Mining Ideas 2: A Report on 106 Great Lakes Ecological Protection and Restoration Projects

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CLUSTER GRANTS

The following grants cluster a number of different and sometimes unrelated projects under one grant number. Clustering was undertaken for two reasons. First, the clustered projects may be related by design but geographically separate, requiring different personnel and resources, i.e., The Nature Conservancy. Second, projects may be clustered under one grant number in order to efficiently distribute resources to one entity, i.e., the State of Wisconsin. The results for each project are described more fully in the project appendix that follows.

A. Great Lakes Conservation Planning and Implementation

(FY1992 - X995819-01-0)

The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017; Fax- 312-759-8409

Cluster Grant Projects:

This cluster of projects resulted in the production of maps and reports about Great Lakes ecosystems and biodiversity, a strategic plan for conserving biodiversity across the basin, and implementation actions in one important region, the Kakagon Sloughs of Northern Wisconsin. One product, the report "Conservation of Biological Diversity in the Great Lakes Basin Ecosystem: Issues and Opportunities," is seminal because of its original analysis of the severity of threats to biodiversity and recommendations for action to protect and restore. Another report, "Significant Areas of Biodiversity in the Great Lakes Basin, " mapped and cataloged important biodiversity areas across the basin, including Ontario, and recorded species and community types of importance as well as primary threats. The Kakagon Sloughs analysis paved the way in directing the Bad River Tribe and other agencies' and organizations' attention towards preserving the largest fresh water estuary in the Great Lakes. This project became a model for cooperative conservation that is now standard throughout the basin.

This cluster grant served as a parent for three projects:

57-Kakagon Sloughs Plan Implementation and Sustainability Analysis
92-Significant Areas of Biological Diversity in the Great Lakes Basin
96-Strategic Overview of Biodiversity Conservation

Cluster Grant Statistics:

Award Amount: $318,000
Dollars Leveraged: $16,737
Project Timetable: October 1, 1992 - December 31, 1994
Project Location: Great Lakes Basin

B. Great Lakes Ecosystem Protection

(FY1993 - GL995819-02-0)

The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017; Fax- 312-759-8409

Cluster Grant Projects:

This cluster of projects, a followup to the Great Lakes Conservation Planning and Implementation cluster grant, advances key strategies for conserving the biological diversity of the Great Lakes ecosystem. Work focused on three key strategies for implementing a systemwide approach to protecting and, where possible, restoring biological diversity and the ecological processes that sustain it:
1) Developing our knowledge of critical ecosystem components–where they exist, how they function, and what can be done to sustain them–to guide strategic conservation action.

2) Establishing a series of ecosystem-scale protection initiatives at the local level in areas of unquestionable biological importance to demonstrate success and to build lasting partnerships.
3) Providing effective regional coordination and support of this work and developing a comprehensive design for Great Lakes biodiversity conservation.

The grant served as a parent for fifteen projects:

4-Basinwide Planning and Coordination of Biodiversity Protection Activities in the Great Lakes Ecosystem,
5-Basinwide Survey of Great Lakes Marshes,
6-Biodiversity of New York's Great Lakes Shoreline,
27-Door Peninsula Conservation Initiative,
28-Eastern Lake Ontario Conservation Initiative,
29-Ecological Targeting in Ohio's Great Lakes Basin,
31-Fish Creek Watershed Stewardship project,
33-Functional models of Priority Subsystems,
42-Great Lakes Biodiversity Publication,
43-Great Lakes Conservation Technology Transfer Program,
57-Kakagon Sloughs Plan Implementation and Sustainability Analysis,
81-Northwestern Ohio Lakeplain Initiative,
93-Southern Lake Michigan Conservation Initiative,
98-Targeting System for Aquatic Biodiversity Conservation,
101-Watershed-level Biodiversity Assessments

Cluster Grant Statistics:
Award Amount: $1,596,237
Dollars Leveraged: $84,013
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Great Lakes Basin

C. Great Lakes Fish and Wildlife Habitat Program
(FY1993 - GL995427-01-0, -1)
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
608-267-9352; 608-267-2800

Cluster Grant Projects:
In an effort to streamline the process of awarding grants for various ecological protection and restoration projects to the state of Wisconsin, seven different projects were clustered under one grant. One state coordinator handled paperwork and logistics.

This grant served as a parent grant for seven unrelated projects:

14-Chequamegon Bay Aquatic Vegetation Restoration
62-Lake Superior Coastal Wetlands Evaluation
64-Lakes Superior Trumpeter Swan Restoration
65-Lake Trout Spawning Reef Feasibility Study
79-Northern Pike Habitat Protection and Restoration
82-Onion River Fish Habitat Restoration
104-Whittlesey Creek Stabilization and Rehabilitation Demonstration

Cluster Grant Statistics:
Award Amount: $521,020
Dollars Leveraged: $51,920
Personnel: $119,633
Contracts: $322,681
Project Timetable: October 1, 1993 - March 31, 1998
Project Location: Wisconsin

D. Lake Ontario Barrier Beach/Wetlands Habitat Restoration Project
(FY1994 - GL995663-01-0)
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-4754
518-457-4480

Cluster Grant Projects:
This initiative protected and preserved the barrier beach system and the wetlands and natural areas that the beach system protects. Both the Deer Creek Marsh inland wetland and the Lakeview Wildlife Management Area have ecologically sensitive areas that lay behind their protective beaches. Buckhorn Marsh is a marsh that needs care, restoration, and protection.

This grant served as the parent grant for three projects:

11-Buckhorn Marsh
24-Deer Creek Marsh Wildlife Management Area
66-Lakeview Wildlife Management Area

Cluster Grant Statistics:
Award Amount: FY1994 - $169,143
Dollars Leveraged: $232,779
Project Timetable: October 1, 1994 - September 30, 1996
Project Location: Eastern shore of Lake Ontario and along the Niagara River

PROJECT NARRATIVES, RESULTS, AND STATISTICS

The following 106 projects were awarded and completed between 1992 and 2001. They are presented in alphabetical order by project title and numbered for easy reference. Each entry contains the following information:
- Title of project, grant number, and name and address of organization.
- A brief project narrative that recounts major project goals, objectives, and milestones.
- Project results, including environmental, stewardship and economic successes or lessons learned.
- Project statistics, including award amount; project timetable and location; acres impacted and/or involved; Great Lakes system (open lake, nearshore waters, coastal wetland, coastal shore, tributary/ connecting channel, inland wetland, and inland terrestrial); culturally, economically, and/or biologically significant plants, animals, and habitats; stressors impairing the system; and partners.

#1 - Applied Research Symposia - 1999 Midwest Fish and Wildlife Conference (FY1999-GL975164-01-0)

Illinois Conservation Foundation
524 South 2nd Street
Springfield, IL 62701
217-785-2003; Fax 217-785-9236

Project Narrative:

This project supported the 1999 Midwest Fish and Wildlife Conference, December 5-8, 1999, in Chicago, Illinois. The theme of the conference was "Pathways to the Future" and over 1,000 people attended from 14 Midwestern states and four Canadian provinces. Symposia and research paper sessions addressed the unique circumstances of fish and wildlife in major metropolitan areas like Chicago. Topics included habitat fragmentation, urban biodiversity, ecological implications of exotic species, human dimensions in managing natural resources, citizen monitoring, and natural resource marketing. The funds were used for direct costs such as workshop promotion, speaker fees and travel, meeting room facilities, and rental of audio-visual equipment.

Project Results:

Environmental Science and Management
- *planning, coordination, information sharing, technology transfer*:
Symposia for natural resource managers to better understand challenges and impediments to fish and wildlife restoration efforts.

Economic Impact
- *direct*
$5,500–contractual
$500–leveraged

Project Statistics:

Award Amount: $5,000
Project Timetable: October 1,1999- March 31, 2000
Project Location: Sheraton Hotel and Towers, Chicago, Illinois
Partners: U.S. Fish and Wildlife Service

#2 - Aquatic Community Health Paper for State of the Lakes Ecosystem Conference (SOLEC 1994) (FY1992 - X995909)

Great Lakes Fisheries Commission
Case Western Reserve University, Department of Biology
Cleveland, OH 44106

Project Narrative:

Funding supported a temporary ecosystem partnership coordinator housed by the Great Lakes Fisheries Commission. The primary purpose of the position was to integrate lakewide management plans and fisheries management plans by

facilitating development of ecosystem objectives useful to both fisheries and water quality managers. The project resulted in a major paper for the 1994 State of the Lakes Ecosystem Conference (SOLEC), "Aquatic Community Health of the Great Lakes," which addressed the state of aquatic communities, their habitat, and their stressors. This paper was the first time that such a comprehensive assessment was undertaken. It was one of six papers presented and discussed in workshops during the conference. The post conference version of the paper is an appendix to the 1995 U.S./Canada State of the Lakes Report. A full report, "Great Lakes Fisheries Commission Ecosystem Partnership Coordination," is available from the Fisheries Commission. Progress was made creating joint water quality and fisheries objectives. The purpose of SOLEC was to inform managers and other decision makers of ecosystem problems and opportunities to solve them. The result is that problems are avoided or more effectively solved.

Project Results:

Environmental Science and Management

- *planning, coordination, information sharing, technology transfer*

Paper for the 1994 State of the Lakes Ecosystem Conference (SOLEC), "Aquatic Community Health of the Great Lakes."

"Great Lakes Fisheries Commission Ecosystem Partnership Coordination," is the post conference version of the paper is an appendix to the 1995 U.S./Canada State of the Lakes Report.

Economic Impact

- *direct*

$33,333–Leveraged

- *indirect*

Cost effective, more efficient use of fishery resources. By coordinating fisheries and water quality management objectives, more efficient use of resources is possible; by better informing managers and the public as to the state of aquatic community health, cost effective decisions can be made.

Project Statistics:

Award Amount: FY1993 - $33,333
Project Timetable: October 1993 - December 1994
Project Location: Detroit, Michigan
Great Lakes System: Open lake, nearshore waters and coastal marshes
Stressors Impairing System: Virtually all known stressors, with most degradation a result of exotic species and habitat destruction.
Partners: U.S. Fish and Wildlife Service

#3 - Bad River/Kakagon Watershed Management Project and Coordinator

(FY1995, 1996 - GL985001-01-0, -02-0)

Bad River Band of Lake Superior Chippewa
P.O. Box 39
Odanah, WI 54861
715-682-7123, Fax 715-682-7118

Project Narrative:

Kakagon Sloughs are the largest, least disturbed, fresh water estuary system in the upper Great Lakes basin. They are the central element in the history and culture of the Bad River Tribe. This project facilitated sound ecosystem planning and management by: conducting biological and hydrological inventories to identify baseline conditions, managing collected data with GIS, collaborating with other agencies and stakeholders to maintain ecosystem health, and educating Tribal and non-Tribal public about the resources of the watershed.

The effort enhanced watershed protection by: producing biomonitoring plans, assisting with the Tribe's Integrated Resource Management Plan, educating the Tribe and non-Tribal public about watershed resource values and protection efforts, and encouraging and collaborating with similar organizations and individuals to undertake protection efforts. During the second year, an education program informed the watershed public and the Tribe about

ecosystem protection actions being taken by the Tribal Natural Resources Department, in coordination with other resource agencies in the watershed.

Project Results:

Environmental Science and Management

Acres Involved: 690,000 acres (1,421 sq. mi. watershed)

- *planning, coordination, information sharing, technology transfer*

Results of inventories and baseline studies incorporated into Bad River Tribe's Integrated Resource Management Plan.

- *inventory, assessment, classification*

Riparian and wetland cover types digitized.
Bad/White River cover type surveys completed.
Rare plant survey of the Bad and White Rivers completed.
Protected areas along river corridors mapped.

- *scientific study*

Baseline benthic productivity study.
Baseline aquatic productivity study (macrophyte and periphyton).

Public Stewardship

- *outreach, information exchange*

Articles published in tribal newspaper.

- *partnership building*

Tribal and non-tribal partnerships cultivated.

- *education*

Multimedia educational efforts to Tribal members about pollution and erosion prevention, land management, environmental values.

Economic Impact

- *direct*

1 full time project watershed coordinator for duration of the project.
$53,900–Contractual
$25,283–Leveraged (FY1995- $22,783; FY1996- $2,500)

- *indirect*

Designing of periphyton sampler to cost-effectively continue aquatic monitoring.

Project Statistics:

Award Amount: $115,937 (FY1995- $75,753; FY1996- $40,184)
Project Timetable: February 1, 1995 - September 30, 1998
Project Location: Bad River/Kakagon Watershed, Wisconsin
Great Lakes System: Coastal wetland, tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Bald eagle, lake sturgeon, wood turtle, piping plover, three mussels that are Wisconsin species of concern, Kakagon/Bad River sloughs the largest and most pristine on and intact estuarine system in the upper Great Lakes, ten natural communities within the sloughs
Stressors Impairing System: Sediments, toxins, and nutrients being assessed, exotic species, heavy metals
Partners: Northland College/Sigurd Olson Environmental Institute, The Nature Conservancy, National Wildlife Federation, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, University of Wisconsin-Madison, Great Lakes Indian Fish and Wildlife Commission

#4 - Basinwide Planning and Coordination of Biodiversity Protection Activities in the Great Lakes Ecosystem (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)

(FY1993 - GL995819-01, 02)

The Nature Conservancy
8 South Michigan Ave., Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:

The purpose of the project was to facilitate regional and local biodiversity strategic planning and to coordinate among The Nature Conservancy's (TNC) eight Great Lakes state offices to implement these strategies. The objectives were (1) to build upon the existing preliminary analysis of biodiversity knowledge, principle threats, protection tools, important partnerships, and strategic opportunities to develop and implement an internal strategic plan for The Nature Conservancy that identified key objectives, needs, opportunities, partnerships, and strategies to address them; (2) to coordinate and support TNC projects aimed at understanding and protecting key Great Lakes biodiversity features and the ecological systems that support them. One project that took precedence was the International Alvar Conservation Initiative. Led by TNC, the Initiative coordinated the research efforts of more than 50 scientists and compiled information about this little-understood ecosystem. 95% of all Alvars lie in the Great Lakes basin.

Project Results:

Environmental Science and Management

- *planning, organization, partnership development, information exchange*

With partners, developed conservation vision to sustain biodiversity.
Assisted state and international conservancy partners to design and implement effective conservation strategies.

- *inventory, assessment, classification*

Assembled updated natural heritage program datasets.
Analyzed data to identify conservation targets representing full range of biodiversity.

- *ecological protection*

Led the International Alvar Conservation Initiative, a model for coordinated region protection action.

Economic Impact

- *direct*

$16,638–Leveraged

- *indirect*

Reduction in future remediation costs due to greater attention and efforts toward protection of key resources and prevention of damage.

Project Statistics:

Award Amount: $248,737
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Chicago, Illinois (program office)
Great Lakes System: All Systems, but focused primarily on coastal and lakeplain systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Addressed multiple elements
Stressors Impairing System: Virtually all known stressors
Partners: Natural Heritage Programs in the United States and Canada, National Biological Service, World Wildlife Fund, Bureau of Land Management, Consultative Group on Biological Diversity, Lake Michigan Federation, TV Ontario, Great Lakes Protection Fund, Federation of Ontario Naturalists, Nature Conservancy of Canada, Ministry of Natural Resources

#5 - Basinwide Survey of Great Lakes Marshes (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02)
Michigan Natural Features Inventory
Mason Building, 4th Floor
Box 30444
Lansing, MI 48909-7944
517-373-1552; Fax- 517-373-9566

Project Narrative:
The goals were to inventory and sample the remaining large, intact marshes along the Great Lakes shoreline, develop a classification system that included the entire diversity of Great Lakes marshes, extend the systematic evaluation completed for Lake Michigan to the other lakes, and assess and target protection and restoration activities at State and regional levels.

Project Results:
Environmental Science and Management
- *inventory, assessment, classification*
Comprehensive ecological assessment completed of most natural quality marshes of significant size in the US portion of the Great Lakes.
Baseline data for studying the quality of marshes.
Impacts of human induced and natural water level fluctuations assessed.
Clarification of diversity of vegetation types and processes that sustain the marshes.
Classification of marshes based on physical characteristics and biota.
Ranking and clarification of each type of marsh based on natural quality and condition.
Economic Impact
- *direct*
$7,250–Contractual
One full time job for the duration of the project.
$3,250–Leveraged

Project Statistics:
Award Amount: $65,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Great Lakes basin shoreline; [Lansing, Michigan (program office)]
Great Lakes System: Coastal marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Coastal marsh communities
Stressors Impairing System: Water level fluctuation (natural; management)
Partners: US Army Corps of Engineers, New York Heritage Program, Departments of Natural Resources in Minnesota, New York, Pennsylvania, Ohio, and Wisconsin

#6 - Biodiversity of New York's Great Lakes Shoreline (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-01, 02)
New York State Department of Environmental Conservation
700 Troy-Schenectady Rd.
Latham, NY 12110-2400
518-783-3937, Fax 518-783-3937

Project Narrative:
From 1975 to 1986 the New York State Department of Environmental Conservation (DEC) compiled a statewide file

of critical habitats. These manually obtained "Significant Habitat" files contained a great deal of valuable information on biodiversity within the Great Lakes watershed. The goal of this project was to integrate this data into the New York Natural Heritage Program's Biological and Conservation Data System (BCD). The tasks included: the conversion of any important biodiversity data from the Significant Habitat files into the BCD System, and disseminate biodiversity data to the town planning boards of the New York portion of the Great Lakes watershed.

Project Results:

Environmental Science and Management

- inventory, assessment, classification

Biodiversity data from many sources was loaded into the Natural Heritage Program database to support conservation planning and environmental review. The data was downloaded into ARC/Info and maps were produced. 100% of the total number of files which needed integration are now complete.

Public Stewardship

- outreach, information exchange

Summaries of biodiversity data were provided and disseminated to local governments, including county maps with locations of ecologically sensitive heritage sites.

Economic Impact

- direct

$3,350–Leveraged

- indirect

Three information management assistants were assigned to the project and fully trained in the integration process.

Project Statistics:

Award Amount: $67,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: New York counties that border Lakes Erie and Ontario
Great Lakes System: Coastal shore, coastal marsh, lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Native aquatic vegetation
Stressors Impairing System: Virtually all known stressors
Partners: The Nature Conservancy

#7 - Biological Inventory for Conservation of Great Lakes Islands: 1999 Progress Report (FY1998 GL985161-01-0)

Michigan Natural Features Inventory
Mason Building, 4th floor
P.O. Box 30444
Lansing, MI 48909-7944
517-335-4582; Fax 517-373-9566

Project Narrative:

This multi-year project conducted biological inventories of Michigan's principal Great Lakes islands for the identification and inventory of significant natural features. Features were identified through plant, animal, and natural community surveys. The inventories will be used to determine future conservation and restoration priorities. Conservation planning efforts will also be initiated through ongoing landowner contact and the formation of focus groups.

Surveys of birds, insects, reptiles, and plants were conducted on six islands between Michigan's upper and lower peninsula: Beaver, Hog, Garden, Bois Blanc, Drummond, Marquette, and LaSalle islands. Natural communities were recorded for each island. All of the natural features, both previously documented and newly found were digitized, utilizing a GIS information platform. Significant biodiversity areas were identified, and analyses of the data were given.

Conservation planning information was provided to island communities and local decision makers. A

presentation was given at the 1999 annual meeting of the Beaver Island Property Owners Association (BIPOA), and an interactive workshop was held later, entitled, "Preserving the Natural Resources and Community Character of Beaver Island." This workshop was open to all residents and stakeholders.

Project Results:

Environmental Science and Management
Acres Involved: 155,600
- *inventory, assessment, classification*
The biodiversity of six Lake Michigan and Lake Huron islands was surveyed.
Public Stewardship
- *outreach, information exchange*
Land owner contact was initiated.
Presentation at the 1999 annual meeting of the BIPOA.
Workshop entitled, "Preserving the Natural Resources and Community Character of Beaver Island."

Project Statistics:

Award Amount: $40,994
Project Timetable: September 25, 1998 - October 31, 2000
Project Location: Beaver & Les Cheneaux Island groups, Bois Blanc & Drummond Islands - Michigan
Great Lakes System: All systems (on the islands)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Numerous native species of flora and fauna, significant biodiversity areas, and native natural habitats
Stressors Impairing System: Development
Partners: Michigan Department of Environmental Quality - Michigan Coastal Management Program, Michigan Department of Natural Resources - Forest Management Division, Central Michigan University Biological Station, University of Michigan Museum of Zoology, The Nature Conservancy, the Land Information Access Association

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#8 - Bioremediation Demonstration Project

(FY1994 - GL995709-01-0)
City of Hammond
Department of Planning and Development
649 Conkey Street
Hammond, IN 46324
219-937-1042, Fax 219-931-0831

Project Narrative:

This project was designed to improve the habitat conditions of approximately 40 acres of land Southeast of Wolf Lake. Owned by the Hammond Parks and Recreation Board of Commissioners, the area is composed of slag fill. Slag is a waste product which consists of impurities from the making of steel, the historically dominant economic force in the area of Northwest Indiana designated as the Grand Calumet River Area of Concern (AOC). The AOC contains a large number of slag fills that have been created by the dumping of steel mill slag within the swales (wetlands) between natural sand dune ridges. Once filled with slag, the swales can become rock hard. Its cement-like surface is highly resistant to the normal revegetation of the 1400 native plant species common to the ecosystem. The project was designed to develop a simple, easily replicated procedure for native revegetation of slag sites typically present within the AOC and other sites throughout Lake County, Indiana. The results of the test plots provided a means to improve water quality of Wolf Lake by subsequent limitations on surface water runoff, to provide a plan for implementing a habitat management and best management practices plan for maintenance of the area, and to discourage inappropriate uses such as dumping.

Project Results:

Environmental Science and Management
- *scientific study*

Provided a replicable technique for restoring slag acres, covering thousands of acres in Northwest Indiana.
- *ecological restoration*
Restoration of 40 acres of slag fill on the Southeast tip of Wolf Lake in Northwest Indiana.
Economic Impact
- direct
$6,000–Leveraged
- *indirect*
Will result in reclamation of large tracts of land for parkland as well as private lands for developers.
40 acres of slag filled land was remediated.
Will lead to reclamation of large tracts of land for parkland for use by the public as well as reclamation of private land for developers.

Project Statistics:
Award Amount: FY1994 - $120,000
Project Timetable: October 1, 1994 - December 31, 1996
Project Location: Hammond, Indiana
Great Lakes System: Inland terrestrial
Stressors Impairing System: Solid waste disposal
Partners: Hammond Parks and Recreation Board, The Nature Conservancy, Natural Resources Conservation Service, Hammond Volunteer Group

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#9 - Black River Habitat Restoration
(FY1993 - GL995439-01-0)
Lorain County Soil and Water Conservation District
42110 Russia Road
Elyria, OH 44035
440-326-5800; Fax 440-326-5807

Project Narrative:
The Lorain Soil and Water Conservation District assisted the Lorain County Metropolitan Park District in the conversion of 20 acres of crop land to wetland habitat for existing and reintroduced species within the Black River Watershed. The project provided a model of cooperative effort, opportunities for public and private sectors to work together on a restoration project, demonstration areas for habitat restoration and wetland creation and enhancement, and the generation of funds for additional restoration work.

Project Results:
Environmental Science and Management
- *ecological restoration*
Restoration of 20 acres of former cropland to inland wetland habitat.
Public Stewardship
- *outreach, information exchange*
Two site tours and a dedication ceremony were held to showcase the restorations.
Economic Impact
- *direct*
$125,000–Contractual (5% with local farmers and grain elevator operators to complete revegetation and fertilization.)
$28,000–Leveraged

Project Statistics:
Award Amount: FY1993 - $159,615
Project Timetable: October 1, 1993 - June 30, 1995
Project Location: Charlemont Creek and Carlisle Reservation in the Black River Watershed, Lorain County, Ohio.

Great Lakes System: Inland wetland
Stressors Impairing the System: Agriculture, development, sedimentation
Partners: USDA Natural Resources Conservation Service, Lorain County Metropolitan Park District, Lorain County Chapter of Pheasants Forever, Ohio Division of Wildlife, Black River Remedial Action Plan Coordinating Committee, Western Reserve Resource Conservation & Development, Lorain County Commissioners, Oberlin College Biology Department.

#10 - The Blue Creek Project: An Agricultural Wetland Demonstration Project (FY1992- X995959-01)

Toledo Metropolitan Area Council of Governments
300 Central Union Plaza
Toledo, OH 43602
419-241-9155; Fax 419-241-9116

Project Narrative:

The primary goal of the project was to demonstrate how wetlands in agriculturally dominated landscapes can filter pollutants contained in agricultural runoff and reduce soil erosion resulting in cleaner lakes, rivers, and streams. Additionally, the project provided research and educational opportunities, reduced flood damage, and enhanced wildlife habitat. The wetlands are being monitored presently for their effectiveness in removing phosphorous and sediments, thereby improving water quality. The project is serving as a demonstration in the Maumee River Basin.

The Blue Creek Wetland is a site that supports many educational sessions and workshops. This site is being utilized by local universities for research projects. A report, "A Guide to Research Opportunities," was produced to help guide research and environmental improvement at Blue Creek. The site is being monitored and data on water quality is being collected. In addition, four quarterly newsletters were created and distributed during the project.

Project Results:

Environmental Science and Management
- *scientific study*
Demonstrated how wetlands in agriculturally dominated landscapes can filter pollutants and reduce erosion.
Report, "A Guide to Research Opportunities," produced to help guide research.
- *ecological restoration*
3 acres of wetlands were restored.
- *monitoring, indicators*
Water quality is being monitored.

Public Stewardship
- *education*
Site is utilized by local schools and universities.

Economic Impact
- *direct*
$7,000–Contractual
$58,789–Leveraged
Partial funding for several university researchers.
- *indirect*
Reduced flooding.
Enhanced wildlife habitat.
Water quality improvement.

Project Statistics:

Award Amount: FY1992- $20,000
Project Timetable: May 15, 1993 - December 31, 1994
Project Location: Whitehouse, Ohio, located in the Maumee River Basin which contributes more sediment to Lake Erie than any other watershed

Great Lakes System: Inland wetland
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Part of the Great Black Swamp, Lake Erie waterfowl habitat
Stressors Impairing the System: Agriculture, development
Partners: Ohio Operating Engineers Apprenticeship Fund, Local 18, The Toledo Edison Company, the Toledo Metropolitan Area Council of Government, Lucas Soil and Water Conservation District, Toledo Metroparks, The City of Toledo, Lucas County Engineers, Bowling Green State University, University of Toledo, Ohio Environmental Protection Agency , Ohio Department of Natural Resources, USDA, Natural Resources Conservation Service.

#11 - Buckhorn Marsh (See " Lake Ontario Barrier Beach/Wetlands Habitat Restoration Project" description of the cluster grant to New York State Department of Environmental Conservation for more information.)
(FY1994 - GL995663-01-0)
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-4754
716-851-7010; Fax 716-851-7032

Project Narrative:

Buckhorn Marsh is the largest remaining emergent wetland in the upper Niagara River, located at the northern tip of Grand Island. Two overtopping weirs that maintain water levels were constructed, as was an 1800 foot channel inlet. The construction of the weir and channel allowed desirable water to remain in the marsh, simulating historic conditions by allowing re-establishment of previously occurring species, affording a breeding area to northern pike, and providing an important link in the riparian habitat corridor for other riverine species. Two Osprey nesting platforms were erected that provide suitable nesting sites for this species, which often frequent the Niagara River during their migration period. This project helped restore valuable marsh bird habitat within the Niagra River corridor, and spurred other work as a continuation of the project's initiative.

Project Results:

Environmental Science and Management
- *ecological restoration*
74 acres restored
Weirs and channel constructed to simulate historic water levels.
Osprey nesting platforms constructed.
Economic Impact
- *direct*
$228,962–Leveraged

Project Statistics:

Award Amount: $95,628
Project Timetable: October 1, 1994 - September 30, 1996
Project Location: Buckhorn Marsh, Eastern shore of Lake Ontario and along the Niagara River
Great Lakes System: Coastal Wetland
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Coastal wetlands, northern pike breeding area, marsh bird habitat, Osprey nesting areas
Stressors Impairing System: Water Level Fluctuation due to Hydroelectric power generation and other uses
Partners: New York State Department of Environmental Conservation Fund, New York State Department of State, New York State Parks and Recreation, Oswego County Soil & Water Conservation District, Oswego County Youth Conservation Corps, USDA Agricultural Stabilization & Conservation Service, Thousand Islands Park Commission, New York Sea Grant/Sea Trail, Oswego County Environmental Management Council, The Nature Conservancy, Ontario Dunes Coalition, Ducks Unlimited

#12 - Buffalo River Fish and Wildlife Habitat Restoration Demonstration Project (FY1993 - GL995960-01-1)

Erie County Department of Environment and Planning
95 Franklin Street
Buffalo, NY 14202
716-858-6231, Fax 716-858-7713

Project Narrative:

The Erie County Department of Environment and Planning coordinated a number of tasks to demonstrate the effectiveness of fish and wildlife habitat restoration and enhancement efforts on the Buffalo River. Restoration of a naturally vegetated shoreline, coupled with implementing Remedial Action Plan recommendations, including conducting inactive hazardous waste site remediation within the watershed, improving the dissolved oxygen condition of the river, and reducing combined sewer point source pollutants are some ways that helped to recapture the biologic integrity of the river. Specifically, the following four items were completed as part of this project: 1) Designed and constructed a fish and wildlife restoration demonstration project; 2) Prepared an Environmental Assessment to evaluate and determine what ecological impacts other proposed projects will have on this project; 3) Established an Upper Buffalo River Pollution Prevention Monitoring and Implementation Project; and 4) Extended community outreach activities.

Project Results:

Environmental Science and Management
- *ecological restoration*
Restoration and enhancement of 10.6 acres at 3 sites.

Public Stewardship
- *outreach, information exchange*
Increased public awareness about habitat restoration and enhancement and about what is needed to maintain a healthy Buffalo River.

Economic Impact
- *direct*
$668,500–Contractual
$150,000–Leveraged
Three full time jobs for the duration of the project.

Project Statistics:

Award Amount: FY1993 - $1,250,000
Project Timetable: August 15, 1993 - August 14, 1999
Project Location: Buffalo River in Erie County, New York
Great Lakes System: Coastal shore, coastal marsh, tributary/ connecting channel
Stressors Impairing System: Development, erosion, water level fluctuation (management), non-point source pollution, illegal dumping (construction and commercial debris)
Partners: U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, City of Buffalo, Buffalo River Remedial Advisory Committee, Friends of the Buffalo River, Erie County Water Quality Strategy Committee (including USDA Natural Resources Conservation Service), State University of New York at Buffalo (Great Lakes Program), State University College at Buffalo (Great Lakes Center).

#13 - Building a Conservation Vision for Great Lakes Biodiversity
(FY 1997 - GL985513-01-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017; Fax 312-759-8409

Project Narrative:

This project's overarching goal was to help conserve the biological diversity that is sustained by the Great Lakes. The project developed clear objectives and recommendations for conservation of natural communities and vulnerable species at a Great Lakes ecoregional level. It identified and prioritized the conservation sites in the Maumee Lakeplain and the Northern Great Lakes. A portfolio includes all the sites that need conservation action. A portfolio report of high-priority conservation sites in the Maumee Lakeplain and Northern Great Lakes ecological units, as well as the U.S. portion of the Great Lakes Ecoregion, was constructed. Sites that met certain ecoregional conservation objectives of the natural communities and species were identified and prioritized. This included 271 sites for the U.S. portion of the Great Lakes ecoregion. Of these sites, 72 were identified as "priority action sites," and state conservancy chapters are taking action within the next 5-10 years. This project also mapped selected sites, and created a database that helps to easily identify priority site, analyze key threats, and identify opportunities for conservation action. Data gaps were identified for both geographic areas and target elements. Strategies were developed among The Nature Conservancy state chapters, within the Maumee Lakesplain and Northern Great Lakes ecological units, and among potential and current partners.

Project Results:

Environmental Science and Management
- *planning, coordination, information sharing, technology transfer*
Conservation strategies were identified with partners.
- *inventory, assessment, classification*
Constructed a portfolio of 271 sites (72 identified as high-priority conservation sites) in the US portion of the basin. Selected sites were mapped, key threats analyzed, and opportunities for conservation identified.
Data gaps were identified for geographic areas and target elements.
Public Stewardship
- *outreach, information exchange*
This report was made available to the general public
Economic Impact
- *direct*
$10,526–Leveraged

Project Statistics:

Award Amount: FY 1997 - $200,000
Project Timetable: July 30, 1997 - July 30, 1999
Project Location: Basinwide (especially Maumee Lakeplain and Northern Great Lakes)
Great Lakes System: All systems
Stressors Impairing System: Regional threats include: development, exotic/ invasive species, recreation, and incompatible forestry practices, hydrologic alterations, resource extractions, agriculture, fire suppression
Future Project Ideas/extensions: TNC is working with the Nature Conservancy of Canada to secure funding to complete the Great Lakes conservation blueprint in Ontario. Other ideas include finding information on additional important stopover and wintering sites for migrating birds, and finding the breeding sites for high risk grassland and forest bird species.
Partners: Illinois Nature Preserves Commission, University of Illinois - Chicago, Morton Arboretum, U.S. Fish and Wildlife Service, McHenry County Conservation District, Indiana Dunes National Lakeshore, Lake County Parks, Indiana Natural Heritage Data Center, U.S. Geological Service - Biological Resource Division, Michigan Natural Features Inventory, Saginaw Basin Land Conservancy, Hiawatha National Forest, Northern Michigan University,

Tip of the Mitt Watershed Council, Michigan Department of Environmental Quality, Ottawa National Forest, Huron-Manistee National Forest, Mead Paper, Seney National Wildlife Service, Porcupine Mountains Wilderness State Park, U.S. Geological Service - National Water-Quality Assessment Program, University of Michigan School of Natural Resources and Environment, Michigan Department of Natural Resources: (Forest Management Division, Wildlife Management Division, Parks & Recreation Division, Fisheries Division), Shelter Bay Forests, Grand Traverse Regional Land Conservancy, Allegan State Game Area, Lake St. Clair Great Lakes Fisheries Station, Keweenaw Land Trust, Blue Water Land Conservancy, Tahquemenon Falls State Park, Arrowhead Regional Development Commission, Minnesota Department of Natural Resources: (Minnesota County Biological Survey, Parks, Ecological Services, Fisheries), University of Minnesota - Duluth, Minnesota Parks and Trails Council, Lake County Courthouse, Minnesota Pollution Control Agency, U.S. Environmental Protection Agency - Mid-Continent Ecology Division - Duluth, Potlach - Minnesota Wood Products Division, Wolf Ridge Environmental Learning Center, USDA Forest Service - Tofte Ranger Station, Northern New York Community Foundation, Thousand Islands Land Trust, New York Natural Heritage Program, New York Department of Environmental Conservation, State University of New York: (College at Oswego, Buffalo, College of Environmental Science and Forestry, Onconta Biological Field Station), Cornell University, Toledo Metroparks, Ohio Natural Heritage Program, Ohio Department of Natural Resources - Division of Geological Survey, Ohio Environmental Protection Agency: Ecological Assessment Section, Natural Heritage Information Center - Ontario, Bad River Natural Resources Department, University of Wisconsin, Wisconsin Department of Natural Resources, Northeast Wisconsin Land Trust, Wisconsin Natural Heritage Program, Apostle Islands National Lakeshore, Chequamegon - Nicolet National Forest, Door County Land Trust, Northland College: Ashland, The Nature Conservancy: (Illinois Field Office, Peoria Office, Indiana Field Office, Southern Lake Michigan Project, Michigan Field Office, Minnesota Field Office, Northeast Minnesota Office, Midwest Resource Office, New York Regional Office, Adirondack Office, Central & Western NY Chapter, Eastern Lake Ontario Project, Neversink River Project Office, Ohio Field Office, Oak Openings Project Office/ Kitty Todd Preserve, Wisconsin Field Office, Door County Office, Kakagon Sloughs Project, Door Peninsula Project), United States Forest Service - Tofte Ranger Station

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#14 - Chequamegon Bay Aquatic Vegetation Restoration (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
(FY1993 - GL995427-0)
Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:
Most of Chequamegon Bay near the Fish Creek Sloughs is shallow with a firm sand bottom. Aquatic vegetation, both submerged and emergent, was lacking over portions of this area due to past logging practices which destroyed the vegetative cover by shading the area. Although historically this area was important for migratory diving ducks, the habitat has been destroyed. This project involved the re-establishment of aquatic vegetation in shallow water areas of Chequamegon Bay. Tubers were placed to re-establish aquatic vegetation, important to migrating waterfowl. This project intended to reverse the trend of aquatic vegetation losses in Chequamegon Bay. The restoration of historically present aquatic vegetation was meant to stabilize sediments and provide aquatic habitat for native species and food and shelter for waterfowl in important migratory areas.

Project Results:
Environmental Science and Management
- *inventory, assessment, classification*
Sample survey of the bay to understand the present situation in relation to historic records.
Produced the report, *Plant Survey Results*.
- *ecological restoration*
Re-vegetated approximately 5 acres with aquatic vegetation.
Public Stewardship

- outreach, information exchange
Constructed informative signs around the planting sites.
Economic Impact
- direct
Leveraged dollars: (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
- indirect
Clearer water and stronger fish and waterfowl communities will increase recreational use.

Project Statistics:
Award Amount: $25,000
Project Timetable: October 1, 1993 - October 30, 1996
Project Location: Lake Superior - Wisconsin
Great Lakes System: Coastal shore, open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Numerous kinds of waterfowl (Common Merganser, Red-Breasted Merganser, Bufflehead, Lesser Scaup, Canvasback, Northern Shoveler, Common Goldeneye, Widgeon, Northern Pintail, Blue-Winged Teal, Green-Winged Teal, Mallard, Black Duck, Wood Duck, Canada Goose), and plant species (*Elodea canadensis, Valisineria americana, Ceratophyllum dermersum, Potamogeton Richardsonni, Potamogeton Robinsii, Potamogeton gramineus, Potamogeton pectinatus, Potamogeton zosteriformes, Najas flexis, Heteranthera dubia, Myriophyllum spicatum, Scirpus validus, Scirpus acutus, Sparganium eurycarpum, Nuphar luteum, Sagitarria rigida, Sagitarria sp., Chara sp., Eleocharis sp., Myriophyllum sp.*
Stressors Impairing System: Turbid water due to lack of sediment-stabilizing vegetation (sedimentation), historic logging
Partners: Wisconsin Conservation Corps, The Great Lakes Indian Fish and Wildlife Commission, Protect the Earth/Partners - Training - and Education, Mercer Department of Natural Resources, Angler's All, US Fish and Wildlife, graduate students, landowners, the City of Ashland, and Ducks Unlimited

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#15 - Chicago Region Biodiversity Atlas and Recovery Plan
(FY1995 GL985055-01, GL985200-02-4)
The Nature Conservancy
8 South Michigan Avenue, Suite 900
Chicago, IL 60603
312-346-8166; Fax- 312-346-5606

Northeastern Illinois Planning Commission
222 South Riverside Plaza
Suite 1800
Chicago, IL 60606
(312) 454-0400

Project Narrative:
The first phase of this project was the development of the *Chicago Region Biodiversity Atlas,* a colorful and widely distributed publication that captured the breadth of biodiversity and native landscapes within a tri-state (Southeast Wisconsin, Northeastern Illinois, and Northwest Indiana) Chicago area region. The Atlas was followed by the Recovery Plan, which identifies problems, opportunities, and recommends actions to 1) involve citizens, organization, and agencies in biodiversity conservation efforts; 2) develop citizen awareness and understanding of local biodiversity and what it takes to protect it; 3) protect globally and regionally important natural communities; 4) restore natural communities to ecological health; 5) manage communities to sustain biodiversity; and 6) improve the scientific basis of ecological management. The overall intent was to foster a sustainable relationship between society and nature in the region thereby enriching the quality of life of the region's citizens.

The Recovery Plan development process was instituted by the Recovery Plan Task Force. The Task Force

coordinated Chicago Wilderness member reviews and public involvement meetings. The project resulted in a Chicago Wilderness Biodiversity Recovery Plan which encompassed the natural areas of the three state area.

The "Atlas of Biodiversity" covers the tri-state Chicago Area Region. The "Biodiversity Recovery Plan," "A Guide to the Biodiversity Recovery Plan," and "A Summary of the Biodiversity Recovery Plan" were produced and continue to be distributed to interested individuals and organizations. More than 175 individuals representing 120 organizations, including 24 municipalities, were involved in public workshops to review the plan. Never before had such a comprehensive plan for the region been developed, and never before had so many different organizations and individuals decided to work side by side on the same project. Involved scientists and land managers participated in 13 day-long workshops to identify priorities and develop recommendations.

All publications were made available to the public. The Education and Communication team of Chicago Wilderness held a series of workshops discussing the most pressing educational needs. The policy and strategy team held a series of workshops on key topics in regional planning, such as biodiversity and the law, water management issues, and economics.

Project Results:

Environmental Science and Management

- *planning, coordination, information sharing, technology transfer*

"Chicago Wilderness Biodiversity Recovery Plan" produced along with a summary and guide.
Involved more than 175 individuals representing 120 organizations from 24 municipalities.
Scientists and natural resource managers participated in 13 day-long workshops to identify priorities.
The Chicago Wilderness Policy and Strategy Team held a series of workshops on key regional planning topics including biodiversity and the law, water management, and economics.

Public Stewardship

- *outreach, information exchange*

Produced an "Atlas of Biodiversity" which was widely distributed.

- *education*

The Chicago Wilderness Education and Communication Team held a series of workshops to discuss the most pressing educational needs.

Economic Impact

- *direct*

$59,312–Contractual
$13,906–Leveraged (FY'95- $2,100; '96- $8,000; 5055-0- $3,806)

Project Statistics:

Award Amount: $235K (FY1995- $35,000; 1996- $150,000; 5055-01- $50,000)
Project Timetable: October 1, 1995 - September 14, 2000
Project Location: southeast WI, northeast IL, northwest IN
Great Lakes System: Lakeplain, tributary/ connecting channel, inland wetland, inland terrestrial, coastal shore, coastal marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Too many to list, reference the "Chicago Wilderness Atlas of Biodiversity"
Stressors Impairing the System: All known stressors
Partners: This plan was the result of the efforts by more than 200 people and over 90 environmental agencies and organizations in the tri-state region, including, but not limited to: Brookfield Zoo, City of Chicago: Department of the Environment, Chicago Academy of Sciences, Field Museum, The Nature Conservancy, Northeastern Illinois Planning Commission, U.S. Fish and Wildlife Service, and USDA Forest Service. Organizations participated in preparing background papers and workshops that addressed scientific policy issues. Various organizations and various Chicago Wilderness Teams (including Science, Land Management, Education and Communications, and Sustainability) helped to shape this plan as well.

#16 - Colonial Nesting Birds Restoration
(FY1992 - GL995872-01)
Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:
This project was comprised of two geographically distinct sites on the Lake Superior Coast. The Wisconsin Point Project in the St. Louis River Estuary involved construction along the shoreline to provide additional nesting habitat for the common tern. This area of construction had been periodically inundated and subject to recreational vehicle traffic. The second site was the restoration of an existing nesting platform in Chequamegon Bay which had been damaged from winter ice flows. This platform has been historically used as a nesting site for common terns.

Project Results:
Environmental Science and Management
- *ecological restoration*
Increased two acres of breeding and rearing habitat at Wisconsin Point and Chequamegon Bay, for a state endangered species (common tern)
Economic Impact
- *direct*
$3,500–Leveraged
- *indirect*
Increased recreational bird watching opportunities

Project Statistics:
Award Amount: $262,713
Project Timetable: October 1, 1992 - February 1, 1998
Project Location: Allouez Bay, Lake Superior
Great Lakes System: Coastal shore (Lake Superior)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Common terns (state endangered species)
Stressors Impairing System: Development, recreation

#17 - Compiling Site Specific Information for Imperiled Species within the Great Lakes States
(FY1995 - GL985178-01-0)
The Nature Conservancy
1313 5th Street, SE Suite 314
Minneapolis, MN 55414
612-331-0700; Fax- 612-331-0770

Project Narrative:
The Nature Conservancy (TNC), through its Midwest Regional Office and Home Office, worked cooperatively with Natural Heritage Program databases in Illinois, Indiana, Michigan, Minnesota, New York, Ohio, western Pennsylvania, eastern Pennsylvania, and Wisconsin to compile element occurrence information for the Great Lakes basin. The Natural Heritage Programs collected the information through the nine grants given under the heading Developing Imperiled Species Occurrence Information, and this project took that information and compiled it into one database. The data was compiled at TNC's Midwest office, for TNC's Biological and Conservation Data (BCD) system. This preliminary step allowed the element occurrence information to be kept in one place and was completed at a central database, where it is presently stored and updated. The resulting data are Confidential Business Information (CBI) and may be used only within EPA, in accordance with the legally binding license agreements. These data have been determined by the Office of Regional Counsel to be exempt from the Freedom of Information

Act (FOIA).

Project Results:

Environmental Science and Management

- inventory, assessment, classification

Complied a biological and conservation database of Natural Heritage Program data for the eight Great Lakes states.

Economic Impact

- direct

$2,106–Leveraged

Project Statistics:

Award Amount: FY1995 - $40,000
Project Timetable: October 1, 1995 - September 30, 1997
Project Location: Chicago, Illinois (program office)
Great Lakes System: All systems except open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Imperiled species of the basin
Stressors Impairing System: All known stressors
Partners: Great Lakes State Natural Heritage Programs

#18 - Conifer Restoration in the Bad River Watershed
(FY 1997 - GL985515-01-0)
Northland College
1411 Ellis Avenue
Ashland WI 54806
715-682-1550

Project Narrative:

Many forests that border the Lake Superior shoreline and occupy the headwaters of streams have suffered a reduction in their conifer component since the cutover took place around 1900. These conifers not only increased the biological diversity of the area, but also provided watershed protection by retarding spring runoff and reducing erosional capacity of the falling raindrops, adding to the ecological heath of the system by reducing the sediment loading in the streams, rivers, and coastal wetlands. Conifers also reduced the rate at which the snow melts, and have potential to maintain viable populations of native species.

This project intended to study the herbivory on conifers and other vegetation in a series of experiments designed to establish a tree planting program and assessment of success as part of Northland College's regular curricula activities. The herbivory experiments included the testing of deer and hare browse on white cedar, white pine, and on eastern hemlock, in addition to existing plant community composition. The experiments included an observation of deer browse affecting the recovery of Canada yew. Five specific ecological land types were identified and selected as the sites at which the experiments would take place. These included the Lake Superior clay plain, the Bad River corridor, the Penokee Hills, the thrust-till ground moraine, and the wave planed tills of the Nipissing shoreline. These experiments were intended to initiate the planting program and assessment, and to aid in the restoration of the conifers.

Two demonstration exclosures at the Northern Great Lake Visitor Center in Ashland were constructed to illustrate the potential negative effects of deer herbivory. Strategic white cedar plantings, along with educational signs, convey a message about the importance of long term monitoring to assess environmental change. Unfortunately, a severe drought in the summer of 1998 caused conifer mortalities, and no interpretation of the differential success of the exclosure locations was made as of June 1999. It was estimated that it would take at least 3-4 years before there would be interpretable results. The second assessment of the tree plantings took place in the spring and summer of 2001. Since the end of this project, however, it has been observed that deer browsing was rampant in two of the areas and successful conifer growth unlikely. In several areas, the seedlings have not yet grown above the normal winter's snow depth. Because of a lack of comprehensive interpretation, no tree planting program

or assessment were created, but results were incorporated into the Bad River Biodiversity Project and the Northland college's regular curriculum. Finally, the project continued to be funded after the grant ended, and students from Northland College are hired every year to monitor.

Project Results:

Environmental Science and Management

- scientific study

The effects of deer browse on conifers is being studied. Results will not be available for several years after the project's conclusion.

- monitoring, indicators

Northland College students are continuing to monitor the effects of deer browse.

Public Stewardship

- outreach, information exchange

Constructed two demonstration deer exclosures at the Northern Great Lakes Visitor Center to illustrate the potential negative impacts of deer herbivory to the public.

Planted white cedars that with signage demonstrates the importance of long term monitoring to demonstrate environmental changes.

- education

The conifer-deer browse studies have been incorporated into the Northland College curriculum.

Economic Impact

- direct

$24,000–Personnel with fringe

$11,400–Leveraged

Project Statistics:

Award Amount: $46,700

Project Timetable: July 1, 1997 - July 1, 1999

Project Location: Wisconsin, at The Penokee Hills, The Bad River corridor, The Caroline Lake thrust tills, The Maxwell clay plain, and at Gurney/Saxon dissected tills.

Great Lakes System: Inland terrestrial

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Northern conifers such as white cedar, hemlock, and white pine

Stressors Impairing System: Animal herbivory, and the resultant stress that the cut over around 1900 had on the overall health of the area (logging).

Partners: Bad River Tribe, The Nature Conservancy, Whittlesey Creek Conservation Project, Wisconsin Department of Natural Resources

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#19 - Control of Harmful Exotic Fish Through Spawning Pheromone Attractants (FY1995 - GL985052-01-1)

Fond du Lac Reservation Business Committee
105 University Road
Cloquet, MN 55720
218-879-1759; Fax- 218-879-4854

Project Narrative:

The invasive non-indigenous fish including *Gymnocephalus cernuus,* Eurasian ruffe, and common carp encroach on the habitat of native species. This project conducted field testing of various and hypothetical ruffe and carp reproductive pheromone situations in the St. Louis River estuary in order to find a more effective and efficient means of controlling this biologically harmful species. The effective control of ruffe through the use of reproductive pheromones would supplement other control measures in areas where ruffe become established, and would prevent or significantly slow the further expansion of this species. The control of common carp through the use of pheromones would allow for an effective and environmentally safe remediation of the impacted fisheries and aquatic

resources in much of North America. It was hoped that by understanding how pheromones affect ruffe, that we would then be able to use that knowledge to our advantage by catching, removing, and controlling the spread of ruffe and also by generally disturbing their mating process.

The project examined the actions of Ruffe in the presence of different pheromones, and we now have a better understanding of how pheromones attract and affect Ruffe. The results from the field testing of 1995 and 1996 were reported separately, but both years were combined in the preparation and printing of the lab report, "Characterization of the Olfactory Sensitivity of the Eurasian ruffe, *Gymnocephalus cernuus*, to putative pheromones." The report confirmed the "communication" between male and female ruffe through pheromones, thus initiating spawning behavior.

Project Results:

Environmental Science and Management

- *scientific study*

Examined the actions of the invasive Ruffe in the presence of different pheromones and gained an understanding of how pheromones attract and affect Ruffe.

Report produced: "Characterization of the Olfactory Sensitivity of the Eurasian Ruffe, *Gymnocephalus cernuus*, to Putative Pheromones."

Economic Impact

- *direct*

$20,000–Contractual

$60,225–Personnel

- *indirect*

The European ruffe is believed to be a major threat to the freshwater sport and subsistence fishery in this region and potentially much of eastern North America. According to a National Oceanic and Atmospheric Administration recent economic analysis, the estimated loss of income to sport and commercial fisheries in the Great Lakes could reach $120 million annually (NRRI Now, University of Minnesota, Duluth, Winter 1996).

Project Statistics:

Award Amount: $102,000 (FY1995- $70,000; FY1996- $32,000)
Project Timetable: April 1, 1995 - March 1, 1997
Project Location: Fond du Lac Reservation, St. Louis River estuary, coastal Lake Superior, Minnesota
Great Lakes System: Tributary/ connecting channel, coastal shore, coastal marsh, open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The native ecosystem and ecology including all the native aquatic plant and animal species
Stressors Impairing System: Invasive exotic fish species
Partners: University of Minnesota Department of Fisheries and Wildlife, Fond du Lac Resources Program - Department of Fisheries and Wildlife, Minnesota Sea Grant, National Biological Service, Ceded Territory Fisheries Program, U.S. Fish and Wildlife Service, Natural Resources Research Institute-Duluth, University of Texas at Austin

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#20 - Conversion of Dry Basins to Created Wetlands for Mitigation of Runoff Water Quality Project (FY1993 - GL995957-01-0)

Monroe County Environmental Health Laboratory
Environmental Health Laboratory
435 East Henrietta Road
Rochester, NY 14602
716-274-6820; Fax 716-274-8098

Project Narrative:

Project funds were used for the conversion of suburban dry retention basins into wetland detention ponds. This provided treatment and thermal moderation of storm runoff, while reducing hydraulic, thermal, and nutrient loading of receiving bodies and also providing wetland habitat functions. Coordinative and informational materials and meetings had been provided to County municipalities in 1993 and 1994. Several towns and villages were enrolled in

the project including: Monroe County, the towns of Greece, Ogden, Penfield, and the villages of Churchville and Spencerport. Contracts were let with municipalities, and construction was implemented.

The project mitigated thermal and nutrient impacts of urban and suburban storm water on receiving bodies, especially the Genessee River and Irondequoit Bay drainage basins; established onsite treatment technologies and best management practices; and incorporated technologies into future new developments. Through informational meetings, and personal interactions and encouragement with municipalities, information was shared in Monroe County regarding storm water pollution mitigation and available technologies were promoted. The project offset other more expensive public and private mitigative actions.

Project Results:

Environmental Science and Management

- ecological restoration

Established on site treatment technologies and best management practices and incorporated technologies to mitigate thermal and nutrient impacts of urban and suburban storm water on the 22,400 acre Genessee River and Irondequoit Bay drainage basin.

Public Stewardship

- outreach, information exchange

Storm water pollution mitigation and available technologies were presented at informational meetings and personal interactions with municipalities of Monroe County.

Economic Impact

- direct

$135,635–Contractual
$10,275–Personnel
$72,337–Leveraged

- indirect

More expensive public and private mitigative actions were offset.

Project Statistics:

Award Amount: FY1993 - $90,000
Project Timetable: June 7, 1993 - October 31, 1998
Project Location: Monroe County (suburban Rochester), New York, lower Genessee River/Irondequoit Bay drainage basin; Lake Ontario drainage basin
Great Lakes System: Inland wetland, tributary/ connecting channel
Stressors Impairing System: Agriculture, alteration of nutrient inputs
Partners: New York State Department of Environmental Conservation; Monroe County Water Coordinating Committee; USDA Natural Resources Conservation Service; U.S. Geological Service; Irondequoit Watershed Collaborative; various Monroe County towns, villages, and the City of Rochester. A consortium of staff from various municipalities in the Irondequoit Bay drainage basin, the Irondequoit Watershed Collaborative, has formed to promote a regional watershed approach to issues affecting the basin. Members have been active in promoting the objectives of this project within their organizations.

#21 - Critical Habitat Protection in the Fox-Wolf River Basin

(FY 1995-GL985124-01-0)

Fox-Wolf Basin 2000, Inc.
P.O. Box 1861
Appleton, WI 54913-1861
920-738-7025

Project Narrative:

The project created a locally based entity to receive ownership or other interests in land that is ecologically important but not large enough to attract state or national conservancy organizations. The project included support and training for the steering committee, which became the board of directors of the locally based conservancy, the Northeast

Wisconsin Land Trust (NEWLT); and support for the assembly of information on critical and high quality habitat within the region. The project contacted landowners and provided assistance in arranging protective agreements, dedications, or purchases. The project sought to demonstrate that, by supporting creation of a community based organization based upon local partnerships, long term protection and restoration of habitat and water quality could be accomplished without continuing federal funding. The end products were the identification and protection of critical habitat and the creation of institutional capability in the form of a locally based land conservancy. Three seminars were held to introduce the concept of a land trust to local citizens.

Project Results:

Environmental Science and Management
- *ecological protection*
Creation of a local land trust: NEWLT
Public stewardship
- *partnership building*
Three seminars were conducted for local citizens to introduce the concept of a land trust.
Economic Impact
- *direct*
$7,000–Leveraged
A business was created that will raise money in order to buy and preserve land.

Project Statistics:

Award Amount: FY1995 - $50,000
Project Timetable: September 1, 1995 - August 28, 1997
Project Location: Fox - Wolf watershed in Wisconsin
Great Lakes System: Inland terrestrial
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Numerous elements exist within this basin; specific sites will be identified as the land trust proceeds.
Stressors Impairing System: Habitat destruction
Partners: More than 20 local organizations and governments

#22 - Critical Habitat Restoration and Protection at Ives Road Fen, Lenawee County, Michigan (FY1997 - GL985701-01)

The Nature Conservancy
Michigan Field Office
2840 East Grand River, Suite 5
East Lansing, MI 48823
517-332-1741; 517-332-8382

Project Narrative:

This project focused on the hydrology of Ives Road Fen. Wells were installed, samples taken, and baseline data collected. Even after this grant ended, follow-up monitoring continued, and will continue after the completion of the restoration, scheduled for 2003. This project incorporated hydrological monitoring into action plans. The baseline data that was collected suggested that the objectives are appropriate for this study. It is expected that the groundwater levels will be indistinguishable for those in the undisturbed fen; the vegetation will be less than one meter tall; there will be few non-native species; and the vegetation will reflect and influence the groundwater, with the average plant possessing a coefficient of wetness of less than -3.0.

In addition, a partnership was developed that led to a collaboration of work when conducting prescribed burns. More than 70 volunteer workdays, involving about 240 individuals and over 2000 hours, offered an opportunity for education, environmental experience, and environmental involvement. A relationship with a middle school, which gave a chance to offer an educational presentation, and educational volunteer opportunities for the children (they helped remove invasive species) was formed. Three meetings were also held with the newly formed Volunteer

Preserve Committee.

Project Results:

Environmental Science and Management

- inventory, assessment, classification

Wells were installed and baseline data was collected throughout the 640 acre fen.

- monitoring, indicators

A hydrological monitoring plan for Ives Road Fen was developed and monitoring is continuing and a followup evaluation will occur in 2003.

Public Stewardship

- partnership building

A Volunteer Preserve Committee was formed

- protection and restoration volunteers

70 volunteer workdays were held involving more than 240 individuals working over 2,000 hours.

Economic Impact

- direct

$19,555–Personnel

$1,750–Leveraged

Project Statistics:

Award Amount: $33,250

Project Timetable: September 22, 1997 - September 21, 1999

Project Location: Lenawee County, Michigan

Great Lakes System: Inland Wetland

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: the prairie fen, and all the native plants that grow in it

Stressors Impairing the System: Invasive species

Partners: Volunteer Preserve Committee, Tecumseh Middle School, Ann Arbor Parks & Recreation Department, the public

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#23 - Cuyahoga River Remedial Action Plan (RAP) Project

(FY1995 - GL985134-01-2)

Cuyahoga River Community Planning Organization

1299 Superior Avenue

Cleveland, OH 44114-3000

216-241-2414; Fax 216-621-3024

Project Narrative:

The purpose of this grant was to demonstrate how to re-establish a riparian corridor in the Cuyahoga River area of concern using soil bioengineering and indigenous plant species for the recovery to a healthy, diverse, aquatic ecosystem. New soil bioengineering techniques were tested at four sites. Problem sites within the Cuyahoga River Area of Concern (AOC) were inventoried. Concept plans, designs, and initial construction on four individual projects in the AOC were completed. Riparian habitat was reconstructed to reduce and prevent future pollution. Hundreds of different varieties of trees, shrubs, and low-lying groundcover were planted. Live branch layering, live crib wall, branch packing, rock toe protection, rock weirs, seeding and mulching, slope stabilization matting, root wad revetments, vortex rock weirs, stream realignment live fascine, and step pools were used to restore the riverbanks. It is important to note that each site had only one local landowner. This saved many legal complexities. The purpose of this project was to demonstrate new institutional arrangements whereby a watershed group could leverage experimental actions by local public landowners.

As a result of the project, new partnerships with private landowners, local municipalities, public agencies, and stakeholder organizations were created. Technology on soil bioengineering techniques was shared with local implementing agencies, Remedial Action Plan partner organizations, local riparian landowners, local municipalities,

park districts, and local consulting firms, businesses, engineering firms, and potential financial partners through avenues such as a two-day workshop, field trips, and on-site guidance, and a handbook on the session. The workshop targeted governmental officials, state agencies, mayors, service directors, city engineers, and soil conservationists. Articles in a bi-annual newsletter informed people about the project. Printed news media, local radio and television stations, and community events, along with informational signs at the restoration sites were communication tools used. Site tours were given. The project raised awareness about the importance of protecting the riparian zones. Volunteers helped with the planting of the vegetation on the sides of the rivers.

Project Results:

Environmental Science and Management

- inventory, assessment, classification

Inventoried problem sites along the Cuyahoga River AOC.

- ecological restoration

Reconstructed riparian habitat at four sites using bioengineering techniques.

Public Stewardship

- outreach, information exchange

Information was disseminated to the general public via various news media and tours.

- education

Two-day workshop conducted for local officials and landowners about bioengineering techniques.
A handbook about these techniques was published.

- protection and restoration volunteers

Volunteers assisted with the river bank plantings.

Economic Impact

- direct

$410,742–Leveraged

Project Statistics:

Award Amount: $156,540
Project Timetable: September 25, 1995 - September 24, 2000
Project Location: Cuyahoga River, in and around the Cleveland area
Great Lakes System: Tributary/ connecting channel
Stressors Impairing the System: Pollution, habitat loss
Partners: U.S. Environmental Protection Agency, Ohio Environmental Protection Agency, Cuyahoga Soil and Water Conservation District, Ohio Department of Natural Resources, Northeast Ohio Area wide Coordinating Agency, Northeast Ohio Four County Regional Planning and Development Organization, Northeast Ohio Regional Sewer District, Biohabitats Inc., City of Seven Hills, Village of Highland Hills, City of Cleveland, MetroParks Serving Summit County, landowners

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#24 - Deer Creek Marsh Wildlife Management Area (See " Lake Ontario Barrier Beach/Wetlands Habitat Restoration Project" description of the cluster grant to New York State Department of Environmental Conservation for more information.)

(FY1994 - GL995663-01-0)

New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-4754
518-402-8919; Fax 518-402-8925

Project Narrative:

At the Deer Creek Marsh Wildlife Management Area, a great diversity of ecological communities exist. Almost every animal found within the Great Lakes coastal zone can be found in this area. This project supported barrier beach restoration and stabilization; public use control, including dune crossover and moveable trail construction; public user education; the creation of wildlife nesting habitat; and exotic vegetation control. Education as a deterrent

to resource abuse was emphasized along with highlighting demonstrations of actual restoration.

Dunes were stabilized by fertilizing existing beach grass, transplanting grass from thick growth to thin growth areas, and protecting these areas from erosion with fences. The public use was controlled, and dunes were protected with the construction of a public foot path across sensitive sand areas. Approximately one acre of Phragmites (invasive species) was removed, and an osprey nest platform was repaired and maintained during the project period. Both actions lead to the recovery of native and the removal of foreign species.

Non-law enforcement staff patrolled and monitored the dunes, and emphasized personal contact to educate and inform the users of the fragile nature of the barrier beach and marsh habitats. Interpretive signs were placed to explain the ecology of the Lake/Dune/Marsh system, and signs were also placed to inform users of the area of sensitive and fragile areas of which they needed to be careful. In addition, information handouts were produced, and an observation deck was constructed to be the focal point for the project. The project authors believe that the public education effort was the most important element of this project, compared to the other restoration and protection techniques. It seems to them that the most effective means of preventing degradation of the dune system is through education, especially through the interaction of staff on site with the users that come to visit.

Project Results:

Environmental Science and Management

- *ecological protection*

Dune crossovers and moveable trails were constructed to protect 1,196 acres of sensitive beaches and dunes.

- *ecological restoration*

A 1 acre barrier beach on Eastern Lake Ontario is being restored.
Wildlife nesting habitat was created.
Exotics were controlled.

Public Stewardship

- *outreach, information exchange*

Non-law enforcement staff patrolled and monitored the dunes and explained the fragile nature of the ecosystem to recreational users.
Interpretive signs were erected to explain local ecology.
Informational handouts were produced and disseminated by patrols.
An observation deck was constructed.

Economic Impact

- *Direct*

$2,817–Leveraged

Project Statistics:

Award Amount: $53,515
Project Timetable: October 1, 1994 - September 30, 1996
Project Location: Eastern shore of Lake Ontario and along the Niagara River - Town of Richland - Oswego County
Great Lakes System: Coastal Marsh, Coastal Shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The Nature Conservancy Eastern Lake Ontario Megasite Element. Highly significant communities include barrier beaches (Great Lakes dunes), wetlands (rich shrub fen, medium fen, red maple-hardwood swamp, and red maple-tamarack peat swamp), and forested areas (maple-basswood rich mesic forest). Five rare animals (Cyan's buckmouth, black tern, northern harrier, sedge wren, and osprey). Six plants (rush aster, largeleaf aster, creeping sedge, Houghton's sedge, livid sedge, sand sherry, and sand dune willow). This area is also an important waterfowl migratory staging area, and provides for waterfowl nesting opportunities. This area is so diverse, that almost every animal that can be found within the Great Lakes coastal zone, can be found in this area.
Stressors Impairing System: Exotic Species, Erosion of dune/barrier beach, Dispersed visitor activities
Partners: New York State Department of Environmental Conservation Fund, New York State Department of State, New York State Parks and Recreation, Oswego County Soil & Water Conservation District, Oswego County Youth Conservation Corps, USDA Agricultural Stabilization & Conservation Service, Thousand Islands Park Commission, New York Sea Grant/Sea Trail, Oswego County Environmental Management Council, The Nature Conservancy,

#25 - Developing a Plan for Protecting and Restoring Successional Habitats on Presque Isle State Park by Controlling Exotic Plant Species

(FY 1997 - GL985589-01-0)

Presque Isle Partnership
P.O. Box 8510
Erie, PA. 16505
814-838-5138; Fax 814-871-5757

Project Narrative:

The purpose of this project was to develop a comprehensive plan for dealing with invasive species such as Phragmites, reed canary grass, Japanese bush honeysuckle, purple loosestrife, and hybrid cattail, and to test the effectiveness of control techniques such as burning/cutting, hand removal, and herbicides. Surveys were conducted and vegetative maps were produced to detail threatened habitats and their associated species as well as control measures.

The result of the project is a healthier Presque Isle State Park after the successful removal of many invasive species, including Tree of Heaven, European White Birch, Japanese Bittersweet, Hairy willow Herb, Japanese Bush Honeysuckle, Purple Loosestrife, Eurasian Water Milfoil, Canary Reed Grass, Phragmites, Curly Pondweed, Narrow-leaved cattail, and Hybrid Cattail, from selected areas. Surveys of Presque Isle were conducted which revealed targeted areas for invasive plant control. This was the first survey of it's kind in Presque Isle, and will serve future volunteers and staff in controlling these problems species. This survey, together with trials and errors, led to the development and release of a Habitat Restoration Plan for the park. This plan is still being used and techniques are still being improved upon. This project's initiative inspired a committee to develop a formal "Research Station" on the park.

Partnerships with the local academic community and with the Cleveland Museum of Natural History were set up to remove the invasive species. In addition, because of this project, more educational workshops, brochures, and signs have been continually educating the public about invasive species and restoration that is being undertaken. By removing invasive, non-indigenous species from Presque Isle, it stays natural and beautiful, attracting more than four million visitors every year. The project has been extended and there are now two to four interns hired every year to help control invasive species.

Project Results:

Environmental Science and Management

Acres Involved: 3200

- *planning, coordination, information sharing, technology transfer*

Written plan developed for habitat restoration.

- *inventory, assessment, classification*

Surveyed the park for invasive plant species populations.

- *ecological restoration*

Successful removal of invasive plant species from a selected area of the state park.

Public Stewardship

- *education*

Educational workshops and materials have been developed to educate the public about invasive species and restoration.

- *partnership building*

Partnerships set up with local academic community and the Cleveland Museum of Natural History.

Economic Impact

- *direct*

Two to four interns are hired yearly to control invasive species.
$1,250–Leveraged

- *indirect*

Keeping the park natural and free of invasive species attracts tourism dollars to the area.

Project Statistics:
Award Amount: FY 1997 - $25,000
Project Timetable: October 1, 1997 - October 31, 1998
Project Location: Presque Isle, Pennsylvania
Great Lakes System: Coastal wetland, coastal shore
Stressors Impairing System: Invasive exotic plant species
Partners: Gannon University, Penn State University, Edinboro University, Mercyhurst College, Sea Grant, Presque Isle State Park, Cleveland Museum of Natural History, Erie County Health Department, Pennsylvania Department of Environmental Protection

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#26 - Developing Imperiled Species Occurrence Information

Eastern Pennsylvania (FY1995 - GL985179-01-0)
The Nature Conservancy
34 Airport Drive
Middletown, PA 17057
717-948-3961

Illinois (FY1995 - GL985183-01-0)
Illinois Department of Natural Resources
524 S. 2nd
Springfield, IL 62701
217-782-2602

Indiana (FY1995 - GL985184-01-0)
Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
402 West Washington St., Room W267
Indianapolis, IN 46204
317-232-4052

Michigan (FY1995 - GL985181-01-0)
Michigan Natural Features Inventory
5th Floor Mason Building
P.O. Box 30444
Lansing, MI 48909-7944
517-373-7565

Minnesota (FY1995 - GL985187-01-0)
Minnesota Department of Natural Resources
Box 7, 500 Lafayette Road
St. Paul, MN 55155-4007
612-297-3764

New York (FY1995 - GL985186-01-0)
The Nature Conservancy
700 Troy-Schenectady Road
Latham, NY 12210-2400
518-783-3932

Ohio (FY1995 - GL985185-01-0)
Ohio Department of Natural Resources
1889 Fountain Square, Bldg. F-1
Columbus, OH 43224
614-265-6460

Western Pennsylvania (FY1995 - GL985182-01-0)
Western Pennsylvania Conservancy
316 Fourth Avenue
Pittsburgh, PA 15222
412-288-2774

Wisconsin (FY1995 - GL985190-01-0)
Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707
608-266-3369

Project Narrative:

The Natural Heritage Programs in Illinois, Indiana, Michigan, Minnesota, New York, Ohio, western Pennsylvania, eastern Pennsylvania, and Wisconsin worked cooperatively with The Nature Conservancy (TNC), through its Midwest Regional Office and Home Office, to develop element occurrence information for the Great Lakes basin. The State Natural Heritage Programs collected, developed, maintained, and updated their digital inventory of rare, threatened, and endangered species. This inventory is used now for the protection, recovery, and restoration of species, biodiversity, and ecosystems. The resulting data are Confidential Business Information (CBI) and may be used only within EPA, in accordance with the legally binding license agreements. These data have been determined by the Office of Regional Counsel to be exempt from the Freedom of Information Act (FOIA).

Project Results:

Environmental Science and Management
- *inventory, assessment, classification*
A digital inventory of rare, threatened and endangered species has been developed and is being maintained for an 8-state region.
Economic Impact
- *direct*
$8,424–Leveraged ($1,053 for each of nine projects)

Project Statistics:

Award Amount: $20,000 for each of nine projects
Project Timetable: October 1, 1995 - September 30, 1997
Project Location: Basinwide (Cumulative impacts of projects)
Great Lakes System: All systems except open lake
Stressors Impairing System: Virtually all known stressors
Partners: Great Lakes State Natural Heritage Programs

#27 - Door County Conservation Initiative (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
653 County U
Algoma, WI 54201
920-743-8695; Fax 920-743-9068

Project Narrative:

The goal of this project was to initiate and facilitate conservation activities on protected and unprotected high quality natural areas of the Door Peninsula. These conservation activities varied from a focused effort to define and create a viable natural area project, to impacting region-wide conservation practices that influence the peninsula. Objectives were set to accomplish this goal and include compiling, supplementing, and evaluating relevant natural, biological, and social information; enlisting the support of local and regional conservation partners; developing on-going support for the project, and facilitating the implementation of the conservation plan. Primary activities of the project included field inventory and historical research of several unexplored natural areas; creating or strengthening ties with landowners, the local land trust, lake associations, several property owners associations, academic institutions, and government agencies.

A major product of this initiative was the creation of two new land protection projects, including the site at the north end of Kangaroo Lake. Other organizations have also expressed strong interest in approving other sites for their own organizations. 110 acres of critical uplands on the west side of the lake were acquired by The Nature Conservancy and the Door County Land Trust. One general result was the increase in protection activities. Several other tracts (180 acres) have been protected at the site through verbal landowner agreements. Contracts for GIS mapping and biological inventory work were also made. Much assistance was given to the local land trust to develop their projects and in writing conservation easements and grants. A guide, "A Resource Guide for Local Conservation Partners with Site Reports" was created to provide high quality conservation information to local conservation partners to assist in their protection efforts by providing site conservation plans for high quality but unprotected natural areas on the peninsula and other useful information for their successful protection. Throughout the information gathering process, potential partners have been identified and relationships cultivated. As these partnerships continue to evolve there will be continued assistance in the formulation and implementation of protection and management plans. More integrated stewardship programs were also developed in the Door Peninsula.

Project Results:

Environmental Science and Management
Acres Involved: 174,700 (the northern part of Door County)
- *planning, coordination, information sharing, technology transfer*
Facilitated implementation of a conservation plan.
- *inventory, assessment, classification*
Compiled biological information and historical research of several unexplored natural areas.
- *ecological protection*
Creation of two new land protection projects totaling 290 acres.
Public Stewardship
- *partnership building*
Strengthened ties with local landowners, land trusts, associations, academic institutions, and government agencies.
Economic Impact
- *direct*
Creation of one full time job for the duration of the project.
$3,000–Leveraged
- *indirect*
Increase in tourism dollars; increase in consumptive recreation (hunting, trapping, fishing); increase in non-consumptive recreation (birdwatching, canoeing, photography).

Project Statistics:
Award Amount: $68,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Door County Peninsula, Wisconsin
Great Lakes System: Coastal marsh, coastal shore, inland wetland
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 70 high quality communities, and over 70 state endangered/threatened species occur in this megasite. Among these include the: *Iris Lacustris, Somatochlora hineana, Vertigo hubrichti, Crisium pitsheri, Falco peregrinus anatum,* fish spawning grounds, migratory staging area, and beach and dune communities. Rare beach and dune communities, and the threatened *Iris lacustris* are both found here.
Stressors Impairing the System: Development, agriculture
Partners: Door County Land Trustees, Door County Property Owners Association, Kangaroo Lake Association, Glidden Drive Property Owners Association, Whitefish Bay Property Owners Association, Ridges Sanctuary, Door County Soil and Water Conservation District, Wisconsin Department of Natural Resources, Bay Lake Regional Planning Commission

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#28 - Eastern Lake Ontario Conservation Initiative (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-01, 02)
The Nature Conservancy
339 East Avenue, Suite 300
Rochester, NY 14604
315-298-2040, ext. 28
www.nature.org/cwny

Project Narrative:
The objective of this project was to begin an initiative that could achieve long-term conservation of both the dune/wetland system and the limestone barrens, two distinct ecosystems of high integrity and outstanding biological significance located on the eastern shore of Lake Ontario. Project activities included: 1) completing the inventory of plants, animals, and natural communities that occur within both systems; 2) preparing GIS maps of both ecosystem areas, share them with others, and use them for conservation planning; 3) Coordinating research on ecological processes that maintain the natural system; 4) developing Site Conservation Plans by evaluating the human situation, and developing strategies for implementation of long-term conservation, after defining the system, its stresses and sources of those stresses; 5) acquiring key tracts of land identified by the Site Conservation Plans; and, 6) collaborating with education professionals and volunteers to reach out to targeted audiences within the communities to foster development of a conservation ethic for these systems.

Seven key tracts of land were acquired, including 421 acres of land (including wetlands, dune barriers, land-locked inholdings, and coastal fens), and 4900 feet of barrier shoreline. Site conservation plans for both Ecosystems were completed. Updated inventories for rare plants, animals, and natural communities, and incorporated the records into NYNHP's BCD, where information is available for planning activities. The project area for each megasite was delineated and GIS coverages were digitized within three dune towns and four alvar towns. Two Megasite maps, seven town maps, and eight conservation site maps were prepared. Four bog buckmoth documents, two sand transport documents, two internal reports and a published paper on alvar hydrology, two reports on original alvar land surveys, a report on historical alvar wild fire, and a report on research and inventory methods for the International Alvar Project were produced. Negotiated different types of protection behavior.

Base maps of each individual town, along with town specific slide presentations about ecological communities and rarities, were presented to town boards. Developed relationships with landowners, developed key public-private partnerships, initiated protection and outreach activities, and cultivated relationships with all town governments. Formed a group of volunteers to assist in ecological monitoring and restoration, and developed one preserve for public education and outreach. Increased the interest and appreciation for dune conservation, and started The Friends of Sandy Pond Beach group. Attained local press coverage and attracted support from previously unavailable sources. Spread the word about alvars, and what they are, resulting wider recognition for the alvar

system. Finally, an interpretive trail, a three-panel kiosk, and a self-guiding brochure at Chaumont Barrens Preserve were constructed and produced.

Project Results:

Environmental Science and Management

Acres Involved: 29,000 (16,000 acres from the Eastern Lake Ontario Megasite; and 13,000 acres from the Jefferson County Alvar)

- *inventory, assessment, classification*

Inventories on rare plants, animals, and natural communities were completed.
The project areas were digitized and delineated.
Maps were produced.
Created the 13 following scientific papers: "Status of Studies on the Bog Buckmouth," "Review of Existing Pertinent Information: Sand Transport Dynamics Operating Along the Eastern Shore of Lake Ontario in New York State," "The Role of Grikes in Limestone Pavement Formation in Northern New York, USA," "Summary of Original Land Survey data for Northern New York alvar sites," "Recent Fire History Data for the Perch River Barrens alvar site," "An Addendum to: Summary of original Land Survey Data for Northern New York alvar sites," "Hydroclimatic Reconnaissance of the Chaumont Barrens," "Life History of the Oswego County, New York Populations of the Bog Buckmouth," "Life History of the Bog Buckmouth in New York State," "Development of Research Methodologies for the International Alvar Conservation Initiative," "Biological and Hydrological Monitoring at the Chaumont Barrens Preserve," "Life History of Bog Buckmouth in Oswego County, New York,"and "Eastern Lake Ontario Littoral Processes: Review of Information and Management Implications."

- *planning, coordination, information sharing, technology transfer*

Site conservation plans for both ecosystems were competed

- *ecological protection*

421 acres of land and 4900 feet of barrier shoreline acquired. Initiated other protection activities.

Public Stewardship

- *outreach, information exchange*

Gave maps and slide presentations about ecological communities to each town board.
Made an interpretative trail, a three-panel kiosk, and a self-guiding brochure

- *partnership building*

Developed relationships with landowners and developed other key public-private partnerships.
Cultivated relationships with town governments.

- *protection and restoration volunteers*

Formed a volunteer group to assist with ecological monitoring and restoration.

Economic Impact

- *Direct*

$40,000–Contractual
1 full-time position
$8,400–Leveraged

- *Indirect*

Increase in non-consumptive recreation (birdwatching, canoeing); increase in tourism dollars, directly effected by the local officials embrace and pride of their imperiled ecosystems, once they were more aware of them

Project Statistics:

Award Amount: $160,000

Project Timetable: January 10, 1993 - December 31, 1997

Project Location: Freshwater dune/wetland complex on the eastern shore of L. Ontario, Oswego and Jefferson Counties, NY, and a series of limestone barrens alvar sites in northwestern Jefferson County, New York. The dune system comprises 17 miles of shoreline with a core area of 12,000 acres within a target area of 16,000 acres. The alvar system comprises a chain of discrete sites comprising over 7,000 acres within a matrix target area of almost 13,000 acres. Discrete Nature Conservancy preserves within the site include El Dorado Beach Preserve (360 acres), Sandy Pond Beach (77 acres), Selkirk Fen Preserve (22 acres), Chaumont Barrens (1633 acres), and Limerick

Cedars (350 acres).
Great Lakes System: Coastal shore (barrier beach and dunes), coastal wetland, lakeplain (grassland/savanna), inland and nearshore terrestrial (alvar).
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Great Lakes dunes (G3G4), rich shrub fen (G3G4), medium fen (G3G4), bog buckmoth (Hemileuca sp. 1, G1Q Federal C2), alvar grassland (G2), calcareous pavement barrens (G3), limestone woodland (G3G4), plus several more natural communities and about three dozen species considered rare in NY.
Stressors Impairing the System: Development, recreation, hydrological disruption, nutrient enrichment.
Partners: State University of New York Colleges at Oswego and Genesco and the College of Environmental Science and Forestry, Cornell University, New York Department of Conservation, New York Natural Heritage Partnership, Tug Hill Tomorrow Land Trust, University of Georgia, Finger Lakes Community College, USDA Natural Resource Conservation Service, Oswego County Soil and Water Conservation District, NY Sea Grant Extension, Town governments of seven towns: Clayton, Lyme, Brownville, Cape Vincent, Ellisburg, Sandy Creek, and Richland; International Alvar Working Group, Ontario Dune Coalition

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#29 - Ecological Targeting in Ohio's Great Lake Basin (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
6375 Riverside Drive, Suite 50
Dublin, OH 43017
614-717-2770; Fax 614-717-2777

Project Narrative:
Few high quality natural communities persist in Ohio because the landscape has been changed by a variety of anthropomorphic disturbances. Better priorities for land acquisition and protection can be made if the best remaining examples of each community type are identified. The principle objective of this project was to evaluate and rank plant communities based on the records for sites occurring within the Lake Erie Drainage basin stored in the Division's Heritage Database. This project: 1) Reviewed Heritage Database records; 2) Conducted surveys to document additional high quality plant communities; 3) Revised the plant community classification system currently in use; 4) Produced a revised list of the high quality natural plant communities in the drainage basin; and, 5) Developed a ranking methodology to assess the conservation priority of each plant community. This information was integrated into the Heritage Program database, and information was provided to resource managers, planners, and local, state, and federal agencies.

Seventy high quality sites within the drainage area were identified in the review of the Heritage Database, and 78 new high quality sites were identified and added to the Database during the 21 county survey, boosting the total number of high quality sites in the revised database to 148. While updating the Heritage Database, this project helped to clarify sites and plant communities by revising the classification system and developing a ranking methodology that would be more useful. Presently, the plant sites are classified, not the communities. When ranking sites, it is important to understand the relationship to the rest of the state, not just to the area surveyed. This information has played a valuable role in The Nature Conservancy's ecoregional conservation project, and additional identification work is being leveraged at the close of this project.

Project Results:
Environmental Science and Management
- *Inventory, assessment, classification*
21 counties surveyed: 78 new high quality sites were identified, making a total of 148 sites.
Economic Impact
- *Direct*
$26,200–Contractual
1 full time position for the duration of the project which was continued by the Ohio Department of Natural Resources after the project ended.

$6,000–Leveraged

Project Statistics:
Award Amount: $120,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Lake Erie drainage within Ohio
Great Lakes System: Coastal shore, coastal marsh, lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 148 sites containing high quality plant communities
Stressors Impairing System: Development, water level fluctuation (management)
Partners: Ohio Department of Natural Resources, Ohio Field Office, Division of Natural Areas and Preserves

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#30 - Establishment of Native Plants/Habitat on Lake Huron
(FY1995 - DW929477-01-0)
U.S. Department of Agriculture
Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 48823
517-324-5270; Fax 517-324-5171

Project Narrative:
This habitat restoration project established and demonstrated the techniques required to restore native habitat to lakeshore areas which were previously in commercial/industrial use. This was done in hopes that a methodology to guide other municipalities with similar situations in reclamation to dune/beach natural plant communities would be developed. Three parks owned by Rogers City, Michigan on Lake Huron were the sites for this restoration project. Natural plant communities were identified, samples were collected, methods of propagation were developed, and native plants were propagated and planted. Rogers City worked closely with the Natural Resource Conservation Service (NRCS). The City volunteered city maintenance crews, who assisted with the care of the plants and removed a chain link fence surrounding the old city garage site to allow for a more natural setting. Boy scouts and girl scouts helped in the plantings.

Project Results:
Environmental Science and Management
- *ecological restoration*
Successfully restored 3400-5100 sq. yds. of coastal shoreline.
Public Stewardship
- *protection and restoration volunteers*
Planting was done by volunteers from the boy scouts and girl scouts
Economic Impact
- *direct*
$55,000–Personnel
$5,000–Leveraged

Project Statistics:
Award Amount: $75,000
Project Timetable: October 1, 1995 - December 31, 1998
Project Location: Parks owned on the Lake Huron shoreline of Rogers City, Michigan.
Great Lakes System: Coastal shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: There are species associated with the dune/beach areas of Lake Huron listed as threatened and/or endangered. To date, the work has not been focused on these species but the project is concentrated on species that will create the environment for the introduction of the threatened and/or endangered species. By initiating establishment and management techniques,

determinations and evaluations will be made to develop a methodology for reclaiming dune/beach natural plant communities favorable to threatened and/or endangered species.
Stressors Impairing System: Development, habitat destruction
Partners: Rogers City, Michigan; the local girl scouts and boy scouts, the Presque Isle Natural Resources Conservation District, the Rose Lake Plant Materials Center

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#31 - Fish Creek Watershed Stewardship Program (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
Peachtree Plaza, Suite B2
1220 N. 200 West
Angola, IN 46703
219-665-9141, Fax same
lclemens@tnc.org

Project Narrative:
The Fish Creek Watershed contains the widest array of fish and mussel species in the lower Great Lakes. Improper agricultural practices are the primary threat to this system. The three main components of the Fish Creek Watershed Program addressed this problem: 1) Landowners were contacted to develop practical solutions to minimize agriculture impacts to biota. 2) The Conservation Reserve Program Survey was conducted to understand how private landowners make land use decisions, and gave insight into the potential uses of the land. 3) Landowners were encouraged to participate in the reforestation program to provide a buffer against runoff from farmland. This work resulted in an increased control of sheet erosion. The project inspired landowners to cooperate in seven projects that resulted in 20,000 feet of grass filter strips. Approximately 200 acres of eroding land along Fish Creek and it's tributaries were restored. Five projects led to reforestation, and one project resulted in a wetland restoration. Ten-year cooperative agreements with landowners were made. This project improved awareness and appreciation of the values of the Fish Creek watershed. Information was shared with local governments.

Project Results:
Environmental Science and Management
- *ecological protection*
4,000 acres were involved in the Conservation Tillage Program
- *ecological restoration*
With landowners, 20,000 feet of filter strips were laid.
5 projects with landowners led to reforestation.
1 project led to wetland restoration.
400 acres of riparian forest were restored with the help of landowners, among others, along Fish Creek, and in upland areas.

Helped to control sheet erosion, and improved the physical condition of the watershed as a whole.
Public Stewardship
- *Outreach, information exchange*
Shared information with local governments.
- *Partnership building*
Made 10 year cooperative agreements with landowners.
Surveyed landowners to better understand their land use decision making processes
- *Education*
One-on-one contact with landowners educated them about how to care for their land and the watershed
Economic Impact
- *Direct*
$28,400–Contractual

1 full-time position
$2,500–Leveraged
- *Indirect*
Lower water supply treatment costs
Lower agricultural costs due to sheet erosion control

Project Statistics:
Award Amount: $50,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Fish Creek Watershed, Northeast Indiana, Northwest Ohio
Great Lakes System: Tributary/ connecting channel, inland terrestrial
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: White catspaw pearly mussel *(Epioblasma obliquata perobliqua)*, 8 other rare mussel species, 2 rare fish species; one of the more diverse stream communities remaining in the Great Lakes watershed
Stressors Impairing System: Agriculture and development, which leads to runoff and erosion
Future Project Ideas/extensions: Construct GIS layers so that the intentions and willingness of the landowners to participate in programs and agreements, that would lead to greater environmental quality at the least cost, can be directly analyzed along with environmental parameters. Parameters like location within the watershed, and location of critical habitats and water quality information. This information would provide for the ability to illustrate the tradeoffs among environmental parameters, willingness of landowners, and dollars.
Partners: private landowners

#32 - Fisheries Objectives and Aquatic Habitat Restoration
(FY1993 - X995291-01)
Wayne State University
P.O. Box 32869
Detroit, MI 48232
313-577-3608

Project Narrative:
This project furthered aquatic habitat rehabilitation and advanced the ecosystem approach in the Great Lakes basin. Two areas of activities are: 1) A binational survey was conducted of the 43 Great Lakes Areas of Concern (AOCs) to determine the status of fish community objectives; to stimulate completion of the objectives, and to compare them with water quality objectives. A workshop was then conducted for fisheries and water quality managers to disseminate and discuss the results. One result of the survey and workshop were two publications, “A Survey of Fish Community and Habitat Goals/Objectives/Targets” and “Status in Great Lakes Areas of Concern” and “Toward Integrating Remedial Action and Fisheries Management Planning in Great Lakes Areas of Concern”. 2) A binational survey was conducted of habitat restoration projects associated with AOCs, a workshop held to share information, and the publication, “Status of Aquatic Habitat Rehabilitation and Conservation Efforts in the Watersheds of Great Lakes Areas of Concern,” was produced. This information was incorporated into the binational HABCARES program and associated publications.

Project Results:
Environmental Science and Management
- *Planning, coordination, information planning, technology transfer*
Held a workshop to increase understanding of habitat rehabilitation.
Publication produced: “Status of Aquatic Habitat Rehabilitation and Conservation Efforts in the Watersheds of Great Lakes Areas of Concern”
- *Inventory, assessment, classification*
Report: “A Survey of Fish Community and Habitat Goals/Objectives/Targets”
Report: “Status in Great Lakes Areas of Concern and Toward Integrating Remedial Action and Fisheries Management Planning in Great Lakes Areas of Concern”

Survey of 43 AOC's to determine the status of fisheries objectives, and to know what projects have been associated with AOC's.

Project Statistics:
Award Amount: $320,076
Project Timetable: February 1, 1992 - June 30, 1995
Project Location: Great Lakes Areas of Concern (AOC's)
Great Lakes System: Coastal shore
Stressors Impairing System: Virtually all known stressors
Partners: Environment Canada, Fisheries and Oceans Canada, U.S. Fish and Wildlife Service, the International Joint Commission, numerous individuals from federal, state, and provincial governments, and other RAP stakeholders

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#33 - Functional Models of Priority Systems in the Great Lakes Basin (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:
The Great Lakes ecosystem contains a number of ecological sub-systems that play key roles in its overall function. The health of these systems is integral to maintaining the biological components that characterize the uniqueness of the basin. This project assembled available knowledge and developed functional models for selected systems that are the focus of biodiversity conservation efforts. In Northern Lake Huron, an advisory group of key academic and agency experts on Great Lakes marshes was engaged to identify key knowledge gaps and develop a research program aimed at determining how these systems function. A functional ecosystem model was developed and used to support this work, including a compilation and review of existing knowledge of fish uses of Great Lakes marshes. In Central-Western New York, available information on longshore sediment transport along the shoreline was compiled and a model for maintenance of the barrier dune system developed. A broad coalition of partners collected information on ecological processes and potential stressors in alvar ecosystems through the International Alvar Conservation Initiative and is being used to develop a conceptual model for alvar ecosystems.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Improved knowledge and development of models led to strategic planning for northern Lake Huron marshes, Lake Ontario longshore sediment transport, and alvars.
A presentation was given at an alvar symposium.
- *Scientific study*
Development of three functional models (Lake Huron marshes, Lake Ontario longshore sediment transport, alvar ecosystems) enriched the base of ecosystem knowledge for practitioners.
Economic Impact
- *Direct*
$15,000–Contractual
$2,250–Leveraged
- *Indirect*
Will help sustain fishery-based tourism

Project Statistics:
Award Amount: $45,000

Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Chicago, Illinois (program office)
Great Lakes System: Coastal marshes, coastal shore, inland and nearshore terrestrial (alvar)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Great Lakes marshes, Coastal barrier dune systems, and Alvar ecosystems, lakeplain prairies and savannas (all areas concentrated upon were significant to the health of the Great Lakes)
Stressors Impairing System: Disruption of longshore sediment transport (sedimentation); pollution; physical alterations of coastal wetlands; exotic species; Hydrologic alterations in alvar and lakeplain prairies; fragmentation.
Partners: University of Michigan, New York Natural Heritage Program, Cutter and Associates (Watertown, NY)

#34 - Genesee River Critical Habitat Non-Point Source Pollution Control Demonstration (FY1994 - GL995655-01-0)

Headwaters Charitable Trust
478 Jeffers Street
DuBois, PA 15801
814-375-1372

Project Narrative:

This project reduced non-point source pollution of sediment and nutrients that were impacting aquatic habitat in the upper Genesee River. Technical services were provided to farmers and loggers to improve their skills, such as reducing milkhouse and barn gutter run off, reducing animal waste leaching, and reducing sediment erosion. These skills helped in addressing soil erosion and nutrient movements that would severely impact the critical habitat to an excellent Class A Wild Brook Trout Fishery. Financial cost-share was provided for Best Management Practices (BMPs) that improve habitat. Other local, state, and federal cost-share programs were utilized to compliment the habitat improvement. Potato and dairy farms located in the watershed developed nutrient management plans. BMPs were identified in close cooperation with the Pennsylvania Fish Commission that improves aquatic habitat. Cost-sharing incentives were provided to loggers and farmers to encourage a demonstration of the use of these BMPs. Other logger training on soil erosion control was integrated into an industry-sponsored, operational training program begun in 1992.

The project encouraged farmers to improve land management practices and demonstrate a commitment to managing water quality. By preventing non-point source pollution through use of at least six BMP's at specific locations throughout the watershed, lands were improved. The report, *Benthic Macroinvertibrate and Habitat Assessment* was produced. Over a nine month period, newsletters about BMPs were printed and distributed to farmers. Specific farmers having obvious pollution problems were targeted. The project made efforts to educate farmers about the best methods and techniques to insure environmental quality. BMP demonstration sites were located at sites highly visible to the general public.

Project Results:

Environmental Science and Management
Acres Involved: 138,624
- *ecological protection*

Report: "Benthic Macroinvertibrate and Habitat Assessment"
Nutrient management plans developed for potato and dairy farms.
Technical services and cost share incentives used to encourage BMPs among farmers and loggers.
- *ecological restoration*

Used BMP's to restore the land

Public Stewardship
- *Outreach, information exchange*

Printed and distributed newsletters to the farmers.
BMP demonstration sites used to educate farmers.
Trained loggers about soil erosion control.

Economic Impact

- Direct
$10,000–Contractual
$49,898–Personnel
$40,000–Cost Sharing
$15,000–Leveraged

Project Statistics:
Award Amount: $144,000
Project Timetable: October 1, 1994 - September 30, 1996
Project Location: Upper Genesee River, Pennsylvania, New York
Great Lakes System: Tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Snail darter
Stressors Impairing System: Sedimentation, nutrient and organic loadings
Future Project Ideas/extensions: It is suggested that a helpful future project would be to work with the farmers of this region to install specific practices that will directly improve habitat. While this project may have helped with the reduction of nutrients from livestock and crop management, the trampling of the streambanks and channels still remains in many instances.
Partners: Headwaters Resource Conservation & Development Trust, PA; Potter County Conservation District, PA; USDA Natural Resources Conservation Service; Pennsylvania Fish Commission; New York Seneca Trail Resource Conservation & Development Council; Trout Unlimited; New York State Department of Environmental Conservation; Allegany County Conservation District, NY

#35 - Go Wild! With Michigan Native Plants
(FY1997 - GL985594-01)
Michigan Association of Conservation Districts
P.O. Box 539
Lake City, MI 49651
231-876-0378; Fax 231-876-0372

Project Narrative:
Conservation districts nationwide have the potential for impacting ecosystems both positively and negatively through their tremendous network of landowners. For the past sixty years, districts have been making plant materials, about 10-15 million seedling per year, available to landowners. In the past, the Districts have given out both native and non-native plants with little attempt to inform the consumer about the benefits or disadvantages of using one over the other. This project promoted the planting of native species by private landowners by: 1) identifying areas for seed collection, 2) organizing volunteer networks in each of the nine targeted counties, 3) training Conservation District employees and NRCS about the importance of native species and biodiversity, 4) assisting efforts to evaluate field plantings, and by 5) beginning the process of plant material and seed collection.

A list of warm season grasses and other key native plant restoration species for the southern lower peninsula was developed. Warm season grass seeds were collected during two growing seasons, and about 12 acres were established for propagation. A list was developed that includes other key plant species for other parts of the state. Eight native plant demonstration gardens/plots have been established in eight different districts. A ninth demonstration garden is underway. A steering committee was formed (partnership) that includes representatives from: Michigan Department of Natural Resources, Michigan Department of Agriculture, USDA Natural Resource Conservation Service, a Michigan Conservation District, and the Michigan Native Plant Producers Association. All information gathered during this project was presented at the North Central Regional Conference of the National Association of Conservation Districts and at the annual meeting of the National Wild Ones organization.

A network of volunteers for collecting warm season grass seeds and a cooperative of native plant growers for the eastern upper peninsula were organized. The volunteers collected the seeds for 26 different native plant species. Pre-settlement vegetation maps were given to each district. Training on native plant use, Michigan ecosystems, use of pre-settlement vegetation maps, and other topics related to native plant landscaping and restoration was presented to the pilot districts in the form of five individual workshops with hundreds of people

attending. Three sets of native plant landscaping brochures were created and distributed to districts and other agencies throughout the state; about 750,000 copies were made and distributed. A poster display exhibit was created as a traveling showcase. A landowner workshop was given by a pilot district. Presentations, magazine articles, and native plant seed sales also were used to increase awareness. Two additional brochures on invasive plants were made. Additional funding was added to allow for a new standardized category of professional biologists through a Conservation Resource Management Initiative.

Project Results:

Environmental Science and Management

- *Planning, coordination, information planning, technology transfer*

Organized a native plant growers cooperative.
Steering committee of key natural resource managers organized.
Five workshops with hundreds of people attending trained people in native plant use and Michigan ecosystems.

- *Scientific study*

A 12-acre seed propagation garden established and seeds collected.
List of key native plant species developed.
Eight demonstration gardens established in eight districts.

Public Stewardship

- *Outreach, information exchange*

Media coverage to inform the public.
Three sets of plant landscaping brochures developed and 750,000 copies distributed.
Traveling display created.
Presentation, magazine articles
Seed sales conducted to inform

- *protection and restoration volunteer*s

Organized a network of volunteers to collect seeds.

Economic Impact

- *Direct*

$13,500–Leveraged

Project Statistics:

Award Amount: $150,000
Project Timetable: October 1, 1997 - September 30, 1999
Project Location: Michigan: Counties of: Menominee, Chippewa, Grand Traverse, Leelanau, Muskegon, Newaygo, Ingham, St. Joseph, and Benzie
Great Lakes System: Inland terrestrial, tributary/ connecting channel, lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Native plants (including: Beachgrass, Prairie Sandreed, Canada Wild Rye, Beach Pea, Bearberry, Creeping Juniper, Sand Cherry, Big Bluestem, Little Bluestem, Indian Grass, Switchgrass, Red Osier Dogwood, Ninebark, Arrowwood, Nannyberry, Common Elderberry, Buttonbush, American Cranberrybush, Native shrub willow, Speckled Alder, Native Hawthorn, Choke Cherry, American Mountain ash, Nirgin's Bower, American Hazelnut, Beaked Hazelnut)
Stressors Impairing System: Development, invasive species
Future Project Ideas/ Extensions: A phase 2 of this project has been underway and is still going n. Since the end of phase one, two additional traveling displays have been created, and many landowner workshops have taken place. These workshops have included one for native plant/ wildlife habitat, one for shoreline protection and erosion control using native plant s, and one for watershed and water quality management with the use of native plants.
Partners: Marketing Education Program for Conservation District, Michigan Department of Natural Resources (MDNR) Natural Heritage Program, United States Department of Agriculture - Natural Resource Conservation Service, The Conservation Districts of: Grand Traverse, Leelanau, Benzie, Muskegon, and St. Joseph Counties, MDNR Wildlife Diversion, MDNR Private Lands Program, Wildflower Association of Michigan, United States Forest Service - Manistee and Hiawatha National Forests, Rose Lake Plant Materials, Michigan Nursery and Landscape Association, the Michigan Seedling Growers Association, and The Nature Conservancy

#36 - Grand Calumet River Basin Biodiversity Conservation Plan
(FY1997 - GL985556-01-1)

The Nature Conservancy
Northwest Indiana Field Office
2400 New York Avenue
Whiting, IN 46394
219-473-4312

Project Narrative:

The Calumet Region is a part of the Southern Lake Michigan Lakeplain. It is one of the most heavily industrialized areas in the Great Lakes, but also contains fragments of the native lakeplain landscape which supports one of the most diverse assemblages of native plants and animals in the Midwest. This area is the only Great Lakes Area of Concern (AOC) to have all 14 beneficial use impairments, and at the same time, the remnants of the native dune and swale topography harbor the densest concentration of rare plants and animals in Indiana. These sites support a mosaic of interconnected natural communities including seven that are globally rare. For these reasons, this region offers the opportunity to link habitat restoration with 1) remediation of historic environmental degradation, 2) prevention of further negative impacts, 3) cultural land use planning, and 4) protection and restoration of significant biological diversity.

This project filled inventory information gaps, characterized sites, updated the ownership list, competed the threats assessment and assessment of undeveloped and underdeveloped properties, developed a conservation plan, and identified strategies to restore the ecological structure and function of the degraded areas. The report, "Biodiversity Conservation Opportunities in the Toleston Strandplain of Northern Lake County, Indiana: A Strategic Plan for Conservation Success," summarizes findings and offers challenges for future management.

Project Results:

Environmental Science and Management

- *Planning, coordination, information sharing, technology transfer*

Report, "Biodiversity Conservation Opportunities in the Toleston Strandplain of Northern Lake County, Indiana: A Strategic Plan for Conservation Success."
Developed a conservation plan.
Identified restoration strategies.

- *Inventory, assessment, classification*

Completed habitat inventories.
Updated ownership information.
Completed threats analysis.

Economic Impacts

- *Direct*

$16,000–Contractual
$92,000–Personnel
$29,027–Leveraged

Project Statistics:

Award Amount: $137,000
Project Timetable: September 30, 1997 - September 30, 2000
Project Location: Grand Calumet River and Indiana Harbor Ship Canal Area of Concern
Great Lakes System: Lakeplain, coastal shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 17 critically imperiled elements, 13 imperiled species or communities, 33 rare species
Stressors Impairing the System: Industrialization, urbanization, contamination, Hydrologic alterations, exotic and invasive species, fire suppression. Stressors like these caused all 14 beneficial use impairments
Partners: Ball State University, Northeastern Illinois University, Indiana University Northwest, Purdue University North Central, The Habitat Subcommittee for the Remedial Action Plan for the Grand Calumet River and Indiana

#37 - Grand Portage Reservation Coaster Brook Trout Habitat Protection Program (FY 1997 - GL985618-01-0)

Grand Portage Reservation Tribal Council
P.O. Box 428
Grand Portage, MN 55605
218-475-2415; Fax 218-475-2615

Project Narrative:

The brook trout and the lake trout are the only two fish species native to Lake Superior. This project assessed the reasons for the loss of the coaster brook trout and formulated a management plan to restore fish to natural levels by first assessing, then quantifying, and mapping the critical areas used by coaster brook trout in the near shore areas of Lake Superior around Grand Portage.

The areas utilized by Coaster Brook trout were assessed and delineated with the use of known data, field testing, and the Global Positioning System. Areas of habitat were then quantified to determine the extent of habitat in the Grand Portage area, then qualified as optimal or sub-optimal and mapped. A large purpose of this project was to delineate the trout's habitat before pollution or environmental degradation becomes a problem.

The project improved the protection of coaster brook trout by increasing our understanding of the species' habitat. The substrate in the area was delineated and mapped, showing that the area had the characteristics needed for good brook trout habitat and allowing for a better understanding of where the optimal places for trout habitat were, and where they could be. The substrate present also suggests that a wide range of habitat is suitable for both spawning and "cover." While all of the specific areas where spawning may occur was not identified, spawning sites in two streams were identified as suitable, which allowed for a verification of optimal sites with suitable substrate.

Project Results:

Environmental Science and Management

- *Inventory, assessment, classification*

Delineated and mapped the substrate of the Grand Portage nearshore areas of Lake Superior, and classified areas that are possible habitat.

- *Scientific study*

Increased our understanding of the coaster brook trout's habitat.
Compared and verified delineation with already classified habitat, and laid groundwork for future studies.

Economic Impact

- *Direct*

$40,000–Personnel
$17,400–Leveraged

Project Statistics:

Award Amount: FY1997 - $47,354
Project Timetable: May 15, 1998 - September 30, 1999
Project Location: The Grand Portage zone of Lake Superior
Great Lakes System: Tributaries/ connecting channel, Nearshore aquatic, open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The last remaining native species to Lake Superior: Coaster brook trout, Lake trout
Stressors Impairing System: Poor management practices (over fishing, poor land use practices)
Future Project Ideas/extensions: Locate and identify the presence of groundwater discharge in the delineation area (do this perhaps by using thermal sensing technology under development and being tested elsewhere). The physical, thermal, and chemical properties of substrate identified as suitable spawning habitat could also be tested.
Partners: U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources, Ontario Ministry of Natural Resources, Wisconsin Department of Natural Resources, Michigan Department of Natural Resources, Trout Unlimited, Grand Portage Reservation Tribal Government, 1854 Ceded Territory Authority

#38 - Grand River Protection
(FY1994 - GL995650-01-0)

Western Reserve Resource Conservation & Development Council
125 East Erie Street
Painesville, OH 44077
440-350-2730; 800-899-5253 outside Lake County; Fax 440-350-6201

Project Narrative:

The Grand River Protection Project was a three-year project seeking to protect the over 50 rare and endangered species which make the watershed their home. Beginning in 1993, the Grand River Partnership worked with many partners to implement a conservation easement program and install needed protection measures on the easements. Goals included establishing a citizen-based land trust and protecting water quality and aquatic habitat, wetlands, and forest communities in the Grand River Watershed.

Permanent easements were acquired from willing cooperators in the riparian corridor. Management practices were implemented to prevent non-point source pollution at selected sites. Much of the efforts of this project went into the preparation of legal documents and the methodology for acquiring these easements. This project allowed for 12 easements to be recorded, and an additional one that will be purchased in the future for a total of 534 acres and 38,850 feet of riparian corridor. These easements, along with implementation of best management practices, helped to increase the control of non-point source pollution.

Project Results:

Environmental Science and Management
- *Ecological protection*

Preserved 534 acres of land, including 38,850 feet of riparian corridors through 12 easements, and one more that will be purchased after the project ends.

Economic Impact
- *Direct*

$28,913–Leveraged
- *Indirect*

Spurred the economy through the purchase of land and of legal services

Project Statistics:

Award Amount: FY1994 - $300,000
Project Timetable: October 1, 1994 - September 30, 1997
Project Location: The Grand River watershed is located in northeastern Ohio (Geauga, Lake, Trumbull and Ashtabula counties)
Great Lakes System: Tributary/ connecting channel, inland terrestrial, inland wetland
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: A state-designated Wild and Scenic River, the Grand River watershed is home to over 50 rare and endangered species. Fifty-seven species of fish, 49 species of mammals, 115 bird and 18 reptile species and types of ten amphibians inhabit the Grand River basin. In addition, the Ohio Department of Natural Resources is re-introducing the federally endangered river otter into the upper reaches of the Grand River.
Stressors Impairing System: Development, alteration of nutrient inputs, sedimentation, waste disposal, agriculture
Partners: Grand River Partners, Inc., Western Reserve RC&D Council, USDA, Natural Resources Conservation Service's Wetland Reserve Program, Lake and Ashtabula County, Trumbull, and Geauga Soil and Water Cosnervation Districts, Ohio Department of Natural Resources Divisions of Soil & Water Conservation, Natural Areas and Preserves (Scenic Rivers Program) and Wildlife, The Ohio Chapter of The Nature Conservancy, Grand River Environmental Action Task Force, Ohio Environmental Protection Agency, The Cleveland Museum of Natural History, Holden Arboretum, Geauga County Park District, Lake County Metro Parks, Ashtabula County Park District, Headwaters Land Trust, Lake County Extension Service, the Trust for Public Land, local governments, municipalities, and individual citizens

#39 - Great Lakes Alvar Conservation Conference
(FY1998 GL985831-01)
The Nature Conservancy
8 South Michigan Avenue, Suite 2301
Chicago, IL 60603
312-759-8017; Fax 312-759-8409

Project Narrative:
This conference was the first gathering of North American scientists and conservation specialists to promote the collaborative conservation of a very rare and unusual type of natural area found in the Great Lakes basin: alvar, thin soiled grasslands having assemblages of rare plant and animal species. There were over 100 participants from throughout the Great Lakes region, including representation from universities, federal, provincial and state governments; nonprofit conservation organizations, local land trusts; industry; and private landowners. An overview of alvars was provided; recent alvar research findings and threats to these systems were identified; a variety of conservation strategies were highlighted; competing economic interests were discussed; and actions at multiple levels to better conserve these globally significant systems were identified.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Shared info about importance with alvars with participants.
A detailed summary of results was produced for conservation specialists.
Public Stewardship
- *Outreach, information exchange*
A glossy report was created for the general reader
Economic Impact
- *Direct*
$1,053–Leveraged

Project Statistics:
Award Amount: $20,000
Project Timetable: June 1, 1998 - December 31, 1998
Project Location: The conference was held in Tobermory, Ontario but covered all alvars in the Great Lakes Basin.
Great Lakes System: Inland and nearshore terrestrial (alvar)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The alvar ecosystem.
Partners: Federation of Ontario Naturalists

#40 - Great Lakes Alvar Poster
(FY 1998- GL985667-01-0)
The Nature Conservancy
8 South Michigan Avenue, Suite 2301
Chicago, IL 60603
312-759-8017; Fax 312-759-8409

Project Narrative:
This project was a result of the binational Great Lakes Alvar Conservation Initiative, a three year effort by over 30 experts to identify, characterize, classify, and initiate conservation efforts on alvar communities found throughout the Niagara Escarpment. A booklet on the Great Lakes Alvars was developed and this poster complements the booklet by drawing information from it, and also stands alone as an attractive and educational summary on the Great Lakes basin alvars. The Federation of Ontario Naturalists were responsible for taking the lead in developing, designing, printing, and distributing the posters in Canada. The Nature Conservancy participated in the overall review of the poster's content and design, managed requested grant funds supporting the poster production, and distributed

finished posters in the United States.

Project Results:
Public Stewardship
- *Outreach, information exchange*
Made, printed, distributed a poster about alvars to the public
Economic Impact
- *Direct*
$800–Personnel
$316–Leveraged

Project Statistics:
Award Amount: $6,000
Project Timetable: October 1, 1998- September 30, 1999
Project Location: The Great Lakes Alvars, within both the Canadian and United States boundaries
Great Lakes System: Inland and nearshore terrestrial (alvar)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Alvars
Partners: Federation of Ontario Naturalists

#41 - Great Lakes Aquatic Habitat Network and Fund
(FY1999 - GL005567-01-0)
Tip of the Mitt Watershed Council
426 Bay Street
Petoskey, MI 49770
231-347-1181; Fax 231-347-5928
jill@watershedcouncil.org
www.glhabitat.org; www.greatlakesdirectory.org

Project Narrative:
This project's goal was to increase citizen involvement in aquatic habitat protection at the local level. An annual meeting of representatives and advisors to the Watershed Council was conducted to develop a strategy for network priorities. The results were 11 projects from around the basin that accomplished the following: 1) Conducted a survey of migratory birds on the Detroit River; 2) Assembled and organized documents for presentation to the media and public officials in attempts to restrict ORV use; 3) Developed partnerships to protect Seneca Lake; 4) Monitored, planned, and gathered information about pollution from a waste mill; 5) Helped to purchase a monitoring probe that allows non-profit organizations to carry out their work; 6) Organized a workshop in order to improve opportunities, to increase the effectiveness of local groups, to encourage volunteers, and to develop and implement a conservation campaign; 7) Gathered and disseminated information in order to raise awareness to protect the last 2.4 miles of coastal wetlands in the Detroit area; 8) Built public support to help enforce laws restricting ORV use; 9) Produced a brochure thereby increasing citizen awareness and involvement in preservation to counter developmental pressures; 10) Increased the support for the Fisher Creek Alliance in order to promote planning, education, documentation, meeting, and fund-raising; and, 11) Developed a combination book/cassette tape of frog calls to increase conservation of Wisconsin's native rural and urban wetland habitats.

Project Results:
Environmental Science and Management
- *inventory, assessment, classification*
Survey of migratory birds on the Detroit River
Public Stewardship
- *Outreach, information exchange*
Assembled and organized documents for presentation to the media and public officials in attempts to restrict ORV use.

Monitored, planned, and gathered information about pollution from a waste mill in Ontario, Canada.
Organized a workshop to develop and implement a conservation campaign for Wisconsin rivers.
Gathered and disseminated information in order to raise awareness to protect the last 2.4 miles of coastal wetlands in the Detroit area.
Produced a brochure thereby increasing citizen awareness and involvement in preservation to counter developmental pressures on Ohio ecosystems.
Increased the support for the Fisher Creek Alliance in order to promote planning, education, documentation, meeting, and fund-raising.
Developed a combination book/cassette tape of frog calls to increase conservation of Wisconsin's native rural and urban wetland habitats.
- *partnership building*
Developed partnerships to protect Seneca Lake.
Economic Impact
- *Direct*
$97,131–Leveraged

Project Statistics:
Award Amount: $25,000
Project Timetable: October 1, 1999 - March 31, 2000
Project Location: Petoskey, Michigan (program office)
Great Lakes System: All systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: native migratory birds, the last remaining coastal marshes on the U.S. side of the Detroit river, native waterfowl, rich areas of biodiversity in Ontario, a special heritage site for shipwrecks, native anurans, urban wetlands
Stressors Impairing the System: The lack of involvement and care for our environment
Partners: C.S. Mott Foundation, Waukegan Harbor Citizens' Advisory Group, Friends of the Detroit River, Minnesotans for Responsible Recreation, Seneca Lake Pure Waters Association, Firelands Land Conservancy, Hastings Prince Edward Land Trust, Quinte Watershed Cleanup Inc., Fisher Creek Alliance, Northeastern Wisconsin Audubon, Flintsteel Restoration Association, River Alliance of Wisconsin

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#42 - Great Lakes Biodiversity Publication (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, FAX 312-759-8409

Project Narrative:
The Nature Conservancy's Great Lakes Office developed an illustrated layperson's guide, "Great Lakes in the Balance: Protecting Our Ecosystem's Rich Natural Legacy," about biodiversity features of the Great Lakes basin and the ecological processes that sustain them. This publication, widely distributed, increased awareness of the values and significance of biodiversity resources in the Great Lakes basin, and increased support for their protection and maintenance. The guide is in a format that is easily understood by individuals who are less familiar with Great Lakes environmental or conservation issues.

Project Results:
Public Stewardship
- *Outreach, information exchange*
Publication: "Great Lakes in the Balance: Protecting Our Ecosystem's Rich Natural Legacy"
Economic Impact
- *Direct*

$26,000–Contractual
$1,750–Leveraged

Project Statistics:
Award Amount: $35,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Chicago, Illinois (program office)
Great Lakes System: All systems except open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 31 natural community types, 49 plants, 21 insects, 12 mollusks, nine fish, five birds, three reptiles, and one mammal are all globally significant, and this only begins the list of important plant, animals, habitats, and ecoregions that are contained in the Great Lakes basin which would be too numerous to list here.
Partners: State Heritage Programs, Lake Michigan Federation, National Wildlife Federation, National Audubon Society

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#43 - Great Lakes Conservation Technology Transfer Program (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:
The Nature Conservancy's (TNC) Great Lakes Office compiled information from diverse sources on tools, techniques, and strategies useful for protecting and restoring biological diversity in the Great Lakes basin. The compilation drew on Conservancy information, the literature, and other sources. Included are biodiversity information, who's doing what, project case studies, and sources of assistance. Mechanisms for information delivery included electronic, hard copy, and person-to-person contact. This provided a means of creating a virtual community of conservation practitioners, allowing questions and answers to be shared in real time and in media that reach a range of practitioners. Hands-on assistance was provided in special cases as resources allowed. A meeting of TNC's Great Lakes bioreserve practitioners was held to expand interaction among those working within ecological boundaries of the Great Lakes. An effective delivery system for information was created (incorporating as part of it an electronic listserve), and the operation of the system itself is being maintained. Biodiversity practitioners were linked to the internet and routinely shared progress, opportunities, and lessons learned. This created a sense of community among the those working to protect biodiversity.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Created an effective delivery system for practitioner communication.
Economic Impact
- *Direct*
1 full-time position
$6,325–Leveraged

Project Statistics:
Award Amount: $126,500
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Chicago, Illinois (program office)

#44 - Great Lakes Forest Bank Project
(FY1997 - GL985905-01)
The Nature Conservancy
Center for Compatible Economic Development (CCED)
315 Alexander Street
Rochester, NY 14604
716-232-3530; Fax- 716-546-7825
www.forestbank.org

Project Narrative:

The project investigated using market incentives to conserve forests by providing small landowners with liquidity for their forest assets in exchange for permanent control over how the forest is managed and harvested. The concept of Forest Banking was designed by the Center for Compatible Economic Development to demonstrate the feasibility of a new, self-funded institution that could be effective at a scale relevant to the conservation of Great Lakes ecosystems. The goal was to create a rigorous methodology for analyzing sites and provide a clear and honest assessment of their potential as refuge for forest species. This innovative concept provides a model of a market-based tool for conservation of important forest land, while helping to keep it economically productive. Two pilot sites, the Bad River Watershed in northern Wisconsin and Tug Hill in upstate New York, were the basis for the analysis. This grant has helped make significant steps in developing a market-based tool for forest ecosystem conservation.

Project Results:

Environmental Science and Management
- *Scientific study*

Created and field-tested a comprehensive, comparative methodology for assessing potential Forest Bank sites. Identified potential sites, generated legal and financial frameworks for operationalizing the Forest Bank, and created a core sense of the core business operation that a Forest Bank must undertake to be successful financially and ecologically.

Economic Impacts
- *Direct*

$84,568–Contractual
$44,137–Personnel
$380,877–Leveraged

Project Statistics:

Award Amount: $150,000
Project Timetable: October 1, 1998 - September 30, 1999
Project Location: Kakagon Sloughs/Bad River Watershed, Wisconsin; Tug Hill, New York
Great Lakes System: Inland terrestrial
Culturally, Economically, and/or Biologically significant plants, animals, and Habitats: The Great Lakes' Forests
Stressors Impairing the System: Logging
Partners: The Nature Conservancy, George Gund Foundation, Norcross Foundation, the Moriah Fund, the Great Lakes Protection Fund

#45 - Great Marsh Wetland Habitat Restoration
(FY1995- GL985140-01-0)
Indiana University
P.O. Box 1847
Bloomington, IN 47402
219-291-9943; Fax 219-586-3446

Project Narrative:
Indiana University assisted the Indiana Dunes National Lakeshore in restoring disturbed portions of the Great Marsh. The Indiana Dunes contains the last remnants of diverse lakeshore vegetation and wildlife communities in Indiana. The project objectives were to determine hydrology for the Dunes Creek and Derby Ditch watersheds of the Great Marsh, to implement a pilot wetland restoration for which physical and biological factors would be investigated, to demonstrate the effects that hydrology has on the vegetation composition, to investigate sedimentation rates which reflect land use both on National Lakeshore lands and on lands within the watershed which are the source areas for runoff, and to formulate recommendations based on the findings for expanded restoration and management of the Great Marsh ecosystem and other similar wetland habitats.

A pilot wetland restoration was implemented, a hydrologic and vegetation monitoring network installed, and information on vegetation composition and sedimentation rates was gathered. This enabled better estimation of the hydrologic and other management conditions necessary for the desired plant communities of a restored Great Marsh. A final report which detailed the results of the pilot restoration, hydrologic scenarios, vegetation analysis, and other information collected during the project and gleaned from previous work was completed. All results and data were entered into a database for future GIS analysis. An informational meeting with the local residents to address concerns about possible effects from restoring the Great Marsh in Beverly Shores was held.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Completed a final report and database
- *Inventory, assessment, classification*
Gathered information on vegetation, hydrology, and sedimentation rates
- *Scientific study*
Estimated necessary management conditions for desired plant communities
- *ecological restoration*
Started a pilot wetlands restoration on a 30 acre site
- *Monitoring, indicators*
Installed a hydrologic and vegetative monitoring network.

Public Stewardship
- *Outreach, information exchange*
Held a meeting discussing potential effects of restoring the marsh

Economic Impact
- *Direct*
$27,024–Leveraged

Project Statistics:
Award Amount: $64,805
Project Timetable: September 1, 1995- June 30, 1997
Project Location: Eastern portion of the Indiana Dunes National Lakeshore; Northwest Indiana
Great Lakes System: Coastal Marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Remnant patches of wet prairie, sedge meadow, and hydromesophytic swamp. Twenty-two bird species of Indiana state concern.
Stressors Impairing the System: Habitat destruction, alteration of stream flow (drainage).
Partners: Indiana Dunes National Lakeshore; National Park Service Water Resources Division; U.S. Fish and

Wildlife Service; U.S. Geological Service, Lake Michigan Ecological Station; Indiana Geological Survey; Save the Dunes Council; student interns and community volunteers

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#46 - The GreenWays Initiative
(FY1999 - GL975109-01-1)
Rails-to-Trails Conservancy Michigan Field Office
416 South Cedar, Suite C
Lansing, Michigan 48912-1106
517-485-6022; Fax 517-485-9181
www.railtrails.org (Rails to Trails)
www.cfsem.org (Community Foundation)
rtcmichigan@transact.org

Project Narrative:
An abundance of natural resources are interwoven into the landscape of Detroit and southeast Michigan, amidst environmental problems. This grant supported a series of meetings with community leaders, organizations, administrators, and consultants involved in ecological protection and restoration and open space issues in Southeast Michigan, to explore ways of developing the most effective, comprehensive funding plan for conservation possible for the region. Other community models, developed for Chicago Wilderness, Chattanooga, Tennessee, and Portland, Oregon were explored. The goal was to begin to develop a structure and identify leadership to assume responsibility for a coordinated planning and resource management effort. The result was a partnership with the Community Foundation of Southeast Michigan, a number of Michigan corporations, and more than 75 environmental organizations, and dollars to begin a small grants program to protect and restore greenway, open space and natural areas in Detroit and seven surrounding counties. Throughout the planning process, a Leadership Advisory Group, comprised of 13 of preeminent community leaders was formed. Community input was sought, culminating in a series of seven meetings, and resulting in the convening of the more than 75 organizations and agencies. This initiative has raised awareness of green issues through a variety of regional media, including television and newspapers.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Initiated a conservation plan after developing a greenways plan for Southeast Michigan.
Formed and developed partners with citizens, landowners, businesses, and some of the most influential and preeminent people and organization in Detroit and seven surrounding counties (more than 75 initial organizations and agencies).
Formed a leadership advisory group.
Public Stewardship
- *Outreach, information exchange*
Reached out through every form of media to raise awareness and support for this initiative and the need for green space
Economic Impact
- *Direct*
$5,250–Contractual
$25,000–Leveraged
$15 million grant from the Kresge Foundation and others is forthcoming.

Project Statistics:
Award Amount: $29,800
Project Timetable: September 15, 1999 - April 30, 2000
Project Location: Southeast Michigan
Great Lakes System: All systems except open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Wetlands

Stressors to the System: Population growth and development, divided resources, and unused deteriorating developed lands
Partners: More than 75 federal, state, and local agencies and organizations

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#47 - Habitat Conservation and Restoration Strategies (HABCARES) Workshop
(FY1994 - DW14947690-01-0)
Interagency Agreement with:
U.S. Fish and Wildlife Service
1405 S. Harrison Road
Room 302
East Lansing, MI 48823

Project Narrative:
The purpose of this interagency agreement was to provide funds to support a workshop for U.S. and Canadian scientists to enhance the understanding and basis for the protection and restoration of physical habitats vital for the support of successful and diverse communities in a healthy Great Lakes ecosystem. The initial workshop was held November 14-18, 1994 in Barrie, Ontario. The followup technology transfer session was held April 26-27, 1995, in Detroit, Michigan.

The workshop delivered: (1) a peer reviewed science publication; (2) an evaluation of the role of habitat protection, restoration, and modification in achieving ecosystem goals for resource managers; (3) a technical publication that is a compendium of the tools used in habitat restoration and modification including technology involved, time frames, maintenance and benefits for resource managers; (4) a reproduction of posters presented at the workshop including their most relevant references; and, (5) the publication "Methods of Modifying Habitat to Benefit the Great Lakes Ecosystem".

Project Results:
Environmental Science and Management
- Planning, coordination, information sharing, technology transfer
Workshop for natural resource managers to exchange information.
Followup technology transfer session.
Technical compendium of restoration tools.
Publication: "Methods of Modifying Habitat to Benefit the Great Lakes Ecosystem"

Project Statistics:
Award Amount: FY1994 - $15,000
Project Timetable: March 15, 1994 - March 31, 1995
Project Location: Barrie, Ontario
Stressors Impairing System: Virtually all known stressors
Partners: Great Lakes Fisheries Commission, Canadian Great Lakes Cleanup Fund

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#48 - Habitat Design for Mussel Restoration
(FY1997 - DW14947824-01-2)
Interagency Agreement with:
United States Geological Survey
648 Doubletree Avenue
Columbus, OH 43229
614-430-7730; Fax 614-430-7777

Project Narrative:
The St. Joseph Watershed, a tributary to the Maumee River and Lake Erie, contains some of the richest habitats for populations of fresh water mussels in the Great Lakes Basin. Mussel populations have suffered rapid declines, and yet there is still little known about their habitat requirements. Protection and restoration of freshwater mussel

populations is difficult if knowledge of their habitat and water-quality requirements is lacking. The project intended to fill gaps in our knowledge about suitable habitat, water quality, and food resources. This project obtained and analyzed data regarding existing freshwater mussel diversity and relative abundance from over 80 sites along with fish community and water quality records from the three major tributaries.

An understanding of freshwater mussel habitat and water quality conditions in the St. Joseph River Basin was advanced as a result of this study. Stream flow, particle size, channel stability, water quality, and potential food resources (bacteria and algae) were assessed in extant mussel beds in the Ceder Creek, Fish Creek, and the West Brance sub-basins on the St. Joseph River. A template of conditions favoring survival of native-mussel populations was developed to guide restoration efforts. The U.S. Geological Service (USGS) worked with Indiana and Ohio State Departments of Natural Resources and Fish and Wildlife and the Ohio Environmental Protection Agency to share data-collection methods, data interpretation, and the potential use of the assessment factors as a protection tool. An informative fact sheet about mussels was produced and distributed through groups such as the St. Joseph River Watershed Initiative.

Project Results:

Environmental Science and Management

- *inventory, assessment, classification*

Assessed 80 mussel beds in Cedar Creek, Fish Creek, and the West Branch of sub-basins of the St. Joseph River.

- *ecological restoration*

Template of preferred conditions to guide restoration of mussel beds produced.

Public Stewardship

- *Outreach, information exchange*

A fact sheet highlighted important habitat and water quality characteristics necessary for the conservation of freshwater mussel biodiversity.

Worked with state natural resource managers to exchange information and share tools that protect mussels.

- *partnership building*

Worked with local citizen groups such as Water Watchers of Indiana, and others connected to the St. Joseph River Watershed Initiative.

Economic Impact

- *Direct*

$8,358–Contractual

$86,029–Personnel

Project Statistics:

Award Amount: $115,000

Project Timetable: July 23, 1997 - December 22, 1999

Project Location: Northeastern Indiana in the St. Joseph River, tributary to the Maumee River and Lake Erie

Great Lakes System: Tributary/ Connecting Channel

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Native mussel species

Stressors Impairing the System: Pollution, exotic species, encroachment

Partners: Ohio EPA: Division of Surface Water, Indiana DNR: Division of Fish and Wildlife, U.S. Geological Service

#49 - Habitat Protection and Restoration at Grand Calumet Nature Preserves
(FY1992 - X995281-01-0; FY1995 - GL985066-01-0)

The Nature Conservancy
Northwest Indiana Field Office
2400 New York Avenue
Whiting, IN 46394
219-473-4312

Project Narrative:

The Ivanhoe project site was a degraded dune and swale previously altered by the construction of unpaved streets for an aborted subdivision in Gary, Indiana. The construction altered the natural water regime. The objectives of this project were to remove the piles of trash located in several swales, control and eradicate exotic plant species, protect the preserve from future human encroachments such as midnight dumpers, and increase the public's awareness about the preserve. One other goal was to improve the water quality at the site, which is in the Grand Calumet Area of Concern. Other actions included recreating the dune topography, removing young oak trees from several dunes to provide open habitat for the Karner blue butterfly, and planting native vegetation in disturbed areas.

Trash was cleared from most of Ivanhoe site. Prescribed burns were reintroduced to both Ivanhoe and Hoosier Prairie. A fence and informational sign were erected at Ivanhoe. Brushy species are under control and savanna and wetland forbs have reappeared as a result of prescribed burns. The Gaylord II tract of Hoosier Prairie, part of the Indiana Dunes National Lakeshore, was surveyed and then fenced to prevent access by off-road-vehicles. The fence and sign protect the site from midnight dumpers. A butterfly survey was conducted. A botanical study was conducted at Ivanhoe. Ivanhoe is part of Karner blue reintroduction/protection planning. The report, *An Assessment of Potential Impact of a Proposed Roadbed Removal Project on the Butterflies of the Ivanhoe Sand Savanna,* was completed. Walks and workdays were held on a weekly basis and an effort was made to recruit neighbors as volunteers.

Project Results:

Environmental Science and Management

- *Inventory, assessment, classification*

Gaylord II tract surveyed.
Report: “An Assessment of Potential Impact of a Proposed Roadbed Removal Project on the Butterflies of the Ivanhoe Sand Savanna”

- *Ecological protection*

Erected a fence to keep out vehicular traffic
Erected a fence at Gaylord II site for protection against off-road vehicles
Erected a sign and fence to protect areas against midnight dumpers

- *Ecological restoration*

Removed trash.
Conducted prescribed burns on 1,148 acres (150 acres in the Ivanhoe Preserve and Ivanhoe South; 270 acres in the Clark and Pine Bongi Tract; 130 acres in the Gibson Woods; 49 acres in the Tollston Ridges; 440 acres in Hoosier Prairie; 109 acres in the Hoosier Prairie Gaylord Tract)

Public Stewardship

- *Education*

Used the walks and workdays as opportunities to educate people, especially children, about the nature preserves

- *Protection and restoration volunteers*

Held workdays and walks on a weekly basis. Made an effort to recruit neighbors and children as participants.

Economic Impact

- *Direct*

3 part-time to full-time 1-year positions
Employed 2 interns for a summer
Employed 2 people for 1.5 years
Employed several short-term job-specific jobs

$18,750–Leveraged

Project Statistics:
Award Amount: $55,000 (FY1992- $15,000; FY1995- $40,000)
Project Timetable: October 1, 1991- September 30, 1997
Project Location: Ivanhoe Dune and Swale Preserve and Hoosier Prairie in northwest Indiana
Great Lakes System: Lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Karner blue butterfly, dune and swale, black oak savanna, tallgrass prairie, small white lady's slipper orchid
Stressors Impairing System: Exotic species, development, recreation (off-road vehicles), waste disposal, fire suppression
Partners: Northeastern Illinois University; Hamlin Street Block Assoc.; Indiana Dunes National Lakeshore; Indianapolis Power and Light Company; Indiana Department of Natural Resources: Division of Nature Preserves; NIPSCO; Shirley Heinz Environmental Fund

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#50 - Habitat Restoration of Minnesota's Grassy Point
(FY1994 - GL995662-01)
Minnesota Department of Natural Resources
120 State Road
Two Harbors, MN 55616
218-834-6612; Fax 218-834-6639
www.d.umn.edu/~pcollins/main.html

Project Narrative:
The Habitat Restoration of Minnesota's Grassy Point project goals were to restore and enhance plant and animal habitat by removing industrial woody debris and other waste, and improving wetland hydrology. Specific activities included: assessing the extent and nature of sediment degradation; developing a project plan to maximize fish and wildlife habitat; hiring a contractor to remove and dispose of woody debris, enhancing wetland hydrology, and stabilizing shorelines; sharing information with River Watch group to foster citizen monitoring activities; sharing information with St. Louis Remedial Action Plan Citizens' Advisory Committee to encourage development of appropriate public uses; documenting site activity; and developing a final project report that summarizes the process to help guide further restoration efforts.

LHB Architects and Engineers and American Testing and Engineering completed geotechnical and chemical assessments at the site and assisted in development of construction specifications for the removal and disposal of woody debris. Duluth Superior Erection completed the removal of 11,000 cubic yards of waste, creating two small ponds and a channel through the wetland to connect Keene Creek to the St. Louis River. With the Minnesota Pollution Control Agency, the City of Duluth, and interested citizens, a design for restoration was developed; the project catalyzed the development of a riverside trail, a proposal to restore 3.5 acres of adjacent wetlands, an investigation of the cultural history of the site, and a discussion to use the area as a River Watch monitoring site. Specific activities included: long-term, broad-based planning for protection and restoration of ecological resources by building partnerships with local interest groups and agencies. A contractor that removed the wood waste also grinded the material to use in gravel pit reclamation and for resale as black dirt after mixing with peat and sand.

Project Results:
Environmental Science and Management
- *Ecological restoration*
Removed 11,000 cubic yards of waste and woody debris from a 100-acre site.
Created two small ponds and a channel to connect the creek and the St. Louis River
Public Stewardship
- *Partnership development*
Broad based protection and restoration planning with citizens, control agencies, and the city.

Economic Impact
- Direct
$166,000–Contractual
$8,500–Leveraged
The contractor was able to use the wood waste in a gravel pit reclamation and for resale as black dirt

Project Statistics:
Award Amount: FY1994 - $170,000
Project Timetable: October 1, 1994 - September 30, 1995
Project Location: Grassy Point in the St. Louis River Watershed, Duluth, Minnesota
Great Lakes System: Coastal marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Coastal fresh water estuary
Stressors Impairing the System: Industrial woody debris (logging)
Partners: River Watch, St. Louis River Remedial Action Plan Citizens' Advisory Committee, City of Duluth, Minnesota Pollution Control Agency

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#51 - Hamilton Lake Watershed Land Treatment
(FY1992 - GL995954-01, 02, & 03)
Indiana Department of Natural Resources
Division of Soil Conservation
402 West Washington Street W265
Indianapolis, IN 46204
317- 233-3870; Fax 317-233-3882

Project Narrative:
Hamilton Lake is a 700 acre natural impoundment that flows into a tributary to Fish Creek. The Hamilton Lake Watershed contains 9,681 acres, approximately 15 square miles. Macrophytes in the lake include Richardson's pond weed, a state endangered plant. Fish Creek, a tributary to the St. Joseph River and then to the Maumee River in the Lake Erie basin, receives the outflow from Hamilton Lake and contains one of the richest assemblages of fresh water mussels in the world. Thirty one species are present in Fish Creek, including six that are state endangered. The white cat's paw pearly mussel is present below the inflow from Hamilton Lake, the only location where it is known to survive. The goal of this project was to treat the land within the entire watershed according to its conservation needs. Project funds were used to support a partnership of federal, state and local organizations working with land owners to install management practices which control sediment, nutrients, and other pollutants within the watershed. These activities supported implementation of the recovery plan for the endangered mussel.

An increase in conservation practices allowed a reduction in the amount of sediment and nutrients entering Hamilton Lake and its associated wetlands. The reduced sedimentation has improved the water quality. The amount of wetland acreage increased, and a 48 hour retention basin controls sediments after storms. Wind erosion has been reduced, as has agrochemical drift. Resource management system plans were developed to help individual landowners address their soil erosion and nutrient management concerns. During this project at least 28 participants were helped in applying approximately 19 different conservation practices, with an estimated 10,100 tons of soil being “saved.” Land uses have subsequently changed. Over 67 acres of trees were planted, and crops that have proper nutrient and herbicidal timing and application have resulted in healthier plants. Wildlife areas were enhanced, and crop production for domestic animal use improved. Wetlands were restored, grassed waterways were replanted, and practices like installing filter strips were undertaken.

On August 10, 1994, a field day was held to demonstrate construction of conservation practices, to demonstrate identification of tree planting and wetland restoration sites, and to give presentations on conservation tillage and integrated crop management. This project was highlighted and exposed to the public via 20 different newspaper and magazine articles, as well as through the Steuben County Soil and Water Conservation District’s newsletter for the duration of the entire project. Out of 103 possibilities, about half, 51 land users, were at least interested in hearing what possibilities were available, and 28 were interested in participating.

Overall, knowledge about watersheds and natural resource concerns and objectives increased. Awareness of the watershed itself and impact that activities have on its natural resources improved. Awareness of wildlife habitat and endangered species improved. Citizen involvement for the common cause of water quality and water management in the community was initiated. Finally, a local Advisory Group to guide the project and serve as the vehicle for continued watershed monitoring beyond the completion of the project was established.

Project Results:

Environmental Science and Management

Acres Involved: 5,675

- *Ecological protection*

Protected the soil and land that is left from further degradation by implementing best management practices. (estimation of 10,000 tons)

- *Ecological restoration*

Planted 67acres of trees.

Wildlife areas were enhanced.

Increased wetland acreage.

Reduced wind erosion and chemical drift.

Improved the conservation practices which led to better healthier crops, less erosion and sediment loading of the lake, and better water quality.

Replanted grassed waterways and installed filter strips.

Public Stewardship

- *Outreach, information exchange*

Field day held to demonstrate practices.

Utilized 20 different newspapers and magazines, and a newsletter to inform, expose, and highlight the project.

- *Education*

One on one contact with interested participants led to education about the things mentioned above, as well as better education about management practices.

- *Partnership building*

Formed a local Advisory group to guide the project and for continued monitoring beyond the completion of the project.

Economic Impact

- *Direct*

$213,699–Contractual

$103,180–Leveraged

Project Statistics:

Award Amount: $294,800 (FY1992- $103,180; FY1993- $147,400; FY1995- $44,220)

Project Timetable: May 15, 1993 - September 30, 1997

Project Location: Angola & Hamilton, Indiana, in Steuben County

Great Lakes System: Tributary/ connecting channel, inland terrestrial, inland wetland

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Federally endangered white cat's paw pearly mussel *(Epioblasma obliquata perobliqua*) and six state endangered mussel species, five of which are being considered for federal listing

Stressors Impairing System: Habitat destruction, sedimentation, nutrients, agriculture

Partners: Indiana Department of Natural Resources, Divisions of Soil Conservation, Fish and Wildlife and Forestry, Indiana Department of Environmental Management, U.S. Department of Agriculture, U.S. Fish and Wildlife Service, The Nature Conservancy, Steuben County and DeKalb County Soil & Water Conservation Districts, local farmers, Ohio Department of Natural Resources, Ohio Environmental Protection Agency, Williams County (Ohio) Soil & Water Conservation District, Hamilton Lake Association, Maumee River Basin Commission, Purdue Cooperative Extension Service

#52 - Hearding Island Native Community Project
(FY1994 - GL995662-01)

Minnesota Department of Natural Resources
120 State Road
Two Harbors, MN 55616
218-834-6612, Fax 218-834-6639

Project Narrative:

The Hearding Island Native Community Project goals were to reduce populations of non-native and invasive plant species, and increase populations of desirable native plant species to improve wildlife values and more closely represent the pre-European plant community characteristic of Minnesota and Wisconsin Points. Specific activities included: a site survey to identify potentially sensitive ecological resources; removal of non-native shrubs and forbs; planting native trees and forbs; community-based planning; and decision making for public use of the area, and desired future conditions. This project was set up and run by the Minnesota Department of Natural ResourcesLake Superior Habitat Coordinator.

Brush was cleared and competing vegetation from 4-5 feet around each of the planted and self-seeded pine trees on the island was removed. Alders and willows encroaching on the dune grass community were also removed. In addition to pines, tamaracks were planted, and tree mats placed to control weeds, especially the tansy. Using GIS, the present and future desired vegetation of the islands was digitized and mapped. Finally, the Wildlife Management Area's Management plan was revised based on input from public meetings. Area and regional staff met to determine agency management goals, and to discuss preplanning, and site management.

The project involved interested citizens in planning and evaluating options for future management. It raised public awareness of the Wildlife Management Area and ongoing project activities through various media. Volunteers assisted in the restoration.

Project Results:

Environmental Science and Management
- *Inventory, assessment, classification*

Digitized and mapped the present and desired vegetation of the island
- *Planning, coordination, information sharing, technology transfer*

Developed agency management plans with regional staff, and revised the wildlife's management plan based on public meetings
- *Ecological restoration*

Brush and exotics encroaching on dune grasses and native plants were removed.
Native trees were planted.

Acres Involved: 32

Public Stewardship
- *Outreach, information exchange*

Raised public awareness through television and radio interviews.
- *Partnership building*

Involved interested citizens in evaluating options for future management and collaboration of that management.
- *Protection and restoration volunteers*

Held volunteer workdays.

Economic Impact
- *Direct*

$350–Leveraged

Project Statistics:

Award Amount: $7,000
Project Timetable: October 1, 1994 - September 30, 1995
Project Location: Minnesota Point, Lake Superior Watershed, Duluth, Minnesota
Great Lakes System: Coastal shore

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Great Lakes red/white pine forest, Lake Superior sand beach/beach dune communities, clustered bur-reed
Stressors Impairing System: Exotic plant species
Partners: Natural Resources Research Institute, Park Point Community Club, St. Louis River Remedial Action Plan Citizens' Advisory Committee, Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, Minnesota Department of Corrections

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#53 - Hypolimnetic Oxygen Supplementation Project
(FY1993 - GL995956-01-0)
Monroe County Environmental Health Laboratory
435 East Henrietta Road
Rochester, NY 14602
716-274-6820; Fax 716-274-8098

Project Narrative:
The project demonstrated the practicality of a large scale hypolimnetic oxygenation process to return Irondequoit Bay to aerobic conditions, fostering a return of a more natural biotic community, and including passage of high trophic level consumers (including walleye and salmonids) between Lake Ontario and Bay tributaries. The project goal was to demonstrate improved management of phosphorus cycling by biochemical means (oxygenation to increase adsorption to iron oxides/precipitation) and by biologically improved planktivore browsing of algae to relieve toxic anaerobic conditions in the Bay.

The Bay, before any treatment, had phosphorus accumulation rates of about 28 kg TP/day. Since then, 11 years prior to this project's ending date, the levels have dropped significantly, due significantly to the artificial oxygenation promoted by this project. The Bay, however, has not been completely treated. The goal is that by 2010, the median metalimnetic dissolved oxygen concentration will be sufficient (.5-1.5 ppm) to allow for continuing recovery naturally through the expected recovery of the entire food chain.

The aerobic conditions and the rate of phosphorus accumulation in the Bay's metalimnion and part of the hypolimnion were partially restored. The level of phosphorus accumulation before oxygen treatment was about 28 kg TP/day. In 1997, the rate was down to 6.9 kg TP/day. Likewise, the initial average metalimnetic oxygen conditions were at about .1 ppm, and after treatment, they went to an average of 1.23 ppm. This means the Bay is on it's way to recovering needed conditions to support life. Through experimentation and research, the knowledge of the lake processes, especially those involving oxygen, was increased.

Local communities have experienced renewed use of the Bay due to improved water quality, with commensurate public interest in waterfront activities, enhanced commercial and residential property values and development. Continued water quality and cool/cold water fisheries enhancement will augment this trend.

Project Results:
Environmental Science and Management
- *Scientific study*
The effectiveness of the oxygen supplementation process was studied.
A better understanding of lake processes, and what is needed for sustained oxygen levels without supplementation was realized.
- *Ecological restoration*
Partially restored the oxygen levels that affect 1,648 acres o water in the Irondequoit Bay.
Economic Impact
- *Direct*
$137,152–Leveraged
- *Indirect*
Improved water quality has increased the property values in the surrounding area. Also, fisheries enhancement will augment this trend.

Project Statistics:
Award Amount: FY1993 - $90,000
Project Timetable: June 7, 1993 - October 31, 1996
Project Location: Monroe County (suburban Rochester), New York, Irondequoit Bay
Great Lakes System: Inland wetland, tributary/ connecting channel
Stressors Impairing System: Nutrient pollution and eutrophication, esp. by phosphorus
Partners: New York State Department of Environmental Conservation, Bay Border Towns, New York State Department of Transportation, Monroe County Sheriff's Department, Environmental Health Lab, Praxair, Cornell biological Field Station, Limnofix.

#54 - Implementation of the Marsh Monitoring Program in the Great Lakes Basin
(FY1997 - GL985590-01-0; FY1999 - GL975139-01)
Great Lakes United
1300 Elmwood
Buffalo, NY 14222
716-886-0142; Fax 716-886-0303
www.glu.org

Bird Studies Canada
P.O. Box 160
Port Rowan, Ontario
N0E 1M0
519-586-3531; Toll Free 888-448-2473; Fax 519-586-3532
www.bsc-eoc.org

Project Narrative:
Great Lakes wetlands, particularly those dominated by nonwoody emergent plants (marshes), are important reservoirs of plant and animal life and serve a wide array of functions ranging from improving water quality to providing outdoor recreation opportunities. Despite these benefits, Great Lakes marshes have been drained, filled and otherwise impacted for more than a century. This monitoring project was proposed in order to assess the spatial and temporal comparisons of marsh bird and amphibian populations in Areas of Concern (AOC) verses other marshes both on a local and basinwide scale, to provide an indication of the success of habitat rehabilitation, restoration, and conservation activities in individual AOC's, the success of habitat rehabilitation activities in individual AOC's, and to measure the health of the marshes and wildlife communities on both local and regional scales. This project built upon the baseline program conducted in 1994 - 1996 by the Long Point Bird Observatory in Ontario.

Birds, amphibians, and habitat were monitored along 575 routes. Through a coordinated volunteer effort, populations of marsh birds and amphibians were monitored over time on a variety of spatial scales, and habitat associations of marsh birds and amphibians were investigated. The results contributed to the assessment of Great Lakes Areas of Concern and other wetland conservation initiatives and helped increase the awareness of conservation issues among the region's citizens, policy makers, scientists, and others. After five years, included in the report that was produced: "The Marsh Monitoring Program," an assessment was made about what had been learned thus far. This information was incorporated into the State of the Lakes Ecosystem Conference indicator development process and will help assess the health of the Great Lakes wetlands.

Volunteer help was crucial to this project. About 493 volunteers monitored and submitted data from 575 different routes in both Canada and the United States. Local citizen groups have been empowered by this monitoring effort, and are making use of the data to help understand and maintain wetlands in their neighborhoods.

Project Results:
Environmental Science and Management
- *Monitoring, indicators*
Birds, amphibians, and habitats were monitored along 575 routes in both Canada and the United States.

Two indicators were incorporated into the State of the Lakes Ecosystem Conference Suite of Great Lakes indicators: Indicator #4504: Amphibian Diversity and Abundance, and #4507: Wetland Dependent Bird Diversity and Abundance

Public Stewardship

- Protection and restoration volunteers

493 volunteers monitored and submitted data.

Economic Impact

- Direct

$4,052–Contracts

$143,730–Personnel

$128,626–Leveraged ($20,000 was from federal contributions other than that from EPA)

Project Statistics:

Award Amount: $102,100

Project Timetable: October 1, 1997 - September 30, 2000

Project Location: Great Lakes Basin (43 AOC's in all)

Great Lakes System: Inland wetland, coastal marsh

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 13 species of calling amphibians were recorded (8 were commonly recorded). 53 species of birds were monitored (28 that were commonly recorded). Habitat were these birds and amphibians live, as well as habitat for all other animals, plants, and migratory species.

Stressors Impairing the System: Development, habitat destruction such as filling and draining of wetlands

Partners: National Audubon Society, Canadian Wildlife Service, U.S. Geological Service, Federation of Ontario Naturalists, Environment Canada, Bird Studies Canada Marsh Monitoring Program, Ontario Ministry of Natural Resources, International Joint Commission, Remedial Action Plan Coordinators basinwide

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#55 - Improving SOLEC Indicator 8135: Bald Eagles

(FY2000 - GL973591-01-0)

Clemson University
300 Brackett Hall
Clemson, SC 29634
864-656-2424; Fax 864-656-0881

Project Narrative:

The use of the bald eagle as an ecosystem indicator was proposed by both the International Joint Commission as well as for the State of the Lakes Ecosystem Conference (SOLEC) indicator development process. This project intended to improve the use of the bald eagle as an indicator by: testing potential biomarkers for subtle effects of toxicants that would help show progress in water quality improvement; reconfiguring the current databases into GIS format; and by creating a web site for displaying both educational information on eagles, biosentinels, and how the eagle indicates ecosystem health and progress under the Great Lakes Water Quality Agreement.

SOLEC Indicator #8135- Contaminants Affecting Productivity of Bald Eagles, was completed for SOLEC 2000 after assessing the number of fledged young, the number of developmental deformities, and the concentration of organic and heavy metal contamination in bald eagle eggs, blood, and feathers. The development of Michigan's Biosentinel Project was integrated with this project. An analysis of archived samples form 1990-2000 for Voyagers National Park and the Lake Erie coast of Ohio was completed. The development of the GIS based database of all bald eagles data from Michigan, Wisconsin, Ohio, and Ontario was continued.

Project Results:

Environmental Science and Management

- Monitoring, indicators

Completion of State of the Lakes Ecosystem Conference (SOLEC) Indicator #8135–Contaminants Affecting Productivity of Bald Eagles for SOLEC 2000.

Economic Impacts
- *Direct*
$4,237–Personnel
$526–Leveraged

Project Statistics:
Award Amount: $10,000
Project Timetable: August 1, 2000 - June 30, 2001
Project Location: Great Lakes Basin (bald eagle habitats)
Great Lakes System: All Systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Bald Eagles
Stressors Impairing the System: Toxic pollution
Partners: National Park Service, Michigan Department of Environmental Quality, Wisconsin Department of Natural Resources, Ontario Ministry of Natural Resources, Ohio Department of Natural Resources

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#56 - An Inventory and Assessment of the Resources of the Niagara Escarpment in Wisconsin (FY1998 - GL985956-01)
Bay-Lake Regional Planning Commission
Old Fort Square, Suite 211
211 N. Broadway
Green Bay, WI 54303
(920) 448-2820; Fax 920-448-2823
www.baylakerpc.org

Project Narrative:
Local concern for land and water conservation and balanced economic development have been a long tradition in Wisconsin. Recent concerns have involved the impacts of development on the natural resources associated with the Niagara Escarpment. This study examined the pressures of development on the Niagara escarpment and associated wetlands and wildlife habitats, and archaeological and historic sites by conducting an inventory of the resources and comparing the results to others identified in other areas of the escarpment. This was the first step in the development of a comprehensive assessment of the Niagara escarpment in Wisconsin. This study collected and assessed the types of physical, social, and regulatory data that are available for the six county region in the escarpment. In addition, by doing this study, deficiencies were identified, and recommendations were made about the data.

An inventory of the Wisconsin Niagara escarpment, which includes natural resources, land uses, and a detailed analysis and description of the land use and land cover of the area, the flora, fauna, geology, soils, wetlands, and wildlife habitats, was completed. Of particular interest was the discovery of rare snail species, known only to the Escarpment. Stressors were identified and solutions recommended, including a delineation of environmental corridors, to mitigate impacts of development on key resources. The project provided information needed to continue work on the escarpment, while identifying some key resources and preservation actions that can be worked on right away. Besides the assessment, numerous GIS maps and coverages were created describing the region in a tangible and easily accessible manner. A report, "An Inventory and Assessment of the Resources of the Niagara Escarpment in Wisconsin," was produced that will be useful for planners, researchers, builders, elected officials, property owners, and anybody interested in the preservation of this ecosystem.

Project Results:
Environmental Science and Management
- *Inventory, assessment, classification*
Biological inventory of 4000 acres of the Wisconsin portion of the Niagara Escarpment.
Stressors to the system identified.
GIS maps were created for the region.
Report: "An Inventory and Assessment of the Resources of the Niagara Escarpment in Wisconsin."
Economic Impact

- Direct
$10,225–Leveraged

Project Statistics:
Award Amount: $55,000
Project Timetable: October 1, 1998 - March 31, 2001
Project Location: The potion of the escarpment stretching from Door County to Dodge County
Great Lakes System: All systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The Niagara Escarpment Ecosystem
Stressors Impairing the System: Development
Future Project Ideas/ Extensions: A study of the effects of development on the escarpment, especially involving the dynamics of water flow, could be done. A study of the effects of development on the dynamics and quality of wetlands should be undertaken. Also, a study inventorying the archeological resources of the Niagara escarpment should be undertaken to provide the basis to determine which areas should be considered for preservation through public ownership, conservation easements, or restrictive zoning.
Partners: U.S. Fish and Wildlife Service, The Nature Conservancy, East Central Wisconsin Regional Planning Commission, Wisconsin Department of Natural Resources, U.S. Army Corps of Engineers, the University of Wisconsin-Green Bay, Door Property Owners, Inc., Kewaunee County Extension, Oneida Tribe, Calumet County, University of Illinois, Calumet County University of Wisconsin Extension, Door County University of Wisconsin Extension, Illinois Geological Survey, Dodge County Planning, Brown County Planning, and local planners and citizens

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#57 - Kakagon Sloughs Plan Implementation and Sustainability Analysis (See "Great Lakes Conservation Planning and Implementation " and "Great Lakes Ecosystem Protection" descriptions of the cluster grants to The Nature Conservancy for more information.)
(FY1992 - X995819-01-0, FY1993 - GL995819-02)
The Nature Conservancy
618 Main Street West, Suite B
Ashland, WI 54804
715-682-5789; Fax- 715-682-5832

Project Narrative:
The goal of the Kakagon/Bad River Sloughs Watershed Project was to maintain the ecological systems and processes that support the biological diversity in the fresh water estuarine complex formed where the Bad River meets the Kakagon Sloughs and the barrier ridges, dunes, and beaches along the south shore of Lake Superior. To accomplish this goal, implementation strategies were developed with partners. Major economic activities within the watershed, including types of industry and trends, were analyzed for their sustainability, linkages to the ecosystem, and benefits to the local communities.

The project increased the scientific understanding of the ecological systems and processes that maintain the Slough's elements of biodiversity. Stresses to these systems, processes and elements were assessed; specific recommendations for reducing or eliminating sources of any such stresses were recommended. The understanding of economic, social, and cultural activities and interaction that occur in or effect the watershed was increased as was the Tribe's capacity to protect the Sloughs by reducing the sources of stress. Opportunities for ecologically compatible and sustainable developments were identified. The report, "Preliminary Analysis of Conservation Issues in the Kakagon/Bad River Sloughs Watershed," was completed. The Bad River Band's Natural Resources Department was assisted in preparing and implementing recommendations in the Integrated Resources Management Plan that are consistent with reducing sources of stresses to Sloughs biodiversity.

Community support for long term protection of the Sloughs and watershed was increased. In addition, the project supported existing and proposed conservation activities and projects in the watershed, particularly those likely to reduce sources of stresses to Sloughs biodiversity. Finally, the project created an avenue between tribal and non-tribal communities, where information could be easily exchanged.

Project Results:

Environmental Science and Management

Acres Involved: 698,880 (1,092 square miles)

- Planning, coordination, information sharing, technology transfer

Developed recommendations for eliminating such stresses to the sloughs.

- Scientific study

Researched the stresses to sloughs, increased the understanding of the ecological systems of the sloughs.
Increased understanding of economic, social, and cultural activities in relation to the watershed.
Report: "Preliminary Analysis of Conservation Issues in the Kakagon/Bad River Sloughs Watershed"

Public Stewardship

- Outreach, information exchange

Strengthened community support for long term protection of the Kakagon Sloughs.

- Partnership building

Developed tribe and non-tribal relations for easier information exchange.

Economic Impact

- Direct

$54,500–Contractual
1 full-time position
$9,750–Leveraged

- Indirect

Raised funds to support the watershed project office
Identified opportunities for ecologically compatible and sustainable development

Project Statistics:

Award Amount: $195,000
Project Timetable: October 1, 1992 - December 31, 1997
Project Location: Kakagon/Bad River Sloughs, Ashland, Iron, Bayfield Counties, Wisconsin
Great Lakes System: Coastal marsh, tributary/ connecting channel
Stressors Impairing the System: Exotic species, logging
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: One of the finest marsh/fresh water estuaries in the world, lake sturgeon, piping plover, bald eagle
Partners: Bad River Band of Lake Superior Chippewa Indians, Great Lakes Indian Fish and Wildlife Commission, Wisconsin Department of Natural Resources, USDA Forest Service, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Biological Survey, National Park Service, USDA Natural Resources Conservation Service, Farmers Home Administration, Northland College/Sigurd Olson Environmental Institute, National Wildlife Federation, Ashland, Bayfield, and Iron Counties.

#58 - Lake Erie Accelerated Wetland Restoration

(FY1993 - GL995432-01-0)

Penn Soil Resource Conservation and Development Council
RD # 3, Box 261
Clarion, PA 16214-8702
814-226-6118, Fax 814-226-4521
www.pennsoilrcd.org

Project Narrative:

The purpose of this project was to restore and enhance wetland resources. Agriculture has left the land drained and useless as habitat for many of the plants and animals that once inhabited the Lake Erie watershed region, a region that contains approximately 20% of Pennsylvania's rare and endangered species. The focus of the project was to construct ten to twelve permanent wetland/reservoirs on private and/or public lands. The intent was to capture runoff from cropland, barnyard, and milkhouse waste, as well as other sources, and passively treat the water before release to the stream, and to rebuild a suitable habitat for native plants and animals.

Agricultural pollutants, particularly barnyard runoff and milkhouse waste, have been eliminated from direct access to streams through the restoration of 14 separate wetlands. Habitat for rare plant and wildlife communities was expanded. Wood duck boxes and wetland type vegetation were installed and planted to encourage wildlife to use the area. Evaluations were conducted on revegetation and water quality functions of restored wetlands. The project inspired landowners to take pride in their restored wetlands.

Project Results:

Environmental Science and Management

- Ecological restoration

Restored 14 wetlands, spanning 36 acres.
Eliminated direct run-off from agriculture, barnyards, and milk houses.
Expanded rare flora and fauna habitats.
Installed duck boxes to encourage wildlife to live there

- Monitoring, Indicators

Evaluated the water quality functions and the revegetation of the restored wetlands

Public Stewardship

- Education

Educated landowners about the usefulness and the goodness of wetlands

Economic Impact

- Direct

$130,000–Contracts
$7,500–Leveraged

Project Statistics:

Award Amount: $146,000
Project Timetable: January 1, 1994 - January 1, 1997
Project Location: Crawford and Erie Counties in Pennsylvania
Great Lakes System: Inland wetland
Stressors Impairing System: Agriculture, habitat destruction
Partners: Erie Soil & Water Conservation District, Crawford Conservation District, USDA Natural Resources Conservation Service, Pennsylvania State University, U.S. Fish and Wildlife Service

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#59 - Lake Erie Basin Grasslands Restoration Project
(FY1998 - GL985094-01)

Erie-Ottawa-Sandusky Chapter of Pheasants Forever
P.O. Box 44
Oak Harbor, OH 43449
419-898-1595; Fax 419-898-5189
dave-harlan@oh.nacdnet.org

Project Narrative:

Over the last 150 years, the number of acres of native prairie grasses in Ohio has diminished drastically. Prairies are one of the most endangered ecosystems in this area, and home to many native wildlife species. This project restored native grasses such as Big Bluestem, Little Bluestem, Indiangrass, Side oats Grama, switchgrass, and a mixture of prairie flowers along the southern shore of Lake Erie. These newly planted areas will be monitored and maintained for a minimum of ten years. After this grant officially ended, an additional 500 acres of prairie were restored.

Project Results:

Environmental Science and Management

- Ecological restoration

Restored a total of 735 acres of prairie by planting grasses on 50 different sites.

Public Stewardship

- *Partnership building*
Worked with and formed relations with the cooperating landowners in order to plant this seed on their privately owned property.
Economic Impact:
- *Direct*
$28,550–Leveraged
- *Indirect*
Money has already been found to continue the planting process in future years.

Project Statistics:
Award Amount: $39,000
Project Timetable: October 1, 1998 - September 30, 1999
Project Location: Erie, Ottawa, and Sandusky counties - Ohio
Great Lakes System: Lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The Prairie ecosystem, Big Bluestem, Little Bluestem, Indiangrass, Side oats Grama, switchgrass, Prairie flowers
Stressors Impairing System: Habitat destruction (development)
Partners: the Ohio Division of Wildlife, the Natural Resource Conservation Service, US Fish and Wildlife Service, the Farm Services Agency, the Soil and Water Conservation Districts of Erie, Ottawa, and Sandusky Counties, and landowners

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#60 - Lake Ontario Dune Restoration Workshop
(FY 1998 - GL985787-01-0)
New York Sea Grant Extension Program - Cornell University
P.O. Box 22
Ithaca, NY 14851-0022
315-312-3042; Fax 315-312-2954
www.nyseagrant.org

Project Narrative:
The project organized and held a workshop of local community leaders, governmental agencies, and non-government organizations, including The Ontario Dunes Coalition (TODC) and the public, to exchange information about the need and rationale for dune protection steps, already underway, and to coordinate actions and explore new directions in preserving and restoring the eastern Lake Ontario coastal dunes ecosystem. The workshop was held on October 19-20, 1998. The participants reviewed progress, identified participant roles resources, evaluated methods, and identified means to map out future steps toward their goal. This project provided important education and outreach to local citizens and community leaders.

A cohesive, systemwide Dune Steward program for the 1999 summer season was developed. This program is a model for development of a possible statewide steward program. A meeting of all the various law enforcement agencies with jurisdiction in the area and member organizations of TODC resulted in a closer working relationship and a new appreciation and better understanding of the legal responsibilities, issues, and jurisdictions involved in the land use management of the area. A slide series called the “Photographic History of the Eastern Lake Ontario Dunes and Wetlands,” which is used by local education and stewardship organizations, was produced. A videotape was produced entitled, “Lake Ontario Dunes and Wetlands: Aerial Photograph Interpretation.” This videotape included photographs for the 30's - 70's, and is accessible to all members of TODC and to people who would find it useful for future land use and planning discussions.

Project Results:
Public Stewardship
- *Outreach, information exchange*
Made a slide series entitled, “Photographic History of the Eastern Lake Ontario Dunes and Wetlands.”
Made a videotape for educational purposes entitled, “Lake Ontario Dunes and Wetlands: Aerial Photograph

Interpretation."
- Protection and restoration volunteers
Developed a dune steward program, whereby volunteer interface with visitors, that is being used as a model for others like it on a statewide level.
- Partnership building
Developed relationships with local law enforcement and member organizations of The Ontario Dunes Coalition.
Economic Impact
- Direct
$995–Leveraged

Project Statistics:
Award Amount: FY 1998 - $13,999
Project Timetable: June 1, 1998 - July 31, 1999
Project Location: Pulaski, New York
Great Lakes System: Coastal Shore, Inland Wetland
Partners: NY Sea Grant, The Ontario Dunes Coalition (active members include: Black River Resource Conservation and Development, Eastman Place Association, Friends of Sandy Pond Beach, Jefferson County, Jefferson County Cooperative Extension, Jefferson County Planning Department, Jefferson County Soil and Water Conservation District, Jefferson-Sunset Bluff Landowners Association, North Jefferson Park Landowners Association, North Rainbow Shores Landowners Association, North-South Sandy Pond Association, New York Sea Grant Extension, New York Department of Environmental Conservation, New York State Office of Parks, Recreation & Historic Preservation, New York State Department of State, Onondaga Audubon Society, Oswego County Cooperative Extension, Oswego County, Oswego County Planning Dept., Oswego County Soil and Water Conservation District, Renshaw Beach Association, The Nature Conservancy, Town of Ellisburg, Town of Sandy Creek, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Colgate University, Eastman Tract, Hobart and William Smith Geoscience Department, Jefferson County Planning, North Rainbow Shores, North/South Pond Association, New York Coastal Management Program, 1000 Islands, Onondaga Audubon Society, Sandy Island Beach/ South Sandy, Steadman Association, Syracuse University, Town of Sandy Creek

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#61 - Lake Superior Basin Brook Trout Broodstock Facility
(FY1998 - GL985873-01-0)
Red Cliff Fish Hatchery
Red Cliff Band of Lake Superior Chippewa
P.O. Box 529
Bayfield, WI 54814
715-779-3728; Fax 715-779-3763

Project Narrative:
The continued loss of coaster brook trout in Lake Superior has been and is of special concern to the Red Cliff Band and to many other governmental, state, and private agencies. A broodstock facility to aid in restocking, and restoring a Lake Superior strain of Brook trout to the Lake Superior Basin was built. Two classes of Brook Trout are already being housed in the facility, and plans for the first year include collecting and rearing trout from the million disease-free eggs that are collected.

Since the project ended, the Red Cliff Hatchery has added a water quality lab and an environmental education area to the broodstock area. They also completing a fish pond/ wetland system for effluent treatment. The broodstock facility is presently housing about 4000 adult coaster brook trout, which have been supplying eggs and fish to all around Lake Superior, to various agencies.

Project Results:
Environmental Science and Management
- Ecological restoration

Coaster brook trout broodstock rearing facility built.

Economic Impacts

- *Direct*

$25,000–Personnel
$15,000–Construction
$37,000–Leveraged

Project Statistics:

Award Amount: $30,000
Project Timetable: September 1, 1998 - April 1, 1999
Project Location: Bayfield, Wisconsin
Great Lakes System: Open lake, tributary/ connecting channel, coastal shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Coaster Brook Trout
Stressors Impairing the System: Exotic species
Partners: United States Fish and Wildlife Service

#62 - Lake Superior Coastal Wetlands Evaluation (See the "Great Lakes Fish and Wildlife Program" description of the cluster grant to the Wisconsin Department of Natural Resources for more information.)
(FY1993 - GL995427-01)
Wisconsin Department of Natural Resources
Great Lakes Fish and Wildlife Program
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352, Fax 608-267-2800

Project Narrative:

Wisconsin's Lake Superior Shore is unique in its features of drowned river mouths and remnant coastal wetlands. The Lake Superior shoreline, including the valuable coastal wetlands, are under increasing developmental pressures. Although regulatory mechanisms are in place at different levels to protect these wetlands, the extent of protection is based upon the knowledge and documentation of the resources that may be affected by a proposed action. This knowledge and documentation of many areas are limited. The goal of this project was to identify habitats that were most critical to protect and restore. A comprehensive inventory and evaluation of the coastal wetlands was conducted. The work was divided into four phases; 1) consolidation of existing data, 2) a field inventory, 3) database development including GIS, and 4) technology transfer of information. In addition to aiding regulatory decisions, identification of altered wetlands may be candidates for restoration. During the project, the scope was amended to include the entire basin. This allowed for a more comprehensive evaluation of the coastal wetlands.

The project provided a detailed inventory and assessment evaluation, relying heavily upon GIS, of the types and functional values of wetlands and other critical areas in Wisconsin's Lake Superior basin. It also provided an inventory and assessment of altered wetlands which would be appropriate candidates for restoration or mitigation projects. After inventorying, all the information was shared with the natural heritage information databases, and also shared with others that would find it useful and helpful in management or research.

Project Results:

Environmental Science and Management

- *Planning, coordination, information sharing, technology transfer*

Information shared with the Natural Heritage Program and other interested managers.

- *Inventory, assessment, classification*

Detailed inventory, assessment and evaluation, relying heavily upon GIS, of the types and functional values of more than 1,000,000 acres of wetlands and other critical areas in Wisconsin's Lake Superior basin.
Inventory of altered wetlands.

Economic Impact

- *Direct*

Dollars Leveraged: (See the "Great Lakes Fish and Wildlife Program" description of the cluster grant to the Wisconsin Department of Natural Resources for more information.)

Project Statistics:

Award Amount: $150,000
Project Timetable: October 1, 1993 - October 30, 1996
Project Location: Northwest Lake Superior Shore, Wisconsin counties of Douglas, Bayfield, Ashland, and Iron
Great Lakes System: All systems except open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Unique coastal wetlands and other globally significant communities identified with several threatened and endangered species.
Stressors Impairing System: Development, sedimentation, alteration of stream flow/water tables
Partners: The Nature Conservancy, Wisconsin Coastal Management Program, City of Superior, Wisconsin Department of Transportation Aeronautics Division, National Park Service, the Bureau of Endangered Species, Bureau of Endangered Resources, Wisconsin's Natural Heritage Inventory Program, the Bureau of Water Resources (now called the Bureau of Watershed Management), the Northwest District Wildlife Management staff, the Bureau of Water Regulation and Zoning Program (now called the Bureau of Watershed management), The Bad River and Red Cliff Bands of Lake Superior Chippewa, Wisconsin Department of Administration Coastal Management Program, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources Department of Forestry

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#63 - Lake Superior Habitat Coordination

Minnesota Pollution Control Agency (FY 1992, 93 - X995813-01/01-1)
520 Lafayette Road
St. Paul, MN 55155

Minnesota Department of Natural Resources (FY1994 - GL995662-01-0; FY1995 - GL985189)
120 State Road
Two Harbors, MN 55616
218-834-6612; Fax 218-834-6639

Michigan Department of Natural Resources (FY1992, 93, 94 - X995809-01, -02)
P.O. Box 30028
Lansing, MI 48909
517-373-3511

Wisconsin Department of Natural Resources (FY1992, 93, 94 - GL995872-01-01, -02, -03)
Water Resources Management
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352

Project Narrative:

In 1992, three Lake Superior Habitat Coordinators from the state Departments of Natural Resources of Minnesota, Wisconsin, and Michigan were hired to identify, protect, and restore the important plant and animal habitats of the basin as well as to ensure timely and effective coordination, cooperation, and communication with other Lake Superior basin natural resource partners. The coordinators were given a number of different roles and responsibilities, most importantly to act as a liaisons for the states in order to coordinate efforts among states and with Canada. Other specific duties included: attending and participating in all necessary Lake Superior Binational Program meetings, developing criteria to define, identify, and prioritize important habitat sites, and coordinating Department of Natural Resource reviews of the Lakewide Management Plan for Lake Superior. In addition, the coordinators were able to propose needed restoration projects, conduct public outreach activities, and provide State representation on Remedial Action Program committees. Overall, the coordinators helped provide a basis for long

range planning to support the protection of identified natural resources in the Lake Superior Basin.

The results of the work of the three Lake Superior Coordinators includes: representation and participation in working on the Remedial Action Plans (RAPS), such as the one with the St. Louis River; collection, summarization, and evaluation of information and data as needed to fulfill work plan commitments; development of a database for information obtained; development of the habitat portion of the Lakewide Management Plan; progress toward zero discharge of certain pollutants in the Lake Superior Basin, development of partnerships and relationships between different state departments and international groups; and development of habitat protection/remediation projects and recommendations. The Minnesota coordinator helped plan and manage the following projects: Hearding Island Native Community project, Grassy Point Habitat Restoration project, and the still underway Sugarloaf Cove project. Results regarding these projects can be found under the individual project's listing. Other accomplishments and actions include participating in the planning and hosting of the annual Ecological Services training session and developing a world wide web site for information exchange relating to the Lake Superior Habitat Coordination efforts, (http:www.d.umn.edu/~pcollins/main.html), the creation of a number of important habitat site maps with the help of GIS, and the production of a *Preliminary Summary of Important Habitat Data in the Minnesota Portion of the Lake Superior Basin*.

The coordinators helped conduct public meetings in the Lake Superior basin to enhance awareness and generate public support for the program. In addition, some of the projects, such as Hearding Island, had a strong outreach component with activities that included volunteers.

Project Results:

Environmental Science and Management

- Planning, coordination, information sharing, technology transfer

Produced a "Preliminary Summary of Important Habitat Data in the Minnesota Portion of the Lake Superior Basin."
Developed a world wide web site for information exchange (http:www.d.umn.edu/~pcollins/main.html).
Revised and distributed the "Criteria for the Identification of Important Habitat in the Lake Superior Watershed."
Participated in the Lake Superior Task Force, Lake Superior Advisory Forum, and Lake Superior Work Group.
Planned and hosted the annual Ecological Services training session.

- Ecological restoration

Managed restoration projects at Hearding Island, Grassy Point and Sugarloaf Cove, Minnesota.

Economic Impact

- Direct

Created 3 full time jobs for the duration of each position. Once the grant funds were depleted, The Minnesota coordinator was supplied money from elsewhere for continued full time funding of his position, duties, and projects.
$58,767–Leveraged (MN - $37,665; MI - $11,052; WI - $10,050)

Project Statistics:

Award Amount: $932,536 (MN - $512,536; MI - $210,000; WI - $210,000)
Project Timetable: MN - October 1, 1992 - September 30, 1997; MI - October 1, 1992 - September 30, 1995; WI - October 1, 1993 - October 30, 1996
Project Location: Lake Superior Watershed
Great Lakes System: All Systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: all the biological and cultural heritage and diversity, the threatened and endangered animals and plants, and the valuable habitat for native life in the Lake Superior Basin.
Stressors Impairing the System: Virtually all known stressors.
Partners: Ontario

#64 - Lake Superior Trumpeter Swan Restoration (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
(FY1993 - GL995427-01)
Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:
Trumpeter Swans (*Cygnus buccinator*) were extirpated from Wisconsin during the 19th century. The bird almost disappeared because of hunting and the millinery trade. The Wisconsin Department of Natural Resources is attempting to re-establish the Trumpeter utilizing Alaskan stock and innovative research and management strategies. The recovery goal was to establish a breeding and migratory population of at least 20 pairs in Wisconsin by the year 2000. Specific project objectives include, 1) identifying a suitable marsh habitat where up to 20 Trumpeter Swans can be reintroduced and reestablished, 2) documenting their nesting success, 3) monitoring the migration and movements of the swans, 4) assess the production and health of the local Mute Swans, and 5) evaluating the potential effects of local Mute Swans on Trumpeter Swans reintroduction. Fourteen Trumpeter Swans were reintroduced on the Bad River Indian Reservation in May of 1996. Monitoring was subsequently turned over to the Bad River Tribe.

Project Results:
Environmental Science and Management
- *Ecological restoration*
14 Trumpeter Swans were introduced on the Bad River Reservation.
Economic Impact
- *Direct*
Dollars leveraged: (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
- *Indirect*
Increased bird watching traffic at release sites.

Project Statistics:
Award Amount: $71,000
Project Timetable: October 1, 1993 - October 30, 1996
Project Location: Lake Superior Watershed - Wisconsin
Great Lakes System: Inland wetland
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Regionally endangered species (Trumpeter Swans)
Stressors Impairing System: Habitat destruction, poor management practices (over-harvest)
Partners: Bad River Tribe, Windway Capital Foundation, Zoological Society of Milwaukee, Natural Resources Foundation of Wisconsin, National Park Service

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#65 - Lake Trout Spawning Reef Feasibility Study (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
(FY1993 - GL995427-01)
Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative
The Clay Banks Refuge is a small area within a larger area of Lake Michigan, next to Door County, that was designated as a primary zone by the Lakewide Management Plan for Lake Michigan (LaMP), where the allocation of

stocked lake trout is favored over most other areas in the lake. A large population of lake trout is now present in the Clay Banks Refuge area, but no evidence of natural reproduction exists. In support of the LaMP, this study was intended to promote the natural reproduction by lake trout by 1) Designing one or more artificial spawning reefs for lake trout in or near the Clay Banks refuge with the consultation of experts throughout the Great Lakes area, and 2) Develop specific plans and cost estimates for installation of the reef.

In 1994, an Expert Workshop made up of specialists in the field of lake trout restoration, asked and answered two questions: 1) Can it work?, and 2) How should it be built? Most agreed that it could work, and they continued to develop requirements, such as depth, size, shape, number of sub-units, etc., that would be needed for the reef to serve it's purpose effectively.

In coordination with the Wicsonsin Department of Natural Resources, the US Army Corps of Engineers carried out the actual design of the lake trout spawning reef. They indicated the coastal engineering restraints, the design, the construction, and the estimated cost, in addition to other considerations and monitoring.

Project Results:

- Scientific study
A study of the Clay Banks Refuge supported lake trout restoration using artificial spawning reefs.

Project Statistics:

Award Amount: $50,000
Project Timetable: October 1, 1993 - October 30, 1996
Project Location: Clay Banks Refuge Nest to Door County
Great Lakes System: Nearshore waters, open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Lake Trout
Stressors Impairing System: Exotic species, poor management practices (over fishing)
Partners: US Army Corps of Engineers

#66 - Lakeview Wildlife Management Area (See " Lake Ontario Barrier Beach/Wetlands Habitat Restoration Project" description of the cluster grant to New York State Department of Environmental Conservation for more information.)
(FY1994 - GL995663-01-0)
New York State Department of Environmental Conservation
317 Washington Street
Watertown, NY 13601
315-785-2261; Fax 315-785-2242

Project Narrative:

The Lakeview Wildlife Management Area is a four mile length of barrier beach that separates 3000 acres of wetland from the damaging effects of wind and water of Lake Ontario. This project constructed 200-300-foot long dune crossover structures between Lake Ontario beach and Lakeview Pond. This was the location of a well worn foot trail which was killing vegetation and adding to erosion of this natural beach barrier. The sensitive areas, including the animals, plants, and dune formations, were better preserved through the construction of the crossover structures. Improved public access and educational opportunities (interpretive signs were installed), while preserving the education opportunities already in place by avoiding closure of public access to the park.

Project Results:

Environmental Science and Management
Acres Impacted: 3,461
- Ecological protection
Constructed crossover walkways to protect the natural formations and wildlife.
Public Stewardship
- Outreach, information exchange
Installed interpretative signs.

Economic Impact
- Direct
$1,000–Leveraged

Project Statistics:
Award Amount: $20,000
Project Timetable: October 1, 1994 - September 30, 1996
Project Location: Lakeview Wildlife Management Area, Eastern shore of Lake Ontario and along the Niagara River
Great Lakes System: Coastal Shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Dunes, Coastal wetlands, Native plants and animals
Stressors Impairing System: Recreation, erosion, plant degradation
Partners: New York State Department of Environmental Conservation Fund, New York State Department of State, New York State Parks and Recreation, Oswego County Soil & Water Conservation District, Oswego County Youth Conservation Corps, USDA Agricultural Stabilization & Conservation Service, Thousand Islands Park Commission, New York Sea Grant/Sea Trail, Oswego County Environmental Management Council, The Nature Conservancy, Ontario Dunes Coalition, Ducks Unlimited

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#67 - Les Cheneaux Compatible Economic Development Project
(FY1997 - GL985489-01-0)
Les Cheneaux Chamber of Commerce
Les Cheneaux Economic Forum
P.O. Box 10
Cedarville, MI 49719
906-484-3031; Fax 906-484-9941
www.lescheneaux.org
lcef@northernway.net

Project Narrative:
The archipelago of 36 Les Cheneaux Islands lies along the largely undeveloped and remarkably diverse stretch of Great Lakes shoreline in the eastern upper peninsula of Michigan. With nine globally-rare natural communities that provide habitat to eleven Federally-listed threatened or endangered species and more the 60 State-listed species, the northern shoreline of Lake Huron is an important resource to the Great Lakes basin.

The project supported the creation of a local community-driven plan for economic development that depended on and provided for the long-term protection of the rich biological diversity of the area. The project brought economic development expertise and a facilitated community visioning and planning process to the rural community. Ultimately, the project resulted in a shared community vision for economic development and a set of action plans to begin compatible development initiatives. The mission that was adopted by the Chamber was: *To develop an economic strategic plan that preserves that beauty and nature of the area and that inspires those who live here and those who will come in the future to maintain the quality of life in this community, its economic health, social and cultural vitality, and ecological integrity.*

A set of concrete plans and ongoing work has begun for a compatible development initiative. Three working task forces were formed which continue to develop strategies and actions that will lead this area to create an economically friendly developmental structure, as well as keeping the environment in the area healthy. These plans include scheduled meetings with scientists and community members to discuss water quality issues, permit planning to protect fish with shelters, nature-based tourism, and a proposed shoreline management pamphlet. "*A Plan for Les Cheneaux: Where Economy, Community and Nature Come Together,"*, a plan for sustainable and compatible development of the area was published. This is valuable for any community that wishes to replicate this work and succeed in planning a sustainable and compatible development. A useful tool for those communities interested can be found on the Les Cheneaux website under *Les Cheneaux – Nature-based Tourism Plan*. In addition, volunteer days to do community work brought many of the community together, and a Health and Safety awareness day attracted

many residents as well. Future plans have been proposed that will raise public awareness and continue restoration efforts.

This project formed a shared community vision for economic development and a sustainable economy. Accomplishments include a birdwatchers' brochure, a customer service workshop, boat tours to enhance economic development, and many other activities that promote the economy while preserving the natural environment.

Project Results:

Environmental Science and Management

- *Ecological Protection*

A community-driven plan for economic development provides for long-term protection of the biodiversity of the 36 Les Cheneaux Islands of Northern Lake Huron.

Public Stewardship

- *Outreach, information exchange*

Birdwatchers' guide produced.

- *Partnership building*

Constructed an economic/ environmentally sustainable plan for the city and it's growth, *"A Plan for Les Cheneaux: Where Economy, Community and Nature Come Together."*

Met with scientists and community members to make the plan, and developed groups and partnerships in order to make and carry out the plan.

- *Protection and restoration volunteers*

Held workdays and developed volunteers to build community unity.

Economic Impact

- *Direct*

$72,260–Contractual

2 full-time positions

$62,719–Leveraged

- *Indirect*

Developed a sustainable economic plan. Effects of this plan can already be seen with an increase in production of recreational activities like boat tours and birdwatching.

Created a plan for sustainability, with the methods used to arrive at the plan, which can be used as an example.

Project Statistics:

Award Amount: FY1997 - $77,500

Project Timetable: July 1, 1997 - September 30, 1998

Project Location: Michigan

Great Lakes System: Nearshore terrestrial and aquatic, coastal wetland, inland terrestrial

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Has nine globally rare natural communities (such as Great Lakes marsh, cobble beach, dune and swale, northern fen, or alvar), 11 federally listed threatened or endangered species (including the bald eagle, wolf, dwarf lake iris, hart's tongue fern, hillside daisy, and Houghton's goldenrod), and 60 state listed species.

Stressors Impairing the System: Development

Partners: Tourist Association, Historical Association, Artists' Association, The Center for Compatible Economic Development, Great Lakes Aquatic Habitat Fund, Michigan Environmental Council, The Corporation for Enterprise Development, The Nature Conservancy, Northern Initiatives, Small Business Development Center in the Sault, Clark Township Board, The Community Foundation, Michigan Works!, Lake Superior State University, Michigan DNR, Little Traverse Conservancy, The USDA Conservation Service, Islands Wildlife, Sportsman's Club, The Community Schools, Hiawatha National Forest Service, Planning Commission, The Islands Association, civic groups, volunteers.

#68 - Mallard Club Marsh Wildlife Area Wetland Restoration
(FY1993-GL995430-01)

Ohio Department of Natural Resources, Division of Wildlife
1840 Belcher Drive
Columbus, OH 43224-1329
614-265-6331; Fax 614-262-1143
www.dnr.state.oh.us; or, www.dnr.state.oh.us/wildlife

Project Narrative:

The project involved the restoration and enhancement of 400 acres of wetland in the Mallard Club Marsh Wildlife Area owned by the Ohio Division of Wildlife. Dikes were built and water control established on degraded wetlands and old agricultural fields. A dedication for the restored area took place on June 24, 1995.

The results of the project included an increase in diversity of wetland types to maximize waterbird production and staging. The restored areas provided a vital link between the existing Maumee Bay State Park and the Little Cedar Point National Wildlife Refuge. The marsh units were used to treat and enhance control of agricultural run-off from the Casino Ditch, thereby improving water quality. 400 acres of Lake Erie coastal wetlands were restored.

Project Results:

Environmental Science and Management
- *Ecological restoration*

Restored 400 acres of Lake Erie coastal wetlands.
Improved water quality through mitigation of agricultural run-off.
Established biological corridor between a refuge and a state park.
Increased wetland type diversity.
Maximized waterbird production and staging.

Economic Impact
- *Direct*

$50,000–Contractual
$57,500–Leveraged

Project Statistics:

Award Amount: FY1993- $50,000
Project Timetable: January 1, 1994 - January 1, 1995
Project Location: Lucas County, Ohio, adjacent to Maumee Bay on Lake Erie. The restoration was within the Lake Erie Marshes Focus Area, Lower Great Lakes Joint Venture, North American Waterfowl Management Plan.
Great Lakes System: Coastal Marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Restoration provided increased habitat for the following species: mallards, wood ducks, blue-winged teal, Canadian geese, marsh wrens, least bitterns, American coots, bald eagles, and other shorebirds, furbearers and wading birds.
Stressors Impairing the System: Agriculture, development
Partners: Ducks Unlimited, Lake Erie Wildfowlers, Ohio Fish and Wildlife Management Association, Shelby Conservation League, Maumee Valley Audubon Club

#69 - Marketing Wetlands for Profit

(FY1994 - GL995652-01-0)

Maumee Valley RC&D Area
06879 Evansport Road, Suite E
Defiance, OH 43512
419-784-3717; Fax 419-784-0643

Project Narrative:

The purpose of this project was to demonstrate how the construction and management of wetland reservoirs could be economically profitable to farmers while increasing wildlife habitat. The focus of the demonstration was to construct three permanent wetland reservoirs on private and/or public lands. The intent was to capture runoff from cropland as well as other sources, store this water in a wetland reservoir, and use the stored water in a subirrigation system during periods of low rainfall.

The project improved a drainage system by installing a subirrigation/drainage system and/or retrofitting one-half of the system. The project demonstrated a method for increasing crop yields and wildlife habitat while decreasing cost outlays, and improving 42 acres of land in the process. The potential for wetland restoration in Ohio is over 500,000 acres. This demonstration, along with the educational slide show and video, informed and made others more aware of the potential for environmental progress and economic prosperity at the same time.

Project Results:

Environmental Science and Management

- *Ecological restoration*

Improved a drainage system by installing a subirrigation/drainage system and/or retrofitting one-half of the system. Restored 42 acres.

Public Stewardship

- *Outreach, information exchange*

Educational slide show and a video produced about the project.

Economic Impact

- *Direct*

$125,000–Contractual
$51,575–Leveraged

Project Statistics:

Award Amount: FY 1994- $125,000
Project Timetable: October 1, 1994- December 31,1999
Project Location: Defiance, Williams, Fulton, Henry, Van Wert, Putnam, Paulding, and Allen Counties in northwest Ohio
Great Lakes System: Inland wetland
Stressors Impairing the System: Agriculture, alteration of nutrient inputs, habitat destruction
Partners: USDA Agriculture Research Service, Michigan State University, Ohio State University, USDA Natural Resource Conservation Service, Ohio Environmental Protection Agency, Soil & Water Conservation Districts, Land Improvement Contractors, the drainage industry

#70 - Maumee River Basin Wetlands Restoration

(FY1992 - X995958-01, FY1994 - GL995575-01-0)

Allen County Soil and Water Conservation District
2010 Inwood Drive
Fort Wayne, IN 46815
219-422-3373; Fax 219-424-9209

Project Narrative:

The purpose of the initial project was to produce a sortable database that inventoried potential wetland restoration

sites for the entire Cedar Creek watershed. The second phase of the project was intended to expand the efforts to include prairie restorations along with wetland restorations. The Cedar Creek Watershed Alliance efforts expanded into involvement with the St. Joseph Watershed Initiative, a tri-state (IN, MI and OH) collaboration concerned with watershed management. Landowners were surveyed in order to gauge interest in the restoration of wetlands for enhanced wildlife habitat and increased erosion control. A total of 197 landowners with potentially restorable wetlands on their property were contacted. A total of 73 site visits were completed. Of these, 50 sites were deemed worthy of surveys.

A wetland inventory database was created. 276 acres of prairies were restored, and 39 sites were constructed, for a total of 192 acres of restored wetlands. The inventory was used to generate mailing lists for initial landowner contacts. A brochure describing the restoration program was created.

Project Results:

Environmental Science and Management

- *Inventory, assessment, classification*

A wetland inventory was conducted.

- *Ecological restoration*

276 acres of prairie and 192 acres of wetlands were restored.

Public Stewardship

- *Outreach, information exchange*

Made a brochure about the restoration program.

The inventory was used to make a mailing list for initial landowner contacts.

Economic Impact

- *Direct*

1 full-time job

$30,050–Leveraged

Project Statistics:

Award Amount: $46,000 (FY1992- $23,000, FY1994- $23,000)

Project Timetable: April 15, 1993 - May 20, 1996

Project Location: Cedar Creek Watershed in northern Allen County, southeast Noble County and central and southern DeKalb County, Indiana

Great Lakes System: Inland wetland

Stressors Impairing the System: Development, agriculture, alteration of nutrient inputs

Partners: USDA Natural Resource Conservation Service, U.S. Fish and Wildlife Service, Indiana Department of Natural Resources, Cedar Creek Watershed Alliance, Purdue University

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#71 - Menominee Habitat Protection and Restoration Project

(FY 1994- GL995661-01-0)

Menominee Indian Tribe of Wisconsin
P.O. Box 910 Courthouse Road
Keshena, WI 54135
715-799-4937; Fax 715-799-6153

Project Narrative:

The goal of the project was to promote the protection and restoration of forest and riparian habitats within the Menominee Reservation through education and outreach, creation of new partnerships, and promotion of biological integrity. The project promoted the exceptional Menominee sustained yield forestry program.

Wild rice was reintroduced to the Wolf River. Lake sturgeon fish-way needs were reassessed. A number of lake sturgeon were reintroduced to the Wolf River above the hydro-project and are being monitored. A technical manual " The Menominee Forest Management Tradition" promotes the Menominee forestry practices and the Menominee Tribal Enterprises Forest Management Plan. This was created in addition to a brochure for general audiences called "Menominee Tribal Enterprises", and a sustained yield forestry/white pine management video.

Tours were also conducted. A conference for Great Lakes foresters promoting Menominee silviculture was hosted by Menominee Tribal Enterprises, a business that maintains the Tribe's forest resources. Menominee forest practices are internationally known. Memorandums of Understanding among the Tribe, the College of the Menominee Nation and Menominee Tribal Enterprises were signed to carry out the education and outreach portion of the project. Wild rice and sturgeon are the two of the most important cultural and nutritional resources to the Menominee Tribe historically. Education and outreach products provided technical support to be used elsewhere in the basin, thereby increasing the potential for economic sustainability.

Project Results:

Environmental Science and Management
Acres Involved: 236,000
- Planning, coordination, information sharing, technology transfer
Created new partnerships with federal and private agencies.
Planned stages for wild rice reintroduction in Pine Lake.
Identified potential sturgeon fish-way studies.
Produced a technical manual: " The Menominee Forest Management Tradition.
- Scientific study
Researched the feasibility of lake sturgeon fish-way needs
- Ecological restoration
Reintroduced wild rice to the Wolf River.
- Monitoring, indicators
Monitored the lake sturgeon planted above the hydro-project.
Public Stewardship
- Outreach, information exchange
Produced a layman's brochure about good forestry practices: "Menominee Tribal Enterprises.
Produced a sustained forest yield video.
Gave tours.
Held a seminar for foresters and loggers about Menominee Tribal Enterprises sustainable forestry program.
- Education
Memorandums of understanding were signed to carry out the educational part of the project.
Economic Impact
- Direct
$10,000–Leveraged

Project Statistics:

Award Amount: $127,276
Project Timetable: October 1, 1994 - September 30, 1998
Project Location: Menominee Reservation, Wisconsin
Great Lakes System: Inland terrestrial
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Wild rice habitat and sturgeon
Stressors Impairing the System: Hydroelectric project, agriculture, development, non-point source pollution.
Partners: U.S. Fish and Wildlife Service, National Biological Service, The Nature Conservancy, Wisconsin Department of Natural Resources, College of the Menominee Nation, Bureau of Indian Affairs

#72 - Metzger's Marsh Wildlife Area

(FY1993 - GL995431-01)

Ohio Department of Natural Resources, Division of Wildlife
Division of Wildlife
1840 Belcher Drive
Columbus, OH 43224-1329
614-265-6331; Fax 614-262-1143

Project Narrative:

Project goals were to restore and manage emergent wetlands for spring and fall migration habitat for waterfowl and neotropical migrants, and summer nesting and brood rearing habitat for resident wildlife. A dike, pump station, and a water control structure, were installed, which helped to restore coastal wetlands on the south shore of Lake Erie.

As a result of this project, there is increased use of the area by black ducks and other waterfowl, shore birds, raptors, wading birds, reptiles, and amphibians. Additional high quality feeding areas for herons and egrets were provided. The marsh unit is used to treat agricultural runoff from Ward's Canal, thereby improving water quality. 558 acres of Ohio Division of Wildlife and 350 acres of U.S. Fish and Wildlife Service coastal wetlands on the southern shore of Lake Erie were restored. This project increased the potential for education about wetlands.

Project Results:

Environmental Science and Management
- *Ecological restoration*
Restored 908 acres of coastal wetland.
Increased wildlife habitat and feeding areas.
Mitigated agricultural run-off.

Public Stewardship
- *Outreach, information exchange*
Increased the potential for education.

Economic Impact
- *Direct*
$50,000–Contractual
$3,400,000–Leveraged
- *Indirect*
Increased interest in recreational activities like fishing and birdwatching

Project Statistics:

Award Amount: FY1993 - $50,000
Project Timetable: November 1, 1993 - December 31, 1994
Project Location: Lucas County, Ohio, adjacent to the Ottawa National Wildlife Area and within the Lake Erie Marshes
Great Lakes System: Coastal marsh
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Coastal Wetlands
Stressors Impairing the System: Shoreline erosion, high water levels (alteration of lake levels)
Partners: Ducks Unlimited, U.S. Fish and Wildlife Service, Maumee Bay Audubon, Lake Erie Wildfowlers, Ohio Decoy Carvers, Wolf Creek Sportsmen's Club

#73 - Michigan's Upper Peninsula Native Plant Demonstration Area
(FY1995- GL985160-01-0)

Upper Peninsula Resource Conservation & Development Council
201 Rublein Street
Marquette, MI 49855
906-226-7487; Fax 906-226-7040
www.portup.com/~uprcdc/home

Project Narrative:

The purpose of this project was to demonstrate management practices and plant species for restoring habitat with native plants. At a native plant information exchange in 1994, the need for more information on types of native plants, their physical requirements, and potential market sources were recognized. Increasing public awareness and educating natural resource specialists were proposed solutions. A half acre native plant demonstration area was developed with walking trails and plant information stations.

An educational brochure, a native plant poster (over 40,000 distributed from'96-'97), and informational trail signs were also produced. Public awareness has increased, especially in school children, on the benefits of using native plants instead of exotic species. Over 600 students and the general public toured the demo area in Escanaba, Michigan in 1996, and over 1000 people visited in 1997. The increase in understanding of native plants has increased the market demand for native plant seeds.

Project Results:

Public Stewardship

- *Outreach, information exchange*

Restored ½ acre by building a native plant garden for primarily educational uses.
Educational brochure and native plant poster produced.
Informative trail signs constructed.

- *Education*

About 1,600 people toured the demonstration garden in 1996-1997.

Economic Impact

- *Direct*

$1,800–Contractual
$19,710–Leveraged

Project Statistics:

Award Amount: $16,350
Project Timetable: August 18, 1995- September 30, 1997
Project Location: Delta County, Michigan
Great Lakes System: Inland terrestrial
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Native prairie flowers, grasses, vegetation, and the animals for which they provide habitat
Stressors Impairing the System: lack of native plant information and demonstration areas (leads to habitat restoration without as strong an emphasis on native plants)
Partners: U.S. Fish and Wildlife Service, USDA Natural Resource Conservation Service, U.S. Forest Service, Delta County Soil & Water Conservation District, Lakeshore National Park, Michigan Department of Natural Resources, Mead Paper, Champion Forests, and local citizens, area plant growers

#74 - Midwest Oak Ecosystems Recovery Plan
(FY1994 - GL995653-01-0)

The Nature Conservancy
8 South Michigan Avenue, Suite 900
Chicago, IL 60603
312-346-8166, Fax 312-346-5606

Project Narrative:

The project planned to complete and implement the Midwest Oak Ecosystems Recovery Plan. A draft recovery plan had been prepared as a result of the 1993 Oak Savanna Conference and its working sessions, as well as a follow up conference held October 1994. Objectives included: (1) setting regional priorities for conservation and restoration efforts; (2) facilitating the work of public and private institutions in carrying out restoration projects; (3) determining how the Recovery Plan can best support and facilitate restoration projects; and (4) demonstrating the effectiveness and importance of the regional recovery plan in supporting two specific savanna projects within the Great Lakes Basin.

The Recovery Plan coordinator: (1) consulted with managers of savanna restoration sites in the basin to gather input on how the development of the regional Recovery Plan can best support and facilitate oak savanna projects; (2) identified, in cooperation with knowledgeable agencies and people in the field of oak savanna restoration, two specific savanna projects, at least one of them a restoration project, to demonstrate the effectiveness and importance of the regional Recovery Plan in supporting and facilitating savanna restoration; and (3) produced a concise Action Plan for accomplishing the demonstrations. The final recovery plan was released at the Midwest Oak Savanna and Woodland Ecosystem Conference, held in Springfield Missouri, on September 26-30, 1995.

Production of the final draft: *Midwest Oak Ecosystems Recovery Plan: A Call to Action*, raised awareness and interest in savannas, inspired research, and served as a model for future work. One result of the Missouri conference was a coordinated effort to develop on the ground projects based on meaningful partnerships. The production of the final draft of the recovery plan was distributed to approximately 900 people. This project also brought to light the need for future conferences in order to discuss and share information for the purpose of focusing on local resources and projects and to raise the consciousness of local constituents.

Project Results:

Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*

Coordinated a meeting of scientists, resource managers, and practitioners in order to produce a recovery plan for Midwest oak ecosystems.
Finalized and distributed the recovery plan, "Midwest Oak Ecosystems Recovery Plan: A Call to Action" to about 900 people.

Economic Impact
- *Direct*

1 part-time job for 2 years
$1,053–Leveraged

Project Statistics:

Award Amount: FY1994 - $20,000
Project Timetable: August 1, 1994 - October 1, 1995
Project Location: Chicago, Illinois (program office)
Great Lakes System: Inland terrestrial, lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Oak savanna, Karner blue butterfly
Stressors Impairing System: Development, agriculture, invasive exotic plant species
Partners: University of Wisconsin-Stevens Point, Northeastern Illinois University, Illinois State University, University of Wisconsin-Madison Arboretum, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Dept. of the Army, U.S. Army Corp of Engineers, U.S. Environmental Protection Agency, Illinois

Department of Natural Resources, Indiana Department of Natural Resources, Iowa Department of Natural Resources, Michigan Department of Natural Resources, Missouri Department of Natural Resources, Minnesota Department of Natural Resources, Missouri Department of Conservation, Ohio Department of Natural Resources, Wisconsin Department of Natural Resources, Forest Preserve Districts of Cook, Kane, DuPage, McHenry, Lake, and Will Counties, Illinois, plus numerous local volunteer restoration groups such as the North Branch Prairie Project.

#75 - Mighty Acorns Youth Stewardship Educational Program
(FY1994, '97- GL995612-01-0, -02-1)

Nature Conservancy
8 South Michigan Avenue, Suite 900
Chicago, IL 60603
312-346-8166, Fax 312-346-5606

Project Narrative:

This project expanded, implemented and evaluated The Nature Conservancy's Mighty Acorns Youth Stewardship Education Program in Southeast Chicago communities. Partnerships were developed with schools, students, and volunteer docents in the community so that they learn the importance of protecting and restoring habitats in the Great Lakes Basin. The objectives were to introduce students from traditionally under-served city and suburban audiences to natural areas in a way that fosters a personal connection to nature; to introduce students to land stewardship by engaging them in restoration activities; to expand and strengthen partnerships with schools in which teachers explore the use of natural areas for curricular projects and service projects; and, to aid the social development of children in their classes. In addition to helping students, this project aimed to recruit and train adults from each community to serve as volunteer docents for the project; to evaluate the impact of the program through documentation; and to build community awareness and support of biodiversity and restoration.

Students, along with the help of volunteers, collected seeds in the fall, planted seeds in the spring, and cut down exotic brush in Cook County forest preserves. In one year, this program exposed over 500, 3rd and 7th grade inner city children to ecological concepts and communities. A newsletter, "The Seedling", is published quarterly.

Project Results:

Environmental Science and Management
- *Ecological restoration*

Collected seeds, planted seeds, and removed exotic species throughout approximately 50 acres in Cook County Forest preserves.

Public Stewardship
- *Outreach, information exchange*

Published a quarterly newsletter: "The Seedling."
- *Education*

500 3-7th graders participate in ecological restoration as part of educational programs each year.

Economic Impact
- *Direct*

$3,000–Contracts
1 full-time position
1 part-time position
$144,420–Leveraged

Project Statistics:

Award Amount: $159,348
Project Timetable: July 1, 1994 - September 30, 1996; September 30, 1997 to September 30, 1998
Project Location: Southeast Chicago, Illinois
Great Lakes System: Inland terrestrial
Stressors Impairing the System: Habitat destruction, fire suppression, exotic species
Partners: Cook County Forest Preserve District, Altgeld Gardens: children and adult volunteers, Morton

Arboretum, Chicago State University, the Volunteer Stewardship Network, and U.S. Environmental Protection Agency volunteers

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#76 - Monitoring Avian Migrations, Productivity, and Survivorship in Northwest Indiana, 1999-2000 (FY1998 - GL985903-01)

Save the Dunes Conservation Fund
444 Barker Road
Michigan City, IN 46360
(219) 879-3564; Fax 219-872-4875
sand@savedunes.org
www.savedunes.org/html/

Project Narrative:

Although there are several permanent banding stations in the Great Lakes region that monitor spring and fall migrations, there has been no established effort to create one in northwest Indiana, where tens of thousands of songbirds congregate in a concentrated area on the southern tip of Lake Michigan. The absence of a bird banding and information monitoring station in this northwest Indiana region has created a large gap in the knowledge of bird migrations through the central Great Lakes region. The need for a monitoring station has resulted from a continuing decline in the numbers of these neotropical migrants. This project's goal was to set up and establish a bird banding station in order to inventory avian species, assess the overall health of the species, and collect data to determine conservation needs and ensure the viability of northwest Indiana's avian community.

A "constant effort" banding station in the Miller Woods section of the Indiana Dunes National Lakeshore in Gary, Indiana was established and will provide long term data for evaluating migrant bird habitat needs and trends, breeding bird health, and population trends. During the first year, 1031 birds were banded, and 131 birds were recaptured, totaling 78 species (not including birds banded for demonstration purposes). From the number of birds banded, and the data gathered. Preliminary assessments were made. For instance, overall, fall migrations are larger than spring migrations, and productivity during the breeding season was healthy for most species. The data collected was shared with both the Federal Bird Banding Laboratory, and the Institute for Bird Populations, and the information will assist the National Lakeshore and others in land management decisions.

A five day training workshop to encourage and prepare volunteers and lakeshore employees was conducted; 627 volunteer hours were provided to the banding program. A narrated slide show for the general public was developed and presented on three occasions (at the Douglas Center in Gary, to the Griffith Chapter of the Izaak Walton League, and at the Gibson Nature Preserve in Hammond). It was also presented to high school teachers at the Indiana Dunes Environmental Learning Center. A flyer to advertise the Douglas Center program was developed and distributed. Two articles were published in a regional paper. A demonstration was given to a class of Wirt High School students, educating them on the environment of northwest Indiana and how bird banding improves land management decisions.

Project Results:

Environmental Science and Management

- *Monitoring, indicators*

Acres Involved: 35 (15 directly used for breeding study, and 20 for migration the migration nets)
Banded 1031 birds, or 78 species the first year.
Monitored and recorded health, population, migration and breeding statistics for the Federal Bird Banding Laboratory and the Institute for Bird Populations.

Public Stewardship

- *Outreach, information exchange*

Three slide shows about the work presented locally.
Two articles published in a local newspaper.
Demonstrated techniques to a local high school group.

- *Protection and restoration volunteers*

Five day training workshop to prepare volunteers.

627 volunteer hours were provided to the banding program.

Economic Impact

- *Direct*

$1,000–Contractual
$7,647–Personnel
$5,398–Leveraged (including the volunteer effort)

Project Statistics:

Award Amount: $16,228
Project Timetable: October 30,1998 - April 30, 2000
Project Location: Miller Woods section of the Indiana Dunes National Lakeshore - East side of Gary, Indiana
Great Lakes System: Lakeplain, Inland terrestrial (Migratory and/or permanent bird habitat)
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 78 species of birds (33 species of migrants, of which 15 area breeders, and 13 likely breeders were identified)
Stressors Impairing the System: A lack of knowledge (declining population of neotropical migrating birds)
Partners: Gibson Woods Nature Preserve, Earlham College, Dunes-Calumet Audubon, U.S. Geological Service Biological Resources Division, Indiana Dunes National Lakeshore, Indiana Department of Environmental Management, Institute for Bird Populations, Grand Calumet Task Force, Izaak Walton League, Chipper Woods Bird Observatory

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#77 - Natural Areas Association 1998 Conference

(FY1998 - GL985676-01-0)

Natural Areas Association
P.O. Box 1504
Bend, OR 97709

Project Narrative:

This grant was intended to help with the administration and planning of the October 6-10, 1998, Natural Areas Association Conference on Mackinaw Island, Michigan. The Natural Areas Association (NAA) sponsored its 25th Annual Conference on October 6-9, 1998 at Mission Point Resort, Mackinac Island, Michigan. The conference theme " Planning for the Seventh Generation" was explored through scientific presentations, informal discussions, exhibits, the arts, and a traditional Native American Powwow. The theme reflected the Native or Tribal tradition of considering how choices we make now affect the next seven generations. The linkage of science, native peoples' issues and the philosophical perspectives of Dr. John Hinchliff, combined with the atmosphere and beauty of Mackinac Island, helped make the Natural Areas Association's Silver Anniversary Conference an outstanding success.

In addition to presentations and scientific papers, field trips to local natural areas generated discussions about Great Lakes ecosystems. This conference was aimed at natural areas professionals and discussions about protection and restoration in natural areas was an important part of it. 626 participants from 37 states, including the district of Columbia, and three foreign countries attended.

Project Results:

Environmental Science and Management

- *Planning, coordination, information sharing, technology transfer*

Brought together top environmental natural resource managers to exchange information.
Developed relations between Native peoples and resource managers.

Economic Impact

- *Direct*

$10,000–Contractual
$5,000–Leveraged

Project Statistics:

Award Amount: $5,000
Project Timetable: September 22, 1998 - December 31, 1998
Project Location: Mission Point Resort, Mackinaw Island, Michigan
Great Lakes System: All Systems
Stressors Impairing System: All stressors
Partners: Although the money for the project went only towards the hiring of the conference planner, this is the list of partners that help made the conference happen: Michigan Department of Natural Resources, Michigan Natural Areas Council, Gale Gleason Environmental Institute, Lake Superior State University, Mackinac Straits Area Native American Community, Association for Biodiversity Information, Exotic Plant Pest Council-(California, Florida, Pacific NW, Tenn. Councils), Lake Superior Protected Area Managers, Michigan Chapter of the Wildlife Society, Michigan Bureau of Land Management, Michigan Coastal Management Program, CLIMB: Michigan State University, Consumer's Energy Corporation, Michigan Great Lakes Protection Fund, Lake Superior State University, Michigan Chapter - The Wildlife Society, Michigan Department of Education, Monsanto, National Park Service Midwest Region, Michigan Natural Heritage Program, Natural Resource Conservation Center Rose Lake Plant Materials Center, Michigan Parks & Recreation Stewardship Program, Rocky Mountain Elk Foundation, The Nature Conservancy - Michigan Chapter, Ann Arbor Parks and Recreation Department, Natural Areas Preservation Division, Fort Wilkins Historical Society, Garden River Ojibway Forest Nation, Heritage Resources Centre - University of Waterloo in Ontario, Hiawatha National Forest, Kewadin Casinos, Little Traverse Conservancy, Mackinac State Historical Parks Commission, Matthaei Botanical Gardens: University of Michigan, Michigan Karst Conservancy, native American Programs: Central Michigan University, Native American Society for Historical Preservation, North Central Research Station: U.S. Forest Service, Parks Canada, Pictured Rocks National Lakeshore, School of Natural Resources and Environment at University of Michigan, Seney Wildlife Refuge: U.S. Fish and Wildlife Service, Sleeping Bear Dunes National Lakeshore, Tip of the Mitt Watershed Council, Travel Michigan, University of Michigan Herbarium, US-Canada Great Lakes Islands Project, Whitefish Point Bird Observatory, Wildflower Association of Michigan.

#78 - Nettle Lake Habitat Restoration Project
(FY1993 - X995943-01-0; FY1994 - GL995630-01-0)
Maumee Valley Resource Conservation and Development Area
06879 Evansport Road, Suite E
Defiance, OH 43512
419-784-3717; Fax 419-784-0643

Project Narrative:

Nettle Lake is the largest natural lake in Ohio with over 140 acres of adjoining wetlands and undeveloped areas. During the first year, the purpose of the project was to develop a brochure and a slide presentation, and erect signs showing endangered and/or threatened plant and animal species in the Nettle Lake area in order to inform landowners and lake users of the significance of the lake as habitat. In addition, the organization of a task force would provide technical input regarding the restoration of the wetlands adjacent to Nettle Lake. During the second part of the project the objectives were to determine the plant and animal populations by habitat distribution, resident and migratory species, and season; develop a master plan for conservation and ecological restoration of habitats; and disseminate findings to area residents.

A wetland task force was created to provide technical input for the neighboring wetlands of Nettle Lake, and was comprised of representatives from the Department of Interior, Ohio Department of Natural Resource-Division of Wildlife, county Soil Conservation Service personnel, Soil and Water Conservation District personnel, and Nettle Lake Steering Committee members. An inventory and restoration plan for the wildlife habitat of the Nettle Lake area was produced. The inventory identified more than 250 plants and animals.

A detailed brochure entitled, "The Endangered Species of Nettle Lake," was created, and 2500 copies were distributed. The brochure is a resource to inform land owners and lake users of the endangered and/or threatened plant and animal species which inhabit the area. Four signs were constructed to inform owners and land users of the lakes ecosystem and its interdependency on man, and help to describe the Lake's complex habitat and

environmentally sensitive areas. A narrated slide series was created to explain the Nettle Lake ecosystem, its history, and its prospects for the future. The series was given a few times, including the Public Library. 200 copies of the final report/ biological survey and restoration plan were distributed to the Nettle Lake steering committee, interested landowners, and agency personnel. Seven landowners who own decks around the lake began talking and working together.

Project Results:

Environmental Science and Management

Acres Involved: 140

- Planning, coordination, information sharing, technology transfer

Put together a wetlands task force; made a restoration ecological plan for wildlife habitat at Nettle lake

- Inventory, assessment, classification

Produced an inventory of the wildlife habitat of Nettle Lake

Public Stewardship

- Outreach, information exchange

2500 copies of a brochure about endangered species distributed; 4 signs constructed about ecosystem and sensitive areas

Economic Impact

- Direct

$1,679–Contractual (FY1993- $1,279; FY1994- $400)

$18,916–Leveraged (FY1993- $8,006 (including 750+ volunteer hours); FY1994- $10,910)

Project Statistics:

Award Amount: $16,070 (FY1993- $6,070; FY1994- $10,000)

Project Timetable: May 1, 1993 - December 31,1996

Project Location: Williams County, Ohio

Great Lakes System: Inland wetland, lakeplain

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Blackchin shiner (*Notropis heterodon*), Iowa darter (*Etheostoma exile*), lake chubsucker (*Erimyzon sucetta*), pugnose minnow (*Notropis emiliae*), reflexed bladder sedge (*Carex retrorsa*), small purple fringed orchid (*Plantanthera psycodes*), white-stem pondweed (*Potamogeton praelongus*), Canada frostweed (*Hellanthemum canadense*), dwarf bulrush (*Hemicarpha micrantha*), dwarf dandelion (*Krigia virginica*), yellow vetchling (*Lathyrus ochroleucus*), matted spikerush (*Eleocharis intermedia*), American panicgrass (*Panicum columbianum*), tiger salamander (*Ambystoma tigrinum*)

Stressors Impairing the System: Development, agriculture

Partners: Department of Interior, County Soil Conservation Service personnel, Soil & Water Conservation District, Ohio Department of Natural Resources, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Ohio Environmental Protection Agency, Ottowa National Wildlife Refuge, Maumee State Forest, Nettle Lake Steering Committee, Defiance College, The Ohio Biological Survey Office, Ohio State University

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#79 - Northern Pike Habitat Protection and Restoration

FY1993 - GL995427-01-0, -1; FY1997 - GL985712-01) (Also see "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)

Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:

The goals of this project were: to restore northern pike spawning habitats in three identified areas along Green Bay's western shoreline; to examine and document the amount of present and potential northern pike spawning habitats along the entire western shore of Green Bay (particularly to answer two questions: "what tributaries offer potential

for restoration?" and "what is the contribution of existing wetland habitat to northern pike production on the western shore of Green Bay?") After this data was collected, the second year of the project concentrated on the development and production of a comprehensive plan for northern pike habitat restoration for the western shore of Green Bay.

This project's objectives during phase II were to restore wetland fish spawning habitat and to determine the feasibility of restoring juvenile northern pike littoral habitat used by juvenile and older northern pike. The focus was on the Suamico and Little Suamico Watershed.

Habitat restoration was completed at three sites: 1) L.H. Barkhausen Waterfowl Refuge, including 8 acres of pike habitat; 2) Mitigation Ditch, which reduced mortality of pike by about 50%; and 3) Beaver Meadow Creek, which increased pike production from 60 fish to 5,274 fish. Habitat protection and restoration were two important objectives for this project, but two other important objectives were the completion of the ongoing northern pike assessment (resource inventory), and production surveys to assess completed habitat restoration projects and to identify critical habitat. Habitat was assessed along the western shore which led to the determination that 78 small tributaries (17 identified using GIS technology) on the western shore of Green Bay were good places that northern pike could use as spawning grounds. Functional wetland spawning habitat needing protection was identified, as were sites suitable for future habitat restoration. After assessment, the comprehensive management plan for northern pike and their habitat was completed. Finally, monitoring was carried out with the use of traps. It was found, after two years of monitoring, that more young-of-the-year pike were caught by these traps during the second year than the first. In other words, this is good evidence that the number of northern pike being born has increased.

Project Results:

Environmental Science and Management
Acres Involved: 658 (entire acreage of the watershed of concern)
- *Planning, coordination, information sharing, technology transfer*
Management plan for pike developed.
- *Inventory, assessment, classification*
78 tributaries on the western shore of Green Bay were assessed as Northern pike habitat.
- *Ecological restoration*
Northern pike habitat restored at three sites.
- *Monitoring, indicators*
Monitoring of habitat restoration and spawning success of northern pike continues.
Economic Impact
- *Direct*
$37,500–Contractual (Phase II)
$54,253–Personnel (Phase II)
$6,843–Leveraged (Phase II) (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information for Phase I)
- *Indirect*
Increased sport fishing opportunities.

Project Statistics:

Award Amount: $283,000 ('93 Phase I: $153,000; '97 Phase II: $130,000)
Project Timetable: October 1, 1993 - March, 31 2000 (includes both phase I & II)
Project Location: West shore of Green Bay, Lake Michigan
Great Lakes System: Coastal marsh , tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Northern Pike spawning and rearing habitats.
Stressors Impairing System: Development, stream channelization, wetland drilling and filling, sedimentation, non-point source pollution, poor management practices (wetland destructive farming)
Future Project Ideas/ Extensions: This project focused on tributaries which primarily discharge directly to Green Bay, many other water resources have been left out. As a result, it would be helpful to identify all water resources which serve or have the potential to serve as northern pike spawning and rearing habitats.
Partners: Wildlife Forever, Brown County, Oconto County, Town of Pensaukee, U.S. Fish and Wildlife Service,

U.S. Army Corps of Engineers, Peshtigo Wisconsin Conservation Corp, Northern Michigan University

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#80 - Northwestern Lake Superior Workshops
(FY1999 - GL97505201-0)
The Nature Conservancy
8 South Michigan Avenue
Suite 2301
Chicago, Illinois 60603
312-759-8017; Fax 312-759-8409

Project Narrative:

The purpose of this project was to assist local land owners and natural resource managers in Minnesota and Ontario to utilize a methodology for identifying conservation strategies that compatibly integrate economic, social, and ecological information. There were three inter-related elements to this project: 1) address biodiversity information gaps in the northwestern Lake Superior landscape, 2) strengthen capacity of local land owners, natural resource managers and community groups to identify conservation strategies that link biodiversity goals with social and ecological issues, and 3) launch community-based protection action for high priority conservation sites.

Two workshops were held in 1999 to discuss site conservation planning with people who could use that information. In addition, a brochure was made to give an overview of the site conservation approach that was taught in the workshops.

Project Results:

Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
2 site conservation planning workshops held
Identified conservation strategies, launched a community-based protection action for high priority sites, and the site conservation approach
Brochure about the methodology for identifying conservation strategies was developed
Economic Impacts
- *Direct*
$916–Leveraged

Project Statistics:

Award Amount: $17,377
Project Timetable: September 1, 1999 - August 31, 2000
Project Location: Thunder Bay, Ontario, and Duluth, Minnesota
Partners: The Ontario Natural Heritage Information Centre, North American Fund for Environmental Cooperation
Participants: National Heritage Information Centre, Thunder Bay Field Naturalists, Ministry Of Natural Resources, City of Thunder bay, Ontario Recreational Canoe Association, Long Sault Rapids Cultural Centre, Lakehead University, Northern Bioscience Ecological Consulting, Grand Portage Reservation Trust Lands & Resources Department, Parks Canada-Canadian Heritage, The Nature Conservancy, Environment North, Rainy River Watershed Program, Magpie Rod and Gun Club, Cook County Soil and Water Conservation District, Duluth Planning Department, Nemadji River Basin Project, Wisconsin Department of Natural Resources, St Louis River Citizens Advisory Committee, North Shore Technical communications, Minnesota Department of Natural Resources, Sugarloaf Interpretative Center Association, Boise Cascade Corporation/Timberland Resources, MSA professional Services

#81 - Northwestern Ohio Lakeplain Conservation Initiative (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
Kitty Todd Preserve
10420 Old State Line Rd.
Swanton, OH 43558
419-867-1521, Fax 419-867-8049

Project Narrative:

The Oak Openings is a 130 square mile region that supports a mosaic of black oak savanna and wet prairie communities. The Nature Conservancy owns and manages the 400 acre Kitty Todd Preserve. Approximately 7,900 additional acres are under public ownership including Maumee State Forest, Toledo Metroparks, and several State Nature Preserves. The goals of the project included the facilitation of conservation techniques on private and quasi-public lands throughout the region. Additionally, the project provided the means to motivate and facilitate acquisition and management practices at existing conservation sites. The encouragement of regional planning that incorporated biodiversity issues was another goal of the project. The Southwestern Lake Erie marshes, a secondary component of the project is an area of approximately 30,000 acres, much of which is under the ownership of federal, state or private refuges, as well as the Conservancy owned 1,000-acre Putnam Marsh.

This Project increased protection of outstanding biological resources in the Oak Openings and Lake Erie marshes ecosystems of northwestern Ohio, and strengthened local partnerships essential for the long-term conservation of these systems. Extensive botanical work was performed, including pre-management data collection and a general survey of rare species on existing TNC lands. Fifteen land acquisitions at the Kitty Todd Preserve (70 acres) were completed. Two right-of-first refusals on two additional parcels were obtained. An Oak Openings native seed nursery was established, and the initial conservation efforts at the 60 acre Meilke Road Savanna site were begun.

Also, in cooperation with Kitty Todd Stewardship, 3000 feet of ditches were filled, prescribed burns were conducted, and exotic species in areas of the Kitty Todd Preserve were controlled by using techniques like mowing, cutting, hand pulling, seed collection, and re-seeding. Species and community information were identified and recorded at previously undocumented sites. Several high quality wet prairie sites were discovered.

Outreach and educational efforts resulted in 13 separate, private properties to register their land in the Oak Openings Land Registry Program; the creation and establishment of the Oak Openings Conservation Area Program; the development of 3 brochures, 1 educational packet, and an Oak Openings/Kitty Todd display. During this time, the Conservancy also co-sponsored two regional events (an Oak Openings Ecosystem tour, and "Development and Conservation: An Integrated Approach for the Future") to increase awareness of the Oak Openings and offer conservation solutions. In addition, the project inspired other presentations, talks, and tours. An extensive amount of time was spent talking to local public officials and suggesting alternatives for land use.

Other stewardship activities included: compiling zoning maps and planning documents of the region, conducting 5 Oak Openings Working Group Meetings, drafting the Oak Openings Site Conservation plan, conducting conservation activities at the Southview High School, and initiating a stewardship intern program to help support and manage the Kitty Todd Preserve.

Project Results:

Environmental Science and Management
Acres Involved: 83,200 (130 square miles)
- *Inventory, assessment, classification*

Pre-management data collection; general survey of rare species; identified, and recorded species and community info (at previously undocumented sites); discovered several high quality wet prairies.
- *Ecological protection*

Made 15 land acquisitions @ Kitty Todd Preserve; got two rights of refusals, and two additional parcels.
- *Ecological restoration*

Started an oak openings seed nursery.
Initial restoration begun at the 60 acre Meilke Rd Savanna.

Filled 3000 ft of ditches, conducted burns, seeded and re-seeded (and otherwise managed areas).
Public Stewardship
- *Outreach, information exchange*
3 brochures, 1 educational packet, 1 display, co-sponsored 2 regional events.
Numerous presentations, talks, and tours.
Conducted 5 group meetings.
- *Education*
Educated local public officials and suggested alternatives for land use.
- *Protection and restoration volunteers*
Inspired 13 separate, private landowners to register their property in a land registry program.
Started an intern program to support Kitty Todd Preserve.
Started conservation activities at a high school.
Economic Impact
- *Direct*
$9,350–Contractual
2 full-time positions that persisted even after project ended
$7,575–Leveraged

Project Statistics:

Award Amount: $151,500
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Oak openings region of northwest Ohio, southwest Lake Erie marshes
Great Lakes System: Coastal shore, coastal marsh, lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Sand barrens, black oak savannas, coastal plain marshes, moist sand prairies, wet forested flatwoods, over 60 highly ranked state-listed rare plant species including *Agalinis skinneriana, Hypericum kalmainum, and Euthamis remota*, reintroduction of the Karner blue butterfly, migratory waterfowl and songbird habitat
Stressors Impairing System: Habitat loss, fragmentation, woody plant succession, Hydrological alterations (groundwater lowering), exotic plant species. Some of these are perpetuated by: Development, water level fluctuation (artificial drainage), and fire suppression.
Future Project Ideas/ Extensions: The work that this project accomplished will be continued as the Oak Openings Project, which is one of the Ohio's Chapter's major program areas.
Partners: Oak Openings Working Group (a consortium of local partners that includes the Ohio Department of Natural Resources - Division of Natural Areas and Preserves, Division of Forestry, Division of Wildlife, Ohio Department of Transportation, Toledo Metroparks, Natural Areas Stewardship Inc., U.S. Fish and Wildlife Service, and many others)

#82 - Onion River Fish Habitat Restoration (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
(FY1993 - GL995427-01)
Wisconsin Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:

The constant trampling of the river banks by cattle added to the slumping and eroding of Onion River banks. This, along with cattle wading in the river, caused a decline in the river's water quality resulting in poor quality fish habitat, and contributing significantly to downstream water quality degradation. This stream bank restoration project demonstrated the ability to restore degraded resources in an urban setting.

One half mile of the riverbank was stabilized with "LUNKER" type bank covers. Access by cattle to parts of the river was reduced. The banks were re-sloped and re-sodded. Ten pools of water are being monitored for future

movements of the river. Fish spawning and holding habitats were improved. The extent to which the entire river will be remediated is dependant on other landowners as well. One private landowner assisted with the project. Much of the restoration work was done by 25 students over the two year project period. Education provided students an opportunity to learn about environmental problems and to have hands on experience with restoration. The public was informed via newspaper and word of mouth. Because this project was visible from the road, the public also learned about the process by seeing it, and most comments and attitudes were very positive.

Project Results:

Environmental Science and Management

- *Ecological restoration*

One half mile of riverbank stabilized.
Fish spawning and holding habitats were improved.

Public Stewardship

- *Outreach, information exchange*

Newspaper coverage of the project.

- *Education*

25 students participated in restoration.

Economic Impact

- *Direct*

$2,458–Personnel
Dollars Leveraged: (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)

Project Statistics:

Award Amount: $32,000
Project Timetable: October 1, 1993 - October 30, 1996
Project Location: Onion River, Sheboygan County, Wisconsin
Great Lakes System: Tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Lake Michigan anadromous fish spawning habitat.
Stressors Impairing System: Agriculture, erosion, sedimentation
Partners: Cedar Grove High School, Wisconsin Education Board, Wisconsin Conservation Corps, private landowners, Trout Unlimited, City of Sheboygan, Sheboygan County Conservation Association, Sauk Trail Conservation Club

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#83 - Plants Out of Place/Invasive Plants in the Upper Midwest Conference
(FY2001 - GL975488-01-0)

River Country RC&D Council, Inc.
1101 West Clairemont Avenue
Suite 1G
Eau Claire, WI 54701
715-834-9672; Fax 715-834-8663

Project Narrative:

The conference was held on March 1-2, 2001, in order to bring together Great Lakes Partners such as landowners, natural resource managers, Indian tribes, researchers, conservation organizations, and interested individuals, for the purpose of sharing scientific information about non-indigenous invasive plant species, in addition to establishing a dialog toward their control and prevention. A Wisconsin Invasive Plant Council to better coordinate management efforts, to set precedence for future shared learning opportunities, and to initiate strategic planning and collaborative action was recommended.

Over 600 people attended the conference. Information was presented and shared about the status of the current work involving invasive plant species, and the dialogue was initiated. Individuals from scientists to non-profit

members presented their findings. Valuable partnerships were initiated and cultivated. The Wisconsin Invasive Plant Council was formed to deal with invasive, non-indigenous plants in Wisconsin.

Project Results:

Environmental Science and Management

- Planning, coordination, information sharing, technology transfer

Invasive Plant Council was formed.

600 people attended the Plants Out of Place/Invasive Plants in the Midwest Conference.

Economic Impacts

- Direct

$11,500–Contractual

$3,100–Personnel

$1,350–Leveraged

Project Statistics:

Award Amount: $24,800

Project Timetable: March 1, 2001 - February 28, 2002

Project Location: Eau Claire, WI

Stressors Impairing the System: Exotic, Invasive plant species

Partners: The Northwoods Weed Council, The Nature Conservancy, Great Lakes Indian Fish and Wildlife Commission, Lac Courte Oreilles Chippewa Band, USDA: Forest Service, University of Wisconsin at Stevens Point, Univ. of Wisconsin Extension, Wisconsin Department of Natural Resources, Leech Lake Band of Chippewa Indians, USDA Natural Resource Conservation Service, National Park Service

Participants: about 600 people participated from organizations from all over the Midwest, but concentrated in Wisconsin and Minnesota. A list of participants can be obtained by contacting the Great Lakes National Program office, or by contacting the River Country RC&D Council, Inc.

#84 - Preservation and Implementation Plan for the Wentworth & Calumet Prairie Project (FY1997 - GL985741-01)

Corporation for OpenLands Project (CorLands)

25 East Washington, Suite 1650

Chicago, IL, 60602

Project Narrative:

CorLands is a private not-for-profit land preservation affiliate of the OpenLands project. In the past, CorLands has initiated projects that have encompassed about 5,000 acres of land, including a project that acquired the Burnham Greenway Trail. The project goals were to inventory the remaining vacant lands along a 1.5 mile stretch of the Burnham Trail from Calumet City Prairie, to Thornton Fractional Prairie, and secure phase one environmental, valuation information and title background in order to ascertain the physical and legal constraints regarding the preservation of these prairies.

This project inventoried the Calumet City Prairie Addition, the Wentworth Prairie (both east and west), and made mention of Thornton Fractional Prairie and Burnham Prairie. This project also summarized the environmental, valuation, and title information. Together, the information assembled is being used to discuss acquisition opportunities with various governmental and private partners. (This is feasible because the CorLands board of directors voted to allocate $85,000 in matching funds for the acquisitions of these prairies).

Project Results:

Environmental Science and Management

- Inventory, assessment, classification

The biodiversity of the Calumet City Prairie addition and the Wentworth Prairies were inventoried

- Ecological protection

Environmental, valuation and title information for several small prairies totaling 48 acres was obtained.

Economic Impacts
- *Direct*
$13,925–Leveraged

Project Statistics:
Award Amount: FY1997 - $33,925
Project Timetable: October 1, 1997 - December 31, 1998
Project Location: Calumet and Wentworth Prairies - Cook County, Illinois
Great Lakes System: Lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: lakeplain prairies, their associate flora, fauna, and natural habitat
Stressors Impairing the System: Development

#85 - Protection and Restoration of Sandy Pond Peninsula, Lake Ontario Project
(FY1994 - GL985129-01-0; FY1996 - GL985129-02-0)
The Nature Conservancy
339 East Avenue, Suite 300
Rochester, NY 14604
315-298-2040, ext. 28
www.nature.org/cwny

Project Narrative:
This project provided an innovative approach to public use management and education while providing protection to fragile sand dune/beach habitat. The project included 1) management planning with the New York Department of Environmental Conservation; 2) formation of local volunteer management support and assistance team; 3) construction of vehicle barrier, dune walkover, and placement of "symbol fencing" to route recreational traffic; 4) employment of a local dune steward to provide onsite education, to coalesce public support and compliance, to perform site maintenance, and to coordinate volunteer activities; 5) development and installation of onsite interpretive signs and brochures to supplement staff and volunteer communication with the visiting public.

This project turned the area into a model for dune conservation. A 440 foot walk-over was built, and a nylon psychological fence installed to aide in protection. 15,500 clumps of beach grass were planted on two acres of leeward dunes. An additional acre of dune was restored with beach grass. A management plan for Sandy Pond Beach was developed.

Dune stewards were hired to promote a positive atmosphere, to reinforce the message of dune preservation and protection, and to keep the user pattern in the realigned state. A local publisher produced a brochure distributed by staff and volunteers both on the beach and in the community. Two sets of interpretive panels and brochures were made and strategically placed and distributed. Also, field trips and slide shows were given. The Friends of Sandy Pond volunteered more than 950 hours to help in the restoration.

The project provided for 1.5 seasons of locally hired stewards. It used services and products of local lumberyards, contractors, and a publisher. Local marinas, restaurants, and lodging facilities depended upon and benefitted from patronage of visitors attracted primarily by the site. The exploration of sustainable beach grass cultivation holds a promising future.

Project Results:
Environmental Science and Management
Acres Involved: 77
- *Planning, coordination, information sharing, technology transfer*
Developed a management plan for sandy pond beach.
- *Ecological protection*
Made a 440 ft. walkover and a nylon psychological fence.
- *Ecological restoration*
15,500 clumps of leeward dune beach grass planted, plus one extra acre of beach grass restored on a dune; turned the

beach into model for conservation.

Public Stewardship

- *Outreach, information exchange*

Brochure, 2 sets of interpretive panels and brochures, field trips, slide shows.

- *Education*

Dune stewards promoted positive atmosphere, reinforced preservation/protection message.

- *Protection and restoration volunteers*

950 hours to restore by Friends of Sandy Pond.

Economic Impact

- *Direct*

$44,667–Contractual

2 seasons of locally hired stewards; bought services and products lumberyards, contractors, and a publisher

$53,192–Leveraged

- *Indirect*

Increased the number of visitors and their patronage to local establishments.

Project Statistics:

Award Amount: $135,834

Project Timetable: July 15, 1995 - July 14, 1997

Project Location: Oswego County, at the midpoint of eastern Lake Ontario shoreline between Syracuse and Watertown, New York, west of the village of Sandy Creek

Great Lakes System: Coastal shore (site is a sand spit barrier beach separating Sandy Pond from Lake Ontario).

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Site is an important element of the Easter Lake Ontario Megasite identified by The Nature Conservancy. Significant occurrence of globally rare Great Lakes dunes (G3G4/S1S2) , a health population of state rare sand dune willow (G5/S1, NY Threatened). Site is important to Caspian and Common Terns (G5/S1; G5/S3, NY Threatened, respectively) for feeding, resting, and rearing young. Site is also an exceptional migration corridor for shorebirds, water birds, and land birds.

Stressors Impairing System: Heavy public visitation (recreation) with commensurate dune erosion and disturbance of native vegetation, birds and wildlife (habitat destruction).

Partners: New York State Department of Environmental Conservation, Oswego County Soil and Water District, New York Sea Grant, USDA Natural Resources Conservation Service, Ontario Dunes Coalition. Coordination of planning, posting, and on-site management of site with the New York State Department of Environmental Conservation; public support of the project by town officials; active cooperation by Oswego County on coordinated management of their parcel within the site; intensive volunteer assistance (over 950 hours of service) by the Friends of Sandy Pond; individual donations of a boat/motor, moorage, storage, maintenance; assistance from the Oswego County Water and Soil District and Natural Resources Conservation Service in planning and implementation of restoration activities.

#86 - Restoration of Great Lakes Coastal Habitats

(FY1995 - GL985180-01-0)

The Nature Conservancy
2840 East Grand River Avenue, #5
East Lansing, MI 48823
517-332-1741; 517-332-8382

Project Narrative:

This project protected and maintained ecologically significant open dune, interdunal wetlands, alvar grassland communities, and the threatened and endangered plants and animals that reside in four Michigan nature preserves. The project accomplished the protection goals by reclaiming habitat from non-indigenous plant species, determining distributions of key elements in relations to alien plant species distributions, developing and field-testing new biological management techniques, and establishing local volunteer preserve committees.

Workdays/ volunteer days were held, which helped significantly in the management and cleanup of invasive

species using the most efficient techniques known. One technique used was the removal and burning of the invasive plants. This allowed for better growth of native species. The most aggressive species were mapped and inventoried, and different control techniques were tested. This led to an understanding of the most efficient restoration techniques. A management plan for Point Betsie Preserve was also developed.

Partnerships to allow for more efficient and productive environmental improvement were created. The number of efficient work days and field trips was increased and public outreach was enhanced. Interns were provided the opportunity for a learning experience. This project reached out to all parts of the community, including youth groups, schools, families, colleges, universities, civic groups, local groups, neighbors, regional conservancies, and volunteer groups. Fliers were distributed to advertise, informative signs were placed in the different areas, and the media was kept informed.

Project Results:

Environmental Science and Management

Acres Involved: 2,230 (Dudley Bay- 750; Grass Bay- 500; Point Betsie- 80; Maxton Plains- 900)

- *Inventory, assessment, classification*

Mapping and inventories most aggressive species.

- *Planning, coordination, information sharing, technology transfer*

Management plan for Point Betsie Preserve was created.

- *Ecological restoration*

Cleaned up, burned, and removed invasive species.

Public Stewardship

- *Outreach, information exchange*

Held field trips, and reached out to all parts of the community; fliers, informative signs, other media.

- *Partnership building*

Partnerships were created.

- *Protection and restoration volunteers*

Volunteer workdays were held.

Economic Impact

- *Direct*

2 full-four month internships

$6,013–Leveraged

Project Statistics:

Award Amount: FY1995 - $40,000

Project Timetable: October 1, 1995 - September 30, 1997

Project Location: Dudley Bay, along the Lake Huron shoreline; Maxton Plains, on Drummond Island; Point Betsie, near Frankfort, Michigan; Grass Bay, near Cheboygan, Michigan

Great Lakes System: Coastal shore, inland terrestrial, inland wetland

Culturally, Economically, and/or Biologically significant plants, animals, and habitats:

Open dunes, interdunal wetlands, alvar grassland communities, northern fens, Dwarf lake iris, Pitcher's thistle, Houghton's goldenrod, Hill's thistle, the tawny crescentspot butterfly, the Lake Huron locust, fascicled broomrape, and the Lake Huron tansy.

Stressors Impairing System: Exotic species

Partners: Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, Sleeping Bear National Lakeshore, citizens

#87 - Restoration of Habitat for the Endangered Karner Blue Butterfly in the Illinois Beach State Park (FY 1995 - DW 14947739-01-0)

Interagency Agreement with the U.S. Fish and Wildlife Service
Chicago Field Office
1000 Hart Road, Suite 180
Barrington, IL 60010
847-381-2253
and the Illinois Department of Natural Resources
110 James Road
Spring Grove, IL 60081
815-675-2385

Project Narrative:

Lupine (Lupinus perennis) is the obligate host plant for the Federally threatened Karner blue butterfly (Lycaeides melissa samuelis). The Illinois Beach State Park and its similar surrounding area provides habitat for the Lupine, and is a potential recovery unit for the butterfly, extirpated from the area a number of years ago. The goal of this project was to design and restore a native wild lupine population, as a critical step in restoring the endangered Karner Blue Butterfly. The five objectives were: 1)assess the condition of habitat; 2) manage sites to improve the quality of oak savanna to enhance lupine populations; 3) identify ecological restoration needs for lupine populations; 4) managements plans to enhance lupine populations in a macrosite context were developed; and 5) suitable habitats and lupine stands for Karner Blues were monitored.

The project identified the need for lupine enhancement. It improved the quality of the savanna. Invasive plant species were removed. Lupine populations were enhanced by restoring them in area between the Illinois State Park and Wisconsin, where a 2.2 km void in lupine population existed. This lupine enhancement was designed to promote the maximum habitat potential for meta-population persistence of the Karner blue butterfly.

It was hoped that after making this first critical step of mapping, evaluating, and restoring, the lupine populations would be at a level sufficient for Illinois Beach State Park to be given priority by the Illinois Department of Natural Resources for reintroduction of the Karner blue butterfly. As of yet, that priority has not been realized. The butterfly is not expected to be reintroduced to the area anytime soon. The possibility that Karner blues will return on their own, despite the fact that they were thought to have been extirpated years ago, is still a possibility.

Project Results:

Environmental Science and Management
- *Inventory, assessment, classification*
Lupine populations mapped and evaluated.
- *Ecological restoration*
Lupine populations re-established.
Invasive plants removed from 470 acres.
Economic Impact
- *Direct*
$13,580–Contractual
$900–Personnel

Project Statistics:

Award Amount: FY1995 - $18,000
Project Timetable: September 15, 1995 - August 31, 1999
Project Location: Illinois Beach State Park, Zion, Illinois
Great Lakes System: Coastal shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: dunes, lupines, and the potential recovery unit for Karner blue butterfly habitat
Stressors Impairing System: Habitat destruction, exotic species, fire suppression (lupine decline)
Partners: U.S. Fish and Wildlife Service, IL Dept. of Natural Resources and Lake County Forest Preserve District

#88 - Restoration of Michigan Lakeplain Natural Communities
(FY1992, FY1993 - X995944-01)

Michigan Natural Features Inventory
Mason Building, 5th Floor
Box 30444
Lansing, MI 48909-7944
517-373-1552, Fax 517-373-9566

Project Narrative:

The goals of this project were to restore natural hydrologic conditions and to remove brush mechanically or through the reintroduction of fire in the remnant coastal wetland and lakeplain vegetative communities of Allegan State Game Area (SW Michigan), Fish Point Wildlife Area (Saginaw Bay), Algonac State Park (St. Clair River), and Pointe Mouillee State Game Area (Monroe County). The project also monitored the sites and conducted surveys.

Prescribed burns, shrub removal, tree girdling, and hydrologic manipulation helped to restore the hydrological regime. A monitoring regime for a federally threatened plant species was established. The hydrology of the lake plain was monitored at four different sites. A report, "Algonac Prairie: Species Response to Local Hydrology and Prescribed Burns" was completed. Floristic and faunal surveys along well transects were conducted. Baseline data on insect community composition for lakeplain prairies was collected. A report, "Sampling and Management of Lakeplain Prairies in Southern Lower Michigan", which summarizes the results of the surveys, the monitoring activities, and the insect community composition, was completed. This information will aid in future endeavors that attempt to understand the Great Lakes natural lakeplain. For instance, inventories have discovered several prairie insect species previously known only from the Great Plains. In Michigan, they appear to be restricted to lakeplain prairie remnants and therefore, new elements must be taken into consideration when considering future management plans.

Project Results:

Environmental Science and Management

Acres Involved: 730 (including all of the control areas for monitoring. acres actually involved in restoration was about 175 acres)

- *Inventory, assessment, classification*

Surveyed transects for flora and fauna.
Developed baseline data for insect community composition.

- *Scientific study*

Produced the report "Sampling and Management of Lakeplain Prairies in Southern Lower Michigan"
Produced the report "Algonac Prairie: Species Response to Local Hydrology and Prescribed Burns"

- *Ecological restoration*

Prescribed burns, shrub removal, tree girdling, hydraulic manipulation to restore the Hydro- regime.

- *Monitoring, indicators*

Established a monitoring regime for federally threatened plants; monitored the hydrology of the lakeplain at four different sites.

Economic Impact

- *Direct*

$7,000–Contractual
1 half-time position for 2 years
$4,181–Leveraged

Project Statistics:

Award Amount: $32,399
Project Timetable: May 15, 1993 - April 30, 1996
Project Location: Fish Point Wildlife Area, Algonac State Park, Allegan State Game Area, Point Mouillee State Game Area, Michigan
Great Lakes System: Lakeplain, coastal wetland

Culturally, Economically, and/or Biologically significant plants, animals, and habitats:
Lake plain prairies including the following endangered, threatened, and species of special concern: eastern prairie white-fringed orchid *(Platanthera leucophaea)*, king rail *(Rallus elegans)*, Skinner's gerardia *(Agalinis skinneriana)*, Gattinger's gerardia *(Agalinis gattengeri)*, three-awned grass *(Aristida longispica)*, tall green milkweed *(Asclepias hirtella)*, Sullivant's milkweed *(Asclepias sullivantii)*, prairie Indian plantain *(Cacalia plantaginea)*, white lady slipper *(Cypripedium candidum)*, short-fruited rush *(Juncus brachycarpus)*, seedbox *(Ludwigia alternifolia)*, arrowhead *(Sagittaria montevidensis)*, eastern fox snake *(Elaphe vulpina gloydi)*, and tall nut rush *(Scleria triglomerata)*.
Coastal plain marsh including the following threatened and special concern species: three-ribbed spike rush *(Elocharis trichostata)*, short-fruited rush *(Juncus brachycarpus)*, scirpus-like rush *(Juncus scirpoides)*, Vasey's rush *(Juncus vaseyi)*, tall nut-rush *(Scleria triglomerata)*, Atlantic blue-eyed grass *(Sisyrinchium atlanticum)*, two-flowered rush *(Juncus biflorus)*, cross-leaved milkwort *(Polygala cruciata)*, whorled mountain mint *(Pycnanthemum verticillatum)*, and tooth cup *(Rotala ramosior)*.
Stressors Impairing System: Shoreline development, agriculture, silviculture, sand mining, control of natural fire (fire suppression), water level fluctuation (hydrological cycles)
Partners: Michigan Department of Natural Resources

#89 - Restoring Biodiversity to Midwest Oak Savannas in Ohio
(FY1997, '98 - GL985592-01-0)
Metropolitan Park District of the Toledo Area
5100 West Central Avenue
Toledo, OH 43615
419-535-3050
mparks@glasscity.net
www.metroparkstoledo.com

Project Narrative:
Oak savanna and barren communities, and their associated species, rely on regular fires to recycle nutrients and reduce competition from woody species. Fire suppression and exotic invasive species, as well as exotic species and other stressors, have contributed to an almost complete loss of the savannas and barrens of the Oak Openings, with the exception of a few places, such as the 4000-acre Oak Openings Preserve Metropark in Ohio. Even in this place, however, loss of biodiversity is alarming. Animals and plants have been and are disappearing from the area, as did the Karner Blue butterfly in 1989. Programs and efforts have started, such as the prescribed burn program, but overarching canopies still threaten to shade out the sun-dependant life of the savannas and barrens.

This two year project accelerated the pace of recovery in selected areas within Toledo Metropark and restore the integrity of the ecosystem. The project was two pronged. The first was the physical restoration of the area. In the second part of the project, the habitats and the animals and plants in the region were studied to gain a greater understanding of the needs of the ecosystems, and to design restoration management plans.

Physical recovery has taken place in the Metroparks through the use of methods such as stump treating, restoring plants, seeding, creation of wildlife corridors, and creation of baseline community plots, as well as prescribed burns and selective cutting for exotic species control. The canopy has been reduced, thus promoting the original oak savanna and prairie ecosystems. A coalition was formed between The Nature Conservancy, the Conservation Association of Northwest Ohio, and the Toledo Metropark District to restore habitat and create corridors between the Metroparks and the surrounding areas in order to increase important savanna and prairie ecosystems. In addition to working together, the partners have begun an initiative called the "Oak Openings Region Greenspace Initiative," which is trying to add an additional 6,000 acres of greenspace and important habitat for preservation to the Metropark system and the region.

Among the endangered and extirpated species, the Karner blue butterfly is important because of the possibility to reintroduce the species to this area. Several state listed endangered or threatened species, such as the prairie Fern-Leaved False Foxglove, and rare species, such as the Antennal-waving wasp, are growing in numbers, reappearing in places previously extirpated. As a result of restoration, another accomplishment is the development GIS maps to delineate habitat. With the compilation of data, and through techniques such as monitoring,, this project has helped develop a greater understanding of the needs and necessary next steps in restoring this area. In addition, 18

different land restoration projects within the preserves are underway, if not already completed. 140 acres of land has already been restored, with an additional 110 acres still being worked on. An article entitled, "Restoring Historic Plant Communities in the Oak Openings Region of Northwest Ohio", was published in the vol. 19, number 3 issue of *Ecological Restoration* in 2001. This gives ecological practitioners information about and an analysis of the area.

There was a large educational effort included in this project. Teacher training programs were held, including ones that were open to the public, such as the plant monitoring training program. Teacher kits were made available, and public education classes were held (about 10 programs on a quarterly bases). Plans for a walking center in the park were begun. The "Beuhner Walking Center" is planned to open in June 2002. A large volunteer effort made the work progress faster. Workdays were held with involvement of local schools, groups, businesses, and through individual citizen involvement. Volunteers helped with work such as gathering seeds or shrub canopy reduction.

Project Results:

Environmental Science and Management

- *Inventory, assessment, classification*

GIS maps developed.

- *Planning, coordination, information sharing, technology transfer*

Coalition formed to create habitat corridors between the preserves.

Produced the report for the journal *Ecological Restoration*: "Restoring Historic Plant Communities in the Oak openings Region of Northeast Ohio."

- *Ecological restoration*

18 restoration projects in the Toledo Metroparks begun; 140 acres have been restored and 110 acres are in the process of being restored.

Public Stewardship

- *Education*

Plans for an Oak Openings interpretative center developed.

- *Protection and restoration volunteers*

Volunteers helped with oak savanna restoration.

Economic Impact

- *Direct*

5 full time positions

4-5 seasonal positions

$104,866–Leveraged

Funds from the Toledo Metroparks will keep the project and the restoration endeavors underway. Money from different places are being elicited to give even more momentum to the project. In addition, an eco-tourism component is being explored with Lake Erie regional emphasis assistance.

Project Statistics:

Award Amount: $166,600

Project Timetable: October 1, 1997 - September 30, 2000

Project Location: Oak Openings Preserve Metropark - Toledo, Ohio

Great Lakes System: Lakeplain, Inland Terrestrial

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: The last few remaining natural savannas and barrens in the Oak Openings. The flora and fauna associated with this natural habitat includes the federally endangered Karner Blue Butterfly, many state listed endangered and threatened species including, but not limited to the Antennal-Waving Wasp and the Fern-Leaved False Foxglove.

Stressors Impairing System: Fire suppression, poor management practices (plowing, pasture operations), exotic invasive species, and fragmentation

Partners: Bowling Green University - Environmental Studies Program, The Nature Conservancy, Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Toledo Zoo, Key Bank, Boy Scouts, Girl Scouts, Local schools within the region, and local citizens

#90 - Saginaw Bay Watershed Wetland Restoration Project

(FY1993 - GL995429-01-0)

Lapeer County Soil and Water Conservation District
1739 North Saginaw Street
Lapeer, MI 48446
810-664-3941; Fax 810-664-8254

Project Narrative:

The Lapeer County Soil &Water Conservation District restored and enhanced wetland resources in the Saginaw Bay Watershed area. District technicians in twenty-two counties were trained in restoration techniques. The project involved working with private landowners to restore wetlands through drainage ditch filling and/or breaking the tile lines in farm fields. 25 different wetland projects in the watershed were completed with the help of local landowners. This project produced a heightened awareness among local landowners of benefits of wetlands for wildlife habitat and clean water. Five contractors, three technicians, and one Conservation District personnel were trained in wetland restoration techniques. Seven presentations were made, and two different tours were given.

Project Results:

Environmental Science and Management
- *Ecological restoration*
Finished 25 different wetland projects spanning 58 acres.

Public Stewardship
- *Outreach, information exchange*
7 presentations, 2 tours.
- *Partnership building*
Landowner partner development.
- *Education*
Trained 5 contractors, 3 technicians, and 1 district conservationist in restoration techniques.

Economic Impact
- *Direct*
$18,000–Contractual
$2,900–Leveraged
- *Indirect*
Increased interest and requests from landowners to restoration, thus increasing the number of contract dollars.

Project Statistics:

Award Amount: $20,000
Project Timetable: October 1, 1993 - September 30, 1995
Project Location: Saginaw Bay Watershed, Michigan
Great Lakes System: Inland wetland
Stressors Impairing System: Agriculture, habitat destruction
Partners: U.S. Fish and Wildlife Service, Natural Resource Conservation Service, Dow Chemical, General Motors, Farm Service Agency, Michigan Department of Natural Resources, Michigan Department of Agriculture, County Drain Commissions, Wildfowl USA, Pheasants Forever, Michigan United Conservation Clubs, and private landowners.

#91 - Sand Mine Ecological Restoration - Grand Mere State Park
(FY1997 - GL985669-01)

Michigan Department of Natural Resources
Parks and Recreation Division
P.O. Box 30257
Lansing, MI 48909
(517) 335-4823; Fax 517-373-4625

Project Narrative:

A property adjacent to Grand Mere State Park has been sand mined. Under terms of litigation, TechniSand, the mining company, is required to rehabilitate the land and turn it over to the State of Michigan to become part of Grand Mere State Park. The degree of rehabilitation required, however, was not at a level that approached the very high quality habitats found in the Park. This project demonstrated the feasibility of restoring sand mined land to a natural condition that supports high quality native plant communities. The methods of the project included shaping the mined land and restoring native plants. This project demonstrated that both technical and cost effective restoration methods can provide the basis for strengthening both restoration practices and state law.

The mining, at the time of this project's completion date, had not been completed, so the outcome of a completed restoration cannot be fully assessed. This project created a Sand Mine Restoration Plan, followed by a revised Progressive Cell Unit Mining and Reclamation Plan. Contouring of most slopes have been completed. Over 30 pounds of seeds have been collected by volunteers, and many more collected by the contractors. Seeds have been planted, and the re-vegetation demonstration has begun. Monitoring and evaluation of these proceedings are ongoing, and will continue well after the project ends. Contacts were established for native plant propagation. This project is ongoing, and will persist at least until mining and re-vegetation is complete.

The project involved local residents and school-aged children. Volunteer seed collection days were organized. 172 volunteers contributed 266 hours of time collecting seeds, and 150 children every year participated in field trips to the mine site to learn about sand mining and ecological restoration.

Project Results:

Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Sand Mine Restoration Plan completed.
- *Ecological restoration*
40 acres restored
Slopes contoured and planted with native seeds.

Public Stewardship
- *Education*
150 children every year participated in field trips to the mine site
- *Protection and restoration volunteers*
172 volunteers contributed 266 hours of time collecting seeds.

Economic Impacts
-*Direct*
$125,808–Contractual
$7,791–Personnel
$102,862–Leveraged (60,000 from a contributor)
- *Indirect*
The increase of attractiveness of the state park has potential to increase tourism.

Project Statistics:

Award Amount: $94,959
Project Timetable: October 1, 1997 - September 30, 2000
Project Location: Berrien County, MI
Great Lakes System: Coastal Shore

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Beach/Shore dunes, Wet-panne communities
Stressors Impairing System: Mining, development (second homes and recreational facilities)
Partners: Michigan Natural Features Inventory, State Park Stewardship Program, TechniSand, Michigan Department of Environmental Quality

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#92 - Significant Areas of Biological Diversity in the Great Lakes Basin (See "Great Lakes Conservation Planning and Implementation" description of the cluster grant to The Nature Conservancy for more information.)
(FY1992 - X995819-01-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:

The purpose of this project was to design and produce computerized maps of conservation sites for biological diversity. Data from the basin's state and provincial Natural Heritage Data Centers were evaluated to identify concentrations of imperiled species and the best occurrences of wetland and coastal natural communities. This resulted in a list of more than 100 sites. These sites were further evaluated for their relative biodiversity significance, ecoregional representation, conservation opportunity, and level of biodiversity protection already in place. From this process, 66 sites requiring additional protection were identified. These 66 sites provide some of the best opportunities to protect biological features in the basin and to monitor its ecological health.

Biologists from the state and provincial Natural Heritage Data Centers and The Nature Conservancy offices compiled detailed information on these sites and drafted ecological boundaries. These boundaries delineate the "core" area which contains the biodiversity features to be conserved, and a larger "ecosystem" area that generally outlines the geographic scope of ecological processes directly supporting those features. In addition to the map, a Site Profile was prepared for each site, which was a companion to the map. While these sites are not an exhaustive list of important biodiversity areas in the basin, they were not compiled to be a list of the most important candidates for natural areas, and do not constitute a list of the highest priority places to protect biodiversity. They do, however, collectively contain a disproportionate amount of the basin's biological wealth as measured by element occurrences.

Computerized maps of conservation sites for biological diversity were produced and designed. These maps also contain a site profile, which provides a general description of the site, a discussion of how the boundaries were established, a summary of the site's biodiversity significance, a description of the current protection afforded to the area, and other information such as potential offsite influences, water quality monitoring, and other values of the site. Copies of all the maps and data collected were made available to the sate and provincial Natural Heritage Data Centers, which all have established policies and procedures that provide for data security, and experience with providing users with assistance in interpreting and applying the information presented. Individuals and organizations planning or conducting conservation or development activities within the identified sites are encouraged to contact the appropriate state and provincial Natural Heritage Data Center for further information.

Project Results:

Environmental Science and Management
- *Inventory, assessment, classification*
Acres Involved: 0.6% of the total land area of the Great Lakes Basin.
Produced computerized maps with site information (biodiversity, boundaries, and other values of site).
- *Planning, coordination, information sharing, technology transfer*
Shared info with National Heritage Data Centers, and managers and planners encouraged to contact these centers.
Economic Impact
- *Direct*
$15,000–Contractual
$36,000–Personnel
$3,400–Leveraged

Project Statistics:
Award Amount: $68,000
Project Timetable: October 1, 1992 - December 31, 1994
Project Location: Chicago, Illinois (program office)
Great Lakes System: All systems except open lake
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: From the 15,286 documented occurrences of the 1,713 known species of concern and natural community types, the areas documented in this report capture 21% of all these occurrences within their core areas.
Stressors Impairing System: Virtually all known stressors
Future Project Ideas/extensions: Fill geographic gaps in this inventory, particularly in the northern portions of the Basin. Research to get a better understanding of the status and distribution of invertebrates and aquatic communities. There is also a need for additional analysis of the existing data in order to determine locations and protection status for those species and communities that are limited to, or best represented in, the Great Lakes Basin.
Partners: Illinois Natural Heritage Division, Indiana Natural Heritage Data Center, Michigan Natural Features Inventory, Minnesota Natural Heritage and Non-game Research, New York Natural Heritage Program, Ohio Division of Natural Areas & Preserves, Ontario Natural heritage Information Centre, Pennsylvania Natural Diversity Inventory-West, Le Centre de Donnees sur le Patrimoine Maturel do Quebec, Wisconsin Natural Heritage Program, TAMS Consulting, and a number of individuals helped in preparing initial draft maps and site descriptions. State Natural Heritage Programs, Nature Conservancy of Canada

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#93 - Southern Lake Michigan Conservation Initiative (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
2400 New York Avenue, Rm. 411
Calumet College of St. Joseph
Whiting, IN 46394
219-473-4312

Project Narrative:
The objective of this grant was to develop a volunteer network based on the Conservancy's example in Northeast Illinois. The program was designed to direct volunteer stewardship to critical sites, to build strong partnerships among conservation organizations, and to implement specific on-the-ground conservation activities. Through this project, shared protection and restoration objectives could be cultivated among environmental groups, government agencies and private corporations active in the region. In addition, a public education and outreach program would be developed.

This project managed activities such as oak savanna restoration, canopy thinning, glossy buckthorn removal, phragmites control, purple loosestrife control, sweet clover control, and prescribed burning at Ivanhoe Dune and Swale, Gibson Woods, Tolleston Ridges, Clark and Pine East, and DuPont Dune and Swale. Volunteers assisted in the restoration.

Public businesses, such as Northern Indiana Public Service Company and DuPont Industries, and private organizations, cooperated together to manage and restore the preserves. The Nature Conservancy and it's partners were able to generate increased support for biodiversity protection and management, including two waterfowl Conservation Act grants, and additional Chicago Wilderness grants.

One of the primary focuses of this project was to establish a volunteer network that would be dynamic and self sustaining. Two teams of fourteen volunteers were able to contribute approximately 3 years of full-time equivalent labor towards the management of these sites. A permanent network of volunteers was not established, in part because the model for success that was used came from a region that was different demographically and socioeconomically. Still, a small volunteer network that has potential to grow and develop was constructed. A series of six newsletters were published to keep everyone informed about what was going on during the project period.

Project Results:

Environmental Science and Management

Acres Impacted: 1,800 (not including Indiana Dunes National Lakeshore or State Park)

- *Ecological restoration*

Oak savanna restoration, canopy thinning, invasive plant removal, and prescribed burning.

Public Stewardship

- *Outreach, information exchange*

6 newsletters sent to public.

- *Partnership building*

Grassroots and pubic agency ties were developed.

- *Protection and restoration volunteers*

2 groups of 14 people helped with restoration.

Economic Impact

- *Direct*

2 full time positions

Employed a local printer for newsletter job.

$5,775–Leveraged

Project Statistics:

Award Amount: $115,500

Project Timetable: January 10, 1993 - December 31, 1997

Project Location: Northwest Indiana

Great Lakes System: Coastal shore, lakeplain, inland wetland, inland terrestrial

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Beach and dune communities, oak savanna, Karner blue butterfly

Stressors Impairing System: Development, toxic pollution, exotic species, solid waste disposal, fire suppression

Partners: Indiana Dunes National Lakeshore, Indiana Dunes State Park, Friends of Gibson Woods, Indiana Department of Natural Resources, Lake County Parks, Grand Calumet Task Force, Indiana Department of Environmental Management, Amoco Corporation, DuPont Corporation, Save the Dunes Council, Northern Indiana Public Service Company, National Biological Service

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#94 - St. Clair River Lakeplain Prairie and Oak Savanna Ecosystem Restoration Monitoring (FY1997 - GL985694-01-0)

Michigan Department of Natural Resources
P.O. Box 30028
Lansing, MI 48909

Project Narrative:

Only 0.6% of Michigan's original lakeplain prairie and oak savanna communities remain. These communities are considered globally imperiled, with lakeplain wet-mesic prairie being critically imperiled. This project supported activities: 1) restoration activities, including invasive species removal, and prescribed burning; 2) inventory and monitoring of plant and insect communities; and, 3) disseminating information to the public and training volunteers for stewardship activities.

A report, "Vegetation Monitoring Plan for Three Natural Community Types in the St. Clair Flats Region," was produced. Plant and insect populations were inventoried. This baseline data supported an information base that is used to understand the future changes in the ecosystem when monitoring them in years to come.

Project Results:

Environmental Science and Management

Acres Involved: 3,120

- *Inventory, assessment, classification*

Report: "Vegetation Monitoring Plan for Three Natural Community Types in the St. Clair Flats Region."

Plant and insect populations were inventoried.
Economic Impacts
- *Direct*
$35,000–Contracts
$6,657–Personnel
$15,168–Leveraged

Project Statistics:
Award Amount: $51,242
Project Timetable: October 1, 1997 - May 31, 1999
Project Location: The St. Clair Delta Region: including Algonac Stat Park, St. John's Marsh, Harsens Island, and Dickinson Island in southeastern lower Michigan (most of work done in Algonac State Park)
Great Lakes System: Lakeplain
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: the lakeplain prairie, 19 state endangered species of plants and animals, and 8 plants and animals of special concern, one of which being the Federally threatened Eastern prairie fringed orchid.
Stressors Impairing the System: Invasive species, encroachment

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#95 - St. Louis River Wild Rice Restoration
(FY1993 - GL995480-01; FY1994 - GL995651-01, -02)
Fond du Lac Reservation Business Committee
1720 Big Lake Road
Cloquet, MN 55720
218-879-1759, Fax 218-879-4854

Project Narrative:
The goal of the project was to restore and manage the wild rice stands on Wild Rice Lake/Reservoir, Rice Portage Lake, and the St. Louis River to the abundance in which it was once found. This project was part of the *Wild Rice Restoration Plan for the St. Louis River Watershed*. Many reasons could have led to the decline of the rice, so research was done, and this project concentrated on a subset of these possible problems, including: planting rice seeds, measuring and comparing nutrient levels, water, and productivity, and studying the effects that outside elements like geese and fish have on the rice stands. Inventories were also done, such as that of herbicides used in the St. Louis River Watershed in order to determine threats.

Nearly 1,500 lbs of wild rice was planted in the lower St. Louis River in 1994 and 1995, and planting continued in years after that as well. Unfortunately, harvest success was not as good as expected, and after restoration, many of the rice stands actually declined in growth. The exact reason for this is still not completely known, but this project helped to identify possible causes. In addition, remaining localized seed sources were protected, fish enclosures were placed in key areas, and wetland conditions for migratory waterfowl were improved. This project helped to identify the places were wild rice would be successful, such as on the Fond du Lac Bay, where plantings continue. Carp and goose effects on the growth and survival of rice plants were studied, and an inventory of the herbicides used in the St. Louis River Watershed was compiled. Other information on environmental factors were studied and recorded for future researchers such as: mercury levels, water levels, nutrient levels (including ammonia-nitrogen, ortho-phosphate, and potassium), water levels compared to wild rice growth, and information on overall water quality. Restoring wild rice stands in Fond du Lac Bay could eventually lead to positive economic growth. Another economic benefit of this wild rice restoration project will be to migratory waterfowl, which feed on the wild rice; however, this additional economic value is difficult to quantify.

Project Results:
Environmental Science and Management
- *Inventory, assessment, classification*
Identified places where wild rice would be, and might be successful.
Assessed mercury, water, and nutrient levels and other factors impacting wild rice growth.

- *Scientific study*
Wild rice planting was tested for growth success which identified possible causes, and eliminated other perceived causes.
Studied environmental factors associated with growth success and failure.
- *Ecological restoration*
Attempted to plant, grow, and harvest, and restore wild rice production in identified areas.
Economic Impact
- *Direct*
$2,559–Contractual
$23,500–Personnel
$14,000–Leveraged ('93: $9K; '94: $5K)

Project Statistics:
Award Amount: $89,000 ('93: $49K; '94: $40K)
Project Timetable: October 1, 1994 - December 31, 1995
Project Location: Fond du Lac Reservation, St. Louis River, Minnesota
Great Lakes System: Tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Wild Rice Habitat
Stressors Impairing System: Habitat destruction, including but not limited to: anthropomorphic causes, poor water quality, nutrient availability, sedimentation, herbicides, animal herbivory (damage by carp), and water level fluctuations
Future Project Ideas/Extensions: Continue the work started here to eventually be able to determine what the major factors causing the decline of wild rice stands and/or preventing restoration.
Partners: Minnesota Chippewa Laboratory, Natural Resources Research Institute, Leech Lake Natural Resources Program, 1854 Authority, Fond du Lac Ceded Territory Wildlife Program, Minnesota Power, Minnesota Department of Natural Resources

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#96 - Strategic Overview of Biodiversity Conservation (See "Great Lakes Conservation Planning and Implementation" description of the cluster grant to The Nature Conservancy for more information.)
(FY1992 - X995819-01)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:
The report, *Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities*, is a strategic framework for biodiversity conservation in the basin. The health of the key biodiversity resources identified in this report gave tangible meaning to concepts such as "ecological health" and "biological integrity." Through the kind of protection initiatives identified, concrete steps now are now being taken toward ensuring the health of the ecosystem.

The report identified 131 elements and communities of global significance in the basin. Of the 131, nearly half (47%) occur exclusively or predominantly within the basin, or have their best examples here. Of the critically imperiled elements, fully 77% belong to this category. The global existence of these communities and species depends upon their survival in the Great Lakes basin. They define the unique biological character of the Great Lakes ecosystem and underscore the importance of preserving its biological diversity.

The report recommended four types of strategic activities to protect biological diversity in the basin: 1) Developing strategically coordinated, locally-based projects that collectively address the most significant systems and stresses; 2) Improving the basic and applied science necessary for biodiversity conservation; 3) Increasing awareness of the basin's biological diversity and of methods to conserve that diversity; 4) Increasing the support of regional institutions, both governmental and private, for the protection of biological diversity.

Project Results:

Environmental Science & Management

- Planning, coordination, information sharing, technology transfer

Report: "Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities".

- Inventory, assessment, classification

Identified 131 globally significant elements and communities.

- Scientific study

The report is a tool for biodiversity conservation (intended as a strategic framework).

Public Stewardship

- Outreach, information exchange

This report was shared with the public.

Economic Impact

- Direct

$120,200–Personnel

$8,337–Leveraged

Project Statistics:

Award Amount: $150,000

Project Timetable: October 1, 1992 - December 31, 1994

Project Location: Chicago, Illinois (program office)

Great Lakes System: All systems

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: 131 communities and species

Stressors Impairing System: All known stressors

Partners: Joyce Foundation, State Natural Heritage Programs, Nature Conservancy of Canada

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#97 - Strategic Plan for Maintenance and Restoration of Biodiversity on the Pigeon River Ecosystem

(FY1995 - GL985125-01-1)

Indiana Department of Natural Resources, Division of Nature Preserves
402 West Washington Street, Room W267
Indianapolis, IN 46204
317-232-4052; Fax 317-233-0133
www.state.in.us/dnr/naturepr

Project Narrative:

The purpose of the project was to develop a strategic plan for the restoration and maintenance of the exceptionally rich biodiversity of the Pigeon River watershed, identified as one of the three significant areas in Indiana in the Nature Conservancy's 1994 report on biodiversity of the Great Lakes basin.

A plan for the Pigeon River entitled, "Opportunities for Conservation in the Greater Pigeon River Ecosystem,"was developed. This plan included a threats analysis, an inventory of the flora and fauna, the hydrology, and the current and historical conditions, conservation strategies, and protection recommendations. This is resulting in accelerated and more effective public and private restoration and protection activities.

Project Results:

Environmental Science and Management

- Inventory, assessment, classification

Flora and fauna, hydrology, and current and historical conditions inventoried.

Threats analysis conducted.

- Planning, coordination, information sharing, technology transfer

Report: "Opportunities for Conservation in the Greater Pigeon River Ecosystem."

Economic Impact

- *Direct*
$71,888–Leveraged

Project Statistics:
Award Amount: $71,390
Project Timetable: November 1, 1995 - October 30, 1998
Project Location: Lake Michigan basin, tributary to the St. Joseph River, Lagrange County, Indiana
Great Lakes System: Inland wetland, inland terrestrial , tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Alkaline fens, oak savanna, Karner blue and Mitchell's sater butterflies (butterflies possibly extirpated) and other state imperiled and federal candidate species.
Stressors Impairing System: Lack of information and coordination, fire suppression, exotic species
Partners: Indiana Department of Natural Resources, U.S. Fish and Wildlife Service, The Nature Conservancy

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#98 - Targeting System for Aquatic Biodiversity Conservation (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02-0)
The Nature Conservancy
8 South Michigan, Suite 2301
Chicago, IL 60603
312-759-8017, Fax 312-759-8409

Project Narrative:
The purpose of this project was to develop a classification and inventory framework for freshwater aquatic biological communities in order to guide the identification and conservation of aquatic biodiversity in the Great Lakes basin ecosystem. Before this project, the State Heritage programs did not have a methodology for including freshwater aquatic systems as a standard component of their conservation inventory and analysis. Extending the capacity of the existing Heritage methodology to include aquatic communities was an efficient way to develop an integrated targeting system for conservation of aquatic biodiversity. The objectives were: to assemble information on existing classification and inventory; to develop the community classification framework within the context of a national classification, emphasizing the Great Lakes littoral zone, rivers, streams and inland lakes; to apply the classification model in at least one state as a basis for inventory to identify high quality occurrences of aquatic communities; to develop a standardized conservation ranking system and preliminary ranks for aquatic communities to guide identification and conservation planning for high-priority freshwater communities; to preliminarily identify unprotected areas of outstanding aquatic biodiversity in the Great Lakes basin; and to develop standardized tools for management, analysis and application of aquatic community data to support conservation planning.

A classification framework for aquatic communities, rooted in the existing Heritage methodology, was developed and applied to the lower peninsula of Michigan. This classification framework is acting as a guide for aquatic conservation, from preliminary identification, to inventory and data sampling and conservation planning. This framework standardized the classification system.

Project Results:
Environmental Science and Management
- *Inventory, assessment, classification*
Assessed present aquatic classification methods.
- *Scientific study*
Developed and standardized the classification framework for aquatic communities (tools for universal methodology for all aquatic communities).
Economic Impact
- *Direct*
1 full time position
$8,150–Leveraged

Project Statistics:
Award Amount: $163,000
Project Timetable: January 10, 1993 - December 31, 1997
Project Location: Chicago, Illinois (program office)
Great Lakes System: All Systems (aquatic)
Partners: State Natural Heritage Programs, U.S. Geological Service and Biological Resource Division, USDA Forest Service, U.S. Fish and Wildlife Service, GAP, Missouri Dept. of Conservation, Michigan Rivers Inventory, California Department of Fish and Game, Illinois Natural History Survey, university researchers

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#99 - Upper Midwest GAP Analysis Project
(FY1993 - DW14947667-01-0)
National Biological Service Environmental Management Technology Center
575 Lester Avenue
Onalaska, WI 54650-8552

Project Narrative:
The Gap Analysis Program (GAP) was a cooperative effort to map natural land cover, vertebrate species, and the lands that are managed in ways that maintain biological diversity. The purpose of Gap Analysis was to identify the "gaps" in our network of conservation lands regarding land cover habitat types, as well as individual vertebrate species, and to build partnerships around the development and application of this information. The Gap project is nationwide, involving every state. The Upper Midwest Gap Analysis Project was an Interagency Agreement that supported GAP research for a tri-state area, including Minnesota, Wisconsin, and Michigan.

During the first year, a considerable amount of time and effort was spent on developing a cooperatively-based project across the three states. Landsat TM satellite imagery and many additional sources of information were used to determine the portion of biological diversity lying inside protected areas.

One important result of this project was an Arc/Info land cover map of the three states using a single land cover classification scheme. (Lake Basins: Superior, Michigan, Huron, and Erie). Other important products were the creation of land-cover, ownership, and species range maps for the entire three state area, which allow for more effective management of the region's natural resources. The satellite imagery can be found in it's processed and classified formats at the Environmental Management Technical Center through the departments of natural resources in each state.

Project Results:
Environmental Science and Management
- *Inventory, assessment, classification*
Filled in gaps in four lake basins, especially land-cover using a single scheme.
Economic Impact
- *Direct*
Dollars Leveraged: NBS = $400,000/yr thru FY98; MI, MN, WI ~$200,000/yr thru FY97
Because GAP joined with USGS, the EPA, and NOAA to purchase the Landsat Thematic Mapper satellite images, the government saved millions of dollars in direct costs as well as an estimated 30 million dollars in combined program costs.

Project Statistics:
Award Amount: FY1993 - $200,000
Project Timetable: October 1, 1993 - October 30, 1999
Project Location: Michigan, Minnesota, Wisconsin
Great Lakes System: All systems
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Many threatened and endangered species and ecosystem types
Stressors Impairing System: Lack of information

Partners: Illinois Department of Natural Resources, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, Michigan State University, The Michigan Nature Conservancy, National Park Service, U.S. Bureau of Land Management, U.S. Environmental Protection Agency, U.S. Forest Service, U.S. Geological Service, Natural Resource Conservation Service, U.S. Fish and Wildlife Service, University of Minnesota, The Minnesota Nature Conservancy, University of Wisconsin, The Wisconsin Nature Conservancy

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#100 - Urban Stream and Wildlife Habitat Restoration

(FY1994 - GL995730-01-0)

Saginaw County Planning Department
400 Court Street
Saginaw, MI 48602
517-797-6800; Fax 989-797-6809

***Project Narrative*:**

The project sought to identify and restore urban streambanks for the purpose of controlling erosion and protecting and maintaining riparian wildlife habitat. The primary objective was to implement strategies that will restore streambanks and wildlife habitat in urbanizing areas to a less-stressed condition. The project provided a basis for guidelines to maintain wildlife and ecosystem values in areas subject to habitat fragmentation; assessed present knowledge about species-area relationships; assisted local decision makers in their efforts to incorporate viable habitat into local government land use planning efforts, open-space acquisition, and developed plan reviews; encouraged local governments in coming together as co-watershed communities to tackle environmental issues that cross their political boundaries; and, promoted understanding, enjoyment, and stewardship of a rich natural heritage.

Local residents were involved in the restoration. A guidebook "Habitat Restoration and Erosion Control" was created for local government officials. The guidebook provides brief summaries of the five projects that were done with different property owners, explanations and tips for native plants and wildlife along with various resource information. Another product was a newsletter called "The Swan: Environmental Reporter for the Swan Creek Watershed." The newsletter was mailed to 5,000 households in the Swan Creek Watershed and the public response was very good. Responses included private property owners calling and asking if their property could be included in evaluations for restoration potential. Planning tasks included: identified and prioritized restoration needs on urban/suburban riparian lands; evaluated the appropriateness of sites; established a plan for the development and implementation of restoration

Project Results:

Environmental Science and Management
Acres Involved: 89,115
- *Ecological restoration*

Constructed, planted, and implemented restoration recommendations.

Public Stewardship
- *Outreach, information exchange*

Guidebook created: "Habitat Restoration and Erosion Control."
Newsletter for public (5,000 mailings): "The Swan: Environmental Reporter for the Swan Creek Watershed."
Identified restoration needs on urban/suburban riparian lands, made plan for restoration.
- *Protection and restoration volunteers*

Involved local people in remediation and restoration recommendation implementation.

Economic Impact
- *Direct*

$15,500–Contractual
Partial funding for 2 positions
$5,023–Leveraged

Project Statistics:

Award Amount: $95,438
Project Timetable: October 1, 1994 - December 31, 1996
Project Location: Swan Creek Watershed, Saginaw, Midland, and Gratiot Counties, Michigan
Great Lakes System: Tributary/ connecting channel
Stressors Impairing the System: Agriculture, Development, Non-point source pollution, Erosion
Partners: Shiawassee National Wildlife Refuge, U.S. Fish and Wildlife Service, Michigan Department of Natural Resources: Wildlife Division, Michigan Natural Features Inventory, Saginaw County Drain Commission, Saginaw County Natural Resource Conservation Service, Saginaw County Cooperative Extension, Wetlands Nursery; Local governments, Pheasants Forever and, private landowners.

#101 - Watershed Level Biodiversity Assessments (See "Great Lakes Ecosystem Protection" description of the cluster grant to The Nature Conservancy for more information.)
(FY1993 - GL995819-02)
Michigan Natural Features Inventory
Mason Building, 5th Floor
Box 30444
Lansing, MI 48909-7944
517-373-1552, Fax 517-373-9566

Project Narrative:

The biodiversity assessment of the Saginaw Bay and Northern Lake Huron/St. Mary's River watersheds provided a quantitative and qualitative look at the status of native biota and natural ecosystems. It sought to add a new tool in the process of understanding biodiversity: a methodology for synthesizing information on land cover change with data on rare species, natural communities, and habitat use to produce a "biodiversity assessment". The project provided an historical overview of ecological changes since European settlement, analyzed the current status of biological diversity from the standpoint of natural community diversity and integrity, and analyzed and summarized the needs, options, and opportunities for conservation of biological diversity within these watersheds.

Overall, a methodology for understanding and assessing biodiversity was created and then demonstrated by using Saginaw Bay Watershed as an example. A list of steps were outlined in order to develop a biodiversity assessment elsewhere. Digital maps of presettlement vegetation, present vegetation, change in vegetation, rare species and natural community occurrences, and others involving the Saginaw Bay Watershed were created. An analysis using GIS technology was given for land cover, land use, and natural community acreage changes were given. Summaries of key introduced species, restorability status for land adjacent to selected areas, current threats, and status, trends, threats, security, restoration potential, habitat, management, and protection needs of species were created. Charts and tables were made to describe the present situation, the past situation, and the comparative situations more clearly.

A poster display with a handout, a slide presentation, and a full color 12 page brochure were made. Partnerships were created and cultivated by participating in other related and ongoing projects. This was an informal approach, but one that worked effectively, and allowed them to better address the needs of the local people.

Project Results:

Environmental Science and Management
Acres Involved: 6,400,000 (approximately 10,000 square miles) (Saginaw Bay Watershed, 8,709 square miles; Northern Lake Huron/St. Mary's Watershed, 1,000square miles)
- *Inventory, assessment, classification*

Inventoried and assessed elements associated with biodiversity (habitat, status, protection needs) for the past present and future.
- *Scientific study*

Created a methodology for understanding and assessing biodiversity which can be used in almost any area.
Public Stewardship
- *Outreach, information exchange*

Poster with handout, slide presentation, 12 page color brochure.

- *Partnership building*
Developed partnerships by participating in other related ongoing projects (effective informal approach, allowed to address needs of local people).
Economic Impact
- *Direct*
2 part time positions
$4,300–Leveraged

Project Statistics:
Award Amount: $86,000
Project Timetable: January 10, 1993 -December 31,1997
Project Location: Saginaw Bay, Northern Lake Huron/St. Mary's River
Great Lakes System: Tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Numerous high quality natural communities (including fens, oak savannas, and primary forests), declining species (such as beavers, black bears, bobcats, gray foxes, minks, otters, and porcupines), and habitat for declining species (such as marshes, wet prairies upland hardwoods, grasslands, barrens, and wetlands)
Stressors Impairing System: Development, agricultural, water level fluctuation (management)
Future Project Ideas/extensions: Use this methodology by applying it to other areas
Partners: Michigan Department of Natural Resources, Michigan State University, Saginaw Bay Watershed Council, Remedial Action Plan teams, and interested parties in the watershed area

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#102 - Whihala Beach Dune Restoration
(FY1993 - GL995428-01-0)
Lake County Parks and Recreation Board
6400 Harrison Street
Merrillville, IN 46410
219-945-0543; Fax 219-945-0452

Project Narrative:
Thirteen acres of Lake Michigan shoreline property acquired by Lake County Parks was restored to dune habitat (additional acreage was included in the restoration to prevent erosion along the shoreline). This was part of a plan to improve the existing park, to provide greenspace and environmental education opportunities, and to cleanup existing industrial debris.

Trash was removed and dumping ceased once the site was being maintained. Habitat for the endangered Franklin's ground squirrel and migrant birds was expanded with the addition of created greenspace in this community, which had lacked open space. The entire beach was restored, with grass filter strips planted along approximately 1,700 lineal feet of dune to replicate existing nearby undisturbed dune habitat, and to help stop erosion. The final result was a restored and healthy Whilhala beach. A bike and pedestrian walkway was place on one end of the natural area. The bike and pedestrian pathway includes interpretative sings, which introduces the public to the ecosystem. The restored land is now able to be used for future stewardship and environmental education.

Project Results:
Environmental Science and Management
- *Ecological restoration*
Trash removal on 13 acres, and 1,700 lineal feet of beach restored with filter strips.
Habitat for Franklin ground squirrel increased.
Public Stewardship
- *Outreach, information exchange*
Bicycle and pedestrian walkway.
Ecosystem interpretation signs placed at walkway.
Economic Impact

- *Direct*
$9,440–Contractual
8 part time and temporary workers positions
$1,340–Leveraged

Project Statistics:
Award Amount: $25,460
Project Timetable: October 1, 1993 - September 30, 1995
Project Location: Whiting, Lake County, Indiana
Great Lakes System: Coastal shore
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Franklin ground squirrel, Dunes
Stressors Impairing System: Former industrial site (development), wind and wave erosion, recreation

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#103 - White Lake Area of Concern Habitat Assessment
(FY1995 - GL985147-01-0)
Lake Michigan Federation
Michigan Office
700 Washington Avenue, Suite 150
Grand Haven, MI 49417
616-850-0745; Fax 616-850-0765
www.lakemichigan.org

Project Narrative:
This project was a response to the 1995 Remedial Action Plan update, which noted loss of habitat and the degradation of fish and wildlife populations as one of six use impairments. Measures to assess, protect, and restore native wildlife habitat to improve fish and wildlife populations were recommended. This project's purpose was to coordinate a habitat assessment project in the White Lake Area of Concern to accomplish: 1) an increase in public knowledge of White Lake area habitat, past and present, of the value of it's biodiversity, and of methods to conserve that diversity; 2) an improvement in fish and wildlife populations through the increase of native habitat; 3) enhancement of the water quality of White Lake by restoring and protecting near-shore native habitat and biodiversity, and; 4) an increase in overall habitat and fish and wildlife populations and improvement in water quality in the Lake Michigan Basin.

A plant and wildlife inventory and a habitat map were created. Population abundance indicators for key wildlife and plant species were developed from existing information. A habitat assessment for historical and current habitat losses and stresses as well as recommendations for potential sites for habitat restoration was made available. Finally, during the project, four high quality marsh areas worth preserving were found. An educational video (which focused on the value of local biodiversity for fish and wildlife populations and water quality), a poster, coloring book, and pamphlets were produced and made available to the public. Workshops were held, and presentations were given.

Project Results:
Environmental Science and Management
Acres Involved: 1,828
- *Inventory, assessment, classification*
Assessment on habitat losses and stresses; created a wildlife inventory and a habitat map.
Public Stewardship
- *Outreach, information exchange*
Made an educational video, poster, coloring book, pamphlets on biodiversity and water quality. Gave workshops and presentations.
Economic Impact
- *Direct*
$11,000–Contractual
$15,726–Personnel

$11,509–Leveraged (includes $225 of volunteer work)

Project Statistics:
Award Amount: FY1995 - $40,680
Project Timetable: September15, 1995 - September 30, 1997
Project Location: The White Lake AOC - northern portion of Muskegon County, Michigan.
Great Lakes System: Open lake, coastal shore, coastal marsh, tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Walleye, perch, small and large mouth bass, northern pike, bluegill, black crappie, white sucker, trout, salmon, mallard, black duck, wood duck, blue-winged teal, common merganser, Canada goose, tundra swan, snow goose, swamp rose mallow, and fresh water mussel ("lake floater").
Stressors Impairing System: Toxic pollution, alterations of nutrient inputs, habitat destruction, development
Partners: White Lake Public Advisory Council, Michigan Department of Environmental Quality/Department of Natural Resources, White Lake Area Sportfishing Association, Muskegon County Natural Resource Conservation Service, local community groups and citizens

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#104 - Whittlesey Creek Stabilization and Rehabilitation Demonstration (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
(FY1994 - GL995427-01-1)
Wisconsin Department of Natural Resources
101 South Webster Street, Box 7921
Madison, WI 53707
608-267-9352; Fax 608-267-2800

Project Narrative:
Whittlesey Creek is a critical spawning habitat for many fish, and is the home to many plants and animals. Sedimentation and erosion were causing degradation. Sediment deposition was eliminating habitat for aquatic insects, and in turn was reducing the permeability of spawning gravels and blocking the interchange of subsurface and surface waters. The goal of this project was to stabilize highly erosive stream-banks, thereby enhancing spawning habitats and rest areas for anadromous fish (potentially including native coaster brook trout).

The Wisconsin Department of Natural Resources demonstrated innovative biological, ecological, and engineering concepts, to stabilize highly erosive clay stream banks in order to protect and restore fish and plant communities in Bayfield County. It resulted in enhanced spawning grounds, and improved habitat for native wildlife. This resulted in less erosion, less sedimentation, and the restoration and protection of habitat for both trout and the other life that share a similar niche.

The diversity of conditions and installations this project demonstrated provides learning opportunities for all who visit. Hundreds of school children, citizens, and professionals have toured the project both before and after restoration. The Ashland School District and the Watershed Project Education Program monitored the bioengineering practices for water quality impacts.

Project Results:
Environmental Science and Management
Acres Involved: 12,000 (Withing this watershed, numerous degraded streambanks were restored)
- *Ecological restoration*
Stabilized highly erosive streambanks, reducing erosion and increasing fish spawning and living habitats.
Public Stewardship
- *Outreach, information exchange*
Gave tours to hundreds of school children, citizens, and professionals
- *Education*
Ashland school district (with the Watershed project education program) monitored the bioengineering practices for water quality impacts

Economic Impact
- *Direct*
$39,725–Contractual
Dollars Leveraged: (See "Great Lakes Fish and Wildlife Program" description of the cluster grant to Wisconsin Department of Natural Resources for more information.)
- *Indirect*
Improved sport fishery.

Project Statistics:
Award Amount: $40,000
Project Timetable: October 1, 1993 - March 31, 1998
Project Location: Bayfield County, Wisconsin
Great Lakes System: Tributary/ connecting channel
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Critical trout spawning habitat
Stressors Impairing System: Erosion, sedimentation
Partners: Bayfield County, Ashland School District, USDA Natural Resource Conservation Service, University of Wisconsin-Extension, U.S. Forest Service, University of Wisconsin-Ashland Agriculture Research Station, Barksdale Township, local landowners

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#105 - Wild Rice Conference
(FY1998 - GL005322-01-0)
Great Lakes Indian Fish & Wildlife Commission
P.O. Box 9
Odanah, WI 54861
715-682-6619; Fax 715-682-9294

Project Narrative:
Wild Rice is an ecologically and culturally important component of wetlands in the Great Lakes Basin. Unfortunatly, critical information for the proper care and management of rice is often lacking. For this reason Great Lakes tribes, the Great lakes Indian Fish and Wildlife Commission (GLIFWC), federal and state agencies, and regional universities were invited to participate in a conference from July 7-8, 1999, in Carlton Minnesota, to share traditional environmental knowledge and scientific information on wild rice. The goals were to: 1) present and discuss recent research; 2) review the success of recent and historic projects designed to reintroduce or enhance wild rice stands; 3) set up a network to disseminate future findings, economic opportunities, discuss regional research directions; 4) discuss future research (to avoid duplication of work); and 5) increase understanding between Tribes and non-Tribal organizations of the cultural significance of wild rice to native Americans.

The conference increased the awareness of the effects of erosion, metals, water chemistry and depth, exotic species, eutrophication, motor-boat activity and herbicides on wild rice, and promoted greater awareness of potential markets for non-patty grown wild rice. This conference built partnerships between tribal and non-tribal governments, agencies, and organizations, and people. A goal of post conference was to produce better managed wetlands which will also help preserve habitat important for other plants and wildlife. The proceedings of this conference were published and distributed to all conference participants, to other individuals who requested a copy, but who were not at the conference, and to GLIFWC's Voigt Intertribal Task Force. At the close of the project, it was intended that the proceedings were to be also placed on the Internet, and the best ways of doing that were being evaluated.

Project Results:
Environmental Science and Management
- *Planning, coordination, information sharing, technology transfer*
Exchanged info with managers and professionals about wild rice.
Promoted greater awareness of potential market of rice, and of the threats to the habitats now.
Tribal and non-tribal groups came together to share information and work towards similar goals.

Final report: “Proceeding of the Wild Rice Research and Management Conference.”
Economic Impact:
- *Direct*
$12,100–Contractual
$6,450–Leveraged

Project Statistics:
Award Amount: $42,476
Project Timetable: June 1, 1999 - December 31, 2000
Project Location: Carlton, Minnesota
Great Lakes System: Nearshore Aquatic
Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Wild Rice habitat
Stressors Impairing the System: Encroachment, recreation, pollution
Participants: Sokagon Indian Community, Anderson Wild Rice, Fond du Lac Tribal and Community College, Flintsteel Restoration, Chequamegon/Nicolet National Forest, St. Croix Tribe, Fond du Lac band, University of Wisconsin, U.S. Fish and Wildlife Service, Michigan State University-Extension, University of Minnesota, Minnesota Department of Natural Resources -Division of Water Quality, University of Wisconsin-Superior, Bay Mills Indian Community, USDA Natural Resource Conservation Service, Mille Lacs Band, Great Lakes Indian Fish and Wildlife Commission, Colorado State University, Lac du Flambeau Tribe, Bois Forte MCT, Sagkeeng First Nation, Menominee Tribe, U.S. Environmental Protection Agency, Fond du Lac Natural Resources Program, Manitobe Conservation, U.S. Forest Service, Bay Mills Community College, Minnesota Wild Rice Council, University of Wisconsin, Keweenaw Bay Indian Community, University of North Texas, Bureau of Indian Affairs, Wisconsin DNR, 1854 Authority, U.S. Army Corps of Engineers, Ottawa National Forest, Kistiganwacheeng Development Corporation, Garden Hill First Nation, Fisheries and Oceans Canada, Lac Courte Oure Conservation Department, Griffin Consulting Company, Wisconsin Public Radio, Leech Lake Reservation, Foth and van Dyke, Bois Forte Band of Chippewa, Ojibwa Museum, North Bay Trading, White Earth Reservation, Lakehead University, Cornell University, WXPR Public Radio, Kenco Industries, Loucks and Associates, Inc., Blue Water Science, Northland College, Lake Superior College, Lake St. Martin First Nation, College of the Menominee Nation, Rice Lake Ricing Committee, Quality Wild Rice, Minnesota Waterfowl Association, Horslwy and Witten, Channel 8-Duluth, Northwest Rice Growers, Alma College, Bad River Tribe, Red Cliff Band of Lake Superior Chippewa, Northern Ecological Services Inc., Mille Lacs Band, Red Cliff Band of Lake Superior Chippewa, Ducks Unlimited, Hiawatha National Forest, Fond du Lac Natural Resources Program, Forest County Potawatomi, Royal Botanical Gardens, Grand Portage Reservation, St. Cloud state University, Cook Waterfowl Foundation, Smithsonian Institute, Lac Vieux Desert Tribe, Shakopee Mdewakanton Sioux Community

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#106 - Woodland Quality and Amphibian Diversity
(FY1998 - GL985924-01-0)
Citizens For Conservation
P.O. Box 435
Barrington, IL 60010
847-382-7283

Project Narrative:
Restoration of habitat is a key component of the Great Lakes strategy and essential to protection and restoration of the integrity of the Great Lakes basin ecosystem as called for in the Great Lakes Water Quality Agreement with Canada. Amphibians are a taxa that have been severely impacted and better information is needed on their habitat requirements both to better protect them and to guide restoration of the habitats that support all life stages. This project provided support for a cooperative initiative among two county-wide Forest Preserve Districts to investigate the relationship between woodland ecological quality and amphibian and reptile diversity and abundance in the greater Chicago region. The assessment of interactions between amphibians, and their diversity, and upland habitat, and their forest structure and natural quality, were made by comparing six higher quality forests and six degraded forest.

The study documented structural habitat features associated with amphibian species richness, abundance, and

diversity. The presence of a dense ground layer of herbaceous vegetation was correlated with healthy amphibian assemblages, and especially with frog abundance. Another key factor was breeding pond hydroperiod. Even some otherwise good quality sites had suffered from past attempts at wetland drainage, with negative effects on amphibians. The report, "The effect of Forest Structure on Amphibian Abundance and Diversity in the Chicago Region," increases our understanding of amphibian habitat and urges increased attention to restoration of forest ecosystems. The results will be used by agencies and organizations responsible for protecting and restoring natural areas in the region. The results may also be of use to managers in other areas and to scientists investigating declines in amphibian populations elsewhere.

Project Results:

Environmental Science and Management

- *Scientific study*

Research on amphibians and their habitats in order for managers and protection agencies to better accommodate these animals.

12 acres studied

Report: "The Effect of Forest Structure on Amphibian Abundance and Diversity in the Chicago Region."

Economic Impact

- *Direct*

$2,332–Contractual

$14,419–Leveraged

Project Statistics:

Award Amount: $48,962

Project timetable: October 1, 1998 - May 20, 2000

Project Location: Forests in the Chicago region (Northeast Illinois)

Great Lakes System: Inland terrestrial

Culturally, Economically, and/or Biologically significant plants, animals, and habitats: Amphibians, such as salamanders, toads, and frogs

Stressors Impairing the System: Poor management practices (grazing), logging, fire suppression, and animal herbivory (excessive deer browse), urban development, invasive species, hydrology alteration

Partners: Lake County Forest Preserve District, Forest Preserve District of Will County