oswego River has been placed on New York's Priority Water Problem List and identified for preservation of scenic qualities under the State Canal System Revitalization Plan. Additionally, Oswego Harbor has been designated an Area of Concern under the Great Lakes Water Quality Agreement, and the resulting Remedial Action Plan (RAP) is designed to reduce sediment and nonpoint source pollution inputs into the Oswego Harbor.

The Oswego County Planning and Community Development office proposed a three part program to identify erosion problems on the river, prioritize the eroding areas with recommended actions and develop an outreach program directed to local governments and property owners.

ACTIVITIES:

A visual survey and video tape record of the Oswego River shoreline provided the raw data that enabled erosion problems to be identified. Geographical Information System (GIS) maps were then created to identify shorelines, streambanks and other areas requiring protective and/or remedial action.

The team assessed development pressures on riparian property based upon municipal development plans. They produced a report titled: *The Determination of Buffer Widths: Literature Survey and Recommendations for Oswego County, New York*. The team used the report to prepare a model ordinance that would encourage the creation of a riparian buffer zone between development and the river bank.

They disseminated the ordinance to municipal governments and planning boards throughout the county.

The team then developed an educational outreach program that addressed current land-use and erosion conditions, remedial measures, environmental impact and outlined the economic benefits of proper streambank management.

RESULTS:

At a public meeting held in June, 1998, over 120 people heard presentations from the Oswego County Environmental Management Council, the Department of Planning and Community Development, and the Oswego County Soil and Water Conservation District. Attendees also received a number of pamphlets designed by the project team, Cornell University Cooperative Extension and the US Department of Agriculture -- Natural Resources Conservation Service. Conservation district staff offered assistance to riparian landowners requesting a site visit and erosion evaluation. Many site visits have resulted from this event.

Following the public meeting, Oswego County planning personnel presented information at municipal planning board meetings for nine local municipalities, as well as sessions of the Environmental Management Council. These events reached some 110 local legislators. The model ordinance was announced through the press and communicated directly to the New York State Canal Corporation and the Oswego County Sheriff. News releases and newsletters potentially reached an audience of over 120,000. Educational opportunities were arranged for over 6,000 boaters, shoreline owners and members of the general public.

NEW YORK

PROJECT TITLE: ROAD DITCH STABILIZATION DEMONSTRATION FOR
TOWN HIGHWAY SUPERINTENDENTS

GRANTEE: YATES COUNTY SOIL AND WATER CONSERVATION
DISTRICT

BASIN PROGRAM FUNDS: \$ 15,000

NONFEDERAL FUNDS: \$ 20,580

PROJECT DURATION: MAY 1, 1997 — NOVEMBER 30, 1998

PROJECT TYPE: DEMONSTRATION

STATUS: COMPLETE

PROBLEM STATEMENT:

Highway departments are faced with the task of designing and maintaining highways which remove water quickly to prevent flooding and ensure safe driving conditions while, at the same time, ensuring water quality is not impaired through soil erosion and/or chemical pollution trapped in eroded sediments.

BACKGROUND:

Approximately 95 percent of Yates County drains into the Finger Lakes — Seneca, Canandaigua and Keuka Lakes — which, in turn, drain into the Great Lakes basin. A 1974 U.S. Department of Agriculture— Soil Conservation Service “Erosion and Sediment Control Inventory” estimated annual road ditch erosion in the Finger Lakes-Seneca, Canandaigua and Keuka Lakes watershed as averaging 12 to 15 tons per road ditch mile. A New York State Department of Environmental Conservation study entitled, “State of the Canandaigua Lake Watershed – 1994, A Guide to Understanding and Protecting Our Vital Resources,” identified 16 potential causes of nonpoint source pollution which included road bank and road ditch erosion. Road ditches designated very severe, with slopes greater than eight percent, averaged 82 tons of soil eroded per mile, while slopes designated severe, between five percent and eight percent slope, averaged 33 tons of soil eroded per mile. There are 18.1 miles of severe or very severe road ditches in Yates County draining into Canandaigua Lake. Another study using the same methodology designated an additional 26 miles of Yates County ditches draining into Keuka Lake as severe or very severe. An additional 17 miles of ditches in the Kashong Creek watershed were found in need of treatment due to erosion problems.

Most road ditch and bank problems are due to two principal causes: insufficient rights of way along county and town roads and inadequate funds to remediate the problems. Forty-two highway superintendents from five counties have been trained to implement erosion and sediment control practices to control soil erosion when developing road management practices. The superintendents also received a supporting handbook with reference materials. The next step is to develop on-site demonstrations to reinforce classroom-based knowledge.

ACTIVITIES:

Yates County Soil and Water Conservation District inventoried all moderately, severely and very severely eroding road ditches by watershed. The inventory identified 8.9 miles of severe and very severe erosion sites in the Seneca Lake watershed. Project personnel selected approximately 2,750 feet at three severe or very severe sites for stabilization and began working on the sites in July 1998. At site one, project personnel reconstructed a limited use road which gave public access to the Keuka Lake Outlet Trail. Here steep road banks were stabilized by hydroseeding and mulching in anticipation of re-establishing thick vegetative cover. Sites two and three were road ditch projects that were stabilized with rip-rap in order to prevent costly annual reconstruction. Additionally, site two was hydroseeded and mulched.

RESULTS:

All three stabilized sites were subject to severe or very severe erosion. In total, a little over one-half mile or 2,750 feet of road ditch was stabilized. This amounts to a considerable savings of sediment to the Keuka Lake Outlet. Sites two and three, for instance, annually contributed an estimated 33 tons of sediment per mile before stabilization. With the completion of the project it is estimated that annual savings will amount to 41 tons of soil, 412 pound of phosphorus, and 83 pounds of nitrogen. Over the 10 year life of the project, this will mean over 412 tons of soil, 4100 pounds of phosphorus and 825 pounds of nitrogen will be prevented from entering the outlet which leads to Seneca Lake.

There are additional benefits to this project. The road inventory will continue to be used by local communities in planning, especially those wishing to establish a road improvement plan to include road ditch stabilization. The project offers three demonstration sites which have already been viewed by highway superintendents and 15 highway personnel. The project has enhanced working relations between municipal officials and the Yates County Soil and Water Conservation District. Due to this cooperative effort, highway superintendents have contacted the conservation district to request technical assistance on other road management problems they are experiencing.

NEW YORK

PROJECT TITLE: SENECA COUNTY GRAZING LAND INITIATIVE
GRANTEE: SULLIVAN TRAIL RESOURCE CONSERVATION
AND DEVELOPMENT COUNCIL
BASIN PROGRAM FUNDS: \$ 15,000
NONFEDERAL FUNDS: \$ 6,400
PROJECT DURATION: MAY 1, 1997 — SEPTEMBER 30, 1998
PROJECT TYPE: DEMONSTRATION
STATUS: COMPLETE

PROBLEM STATEMENT

Traditional agricultural practices are responsible for a significant amount of nonpoint source pollution entering the Great Lakes basin, including fertilizers and pesticides trapped in sediment particles. Intensive Rotational Grazing systems (IRG), also known as short duration grazing systems, are effective best management practices (BMPs) for controlling agricultural runoff but livestock producers need to know the environmental and economic advantages of IRG systems.

BACKGROUND

Agricultural causes of water quality impairment include manure spreading and storage, barnyard runoff, livestock in streams, pesticide and fertilizer application, and row crops. These activities are responsible for introducing excessive sediments, nutrients, pathogens, pesticides and organic matter into rivers and lakes through runoff. Runoff from marginal crop land and existing pasture and hayfields can be reduced substantially through the use of Intensive Rotational Grazing systems. IRG has been credited with reducing annual soil loss by as much as 9.4 tons per acre. If extrapolated over the one percent total crop land and pasture farmed within New York state's Lake Ontario basin, 2.223 million acres, could save as much as 208,979 tons of soil annually.

Intensive Rotational Grazing BMPs include interior and perimeter fencing to prevent livestock from entering streams, pasture seeding/renovation, installation of livestock watering facilities and introducing short duration grazing systems.

ACTIVITIES

The Sullivan Trail Resource Conservation and Development Council (RC and D) established a Grazing Committee which, in turn, identified and selected participating farms. The RC and D prepared grazing plans for all participating farms. Each plan identified IRG system BMPs applicable to the respective farm. Over the course of the summer project personnel laid out and began installation of BMPs on the participating farms. The Seneca County Water Quality Committee sponsored a tour of one of the farms and held a grazing workshop at another. Additional activities include completing BMP installation and a pasture walk for the fall of 1998.

RESULTS

The IRG system BMPs are expected to last ten years during which they will save 8,800 tons of soil, 88,000 pounds of phosphorus and 17,600 pounds of nitrogen. Additionally, 85 livestock producers and elected officials received information about the project during four workshops/farm tours. These efforts will continue. Project personnel estimate introducing an additional 250 farmers and elected officials to IRG system BMPs in the future.

NEW YORK

PROJECT TITLE: TWELVE MILE CREEK WATERSHED REMEDIATION/
DEMONSTRATION PROJECT

GRANTEE: NIAGRA COUNTY SOIL AND WATER CONSERVATION
DISTRICT

BASIN PROGRAM FUNDS: \$12,800 (APPROVED)

NONFEDERAL FUNDS: \$ 4,900 (PROPOSED)

PROJECT DURATION: JUNE 1, 1996 —

PROJECT TYPE: DEMONSTRATION; INFORMATION AND EDUCATION

STATUS: CANCELED AT REQUEST OF GRANTEE

PROBLEM STATEMENT

Recognized as a significant game fish corridor, Twelve Mile Creek's environmental health is in notable decline. Studies have established a correlation between the degradation of Twelve Mile Creek, soil erosion and the resulting sedimentation. Much of the degradation can be linked to the large scale "ditching" efforts which date back over many decades and remain in practice today.

BACKGROUND

Twelve Mile Creek, one of two major watersheds within Niagara County, feeds directly into Lake Ontario and is a major source of tourism revenue from its sport fishery. While drainage projects within the Twelve Mile Creek Watershed have been designed to meet stringent engineering standards, little attention has been given to the environmental impacts of these practices. Historically, the Niagara Soil and Water Conservation District has set the standard for local drainage efforts and sediment control practices with alternative drainage strategies, in an effort to rehabilitate and preserve sensitive fisheries habitats.

The project goal is to educate the public about the effects of erosion and sedimentation on fisheries habitats and associated ecosystems within Niagara County, while providing a mechanism to remediate and restore this dwindling natural resource. The project will use an interdisciplinary approach to provide outreach education and a viable demonstration project. Great Lakes Basin Program funds will be used in achieving this goal to lease skid-steer type excavation equipment, to cover consultant fees, and to purchase soil bioengineering vegetation, mulch and seed.

ACTIVITIES

The Twelve Mile Creek Watershed was selected because of degraded fisheries habitat in two towns on the watershed. Initially, local politics and historic drainage practices in the area proved very challenging. After many designs, meetings and conversations with the U.S. Army Corps of Engineers, the parties were unable to come to agreement on drainage ditch design and installation specifications. Further collaboration between the Corps, a private environmental consultant and a professional engineer reanimated the permit application process in 1997, however, the initial difficulties resurfaced and the project manager determined that the project could not go forward at this time.

NEW YORK

PROJECT TITLE:	WHAT'S THE DIRT
GRANTEE:	AQUARIUM OF NIAGARA
BASIN PROGRAM FUNDS:	\$15,000 (APPROVED)
NONFEDERAL FUNDS:	\$10,587 (PROPOSED)
PROJECT DURATION:	JUNE 1, 1998 —
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	ONGOING

PROBLEM STATEMENT

Soil erosion and sedimentation is an increasing problem in the Great Lakes basin as urban and suburban development encroaches on previously natural areas such as wetlands and forests. Local governments and citizens must understand the impact of development on their water quality if they are to protect it adequately. Local elected officials do not usually have the necessary knowledge to understand and appreciate these issues, nor do the citizens who elect them. Therefore pressure to control soil erosion is not brought to bear on elected leaders.

BACKGROUND

The Aquarium of Niagara receives a significant proportion of the 5.5 million tourists who visit Niagara Falls annually. Therefore the Aquarium will create an exhibit explaining and demonstrating erosion and sedimentation and their impact on Great Lakes water quality. The proposed display will address a number of issues such as: the causes of erosion; how it affects individuals and the ecosystem; the impact of polluted sediment; what is the difference between natural and human-induced erosion, how can erosion be controlled; and how can individuals effect change. The display will be supplemented by a take-away brochure.

ACTIVITIES

The Aquarium developed a collaborative advisory committee of staff, consultants, and volunteer representatives of six partner agencies. The group met regularly and collected information pertinent to the project. Members of the group also visited a nearby demonstration farm and research vessel to collect additional information on soil erosion and sedimentation issues.

The committee reviewed the collected information and decided which should be included in exhibit modules and the brochure. It also designed the exhibit and selected a location for it in the Aquarium's exhibit gallery. With its colorful images, simple graphics and living components, the exhibit appeals to guests of all ages and backgrounds.

An attractive brochure with a significant amount of clear information about soil erosion and sedimentation is offered at the exhibit for guests to take away with them. The brochure has proven to be very popular, necessitating restocking daily.

Aquarium personnel are also conducting an exit survey to measure the exhibit's effectiveness. Guests are encouraged to complete the survey by being offered the incentive of a discount at the Aquarium gift shop when they turn in a completed survey.

NEW YORK

PROJECT TITLE:	YATES COUNTY MODEL SITE PLAN REVIEW
GRANTEE:	YATES COUNTY PLANNING DEPARTMENT
Basin Program Funds:	\$ 7,000
Nonfederal Funds:	\$ 4,500
PROJECT DURATION:	APRIL 16, 1997 —
PROJECT TYPE:	TECHNICAL ASSISTANCE
STATUS:	CANCELED AT REQUEST OF GRANTEE

PROBLEM STATEMENT:

In order to prevent and mitigate nonpoint source pollution, especially related to stormwater management, erosion and sedimentation control, the Yates County Planning Department proposed the use of model site plan regulations. Models provided under New York State enabling legislation do not meet the needs of Yates County communities for two reasons. Stormwater management, erosion and sedimentation control are not expressly listed as uses which would require site plan criteria. Also single-family dwellings are not expressly listed as uses which require site plan review. Yates County planners, therefore developed model site plan review regulations that include these two elements and are based on natural development constraints as identified by the County's geographic information system.

BACKGROUND:

Municipalities within Yates County have recognized the importance of informed land-use management and water resource protection in order to address nonpoint source pollution threatening water resource quality in the county. Yates County Planning Department personnel provide technical assistance to local municipalities to help ensure new development does not jeopardize planning goals, including environmental aspects. Soil erosion is a priority concern because eroded particles transport nutrients and toxic chemicals into local water bodies.

Yates County planners wanted to develop a model code for Site Plan Review to be adopted by local governments. The review would identify geographic areas within a municipality which are susceptible to erosion and sedimentation problems; determine the environmental impact of proposed developments; require proper stormwater management, erosion and sedimentation control; and protect water resources to preserve municipal drinking water sources as well as recreation and aesthetic properties.

ACTIVITIES:

In order to identify the areas of Yates County most susceptible to soil erosion and sedimentation associated with development, investigators used the Geographical Information System (GIS) base data set *Ontario and Yates Counties, New York-Series 1949, No.5* to correlate five different data sets. These included land-use, steepness of slope, quality of drainage, depth of soil to bedrock and a composite of the constraining soil characteristics (slopes/drainage/bedrock depth). Planners developed a land-use base map classifying land-use into agriculture, forest, transitional, farmstead, lake residential and hamlet. They then produced detailed maps recording slope data -- less than 7 percent, 7-15 percent and greater than 15 percent; drainage as poor, moderate and well; and

bedrock depth data at 10-20 inches, 20-40 inches and deeper than 60 inches for the same areas. Finally, maps which incorporated all three constraining soil characteristics were produced. Severely constrained areas had slopes greater than 15 percent or poor drainage or bedrock depth less than 40 inches. The remainder of the area was classified as Slight to Moderate Constraint.

RESULTS:

A set of illustrative development sensitivity maps were prepared for all nine towns in Yates County. Each set provided land-use profiles, slope information, drainage quality, bedrock depth and composite soil maps with a two tiered development constraints map. The model site plan regulations which were developed refer to "site plan review district" which was defined as the severely constrained areas on the composite map. As of May 1998, the site plan review model had been presented to one municipality, which expressed a desire to move forward with some form of land-use regulation for environmentally sensitive areas, especially steep slopes. Two other municipalities have expressed an interest in developing a site plan review ordinance; presentation of the models are pending. Although the majority of work on the project was completed, personnel changes have forced the Yates County Planning Department to cancel the project before it could be finalized.

OHIO

PROJECT TITLE: **BLACK RIVER BIOENGINEERING INITIATIVE
FOR THE RIPARIAN LANDOWNER**

GRANTEE: **LORAIN COUNTY SOIL AND WATER
CONSERVATION DISTRICT**

BASIN PROGRAM FUNDS: **\$ 15,000**

NONFEDERAL FUNDS: **\$ 15,600**

PROJECT DURATION: **JUNE 1, 1998 –**

PROJECT TYPE: **DEMONSTRATION**

STATUS: **ONGOING**

PROBLEM STATEMENT

Intensive land-use, associated with agricultural activities and unplanned development, produces excessive sedimentation to the Black River watershed where it has unwanted impacts such as flooding and degraded aquatic communities. This is an issue of particular concern for the watershed because it contributes to the area's designation as an Area of Concern under the U.S.-Canada Great Lakes Water Quality Agreement.

BACKGROUND

The goal of this project is to develop a private-public partnership to educate landowners to restore and protect riparian corridors in the Black River watershed. The project will encourage inexpensive, independent and effective work on private land in the watershed to mitigate the impact of intensive land-use. Several studies have indicated that agricultural practices, in particular, are generating significant sediment loads to the Black River.

Despite these significant sediment loads, Lorain County continues to approve activities that alter the landscape and the flow along riparian corridors in the Black River watershed. These activities include flood control as well as agricultural and residential development. Riparian corridor manipulation will continue to occur under the heavy development pressures experienced by Lorain County. For example, Lorain County loses 1,000 acres of farmland annually, while at the same time approving approximately 300 new residential septic system permits. The county has approved some 3,240 acres of residential, commercial and industrial development within its boundaries including a multi-million dollar investment project to widen Interstate 90. These intensive land-use impacts will continue to stress streams in the Black River watershed unless riparian best management practices are implemented.

With the support of many local partners including the Black River Remedial Action Plan Stream Team, Ohio State Extension office, the Lorain County Engineer's Office, the Cuyahoga Soil and Water Conservation District and representatives of the Cuyahoga Remedial Action Plan, the Lorain County Soil and Water Conservation District will provide low-cost, common-sense approaches to stream restoration in the Black River Area of Concern. This will be accomplished through a

combination of demonstration sites, training and public education and outreach directed toward private landowners living in the Black River watershed. Simple and inexpensive best management practices will enable landowners to reduce erosion, protect their property's productivity and value, provide wildlife habitat and reduce flooding.

ACTIVITIES

Lorain County conservation district personnel initiated four riparian best management practices, each demonstrating a different technique. Three restoration sites feature evergreen revetments while the fourth is a seeding demonstration.

The first evergreen revetment site is located on a local golf course. Here project personnel used 43 Christmas trees, ranging from 15 to 30-feet in length, to provide toe protection and streambank stabilization to an area where fast-flowing water undermined bank stability. Volunteers from the environmental technologies class at a local vocational school helped with the project. It will be completed with a planting of quick rooting vegetation above the revetment.

Another evergreen revetment is stabilizing an eroding streambank on private land. The landowner, with help the help of student volunteers from the environmental technologies class and conservation district staff, drilled, placed and anchored Christmas trees in place along the toe of the streambank. The area above the site will be planted with willow and red-osier dogwood cuttings for further stabilization.

A third evergreen revetment in a Lorain County metro park was installed by conservation district personnel and 25 Coastweeks volunteers who participated in this hands-on National Coastweeks event. Project participants placed evergreens in and along an eroding streambank then strategically placed three "kickers" to re-direct stream flow back to the center of the channel. Fast rooting vegetation will be integrated into the revetment.

At the same metro park site, project personnel were able to demonstrate ten varieties of shade tolerant grasses. They prepared ten individual plots which were also overseeded with annual rye for quick ground cover, seeded the sites and covered them with erosion control netting. In addition, three of the ten plots were afforded additional stream toe protection with rocks and logs.

OHIO

PROJECT TITLE:	COST SHARES FOR URBAN STREAMBANKS
GRANTEE:	LAKE COUNTY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$ 3,949
NONFEDERAL FUNDS:	\$ 4,420
PROJECT DURATION:	JUNE 1, 1997 — NOVEMBER 30, 1999
PROJECT TYPE:	TECHNICAL ASSISTANCE
STATUS:	COMPLETE

PROBLEM STATEMENT

Lake County, Ohio has three valuable watersheds, a Lake Erie marsh, and two Ohio Department of Natural Resources (ODNR) designated scenic rivers, whose integrity are threatened by urban development. Sedimentation of the river mouths is the most significant impact of construction since neither the county nor municipalities have plans for stormwater management or creek corridor conservation. There is a need to educate riparian land owners in best management practices (BMP) in order to ensure long-term erosion control and provide support for municipal regulation.

BACKGROUND:

The Chagrin River has been classified a state scenic river with cold-water habitat. The Grand River is designated a wild river with a rating as an exceptional warm-water habitat. Both rivers are experiencing increasing sediment build-up from nonpoint sources. Sedimentation degrades aquatic habitat and affects navigation. The Chagrin River Port Authority estimates annual dredging activity of 10,000 cubic yards to enhance recreational boating, while commercial access to Fairport Harbor will require removal of 225,000 cubic yards of sediment in 1997.

The Lake County Soil and Water Conservation District has a 50 year tradition of working with private landowners to conserve soil and water resources. In the affected watersheds, the district will offer five riparian landowners technical assistance and small financial incentives as well as a 50 percent cost-share of materials, to encourage better stewarding of their streambanks. This pilot project will enable district personnel to assess landowner interest and responsiveness to determine the need for a continued cost-share program. The district also believes this pilot will help develop technical skills in bio-engineered solutions to erosion and sediment control, both among their personnel and, if sufficient interest is displayed, among local landscape contractors.

ACTIVITIES

Project personnel received applications for eleven cost share demonstrations, of which they judged five to be feasible projects for technical assistance. The program consultant developed site bioengineering designs and budgets and presented them to U.S. Department of Agriculture engineers for approval. The project team completed two of the five identified projects. The remaining three projects were not completed for a variety of reasons such as site characteristics, financial limitations and development potentially impacting the project site.

One of the completed projects, Araps Evergreen revetment located on the Chagrin River, is a 140-foot evergreen revetment. Prior to project implementation, the landowner lost up to two feet of yard annually from stormwater erosion exacerbated by a concrete wall across the river. This site is a demonstration site and has been used as an example on a bioengineering workshop tour.

The other project is Piersons Creek cribwall. This is located on a small tributary to the East Branch of the Chagrin River. Streambank erosion at this site threatens an historic barn and possibly a septic system. The cribwall is 52 feet long and 36 inches high, protecting an eroding outside corner of the stream. Additional protection is furnished by two log deflectors which direct heavy stormwater around the structure very efficiently.

RESULTS

During the development of this project, personnel identified significant existing barriers to bioengineering projects in Ohio. All soil and water conservation district and U.S. Department of Agriculture–Natural Resources Conservation Service projects require USDA engineer approval. Because the engineers were not familiar with bioengineering concepts, they were not comfortable signing off on the proposed projects. As a result of this project, Ohio and other state engineers who lacked familiarity with these concepts, have been trained in these issues and now regularly approve bioengineered projects throughout the state. This is a significant accomplishment.

Both project sites have been used as demonstration sites for training state personnel. Additionally, National Oceanic and Atmospheric Administration personnel and Ohio Coastal Zone Management staff have also toured the sites. Of particular interest is the cribwall, which appears to be the first installed in the state. The visibility of these sites has led to two additional bioengineering installations on private land. Project personnel also developed a list of native, shade tolerant plants that can be used for bioengineering projects. After the viability of plants installed at the Piersons Creek site has been determined, the list will be distributed to all conservation districts in the state.

OHIO

PROJECT TITLE:	COST STUDY OF STORM WATER EROSION CONTROL BMPs
GRANTEE:	SEVENTH GENERATION
BASIN PROGRAM FUNDS:	\$ 13,750 (APPROVED)
NONFEDERAL FUNDS:	\$ 4,585 (PROPOSED)
PROJECT DURATION:	JUNE 1997 —
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	CANCELED AT REQUEST OF GRANTEE

PROBLEM STATEMENT:

Lorain and Medina counties are experiencing a development boom with attendant commercial and residential construction. Construction site runoff has been identified in the Black River Remedial Action Plan (RAP) as a significant contributor to nonpoint source pollution in the river impairing several beneficial uses.

BACKGROUND:

The Black River runs through Lorain and Medina counties which, in 1995, ranked ninth and seventh respectively in population growth in the state of Ohio. Since 1994, the counties have experienced a corresponding growth in active construction sites, ranking fifth in the state. The Black River RAP identifies a number of nonpoint source pollution contributors, such as agricultural, urban and suburban runoff; river bank soil erosion; home septic system releases; combined and separate sewer overflows; and construction site runoff. The resulting beneficial use impairments include degraded fish populations, a degraded streambed community, degraded aesthetics and the loss of fish and wildlife populations.

On a per-acre basis, construction sites produce more sediment than any other land-use, although construction is not responsible for the greatest volume of sediment. Builders and developers base development decisions upon economic factors in which best management practices (BMPs) do not always weigh favorably. BMPs are viewed as labor intensive, costly, of little economic benefit and there are rarely any plans to encourage their use. Additionally, most jobs are bid without including the cost of erosion control; developers expect contractors to absorb the cost of BMPs themselves. Thus developers often have no idea of the actual cost of such practices. For instance, an Environmental Protection Agency representative estimated the cost of meeting regulatory requirements at \$500 per acre while a developer, looking at the same requirements, estimated \$2000 per half acre.

The goal of this project is to demonstrate the actual cost of best stormwater erosion control practices to builders. Given accurate information and a comparison to the cost of failing in compliance, builders and developers might be more willing to use BMPs.

ACTIVITIES:

Seventh Generation, the project lead, secured a tentative commitment from two developers, one in Lorain County and the other in Medina County. The project director focused on helping the participating developers understand the process and accelerate their participation. Despite diligent efforts, neither developer was able to participate in a timely manner and the project director was forced to terminate the project.

OHIO

PROJECT TITLE:	EVALUATION OF AN ECONOMIC INCENTIVE FOR CONSTRUCTION SITE EROSION CONTROL
GRANTEE:	GEAUGA SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$15,778
NONFEDERAL FUNDS:	\$ 5,629
PROJECT DURATION:	JUNE 1, 1996 – DECEMBER 31, 1998
PROJECT TYPE:	DEMONSTRATION
STATUS:	COMPLETE

PROBLEM STATEMENT

One of the most frequent complaints of those working in the erosion and sediment control field is that it is like “pulling teeth” to get most developers promptly to apply erosion control measures. For most developers, erosion control is a nuisance, costs money and is simply ignored. While educational and regulatory efforts have had some successes, economic incentives may be the best approach to controlling soil erosion and sedimentation at construction sites. If early seeding and mulching increases the lot value and/or sale time, then developers/builders may voluntarily implement control measures, seeking a competitive edge and an increase in profits.

BACKGROUND

Soil erosion and sedimentation problems often occur at construction sites. Despite educational and regulatory efforts targeting developers, soil erosion and sedimentation control measures are often ignored. This project evaluates whether there is an economic incentive for developers to use good erosion control practices.

The goal of this project is to set up a “real world” experiment to measure objectively the impact that seeding and mulching sites has on lot value and sale time. Increased lot value and/or decreased sale time will result in increased profits for developers and builders. If it can be demonstrated rigorously that the economic benefits of controlling erosion and sedimentation from construction sites are greater than the costs of seeding and mulching, then this information could be widely publicized in the building/development community. Appealing to increased profitability seems to be a good way to develop voluntary application of seeding and mulching on construction sites.

ACTIVITIES

The plan of work included two primary tasks: (1) developing an approach that establishes the impact that seeding and mulching has on lot value, and (2) addressing the issue of lot sale time. Both tasks involved randomly selecting sites for treatment and evaluating them using standard statistical methods. The results of the analyses were published in the *Journal of Soil and Water Conservation* (November 1998).

For Task 1, the study team undertook an empirical study to investigate the economic impacts of seeding and mulching on residential lot sale timing. The team randomly selected residential lots on new developments in Geauga County for the establishment of vegetative cover. They tracked the timing of lots sales with the aim of comparing sale time for seeded (green) lots and unseeded (brown) lots. The results have not demonstrated a preferential bias toward green lots over brown lots as was anticipated; however, the developer of the subdivision could see a benefit to having all the lots seeded.

For Task 2, the team undertook an empirical study to establish the economic impact of seeding and mulching on the values of residential lots. The team selected residential lots in a new Geauga County development for the establishment of vegetative cover at random. Once seed was established, they took photographs of both the green and the brown lots and used them in a “market survey” lot valuation study. Homebuyers, realtors, and developers were invited to take part in the lot valuation study. They were shown the pictures of the lots and then asked to order them in terms of desirability, and then place a dollar value on each lot. Statistical analysis of the survey data reveals that although developers do not perceive much added value for “green” lots, homebuyers perceive “green” lots to be worth on average four percent more than “brown” lots. This additional value far exceeds the costs for developers to apply standard seed and mulch practices to a residential lot. When considered in the context of multiple unit subdivisions, the profits from erosion prevention for developments can be sizable.

RESULTS

The results of this study have been presented to a number of audiences. To date, the project has reached approximately 800 professionals through presentations at workshops, trade shows and regional and international meetings such as the Ohio Association of Conservation Districts and the International Erosion Control Association annual meeting. Articles on the project have been released in local and state newspapers, journals and trade publications reaching tens of thousands of people. Articles on the project will soon appear in *NRDC Stormwater Solutions* and the *Journal of Soil and Water Conservation*. A final project publicity phase was held in October, 1998 at a demonstration site. The results of this project were released through the local and state press and trade organizations.

Because of the nature of the project, there are no appropriate measures of soil loss prevented or beneficial uses improved during this project period. One hundred percent of the initial phase, site selection and treatment, has been completed.

OHIO

PROJECT TITLE:	MAUMEE RIVER STORM WATER EDUCATION
GRANTEE:	HENRY SOIL AND WATER CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$ 2,450
NONFEDERAL FUNDS:	\$2,965
PROJECT DURATION:	JUNE 1998 —
PROJECT TYPE:	INFORMATION AND EDUCATION
STATUS:	CANCELED AT THE REQUEST OF THE GRANTEE

PROBLEM STATEMENT

Every year, 75 percent of the sediment and nonpoint source pollution affecting the Maumee River in Henry County is the result of major, isolated weather events. The Henry County economy relies heavily upon agriculture and construction, and the conservation district intended to take a leadership role in developing a public information and education initiative on stormwater management and erosion control practices.

BACKGROUND

The goal of this project was to educate the public on the soil erosion and sedimentation problems associated with Maumee River tributaries in Henry County, Ohio. Project personnel intended the effort to encourage the use of erosion control practices. It would also have served to monitor stormwater for sediment and nonpoint source pollution. Unfortunately, the conservation district experienced personnel changes which prevented them from undertaking the project.

OHIO

PROJECT TITLE:	STRIP-TILL EQUIPMENT LEASE PROGRAM: REDUCING SOIL AND NUTRIENT RUNOFF
GRANTEE:	TOLEDO METROPOLITAN AREA OF GOVERNMENTS
BASIN PROGRAM FUNDS:	\$ 15, 000
NONFEDERAL FUNDS:	\$ 10, 120
PROJECT DURATION:	MAY 1, 1997 — APRIL 31, 1999
PROJECT TYPE:	DEMONSTRATION
STATUS:	COMPLETE

PROBLEM STATEMENT

Due to factors such as soil composition, farmers in Wood County, Ohio are experiencing significantly lower corn yields per acre when practicing no-till over wheat stubble than farmers who move back to conventional tillage; the yield is 89 bushels compared to 96 bushels respectively. Many farmers are moving back to conventional tillage because of the substantial difference in yield. For instance, between 1995 and 1996, one northwest Ohio county lost 12,964 acres of no-till corn. This reduces the nutrient and soil erosion control benefits proportionately.

BACKGROUND

Wood County, Ohio is the highest wheat producing county in the state. When planting corn into wheat stubble, farmers experienced a substantial reduction in yield because Wood County's clay soils stay wetter and colder into the spring when farmed by no-till methods than by conventional tillage. The county is also an important component of the Maumee Remedial Action Plan (RAP) which had targeted sediment and nutrient loading reduction as important components of the plan. Wood County has the highest targeted reduction goal for phosphorous with the lowest amount of highly erodible land, very few acres enrolled in the Conservation Reserve Program and only two percent of total cropland in hay. Crop residue management, therefore, is the only reasonable means to achieve phosphorus reduction goals which means increasing the acreage under conservation tillage, not reducing it. In addition, tillage destroys soil structure improvements provided by conservation tillage, including microbial activity in organic matter.

This loss can be addressed by introducing zone or strip-tilling which places nutrients, such as phosphorus and potassium, in tilled bands 5-8 inches deep in the fall. Through this process nutrients are not exposed to wind and water erosion and they are concentrated into a smaller area. The overall reduction in amount used is 33 percent. At the same time a mound in which seed will be planted is prepared. In the spring the mound will be 5-10°(F) warmer than untouched soil, which is significant since corn will not grow below 52°(F), while pathogens thrive at temperatures between 40°(F) and 52°(F).

ACTIVITIES

The project team purchased a 12-row DMI Precision Air caddy, tool bar and air unit with the grant money early in the summer of 1997. A tractor was also leased through a complimentary funding source. This equipment was used on thirteen different fields to determine effectiveness.

The equipment was on display at the Wood County Fair in August, 1997. Everyone at the fair was invited to view the equipment in action at the Strip Tillage Demonstration on the evening of August 7, 1997 near Bowling Green, Ohio. Invitations were also mailed to over nine hundred people who have an interest in the program and a press release went out to all area media.

Ninety people attended the demonstration, which also included an update on local 1997 conservation tillage (con-til) plots, an explanation of new equipment from a sales representative, and a presentation from an agricultural specialist on the benefits of tracked equipment. The Wood County Con-Til Club provided a free dinner. The demonstration was deemed successful even though the fertilizers were not released.

Landowners were charged a minimal fee of \$4.00 per acre to use the equipment. Altogether, eight landowners have used this equipment, with a total of 850 acres strip tilled in 1997. An interesting addition to this program was the requirement to have each participant provide test data. For comparison, landowners split their field into normal practice and strip till. They signed a contract to provide the Wood County SWCD with their production and yield data for evaluation. The data included field and soils information, direct crop inputs, nitrogen, phosphorus and potassium, other fertilizers, pesticides, field operations, and indirect and total costs.

Significant reduction in no-till corn yields planted into wheat stubble is a major issue in Wood County. The trend to revert back to conventional tillage is an unfortunate result. This strip tillage equipment has now been used by eight farmers to till 850 acres. Available data only covers one planting year but data will continue to be gathered through the 2000 planting year for comparison.

RESULTS

Over the two-year life of the project, the Strip-Till Equipment Lease Program enabled 16 farmers to plant some 1625 acres using this conservation tillage methodology. Anticipated soil and nutrient savings include 850 tons of soil, 8,500 pounds of phosphorus and 1,700 nitrogen.

In addition to the 16 farmers who participated directly in the project, 900 residents, farmers and elected officials in the area received information about the project in the mail. Numerous additional people attending the Wood County Fair viewed a strip-tillage display and 90 people witnessed the strip-till demonstration at Bowling Green. Project personnel anticipate that an additional 5,000 people will be informed about this opportunity after the project is completed.

PENNSYLVANIA

PROJECT TITLE:	DEMONSTRATING THE EFFECTIVENESS OF SKIMMERS TO CONTROL DEWATERING OF SEDIMENTATION BASINS
GRANTEE:	PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING
Basin Program Funds:	\$ 10,000
Nonfederal Funds:	\$ 14,647
PROJECT DURATION:	JUNE 1, 1997 — SEPTEMBER 30, 1998
PROJECT TYPE:	DEMONSTRATION
STATUS:	COMPLETE

PROBLEM STATEMENT:

Existing sediment basin spillways, primarily perforated risers, are not the most efficient or effective means of reducing the amount of suspended particles released into the environment.

BACKGROUND:

Under the Federal Surface Mining Control and Reclamation Act and Pennsylvania Department of Environmental Protection regulations, mechanisms for controlling erosion from earth disturbance sites include sedimentation basins. Sedimentation basins capture and store soil suspended in effluent leaving a disturbed surface site before the water is discharged into the environment. The amount of sediment released is controlled by the basin's outlet structure, the most popular of which are perforated risers. Perforated risers withdraw water from the entire column, but the majority is removed from the lower layers where sediment concentration is highest. In order to increase the capture of sediment and reduce the amount of suspended silt and chemically active clays released to the environment, investigators propose the use of floating risers or skimmers to remove the highest quality water from the basin.

ACTIVITY:

With the support of Pennsylvania Department of Environmental Protection (PADEP), local conservation districts and engineering firms in each region, the project team selected four sites to demonstrate the skimmer. The sites are located in PADEP designated regions; one is in Lehigh County (south-east region), one in Centre County (north-central region), and one in Lebanon County (south-central region). The remaining site is located in Erie County (north-west region). As project personnel located demonstration sites they also scheduled opportunities for developers, engineers, regulators, and conservation district and US Department of Agriculture— Natural Resources Conservation Service personnel to learn more about the technology.

A Ph.D. candidate constructed Faircloth skimmers and installed one at each site with the help of conservation district personnel. At the same time, project personnel prepared materials for presentation at half day workshops in the counties where each skimmer had been installed. Each workshop included a field trip to see the skimmer installation and, where possible, operation.

RESULTS

A total of 165 people attended the four workshops. These included 43 persons representing conservation districts, 41 attendees from the Pennsylvania Department of Environmental Protection and 81 consulting engineers. In addition, the principal investigator, Dr. Albert Jarrett gave a 75 minute presentation to the annual statewide conservation association meeting in Williamsport. This presentation summarized the workshop material and included a discussion of the potential for effective sedimentation control by basins smaller than the 5,000 cubic feet required in Pennsylvania regulations. The skimmers save an average 34 pounds of sediment at each basin.

PENNSYLVANIA

PROJECT TITLE: GRAZING/WATER SUPPLY EROSION CONTROL
DEMONSTRATION

GRANTEE: PENN SOIL RESOURCE CONSERVATION AND
DEVELOPMENT

BASIN PROGRAM FUNDS: \$ 15,000

NONFEDERAL FUNDS: \$ 5,000

PROJECT DURATION: MAY 1 1997 — DECEMBER 31, 1998

PROJECT TYPE: DEMONSTRATION

STATUS: COMPLETE

PROBLEM STATEMENT

Controlling livestock access to streams by installing fencing and stream crossings helps control streambank erosion but does not address the need to water livestock. Providing an adequate water supply away from stream sites without an immediate electricity supply is a key concern. Ram pumps, which use falling water to push water up hill, offer a low-cost solution where falling water is available. However the Lake Erie basin is too flat to utilize ram technology. A potential solution may be solar powered pumps.

BACKGROUND:

Erie and Crawford counties contain all of Pennsylvania's Lake Erie watershed. Dairying is one of the principal agricultural enterprises in the drainage area and thus a major contributor to agricultural nonpoint source pollution through milk house and barnyard waste, livestock stream access, nutrients and pesticides. Allowing cattle access to water directly in streams contributes to a significant percentage of nonpoint pollution sources. While restricting cattle access reduces pollution, it creates a further problem of how to water the livestock, especially in areas which are not easily reached by electricity.

Hydraulic ram pumps generate power using falling water to push water uphill to a watering trough. While this has proven to be an inexpensive, and effective solution, the flat topography of the Lake Erie watershed does not lend itself to this solution. One potential solution is solar power. Contemporary systems can be installed for less than \$1,500.00. They are reliable, requiring little maintenance with a relatively long life span (from 20 to 40 years) and can pump enough water for any size herd. In addition to delivering water to cattle away from sensitive areas, such as streambanks, solar pumps can also distribute water to all parts of a pasture and ensure improved forage quality, herd health and productivity.

ACTIVITIES:

Penn RC and D hired a project technician who researched available solar powered equipment and conducted a search for potential participant farmers. Ten prospective farm sites were targeted and prioritized within Crawford County's Lake Erie watershed. In conjunction with the U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) a comprehensive barnyard

management plan was developed for one volunteer farmer. The plan included a solar pump system which provided an alternative drinking water source for cattle, restored riparian areas, and limited nutrient runoff.

In Erie County, the project technician consulted NRCS regarding an additional four sites for solar systems. Three farms proved promising and, with the farmers' cooperation, the technician developed system plans for these sites as well. One site is a component of a comprehensive pasture management plan implemented by NRCS. It includes installing drain tile and a 500 gallon underground collection tank which then overflows into a fenced stream. Another site incorporates a pond which is now fenced to prevent livestock access. The third site also features a pond, which is being developed as a wildlife habitat project in addition to a better drained pasture. All three projects limited stream and pond access, restored riparian vegetation and, by providing an alternative source of water for livestock, addressed the impact of livestock waste on water quality.

RESULTS:

One system proved very sensitive to all but direct sunlight. During cloudy weather or afternoons when the solar panel is not in direct line with the sun, the pump does not pump enough water. Also, during the 1998 drought, the source spring went dry and the system was out of operation until the water returned. The project team needed to make some adjustments to system flow at one of the other sites. Here the system was supposed to be a continuous flow system, but the return pipe emptied directly into an adjacent stream rather than being recycled through the tank.

These projects are anticipated to exist for at least twenty years. Over that time, the four projects together will save 1520 tons of soil, 10,000 pounds of phosphorus and 21,000 pounds of nitrogen. An important issue, not initially addressed as part of this erosion control project, is water quality for the herd. With direct access to the stream, livestock are exposed to waterborne pathogens. That possibility is now substantially curtailed, given the new source of water. The sites have been visited by 30 farmers and elected officials with the possibility that an additional 200 individuals will be reached over the life of the project.

PENNSYLVANIA

PROJECT TITLE: INNOVATIVE EROSION CONTROL INVOLVING THE
BENEFICIAL USE OF DREDGE MATERIAL, INDIGENOUS
VEGETATION, AND LANDSCAPING ALONG THE
LAKE ERIE SHORELINE

GRANTEE: PENNSYLVANIA DEPARTMENT OF CONSERVATION AND
NATURAL RESOURCES

BASIN PROGRAM FUNDS: \$ 15,000

NONFEDERAL FUNDS: \$ 18,000

PROJECT DURATION: JUNE 1 1998 — MAY 31 1999

PROJECT TYPE: DEMONSTRATION

STATUS: COMPLETE

PROBLEM STATEMENT

Presque Isle State Park, located on the shore of Lake Erie at Erie, Pennsylvania, attracts approximately four million visitors annually who enjoy the park's multi-purpose trail, boating opportunities and visiting the Perry Monument. A sand bar that has developed northeast of the Perry Monument restricts recreational boat usage in the immediate vicinity.

BACKGROUND

The Pennsylvania Department of Conservation and Natural Resources, Bureau of State Parks -- Presque Isle State Park cooperated with the Presque Isle Partnership to develop an innovative, low cost solution to bay inlet erosion in Presque Isle State Park. The project team decided to incorporate a combination of rip-rap, indigenous plants and landscape architecture to retard shoreline erosion.

Presque Isle State Park, located on Lake Erie's southern shore near Erie, Pennsylvania, is a major recreational resource used by approximately four million visitors annually. In addition to some 13 miles of hiking trails, the park offers access to Lake Erie and is a popular destination for boaters, anglers and bathers. A significant sand bar, some 300 feet long and 25 feet wide, has developed off the northeast tip of Perry Monument, restricting recreational boat usage in the immediate area. Additionally, along Misery Bay the shoreline has eroded to within 15 feet of the multi-purpose trail.

Project personnel proposed dredging some 200 feet of sand from the Perry Monument sand bar to use in stabilizing the shoreline at Misery Bay. The project would leave a portion of the Perry Monument sand bar intact to allow canoeists and boaters a convenient launch spot.

ACTIVITIES

The team dredged and dewatered approximately 400 tons of sand from the Perry Monument sand bar. At the same time they placed 24 inch rip-rap along the Misery Bay site. When the sand had

been adequately dried, it was spread over the rip-rap to create a natural dune profile. Native species, which had been saved from the sandbar dredging, were planted to assist in stabilization. These included willow, red osier dogwood, silky dogwood and button bush. The sand was also covered with geotextile made of coconut fibre to protect the sand from erosion while young plants gain a foothold. Project team members also constructed wattles from the native cuttings and used fallen willow trees as timber groins to act as wave dissipaters and stabilize the new sand dune further.

RESULTS

Park staff will disseminate this information via the "Ask DCNR" link on the Department of Conservation and Natural Resources web page www.dcnr.state.pa.us. They also intend to notify local conservation districts, the U.S. Department of Agriculture - Natural Resources Conservation Service, county and municipal planners and other interested groups about the project. It has received coverage in the *Erie Morning News*, the *Harrisburg Patriot* and the July 1998 edition of the Department of Conservation and Natural Resources newsletter, *Resources*.

Project personnel estimate the life of the project at 25 years. Over that time some 594 tons of soil, 5,940 pound of phosphorus and 1,188 pounds of nitrogen are expected to be kept out of the bay. The project team reached approximately 75 students and local officials during the project period with a multi-media presentation and an on-site inspection. In addition, over 300 students will be exposed to the project beyond the grant period.

PENNSYLVANIA

PROJECT TITLE:	NPDES/EROSION AND SEDIMENTATION CONTROL PROJECT
GRANTEE:	ERIE COUNTY CONSERVATION DISTRICT
BASIN PROGRAM FUNDS:	\$ 15,000
NONFEDERAL FUNDS:	\$ 8,499
PROJECT DURATION:	JUNE 1 1998 — JUNE 1 1999
PROJECT TYPE:	DEMONSTRATION
STATUS:	COMPLETE

PROBLEM STATEMENT

Measurable increases in urban development in Erie County, Pennsylvania and changes to the state's National Pollution Discharge Elimination System (NPDES) permit process, created a need for public awareness of nonpoint source pollution and appropriate best management practices for both permitted and non-permitted earth disturbance sites.

BACKGROUND

The Erie County Conservation District is developing a 35 acre environmental education park in Erie, Pennsylvania. "Headwaters Conservation Park" is located in the upper watershed of Mill Creek which discharges into Presque Isle Bay on Lake Erie. The park is an example of how conservation and industrial expansion can co-exist. Over its long term development, the park will be used to demonstrate a variety of conservation best management practices.

ACTIVITIES

The NPDES/Erosion and Sedimentation Control Demonstration Project used a building site next to the park as an opportunity to demonstrate non-traditional best management practices (BMP) for nonpoint source pollution control during construction. The conservation district modified a required stormwater facility to serve as a sediment trap during the construction phase of the project with the assumption that sedimentation control would be more efficient, cost effective and timely. The project team then used the information gleaned to hold a NPDES workshop for local contractors, developers, engineers and municipal officials.

The project team developed a stormwater management plan which was submitted for township approval. They determined the required capacity for the sedimentation trap and outlet structure. While awaiting approval of the stormwater management plan, the team inspected the construction site weekly and installed temporary best management practices including a silt fence, vegetative buffers along the creek and filter strips.

Once the stormwater management plan had been approved, the team excavated the sediment basin. Sedimentation basins capture and store eroded soil from effluent leaving a disturbed surface site before the water is discharged into the environment. The amount of sediment released is controlled by the basin's outlet structure. Working in conjunction with the University of Pennsylvania, Depart-

ment of Agricultural and Biological Engineering, the project team installed a Faircloth skimmer as a temporary trap outlet device. Skimmers allow eroded material to settle to the bottom of a sedimentation basin while drawing out and releasing clean water. Project personnel dug an interceptor channel which diverted sediment-laden runoff from throughout the building site to the sedimentation trap. They also seeded and mulched the pond embankment and surrounding area.

The project team inspected the site weekly in order to monitor the basin's efficiency and ensure that the skimmer operated properly. They were also able to identify and correct problems as they arose. These included breaches to the diversion berm which required the construction of a separate, temporary trap.

The team developed an educational brochure outlining the project and how it applied to NPDES regulations for a best management practice (BMP) workshop. The workshop introduced township officials and engineers, as well as consultants and developers to a newly published manual, "Pennsylvania BMP Manual for Developing Areas." The workshop also addressed recent changes to the NPDES, use of multi-purpose BMPs, and a summary of the sedimentation basin project and findings.

RESULTS

One of the goals of this project was to persuade developers to use non-traditional, multiple use BMPs for projects involving earth disturbance. Within the first several months after the workshops two consultants expressed interest in obtaining a skimmer, and numerous plans submitted to the township have proposed using the required stormwater pond as a temporary sediment trap during the construction phase.

Additionally, soil saving calculations for both the temporary sediment trap and the sedimentation basin indicate that the basin was much more efficient. The temporary sediment trap accumulated 20 tons of soil while approximately 31 tons of soil were displaced. This meant a net loss of 11 tons of soil. The sedimentation basin retained all but one ton of the 39 tons of soil diverted into the basin.

WISCONSIN

PROJECT TITLE: CONSTRUCTION SITE EROSION CONTROL
DEMONSTRATION FOR ROADS

GRANTEE: ASHLAND BAYFIELD DOUGLAS AND IRON
COUNTY LAND CONSERVATION DEPARTMENT

BASIN PROGRAM FUNDS: \$ 9,076

NONFEDERAL FUNDS: \$ 9,320

PROJECT DURATION: MAY 1, 1997 – JUNE 30, 1999

STATUS: COMPLETE

PROBLEM STATEMENT

The unique red clayey till soil and steep slopes of the Lake Superior basin combine to create an area that is highly susceptible to erosion. Given these factors, road construction is a significant contributor of nonpoint source pollution to Lake Superior and its tributaries. Cost-effective erosion control alternatives for roadway stabilization in Wisconsin's Lake Superior coastal counties are required.

BACKGROUND:

Road maintenance and construction have been an historic concern with resource managers in the Lake Superior coastal counties of Ashland, Bayfield, Douglas and Iron. Steep slopes combine with natural drainage ways and unstable red clayey till soil to contribute to the instability of road construction sites. A number of studies at the federal, regional and local levels have identified proper planning and maintenance of road construction sites as a priority in controlling nonpoint source pollution to the lake. Educational programs which promote proper construction site design as well as application of construction site erosion control best management practices (BMPs) were also identified as priority activities.

ACTIVITIES:

The Ashland, Bayfield, Douglas and Iron Land Conservation Department assembled a review team to evaluate possible demonstration sites, of which five were reviewed. The review team selected two sites, one in Douglas County and the other in Bayfield County.

The project team planned, designed and constructed erosion control measures for the Douglas County site. This included 14,256 linear feet of road ditch shaping and seedbed preparation, 6 ½ acres of roadside seeding and mulch, 1,420 and 1,800 linear feet, respectively, of high velocity and regular erosion control matting placed and anchored, four culvert inlet and outlet protections of non-woven geotextile, rock and matting, and 90 linear feet of channel lined with non-woven geotextile and rock.

The Bayfield County site included 2,500 linear feet of road ditch shaping, 330 linear feet of silt fencing, 23.7 tons of stone used as outlet protection, one culvert replacement (rebedded and packed), one acre of seeding and one acre of mulch, non-woven geotextile for firm outlet bed, and erosion control matting placed and anchored.

RESULTS

The Douglas County road ditch deposited water and sediment directly into Lake Superior, while the Bayfield County project formerly deposited sediment into an intermittent stream, to a trout stream, and eventually to Lake Superior. As a result of the project, road maintenance costs should be reduced and, more importantly, changes to road ditch engineering have reduced runoff peak flows, added vegetation filters runoff and reduces the sediment load to the water. Results indicate that at the Douglas County site an estimated 950 tons of soil were saved by installing these erosion control practices, and an estimated 305 tons of soil were saved on the Bayfield County site. Over 200 elected officials, road crews and contractors have toured the two demonstration sites.

WISCONSIN

PROJECT TITLE: WATER AND SEDIMENT CONTROL BASIN/
GRASSED WATERWAY

GRANTEE: FOND DU LAC COUNTY LAND CONSERVATION
DEPARTMENT

BASIN PROGRAM FUNDS: \$ 5,051

NONFEDERAL FUNDS: \$ 11,785

PROJECT DURATION: JUNE 1, 1998 — SEPTEMBER 30, 1998

STATUS: COMPLETE

PROBLEM STATEMENT

Sediment and nutrient pollution to Lake Winnebago is serious. Among other problems, it causes algae blooms. One best management practice, identified locally as an effective solution to agricultural nonpoint source pollution, is a water and sediment control basin with a grassed waterway. However, farmers are unwilling to install unfamiliar and potentially expensive projects without a clear understanding of potential benefits.

BACKGROUND

Lake Winnebago is 137,700 acres in size with several cities located on its banks including Oshkosh, Fond du Lac and Appleton. It drains through the Fox River to Green Bay and then to Lake Michigan. Water quality has been poor due to nonpoint source pollution, such as nutrients and sediment. In 1997, for example, nutrient loading was so severe that a large algae bloom occurred in that summer. As a result, the Lake Winnebago Citizens Alliance and the Fox-Wolf Basin 2000 group sponsored several public forums to address algae issues on the lake. The meetings discussed one obvious solution, reducing sediment and nutrient input from the agricultural land surrounding the lake.

One of the goals of the Lake Winnebago East Priority Watershed is to improve water quality by reducing nutrient and sediment pollution. Lake Winnebago was designated a priority watershed under Wisconsin's Nonpoint Source Pollution Abatement Program initiated in 1978 to improve and protect the state's natural resources. In priority watersheds, local land conservation department personnel administer watershed programs which give landowners cost share monies to install best management practices improving water quality.

Water and sediment control basins with grassed waterways have been identified as an effective best management practice to address agricultural runoff. Although cost share funds are available, farmers are reluctant to install expensive projects with which they are unfamiliar. These projects require a certain amount of cropland be dedicated to their construction, so landowners tend to weigh the initial cost more than longer term gains that can be realized by the project. The Fond du Lac Land Conservation Department decided that installing a water and sediment control basin in a very visible area with easy access would be one way to expose local landowners to the potential benefits of the project.

ACTIVITIES

The water and sediment control basin is an earthen dam that catches runoff water and allows sediment and nutrients to settle out. Any runoff moving beyond the basin itself settles into the grassed waterway. Construction on the project began at the end of June 1998. Project personnel cleared the site and constructed a dam. Mulching and seeding of both the basin and grassed waterway followed.

RESULTS

This basin drains 96 acres of farmland. Project personnel estimate that over the anticipated ten year life of the project, the basin will save 1,137 tons of soil. Land conservation department personnel have given presentations on the basin at several hunting and fishing clubs, as well as speaking at local fairs and on the local radio station. Approximately 100 people have heard about the project. The project site will be used for future demonstration and information sessions.

PROGRAM YEAR 1999 APPROVED PROJECTS

MICHIGAN

AGRICULTURAL IMPACT REDUCTION PROGRAM, MICHIGAN AGRICULTURAL STEWARDSHIP ASSOCIATION \$25,000

This project will increase policymakers' awareness of the impact of agricultural practices upon Great Lakes ecosystems and teach soil conservation and sustainable farming methods to participating farmers. Contact: Russ LaRowe, (616) 258-3305.

IMPROVING MUSKEGON LAKE WATER QUALITY THROUGH PROPER LAND-USE IN THE RYERSON CREEK WATERSHED, MUSKEGON CONSERVATION DISTRICT \$24,654

This project will produce a template for improving water quality and managing rapidly urbanizing watersheds by remediating existing streambank erosion and developing a stormwater management plan for the Ryerson Creek watershed, which drains into Muskegon Lake, a designated Area of Concern on Lake Michigan. Contact: Kathy Evans, (616) 773-0008.

LAKE MICHIGAN ERODES IN ANTRIM COUNTY, ANTRIM CONSERVATION DISTRICT \$23,422

The Antrim Conservation District in the Grand Traverse Bay area of Michigan will control sedimentation from public access sites on Lake Michigan through bioengineering techniques (e.g., rain gardens) and ensure community support for them through an "Adopt-a-Public Access Site Today" (APAST) program. Contact: Janet Person, (616) 533-8363.

PSUTKA LAKE CROSSING PROJECT, CONSERVATION RESOURCE ALLIANCE \$25,000

This project will improve the water quality and available fish and wildlife habitat of the Betsie River, a state-designated natural river flowing into Grand Traverse Bay, Michigan, by engaging local support to remediate a long-standing, highly eroded site. Contact: Kim Kook, (616) 946-6817.

MICHIGAN WATER TRAIL, MICHIGAN DEPARTMENT OF AGRICULTURE \$23,850

The Michigan Water Trail is a 1/2 acre permanent watershed to be constructed at the State Fairground in Detroit, Michigan. It will provide fair-goers with information about controlling soil erosion in a variety of settings from urban to agricultural. Contact: Jack Knorek, (517) 335-2874.

SAUK RIVER/ ADOPT A STREAM PROJECT, BRANCH COUNTY SOIL AND WATER CONSERVATION DISTRICT \$18,200

This project will raise awareness of the water quality impacts of erosion by involving students from the Quincy and Coldwater School Districts in Branch County, Michigan as well as local businesses, governments and other private citizens in identifying highly eroded sites along the Sauk River, determining best management practices with project partners and monitoring results, including water quality changes. Contact: Gordon Porter, (517) 278-8008.

MINNESOTA

MILLER CREEK SEDIMENT TRAP MAINTENANCE DEMONSTRATION PROJECT, SOUTH ST. LOUIS COUNTY SOIL AND WATER CONSERVATION DISTRICT \$10,000

This project will establish the procedure and resources required to maintain an in-stream sediment trap to allow planning for long-term maintenance for such installations by local governments. Contact: R.C. Boheim, (218) 723-4867.

MULTI AGENCY GIS DATABASE & PLANNING TOOL FOR MINNESOTA'S LAKE SUPERIOR SHORELINE, MINNESOTA BOARD OF WATER AND SOIL RESOURCES \$20,800

This project will build an information base of GIS layers to enhance coordination of the various programs and agencies which address water quality management, specifically soil erosion and sedimentation, in Minnesota's Lake Superior watershed. Contact: Gene Clark, (218) 723-4752.

KNIFE RIVER WATERSHED EDUCATION PROJECT, LAURENTIAN RCD COUNCIL, INC. \$10,230

This is the RCD Council's third grant in support of the Knife River Education Project for this watershed on the north shore of Lake Superior. This grant will support a watershed newsletter, tree-planting in riparian areas and a bioengineering workshop. Contact: Kim Samuelson, (218) 720-5225.

NEW YORK

MANAGEMENT INTENSIVE GRAZING IN THE GREAT LAKES BASIN, CAYUGA COUNTY SOIL AND WATER CONSERVATION DISTRICT \$15,000

By converting highly erodible soils in the Seneca River watershed from tillage to rotational grazing, this project will reduce soil erosion and decrease animal waste run-off to this central New York tributary to Lake Ontario. Contact: James Hotaling, (315) 252-4171.

REMEDIAL EROSION AND SEDIMENT CONTROL FOR SALMON CREEK, TOMPKINS COUNTY SWD \$9,250

Under this grant, the Tompkins County SWCD will re-establish Salmon Creek's natural stream course through the county with bendway weirs and willow plantings as the most cost effective and least maintenance intensive approach to controlling erosion and sedimentation problems in the watershed. Contact: Paul Long, (607) 257-3820.

ST. LAWRENCE RIVER SHORELINE: BIO-TECHNOLOGY SHORE STABILIZATION, ST. REGIS MOHAWK TRIBE \$21,950

This project will demonstrate the economy and effectiveness of using vegetation in combination with rock rip-rap for shoreline stabilization in the St. Lawrence River rather than standard rip-rapping. Contact: Ken Jock, (518) 358-5937.

PENFIELD WATERSHED MANAGEMENT EDUCATION BROCHURE, TOWN OF PENFIELD \$3,375

The Penfield Watershed Management Committee will produce a nonpoint source information brochure to be distributed to approximately 13,000 households in the Irondequoit Bay area, part of the Rochester, NY Area of Concern. Contact: Brian Anglin, (716) 377-8647.

PROTECTED SHORES: ENHANCING YOUR SHORELINE PROPERTY THROUGH PROPER MANAGEMENT PRACTICES, ONTARIO COUNTY SWCD \$9,000

This project will educate residents and cottagers in three western Finger Lakes watersheds currently experiencing significant development pressures on marginal lands which add to the erosion and sedimentation burden on the lakes, the Oswego River and eastern Lake Ontario. Contact: Stephen Lewandowski, (716) 396-1450.

OHIO

LORAIN COUNTY URBAN SEDIMENT EROSION CONTROL PROGRAM, LORAIN COUNTY BOARD OF COMMISSIONERS \$22,500

Controlling construction site erosion problems in the watershed of the Ohio Black River Area of Concern is the focus of this project which will develop an urban sediment/erosion control program for the county through site plan approval, site visits and education and training sessions. Contact: Ron Twining, (440) 329-5302.

SUDDEN SOIL DENSITY CHANGE TRAINING SESSION, CONSERVATION ACTION PROJECT \$4,600

The success of conservation tillage is challenged by soil compaction which restricts root access to moisture. This project will develop a process to ensure a uniform, deep root zone for row crops and communicate that information to farmers using and considering conservation tillage. Contact: Bill Rohrs, (419)784-5389.

CHAGRIN RIVER SEDIMENT AND EROSION MANAGEMENT GUIDE, CHAGRIN RIVER WATERSHED PARTNERS, INC. \$10,485

The Chagrin River Watershed Partners will prepare a guide to the causes, costs and solutions to erosion and sedimentation, in particular the problems associated with the rapid urbanization of Chagrin River sub-watersheds in north central Ohio. Contact: Thomas Denbow, (440) 975-3870.

PENNSYLVANIA

DETERMINATION OF SEDIMENT LOADING POTENTIAL TO PENNSYLVANIA LAKE ERIE COASTAL WATERS DUE TO BLUFF EROSION AND STORM WATER DISCHARGE RAVINES, EDINBORO UNIVERSITY OF PENNSYLVANIA \$24,000

This project will determine the degree to which bluff erosion along Pennsylvania's open water Lake Erie shoreline contributes to overall sediment loading in the shore zone. The results will then be used by various government agencies to promote better land-use planning and decision making in the area. Contact: Eric Randall, (814) 734-1542.

CASCADE CREEK SEDIMENTATION CONTROL AND EDUCATIONAL PROJECT, LAKE ERIE ARBORETUM AT FRONTIER PARK \$24,775

This Erie, PA arboretum will plant approximately 100 trees to stabilize Cascade Creek which flows through the park. Educational plaques and newsletter stories will disseminate information about the importance of trees along streambanks, especially in urban areas. Contact: Dan Dahlkemper, (814) 825-3253.

WISCONSIN

PENSAUKEE RIVER WATERSHED RIPARIAN BUFFER PROJECT, SHAWANO COUNTY LAND CONSERVATION DEPARTMENT \$14,100

The Pensaukee River watershed, which drains into the Upper Green Bay basin of Lake Michigan, is predominantly agrarian and susceptible to extensive nonpoint source pollution problems. This project will develop long-term, vegetative buffer strips in riparian zones to enhance water quality and serve as an educational opportunity for area farmers. Contact: Scott Frank, (715) 526-9239.

BAD RIVER INTEGRATED RESOURCE MANAGEMENT PLAN DISSEMINATION PROJECT, BAD RIVER BAND OF LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS \$4,554

The Band has developed an Integrated Resource Management Plan for this heavily forested river which flows through their reservation and into Lake Superior. The plan, when adopted, will be presented to the public through newspaper stories, public meetings and be available for interested foresters and landowners wishing to apply the forestry practices to their land in order to improve the quality of Bad River water. Contact: Ervin Soulier, (715) 682-7123.

FOREST ROAD BUILDING WORKSHOPS, FOREST INDUSTRY SAFETY AND TRAINING ALLIANCE \$6,605

Under this grant the Alliance will conduct two day-long workshops covering the range of issues which forestry professionals must consider when constructing logging roads in Wisconsin's Lake Superior drainage area. Contact: Donald Peterson, (715) 282-4979.