

Appendix D: Habitat Projects

Appendix D: Habitat Projects

EXAMPLES OF EXISTING PROJECTS

1. BUFFALO RIVER FISH AND WILDLIFE HABITAT RESTORATION, Buffalo, New York

Project Type: restoration, education/outreach

Project Goals: Goals are: 1) to increase area of habitat capable of supporting a healthy diversity and distribution of fish and wildlife communities, with emphasis on self-sustaining native biota; 2) heighten awareness and foster greater appreciation of natural resources; and, 3) enhance recreational opportunities for use of fish and wildlife resources.

Project Status: complete

Narrative: The lower reaches of the Buffalo River have deep channels and steep banks that have been reinforced to prevent erosion. In a few shallow areas, submergent and emergent wetlands do exist and have been enhanced to provide spawning and nursery habitat for fish and nesting and resting areas for waterfowl. Periodic dredging to maintain navigation limits the extent of the habitat. For many years the area suffered from industrial and municipal pollution, with no river access for Buffalo city dwellers. Three small areas, now restored, offer people access for wildlife appreciation, education, fishing and canoeing.

Project Actions:

- At the Smith Street site, logs were placed underwater offshore to improve aquatic species habitat. A rock reef was enhanced to create a riverine wetland. The shore was planted with native species. Public access includes a fishing overlook, interpretive nature trails and a canoe dock.
- At the Ohio Street site, native vegetation was planted along the shore. Two fishing/overlook platforms were constructed. A stone dust trail along the river was installed. A canoe launch was constructed.
- At the Bailey Avenue Peninsula site, the shoreline was enhanced with native vegetation. Logs were placed near the shoreline to improve fish habitat. A trail system and interpretive signs were installed.

Project Partners: Erie County Department of Environment and Planning, New York Department of Environmental Conservation.

2. CAROLINIAN REFORESTATION - CENTENNIAL PARK, Dunnville, Ontario

Project Type: restoration

Project Goal: To create a woodlot depicting the area's natural heritage and providing wildlife habitat for species found within the Carolinian zone.

Project Status: complete

Narrative: Carolinian forest is a feature of southern Ontario that is unique in Canada. With extensive historical clearing of land for development and agriculture, little of this habitat type remains. Efforts to establish Carolinian stands require selection of native tree species. In this demonstration project, 14 species were planted in a heritage grove.

Project Actions:

- Dunnville Town Council approved designation of Centennial Park as a heritage grove.
- The Dunnville District Heritage Association and the Dunnville Horticultural Society then procured Carolinian species of trees such as honey locust, sycamore, black gum and pin oak for planting.
- Subsequently, species such as Kentucky coffee tree, butternut, tulip tree and hackberry have been added to the site.

Project Partners: Dunnville District Heritage Association, Dunnville Horticultural Society, community volunteers, Town of Dunnville.

Additional Details: The original project expanded into a Thompson Creek restoration project in Dunnville undertaken by 16 partners, including: Ducks Unlimited, Dunnville

Bioregion Association for Community Planning, Dunnville District Conservation Dinner Committee, Dunnville District Hunters & Anglers, Dunnville District Heritage Association, Dunnville Horticultural Society, Dunnville Secondary School, Environment Canada's Action 21 Community Funding Program, Grand River Conservation Authority, The Grand River Foundation, Haldimand Stewardship Council, Ministry of Natural Resources, Region of Haldimand-Norfolk, Six Nations of the Grand River, Thompson Creek Elementary School, Town of Dunnville and other interested schools and members of the community. A variety of objectives include demonstrating increased biodiversity; promoting understanding of the natural environment; educating private landowners about proper land stewardship practices; and increasing public awareness about the importance of healthy ecosystems.

3. CAZENOVIA CREEK HABITAT RESTORATION AND STEWARDSHIP PROJECT, New York

Project Type: restoration, education/outreach

Project Goal: Habitat improvement along streambanks of the Cazenovia Creek watershed.

Project Status: *ongoing*

Narrative: This project will improve up to 2500 feet of streambank within the watershed; re-establish critically impacted habitat for game and fish and other animals; improve nearshore aesthetics; and replace non-native noxious vegetation with native trees and shrubs. It will also seek to create a network of interested community representatives who will conduct project activities and monitor the project and assess the effects on enhancing stream corridor habitats.

Project Partners: Erie County (New York) Department of Environment and Management

Appendix D

2

4. CHAGRIN RIVER WATERSHED, Ohio

Project Type: planning/coordination/collaboration

Project Goal: A framework for model ordinances for riparian protection.

Project Status: *ongoing*

Narrative: This project is developing a general framework for model ordinances for riparian buffers, wetland, and floodplain management.

Project Partners: Chagrin River Watershed Partners, U.S. Environmental Protection Agency.

5. CITY OF TRENTON LINKED RIVERFRONT PARKS, Trenton, Michigan

Project Type: restoration, education/outreach

Project Goals: A rehabilitated and enhanced Detroit River shoreline and habitat for fish and wildlife in Trenton, Michigan, and increased public access that links a riverfront park system.

Project Status: *ongoing*

Narrative: Currently, much of the Detroit River shoreline is hardened or has been developed by municipalities and industry, causing significant loss of fish and wildlife habitat. This project will enhance fish and aquatic habitat along the Detroit River as part of a city and park redevelopment project in Trenton, Michigan. Rather than limiting riverbank stabilization to conventional sheet piling, gravel and cobble habitat will be designed and installed to demonstrate the feasibility of creating fish habitat in conjunction with urban park development. This habitat demonstration project is an important aspect of the larger, long-range City of Trenton Linked Riverfront Parks Master Plan. It is an action item that directly seeks to remediate the loss of fish and wildlife habitat and beneficial use impairment identified in the Detroit River Remedial Action Plan.

Project Actions:

- Compile a summary report of baseline data on the existing aquatic habitat conditions in the Trenton Channel within the proposed project area.
- Design and install appropriate habitat at identified project sites.
- Disseminate information about the project widely.

Project Partners: City of Trenton, Downtown Development Authority, Michigan Department

of Environmental Quality, Michigan Department of Natural Resources, Michigan Sea Grant, U.S. Geological Survey, U.S. Environmental Protection Agency, Wayne State University.
Project Needs: The project actions will be completed in 3-5 years. Additional monitoring funds will be necessary in the future to measure long-term success of the fish and wildlife habitat restoration part of the project.

6. COMMON TERN/PIPING PLOVER HABITAT RESTORATION, SHELDON'S MARSH STATE NATURE PRESERVE, Ohio

Project Type: protection/restoration

Project Goal: To restore and maintain historical nesting habitat for common tern and piping plover on 15 acres of foredune on the barrier beach at Sheldon's Marsh State Nature Preserve.

Project Status: ongoing

Narrative: The 460 acre Sheldon's Marsh has one of the last naturally occurring barrier beaches (40 acres) on the south shore of Lake Erie which protects the integrity of an undiked wetland behind it. The barrier beach/marsh complex is heavily used by nesting and migrating waterfowl and shorebirds. Lake sturgeon, an endangered fish species, spawn on the Sheldon's Marsh beach and the U.S. Fish & Wildlife Service Great Lakes Piping Plover Recovery Plan identifies Sheldon's Marsh as ideal habitat. Both common tern and piping plover are impaired due to unmet population objectives per the draft Lake Erie LaMP degradation of wildlife populations and loss of wildlife habitat assessment. Because common tern and piping plover use the same type of habitat, any improvements benefit both species. Stresses to existing habitat include: a) 80,000 people visit Sheldon's each year, making it the third highest visited Nature Preserve in the state; b) vegetative succession on the foredune has eliminated the open, vegetation-free habitat necessary for common tern and piping plover; c) the littoral drift that replenishes the barrier beach has been stopped, resulting in a 1200 foot loss to the beach over the past 20 years.

Project Actions:

- Succession has been controlled by removing vegetation from 15 acres of foredune.
- Public access has been limited to 300 yards on either end of the barrier beach between May 1 and September 30 each year to maintain the habitat conditions needed for the sensitive species that use it.
- A U.S. Army Corps of Engineers engineering study is nearly complete and will identify whether construction of the Huron pier has stopped littoral drift which supplies materials for barrier beach replenishment. If so, the Corps will recommend and potentially assist with funding remedial measures to correct this problem and maintain the barrier beach.

Project Partners: Ohio Department of Natural Resources - Divisions of Wildlife, Natural Areas and Preserves and Geo-survey, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service.

Additional Needs: Resources will be needed to continue the first action. For action 3, \$6 to 8 million is needed to construct a segmented breakwall and provide sand for beach replenishment. A potential source of this funding is a grant from the U.S. Army Corps of Engineers.

7. CONSERVATION FARM PLAN PROGRAM, Ontario

Project Type: restoration

Project Goal: Reduce environmental impacts on agricultural lands.

Project Status: ongoing

Narrative: Conservation Farm Plans are prepared for agricultural operators in the Essex region. These plans identify farm specific projects that could be undertaken to reduce environmental impacts (e.g. feedlot drainage improvements) and improve environmental values (e.g. planting buffer strips) in ways that enhance farm production or do not reduce farm production.

Project Partners: Essex Region Conservation Authority

Project Needs: Approximately \$18,000 per year.

8. CONSERVATION PLANNING IN THE HURON RIVER WATERSHED, Michigan

Project Type: inventory/classification

Project Goal: A complete inventory of the rare species and natural communities of the Huron River watershed.

Project Status: *ongoing*

Narrative: The Huron River watershed is currently the cleanest river in Southeast Michigan. The watershed supports a multi-million dollar fishery, is home to threatened and endangered species, and contains two-thirds of the region's public recreational lands. The Huron River Watershed Council is engaged in several projects aimed at preserving open spaces and wildlife habitat in the Huron River watershed, modeled after the Chicago Wilderness program. This project will fund the habitat inventory components of their ongoing work. The Watershed Council staff will gather existing data regarding open spaces, building on the work done by the Michigan Natural Sources Inventory, National Wetlands Inventory, and other efforts. A "gap analysis" will also be performed to target rare ecosystems or communities. All of the information will be stored as multimedia and geographic information system (GIS) databases. This project will support publicly accessible computer-based tools for evaluating land use options for informed community planning.

Project Partners: Huron River Watershed Council

9. CONSERVING ALVAR HABITATS, Ohio

Project Type: inventory/assessment, protection

Project Goal: Conservation of rare Lake Erie alvar habitats that support the endemic lakeside daisy forb and leafhopper insect species.

Project Status: *ongoing*

Narrative: Western Lake Erie's Kelleys Island and Marblehead Peninsula are home to an unusual Great Lakes habitat, the alvar. Alvars are landscapes that occur on limestone or dolomite bedrock, have thin soils, and are subject to severe drought and seasonal flooding. They are habitat for rare plants and animals. The western Lake Erie sites are known habitat for four species of leafhoppers: *Chlorotettix spatulatus*, *Laevicephalus minimus*, *Polyamia caperata*, and *Chlorotettix fallax*. The Great Lakes endemic lakeside daisy (*Hymenoxis herbacea*) has evolved to survive only in this special environment. Loss of alvar habitat is attributed to quarrying, development, off-road vehicle damage, over-grazing and browsing, non-indigenous invasive species, plant collecting, logging and poor forestry practices, waste dumping, and vandalism. Conservation of this unique but sparse habitat in the Lake Erie basin will preserve plant and animal genetic diversity and help us understand the impacts of climate change on vegetation. The conservation of alvar habitat in Lake Erie is part of the International Alvar Initiative, a project to conserve alvar sites throughout the Great Lakes basin.

Project Actions:

- Assess alvar distribution and conservation status.
- Document priority sites for long-term protection.
- Develop a working knowledge of how alvar systems function.
- Develop conservation strategies for protection and stewardship.
- Increase public awareness of alvar importance as habitat.

Project Partners: The International Alvar Working Group includes members from: Agriculture Canada; Bruce Peninsula National Park; Carleton University; Couchiching Conservancy; Federation of Ontario Naturalists; Finger Lakes Community College; McGill University; Michigan Natural Features Inventory; Michigan State University; Nature Conservancy of Canada; New York Natural Heritage Program; Ohio Department of Natural Resources; Ontario Ministry of Natural Resources; Ontario Natural Heritage Information Centre; Shippensburg University; State University College/Geneseo; Essex Region Conservation Authority; State University of New York; The Nature Conservancy; University of Guelph; Wisconsin Natural Heritage Program; and York University. Other partners are the U.S. Fish and Wildlife Service and U.S. EPA.

Additional Needs: The first two bullet items are complete. Project partners are conducting independent research addressing bullet action three. Bullet actions four and five need to be implemented.

10. CUMMING'S FARM - MODERN CONSERVATION FARMING, Ontario

Project Type: restoration, education/outreach

Project Goal: Marginal farmland was retired into black walnut and wildlife habitat.

Project Status: complete

Narrative: In the agricultural communities of southern Ontario, an educational and influential tool has been developed to demonstrate how various habitat protection and restoration features can be integrated into a working farm. These landowners have established a series of land stewardship activities that blend the natural landscape into a modern farming operation in the Rondeau Bay area of Chatham-Kent.

Project Actions:

- Marginal farmland was retired into black walnut and wildlife habitat. Productive portions of the farm were converted into 100% no till soil conservation management systems.
- Eroded areas of the farm were improved through use of grassed waterways and drop inlets.
- This farm is a living example of modern conservation farming with the aim of sustaining the soil resources to maintain crop profitability. It has demonstrated internationally the practicality and value of conservation farming.

Project Partners: National Soil Conservation Program, Land Stewardship I, Land Stewardship II, Landowners John and Peter Cummings, Woodlands Improvement Agreement Program, Ontario Ministry of Natural Resources.

Additional Details: This farm is in the Rondeau Bay area, with the highest potential of anywhere in Ontario for delivery of phosphorus to Lake Erie, so conservation efforts have dramatic effects. Adjacent waters are highly valued waterfowl staging areas, and a neighboring landowner is re-establishing tall grass prairie as upland migratory bird habitat.

Similar Projects: The Essex County Demonstration Farm is operated by the Essex Region Conservation Authority and Essex Soil and Crop Improvement Association in partnership with more than 30 organizations and individuals. The Johnson Farm in Kent County is a Land Conservation Model. The Sinclair-Campbell Ducks Unlimited project demonstrates conservation tillage and a variety of other conservation techniques to reduce impact of soil erosion and run-off into neighboring Big Creek and Long Point marshes.

Appendix D

5

11. CUYAHOGA RIVER RAP URBAN STREAM RESTORATION, Cleveland, Ohio

Project Type: new tool/technology demonstration, restoration, education/outreach

Project Goals: Innovative soil bioengineering techniques for stream and riparian zone restoration will restore fish and wildlife habitat as well as reduce pollutant loadings from urbanized areas within the Cuyahoga River Area of Concern.

Project Status: ongoing

Narrative: The Cuyahoga River suffers from a loss of biodiversity as evidenced in historical data on fish populations documented in the Cuyahoga River Remedial Action Plan. Sampling in the early 1990s showed significant progress toward recovery of aquatic habitat, however, conditions still do not meet the requirements for the state warmwater habitat designation. The greatest stresses to wildlife habitat and impacts to biodiversity are habitat destruction and the alteration of physical processes such as channelization, floodplain development, damming, etc. The consequence is the degraded riparian condition of the watershed including loss of streambank vegetation, loss of buffer zones, and accelerated stream bank erosion. This project is demonstrating effective streambank restoration using innovative soil bioengineering techniques in several communities throughout the Area of Concern. In addition, municipal engineers, planners, local decision makers and landowners are being shown the new technologies and benefits.

Project Actions:

- A series of workshops were held to teach local engineers, planners and decision makers to use bioengineering techniques to restore degraded streambanks.
- Demonstration projects were implemented at several sites throughout the Area of Concern.
- A homeowner/backyard stewardship program will be developed and implemented to teach residents about the restoration projects and to convey the importance of protecting the riparian zone.

Project Partners: Biohabitats, Inc., Cuyahoga River Community Planning Organization, City of Cleveland, City of Seven Hills, Cleveland Metroparks, Environmental Design Group, Inc, Metroparks Serving Summit County, Cuyahoga and Summit Soil and Water Conservation Districts, Municipal Engineers Association of Northeast Ohio, Northeast Ohio Areawide Coordinating Agency, Northeast Ohio Four County Planning and Development Organization, Northeast Ohio Regional Sewer District, Ohio Environmental Protection Agency, Natural Resource Conservation Service, Ohio Department of Natural Resources, U.S. Army Corps of Engineers, U.S. EPA, Village of Highland Hills.

Additional Needs: Project action one is completed. Project actions two and three are in progress. Additional funding will be needed for streambank restoration beyond the demonstration phase to restore as much of the Cuyahoga River as possible.

12. D'AUBIGNY CREEK RESTORATION, Ontario

Project Type: assessment/research, restoration, monitoring

Project Goal: Watershed rehabilitation to increase stream velocity, stabilize banks and remove barriers to fish movement.

Project Status: complete

Narrative: Like many streams in southern Ontario, D'Aubigny Creek was degraded by poor agricultural practices, railways, urban development and beavers, all of which left a heavy accumulation of sediment on the streambed, eroded banks, decreased stream flow and warmed stream temperatures. Extensive rehabilitation has occurred along the entire length of the stream through a community-based partnership. Stream temperatures decreased, sand and silt were flushed from the substrate, water quality has improved and trout are found in a larger portion of the creek.

Project Actions:

- A stream assessment showed that the creek's potential for fisheries habitat improvements was excellent due to the existing groundwater resources.
- Pauline Johnson Collegiate Vocational School incorporated the rehabilitation of D'Aubigny Creek into their grade 12 Environmental Studies curriculum.
- Students have removed flow impeding debris from the stream and built bank stabilization structures out of logs.
- 51 tonnes of rock was placed in the stream to build vortex weirs and meander the creek channel.
- Students also planted trees along the stream establishing and expanding buffer strips.
- The Brantford Steelheaders built lunger structures for fish cover, added cobble to the stream, planted trees and removed instream debris.
- The project has also included a comprehensive monitoring program in order to assess changes in the entire creek ecosystem. Habitat assessment, stream temperature, fish population, water quality, stream channel characteristics and flows have been monitored by the Steelheaders and other community partners, since 1990.

Project Partners: Pauline Johnson Collegiate Vocational School, Brantford Steelheaders, Grand River Conservation Authority, Ministry of Natural Resources, Brant Nature Club, Environmental Youth Corps, Brant Waterways, Canada Trust - Friends of the Environment Foundation, Izaak Walton Flyfishers Club (Toronto), Ministry of Natural Resources Community Fisheries Involvement Program.

Additional Details: This creek flows into the Grand River, a major tributary of Lake Erie.

Similar Projects: Stream buffers, streambank stabilization projects, restoration and in-stream improvements have been undertaken in numerous locations across the Lake Erie watershed, particularly in Norfolk County where development and intense agriculture historically degraded conditions.

13. DETROIT RIVER CANDIDATE SITES FOR HABITAT PROTECTION AND RESTORATION, Michigan

Project Type: inventory, assessment/research

Project Goal: To inventory and describe the physical characteristics of remaining habitat for fish and wildlife in the Detroit River.

Project Status: ongoing

Narrative: Through field surveys and low-altitude aerial photography, remaining habitat for fish and wildlife in the Detroit River will be inventoried. Candidate sites will be placed into two categories: functional habitat to be protected from impairment, and impaired, non-functional, habitat to be restored and enhanced. Green areas not converted to other land uses will be located along the riverfront in Michigan waters and further characterized and investigated using field surveys and conversations with local residents. All candidate sites will be ranked in order of priority. Recommendations for protection and existing restoration measures will be outlined.

Project Actions:

- Determine the number, location, and extent of remaining functional and impaired candidate sites of fish and wildlife habitat.
- Characterize the sites' present fish and wildlife resource value and function.
- Evaluate the potential of each site for protection and remediation.
- Prioritize sites in functional and impaired categories for remediation using existing ranking system.

Project Partners: U.S. Fish and Wildlife Service, Ducks Unlimited, Grosse Ile Nature Conservancy and Land Trust, Grosse Ile Conservation Club, Trenton Sportman Club, Downriver Walleye Federation, American Heritage River Initiative, Midwest Natural Resources Group, Waterways for Wildlife Project.

Additional Needs: Funding will be needed to implement restoration of the priority sites.

Appendix D

7

14. DETROIT RIVER LAKE STURGEON PROJECT, Michigan

Project Type: assessment/research, inventory

Project Goal: A comprehensive rehabilitation plan for Detroit River lake sturgeon.

Project Status: ongoing

Narrative: Because lake sturgeon live a long time and are bottom feeders, they are a potential indicator species for monitoring tissue contaminant levels and fish habitat. The Detroit River and sediments are heavily contaminated and fish habitat is impaired. Little is known about remnant Detroit River lake sturgeon populations. Understanding lake sturgeon population dynamics, habitat requirements at all life stages, and the dynamics between sturgeon and contaminant levels will provide the basis for a comprehensive plan to rehabilitate lake sturgeon populations. If the lake sturgeon and its habitat can be rehabilitated, the resulting benefit to Detroit River fisheries in general will be a targeted approach to eliminating beneficial use impairments to fish and wildlife habitat.

Project Actions:

- Gather lake sturgeon spawning, nursing, feeding, resting and migration information in the Detroit River in order to determine habitat needs.
- Evaluate the physical, chemical, and biological aspects of current or potential lake sturgeon habitat in the Detroit River.
- Research how exposure to contaminated sediments affects sturgeon growth and survival.
- Formulate a restoration plan for lake sturgeon in collaboration with regional fishery management authorities.

Project Partners: U.S. Geological Survey/Biological Resources Division, U.S. Fish and Wildlife Service, Great Lakes Fishery Commission, Michigan Department of Natural Resources, Ontario Ministry of Natural Resources.

Additional Needs: Funding has been secured for initial research for the first action. This will be completed in 2002. Additional funding will be needed for the three other actions.

15. DEVELOPMENT OF A CONSERVATION ETHIC IN THE OAK OPENINGS, Ohio

Project Type: education/outreach

Project Goal: To increase the awareness of the Toledo public regarding the Oak Openings natural areas.

Project Status: ongoing

Narrative: This project will: develop and implement a marketing and outreach campaign which evaluates the awareness and knowledge level of local residents regarding the Oak Openings; develop a professional marketing strategy and campaign to inform and engage local residents as to the importance of the Oak Openings as a unique natural area; implement an Oak Openings marketing campaign; conduct a market evaluation to gauge effectiveness; and, restore two to three small sites as visual examples of the messages disseminated through the marketing campaign.

Project Partners: The Nature Conservancy.

16. ESSEX REGION BIODIVERSITY CONSERVATION STRATEGY, Ontario

Project Type: restoration

Project Goal: To identify high priority habitat restoration sites for the Essex region, and develop and implement restoration plans for these sites.

Project Status: ongoing

Narrative: Through remote sensing and field surveys, remaining fish and wildlife habitats have been identified and mapped for parts of the Essex region's Lake Erie watershed; unmapped areas are presently being mapped. Using known ecological principles, high priority restoration and enhancement opportunities are identified. These opportunities, when implemented, will confer an immediate and significant benefit to the biodiversity and ecosystem health of the local landscape. Once high priority sites are identified, landowner agreements are obtained, restoration plans are developed, and implementation is undertaken.

Project Actions:

- Determine the location and extent of remaining fish and wildlife habitats.
- Identify high priority fish and wildlife habitat enhancement opportunities.
- Provide associated recommendations regarding relative priority of habitat types for restoration, habitat targets, etc.

Project Partners: Essex Region Conservation Authority, Environment Canada, Canada Trust Friends of the Environment Foundation, Essex County Stewardship Network, Ontario Ministry of Natural Resources, Ontario Ministry of the Environment, Ducks Unlimited Canada, University of Windsor, Essex County Field Naturalists Club, Citizens Environment Alliance, CAW Windsor Regional Environmental Council, Essex County Federation of Agriculture, Essex County Woodlot Owners Association, Little River Enhancement Group, Project Green, Canadian Wildlife Service, Carolinian Canada, County of Essex, City of Windsor, Town of LaSalle, Town of Amherstburg.

Additional Needs: Funding for ongoing restoration projects at high priority sites.

17. FRIENDS OF WATERSHEDS PROGRAM, Ontario

Project Type: restoration, protection, planning/coordination/collaboration, education/outreach

Project Goal: Coordination and support for grassroots watershed groups.

Project Status: ongoing

Narrative: The Friends of Watersheds program provides central coordination and support for grassroots Friends of Watersheds groups throughout the Essex region. Volunteer habitat restoration and enhancement projects (e.g. cleanups, tree plantings, etc.) are also undertaken through this program. Funding for the program presently expires early in 2000.

Project Partners: Essex Region Conservation Authority, Friends of Watersheds.

Project Needs: Approximately \$52,000 per year.

18. GRAND RIVER LOWLANDS TACTICAL PLAN, Ohio

Project Type: protection, restoration, planning/coordination/collaboration

Project Goal: To conserve and enhance wildlife diversity, wetland and riverine habitats, and increase recreational opportunities, utilizing a watershed approach, in the Grand River, Ohio Lowlands.

Project Status: *ongoing*

Narrative: The Grand River Lowlands in Northeast Ohio is a unique ecosystem with relatively undisturbed natural communities. Some of Ohio's highest quality wetlands, an intact riparian corridor, and the highest diversity of fish and mussels of any river of its size in the Lake Erie basin, characterize the ecosystem. Wildlife species abound. State endangered species such as the river otter, eastern massasauga rattlesnake, northern brook lamprey, and Great Lakes crayfish inhabit the lowlands along with neotropical migrant birds and 115 species of nesting birds, 375 species of macroinvertebrates, 18 species of reptiles, and ten species of amphibians. State endangered plant species such as Clifton's wood fern and thin-leaf sedge are also present at the Grand River Wildlife Area. The water quality benefits of the lowlands for aquatic species and for Lake Erie are immense. Development stemming from the Cleveland area is the single largest threat to the habitat and wildlife of the Grand River Lowlands. Protected in part by designations that underscore its uniqueness, such as Ohio Scenic River and Exceptional Warmwater Habitat, the lowlands are the focus of a multi-organizational partnership to protect its natural resources.

Project Actions:

- By 2005, the acreage of protected habitat will increase by 50% (approximately 4500 acres) over 1998 statistics.
- By 2005, recreational use will increase by 25% over 1997 statistics from the *Socio-Economic Study of Ohio's Wildlife Areas*.
- By 2005, the protected riparian corridor will increase by 50% (approximately 5 miles) over 1998 statistics.

Project Partners: Ashtabula Metroparks, Ashtabula Soil and Water Conservation District, Cleveland Museum of Natural History, Cooperative Extension Service, Geauga Metroparks, Geauga Soil and Water Conservation District, Headwaters Land Trust, Lake Metroparks, Lake Soil and Water Conservation District, Natural Resource Conservation Service, Ohio Department of Natural Resources, Ohio Environmental Protection Agency, The Nature Conservancy, Trumbull Soil and Water Conservation District, U.S. EPA, Western Reserve RC&D, other individuals, clubs, and local organizations.

Additional Needs: All project actions are in progress. Under each are a number of strategies that will need support in order to meet the year 2005 objectives.

19. GREAT LAKES GREENNESS PROJECT

Project Type: monitoring

Project Goal: Analyze land use changes in the Great Lakes basin over three decades.

Project Status: *ongoing*

Narrative: An analysis of three decades of satellite imagery of the Great Lakes basin is resulting in insights into land use changes. Maps will show increases and decreases in farm land, forests, and urban areas as well as trends. Results will be reported at the State of the Lakes Ecosystem Conference (SOLEC) in Fall 2000.

Project Partners: U.S. Environmental Protection Agency.

20. HABITAT DEVELOPMENT ON INDUSTRIAL AND PRIVATE PROPERTY: ST. CLAIR RIVER WATERWAYS FOR WILDLIFE PROGRAM, Michigan, Ontario

Project Type: restoration, planning/coordination/collaboration

Project Goal: Ongoing voluntary cooperative habitat enhancement efforts along the St. Clair River by private landowners, particularly industry, to contribute to the long-term health of wildlife habitats and populations.

Project Status: *ongoing*

Narrative: Through the Waterways for Wildlife Program, the Wildlife Habitat Council (WHC) is working with industries and organizations along the St. Clair River to establish an international watershed management plan for the river. The project is designed to promote voluntary, cooperative habitat enhancement efforts initiated by WHC member corporations along the river corridor. These efforts are being used as models to encourage participation from neighboring public and private land managers. The program is focusing on engaging corporate and private landholders to manage their properties to achieve the project objectives as identified by general program participants. One example of a project is the reforestation of the Darcy McKeough Floodway Channel. Project participants are protecting and enhancing habitat along the river, using scarce financial resources more efficiently, contributing to the long-term health and viability of the river, and providing productive habitat for riparian, upland, and prairie-associated wildlife.

Project Actions:

- The Wildlife Habitat Council continues to engage industries and organizations along the St. Clair River to participate in managing the river according to an international watershed management plan.
- Projects to implement the plan will focus on accomplishing various habitat and wildlife objectives.

Project Partners: Wildlife Habitat Council, Detroit Edison, Ontario Hydro, Terra International, Consumers Power, Ford Motor Company, and other corporate and conservation groups.

Additional Needs: Both project actions are ongoing with needs for additional partners as well as specific projects.

21. LAKE ERIE GRASSLANDS, Ohio

Project Type: restoration

Project Goal: 800 acres of restored native prairie grassland.

Project Status: *ongoing*

Narrative: The project will seed 800 acres of native prairie grasses in Erie, Ottawa, and Sandusky Counties in Ohio. The plantings will be done on properties owned by approximately 50 individuals. The local chapter of Pheasants Forever will provide the seed, labor and equipment to do these planting. An evaluation of the plantings will be done in the fall of 1999 by the Natural Resources Conservation Service, the Ohio Division of Wildlife, and the Chapter to see that adequate stands of these grasses are established. Should these stands not be adequate, they will be re-seeded by the Chapter. This restoration project will reduce soil erosion, improve water quality, increase biodiversity, and improve wildlife habitat (particularly for declining grassland bird species).

Project Partners: Natural Resources Conservation Service, Ohio Department of Natural Resources, Pheasants Forever.

22. LONG-TERM NONPOINT POLLUTION ABATEMENT BY A LAKE ERIE MARSH AND ITS IMPLICATIONS FOR WETLAND RESTORATION POLICIES, Ohio

Project Type: assessment/research

Project Goals: To determine the long-term effect of agricultural runoff on the assimilative capacity of two Lake Erie marshes. Target analytes were those that have a negative impact on water quality in the littoral and open water zones of Lake Erie: sediment, carbon, organic matter, nitrogen, phosphorus, and selected pesticides (aldrin, dieldrin, endrin, endrin aldehyde, DDT and metabolites, and three hexachlorobenzene pesticides (HCHs)). To examine the value of wetlands in terms of mitigating the impacts of nonpoint source pollution on downstream habitats, rather than on NPS pollution impacts to the wetland habitat itself.

Project Status: complete

Narrative: This project is based on the premise that programs of wetland acquisition and management designed to emphasize water quality benefits of marshes, should be based on long-term information on contaminant assimilation by wetlands. Current land use practices generally divert nonpoint source runoff around marshes via ditches that discharge to Lake Erie. On the basis of scientific research showing how draining agricultural runoff through marshes abates pollution, the Winous Point Shooting Club breached its dikes to allow more runoff to flow through it rather than around it. The sustained ability of wetlands to remove pollutants during many decades is poorly documented. The long-term record of material transfer between water and sediment may be preserved in the sediment stratigraphy. These issues were addressed in a study of two marshes along the southwestern shore of Lake Erie, by analyzing accumulation records of sand-silt-clay, total phosphorus (TP), organic matter, metals and pesticides preserved in four sediment cores. The two marshes, North Marsh (260 ha) and West Marsh (220 ha), have been managed in the same fashion by the Winous Point Shooting Club for the past 150 years, except that the west marsh has been free from runoff since 1978. These wetlands are classified as palustrine emergent marshes and are dominated by persistent emergents, trees and shrubs. Their agricultural watersheds have been in use since the mid-19th century and are poorly drained. Both marshes have been protected by dikes from the high-energy open-lake environment since ca. 1920 and are situated between agricultural land to the north and Muddy Creek Bay to the south. This bay drains into Sandusky Bay and thus into Lake Erie.

Project Actions:

- Soil data and land use within the marsh watersheds was obtained from quadrangle maps and digitized for use in a GIS application.
- Two cores were taken from each marsh, core chronology was documented, and chemical analyses of the core were performed.
- Nutrient, organic matter, and sediment accumulation rates were calculated for each marsh.
- Pesticide concentration profiles were generated.

Results: Land use practices in the watershed of either marsh changed little since 1950. There was only slight evidence for separating pre-European agricultural deposits from more recent sediments. Phosphorus accumulation during the last 10 years in the North Marsh more than tripled compared with the accumulation rates during the 1920-1977 interval. The pesticide data from Winous Point showed variations of aldrin, endrin, HCHs, and DDT with depth that can be attributed to agricultural use. High concentrations of HCHs and endrin in West Marsh sediments since the mid-1960s point to a possible airborne source. There appeared to be a delay between pesticide application and deposition in the marshes. The continued ability of the North Marsh to sequester phosphorus from agricultural runoff suggests that marshes can play an important role in removing excess phosphorus over the long term. Marshes may also remove carbon and nitrogen from runoff.

Project Partners: Winous Point Shooting Club, J.F. Gottgens, A.L. Spongberg, and B.E. Muller, University of Toledo.

Additional Needs: Although this project is complete, some future needs were identified. Only those that apply to the LaMP habitat restoration context are included. Long-term, real-time research on nutrient and contaminant budgets in Laurentian marshes, linking sedimentary signals to a record of concentrations of target analytes in inflows and outflows, is needed. Pesticides that have been banned appear to still be entering the marsh. Therefore,

continued monitoring for these compounds is recommended. Although the project results make the anecdotal observation that the use of these marshes to trap phosphorus from runoff does not seem to impact the use of these marshes by waterfowl and wildlife, this was not specifically studied in this project. The LaMP would benefit from knowing if any of the pollutants, not just phosphorus, trapped in these wetlands are adversely impacting wildlife from the perspectives of use, reproduction, and/or bioaccumulation.

23. MANAGING AGRICULTURAL DRAINS TO ACCOMMODATE WILDLIFE - JAMES BERRY DRAIN PROJECT, Ontario

Project Type: restoration, monitoring

Project Goal: To provide an opportunity to incorporate the needs of fish and wildlife into drain design and maintenance.

Project Status: complete

Narrative: Agricultural drains are integral features of much of southwestern Ontario's farmlands. This Norfolk County demonstration project incorporates habitat-enhancing methods of maintaining or improving a drainage outlet, while reducing or minimizing costs. Fish and wildlife habitat features are enhanced and protected by buffer strips and rock chutes for bank erosion control. The drain is a warm water fishery that supports spawning pike. The site provided an opportunity to monitor the effectiveness of the buffer strips and investigate different maintenance techniques.

Project Actions:

- An Engineer's report under the Drainage Act identified a number of unique features for this six kilometre drain emptying into Big Creek Marsh (Class 1 wetland).
- The report included 9 metre wide continuous buffer strips, sediment basins, a retention pond with a water control structure, and a fish bypass.
- The performance of the retention pond in reducing sediment delivery to an adjacent 10 acre marsh was evaluated.
- The use of the buffers by wildlife species and waterfowl was also monitored.

Project Partners: Ontario Soil and Crop Improvement Association, Canadian Wildlife Service, Township of Norfolk, Long Point Region Conservation Authority, Ministry of Natural Resources, Long Point Bird Observatory, Wetlands/Woodlands/Wildlife Program - Canada/Ontario Agriculture Green Plan of Agriculture and Agri-Food Canada in co-operation with the Ontario Ministry of Agriculture, Food and Rural Affairs, National Soil Conservation Program, Murray Marsh Club.

Additional Details: This project is enhanced by neighbouring projects. An adjacent area features conservation tillage, and has had warm-season native grasses sown for wildlife habitat. To the west, another project includes a 3500' grassed waterway with two rock chutes and a series of catch basins installed in an agricultural field to intercept surface water flow. An outlet for the basin is provided by underground tile extending the full length of the waterway. To the east, a project undertakes upland restoration using native trees, shrubs, wildflowers and grasses. An existing 10-acre wetland is enhanced to create hemi-marsh conditions providing nesting habitats for water birds and staging habitat for waterfowl.

Similar Projects: Across Lake Erie's Ontario watershed, a number of projects similar to the above have been completed. In Kent County on the Rondeau Bay watershed, the John Clark Drain, an eroding watercourse in a cattle pasture, was successfully rehabilitated. The watercourse was regraded, eroding slopes were stabilized with a live-staked armoured mattress system, willow fascines installed at bases of eroded areas with red-osier dogwood brushlayer upslope. Vortex weirs were placed in-stream; all exposed soils were re-seeded with a mix including annual grasses and Canada wild rye. There have been at least six similar drain modifications completed in Essex County, four in Norfolk, and others in Elgin, Oxford and Kent Counties.

24. MARSH MONITORING PROGRAM, Long Point, Ontario

Project Type: monitoring, assessment/research, education/outreach

Project Goals: To provide baseline information on the population status of Great Lakes marsh birds and calling amphibians and assess their habitat requirements and in so doing contribute to evaluations that lead to the recovery of Areas of Concern.

Project Status: *ongoing*

Narrative: The Marsh Monitoring Program began in 1995 to: provide information about coastal and inland marsh birds and amphibians; contribute to the evaluation of highly degraded coastal and Great Lakes Areas of Concern; improve understanding of the habitat associations of wetland birds and amphibians; and involve skilled and motivated citizens in monitoring and conserving their local wetlands. Marsh birds and amphibians are significant components of coastal wetland ecosystems. Many may be locally or regionally in decline because of habitat degradation. With the help of volunteers from all over the basin, surveys of marsh birds and calling amphibians, as well as habitats, are taking place annually. The surveys are conducted using standardized protocols. Data is analyzed and conveyed to citizens binationally through a website, public presentations, and articles in newspapers and magazines. Since the Marsh Monitoring Program has established credible monitoring protocols, it will be responsible for reporting on two Great Lakes basin indicators of health at the binational State of the Great Lakes Ecosystem Conferences (SOLEC).

Project Actions:

- Solicit and train volunteers from areas of concern all over the Great Lakes basin to properly monitor marsh birds and/or calling amphibians.
- With volunteers, plot survey routes in each of the areas of concern.
- Collect survey data and maintain over the long term in order to measure trends.
- Analyze marsh bird and calling amphibian data to determine abundance and diversity in Great Lakes basin area of concern wetlands.
- Communicate results of the data analysis back to the volunteers and to resource managers.

Project Partners: Bird Studies Canada, Environment Canada, Great Lakes Protection Fund, U.S. Environmental Protection Agency, volunteers from around the Great Lakes basin.

Additional Needs: This long-term ongoing project needs consistent funding. For assisting the LaMP in setting management goals and measuring progress toward restoration of beneficial uses, it would help to establish consistent representative sites for monitoring.

Appendix D

13

25. MIGRATORY BIRD HABITAT – BIRD STUDIES CANADA HEADQUARTERS, Ontario

Project Type: restoration

Project Goal: To enhance an existing 10-acre wetland, creating hemi-marsh conditions which provide nesting habitats for water birds and staging habitat for waterfowl.

Project Status: *complete*

Narrative: This property is in the Dedrich Creek watershed, where other land uses include a golf course and a cemetery, making this a unique opportunity for naturalizing part of a tributary of the Long Point Inner Bay.

Project Actions:

- An extensive management plan for the property phased out agricultural fields.
- Water levels are manipulated when possible to provide exposed substrate in the upper end of the wetland during spring and late summer shorebird migration.
- Annual aquatic plants provide feeding opportunities for waterfowl and other birds in the fall.
- The manipulation of water levels also improves vegetation diversity and interspersions.
- Plantings of native trees, shrubs and grasses focus on interspersions among vegetation types and creation of dispersion corridors for migrant land birds.

Project Partners: Bird Studies Canada, Norfolk Field Naturalists, Ontario Heritage Foundation, Nature Conservancy of Canada, Long Point Region Conservation Authority, Ministry of Natural Resources, Environment Canada, Norfolk Land Stewardship Council, Ducks Unlimited.

Additional Details: The wetland perimeter will be enhanced by upland restoration using native trees, shrubs, wildflowers and grasses.

Similar Projects: Wetland enhancement projects, typically including tree plantings and wild rice establishment, are undertaken in a number of locations in the watershed, including campgrounds and sportsmen's clubs.

26. NEARSHORE HABITAT PRIORITIES FOR MIGRATORY SONGBIRDS, New York

Project Type: inventory, assessment/research, new tool/technology demonstration

Project Goal: Maps that identify key migratory songbird concentrations in nearshore habitats along the eastern Lake Erie and Lake Ontario shorelines. These maps will help determine habitat conservation priorities.

Project Status: ongoing

Narrative: Because the Great Lakes are barriers to migrating songbirds, nearshore habitats function as stopover areas. Not all shoreline stopover areas are of equal importance. Furthermore, stopover areas frequented by a great number of songbirds may not be of high quality, offering little in the way of energy replenishment. Using a remote sensing technique called Doppler radar, concentrations of songbirds along eastern Lake Erie and Lake Ontario are being identified. Subsequent to identification, songbirds will be captured to determine stopover length and the quality of the habitat as it relates to energy replenishment. The high quality habitats will be identified, prioritized and the information disseminated to be used for conservation planning. Planning efforts will be better able to target areas where beneficial uses are impaired.

Project Actions:

- Inventory migratory bird concentration areas in nearshore habitats.
- Assess stopover length and the changes in the condition of birds in different shoreline types.
- Incorporate information into regional conservation plans.

Project Partners: SUNY-College of Environmental Science and Forestry, Braddock Bay Bird Observatory, Genesee Land Trust, SUNY-Brockport, Clemson University, Bird Studies Canada, New York State Department of Environmental Conservation.

Additional Needs: The first two actions are in progress and expected to be completed in 2002. Additional resources will be needed to disseminate the information and incorporate it into regional conservation plans.

27. OJIBWAY PRAIRIES AND SAVANNAHS, Windsor, Ontario

Project Type: protection, education/outreach

Project Goal: Protection of the fragile prairie and savannah ecosystems and resident rare plant and animals populations while providing public access.

Project Status: ongoing

Narrative: The greatest challenge facing the Ojibway Prairie and Savannah Complex is changing the public's perception of nature by providing access to natural areas, while protecting fragile and globally rare plants and animals. Intensive human activities in and around the park have put stress on rare prairie and savannah habitats and consequently on the wildlife dependent on them. Public relations and education programs aimed at local residents have brought people to the complex to explore and learn about the diversity of plant and animal life that is thriving in this urban area. Neighbors are participating in naturalist field trips, bird-watching tours, and seasonal festivals, all designed to offer opportunities to learn about how ecosystems function and contribute to the health of the greater Lake Erie watershed.

Project Actions:

- Continue to manage Ojibway Prairie and Savannah Complex for its biodiverse plant and animal populations and to maintain the functioning of these rare ecosystems.
- Offer opportunities for the public to take part in nature-oriented activities.

Project Partners: Ojibway Nature Centre and Complex, Windsor Department of Parks and Recreation, Ontario Ministry of Natural Resources.

Projects Needs: Both project actions are ongoing and long-term and will require continued funds to maintain operations.

28. PENN SOIL RIPARIAN CORRIDORS, Pennsylvania

Project Type: restoration

Project Goal: Restored Lake Erie watershed tributaries that contribute to the health of native wildlife species and the lake itself.

Project Status: *ongoing*

Narrative: One of the major agricultural enterprises within the Lake Erie drainage basin is dairying. Stream watering for livestock is an age-old practice for area farmers. This direct access of the cows to the streams provides the opportunity for direct discharge of manure and soil erosion from the banks of the streams. The consequences are pollution of the waterway and the destruction of the ecosystem, including 20% of Pennsylvania's rare and endangered plant species, along the stream and tributaries leading to Presque Isle Bay and Lake Erie. Through landowner contact, progress is being made in restoring riparian corridors leading to Lake Erie. Using fencing, cattle are being kept from streams. Streambanks are then being replanted with native species. The result is habitat for a variety of wildlife species, including songbirds and waterfowl.

Project Actions:

- Fencing to exclude cattle from streams will be installed at selected sites pending landowner involvement.
- Degraded ecosystems within the Lake Erie watershed will be restored, including the reestablishment of indigenous plants along the riparian corridors of the tributaries to Lake Erie.

Project Partners: Crawford Conservation District, Erie Conservation District, Natural Resource Conservation Service, Penn Soil RC&D, U.S. Environmental Protection Agency.

Additional Needs: The above two action items are pilots. Additional resources will be needed to carry out the fencing and the restoration on additional sites.

29. PLANT COMMUNITY SURVEY OF OHIO'S LAKE ERIE DRAINAGE, Ohio

Project Type: inventory

Project Goal: Identification of plant communities in the Lake Erie drainage of Ohio in order to better set priorities to protect habitat for rare plants.

Project Status: *complete*

Project Narrative: Prior to this project, the classification of plant communities in the Lake Erie drainage of Ohio was incomplete or preliminary. Most natural communities have been transformed by timbering, agriculture, and urban and industrial development, leaving few known high quality areas for the state's rare plants. This complete survey of plant communities is helping resource managers to set priorities for habitat protection that will benefit Ohio's rare plants.

Project Actions:

- Review all plant community records.
- Conduct plant community surveys to document additional sites.
- Rank plant communities to assess their conservation priority as rare plant habitat.

Project Partners: Ohio Division of Natural Areas and Preserves, The Nature Conservancy Great Lakes Program.

30. PORTAGE RIVER WATERSHED IMPROVEMENT PROJECT, Ohio

Project Type: restoration

Project Goal: Improved water quality along the Portage River.

Project Status: ongoing

Narrative: A \$300,000 grant was given to the Toledo Metropolitan Council of Governments to provide incentives to landowners to install filter strips to prevent erosion along the Portage River. Water quality is expected to improve as a result.

Project Partners: Toledo Metropolitan Council of Governments, Ohio Environmental Protection Agency, Portage River Basin Council.

31. RE-ESTABLISHING THE FRESHWATER UNIONID POPULATION OF METZGER MARSH, Ohio

Project Type: restoration

Project Goal: The re-establishment of a viable native clam community in Metzger Marsh.

Project Status: ongoing

Narrative: One of the most devastating ecological problems resulting from the invasion of the non-indigenous zebra mussel has been the virtual elimination of native unionid clams. A large population of native clams was discovered in Metzger Marsh in 1996 after dewatering to replace an eroded dike. During dewatering, the clams were removed and placed in aquaria. Further field observations and laboratory experiments showed that warm summer water temperatures and soft, silt-clay sediments common to wetlands trigger complete burrowing of the clams. This provides spatial separation that discourages the zebra mussels from infesting and serves as a physical cleansing mechanism to remove any encrusted zebra mussels. Recent surveys failed to find any live unionids outside of the marsh in the littoral zone of western Lake Erie. This project is returning the 21 species of native clams to Metzger Marsh with access to Lake Erie. Wetlands such as Metzger Marsh may provide a refugia for maintaining native clam stocks in waters colonized by zebra mussels.

Project Actions:

- The adult clams originally collected before dewatering were measured and tagged in order to monitor their rate of survival.
- Growth rates of young native clams were monitored and will be compared to that of clams released back into the marsh.
- Reproductive capability will be monitored for at least two years after reintroduction to the marsh.
- Successful recruitment of juveniles into the marsh will be monitored.

Project Partners: U.S. Geological Service, Biological Resources Division

Additional Needs: The original project will be completed in 2000; however, additional monitoring for long-term success will be needed for several years.

32. RESTORATION OF HABITAT AT PRESQUE ISLE, Pennsylvania

Project Type: restoration

Project Goal: The wetlands and dunes of Presque Isle will be restored to support healthy bird, amphibian and insect populations.

Project Status: ongoing

Narrative: Presque Isle's 3200 acres of wetlands and dunes have been impacted by a variety of invasive plant species including tree of heaven, European white birch, Japanese bittersweet, hairy willow herb, Japanese bush honeysuckle, purple loosestrife, Eurasian watermilfoil, reed canary grass, *Phragmites*, curly pondweed, narrow-leaved cattails, and hybrid cattails. The invasions have turned species-rich habitats into monocultures or habitats for just a few species that crowd out native species. The result is a diminishment or fragmentation of healthy habitats for native wildlife. Eliminating non-indigenous invasive species from Presque Isle is restoring and enhancing wetland and dune habitat for native bird, amphibian and insect populations, and preventing further loss of wildlife habitat.

Project Actions:

- Draft a plan that addresses control techniques for management units on Presque Isle.

- Use a variety of eradication techniques such as burning, cutting, hand removal, and herbicides to eliminate non-indigenous invasive species from wetland and dune habitats.
- Monitor the effects of eradication techniques on native plant species.
- Monitor the effects of healthier wetland and dune habitats on bird, amphibian and insect populations.

Project Partners: Presque Isle Partnership, Pennsylvania Department of Conservation and Natural Resources, Mercyhurst College, Cleveland Museum of Natural History, Penn State University.

Additional Needs: A plan (Action 1) is in place and eradication at specific sites (Action 2) has occurred. Additional funds are needed to completely eradicate non-indigenous invasive species throughout Presque Isle and monitor the effects on native plant species and on bird, amphibian and insect populations (Actions 3 and 4).

33. RESTORING AN ENDANGERED SPECIES TO MIDWEST OAK OPENINGS, Toledo, Ohio

Project Type: restoration, new tool/technology demonstration, education/outreach

Project Goals: Sufficient habitat to reintroduce the endangered Karner blue butterfly, extirpated from the Toledo, Ohio area since 1989.

Project Status: *ongoing*

Narrative: The Karner blue butterfly was extirpated from Toledo, Ohio in 1989 because of the loss of its primary habitat, oak openings. Oak openings are globally imperiled communities that support a diversity of plants and animals. Even more significant, loss of oak openings has contributed to soil erosion and the resulting sedimentation of the Maumee River. In order to restore the integrity of remaining parcels of oak openings at various sites in the region, restoration has been initiated on more than 300 acres. Intensive land management will restore critical habitat components for the Karner blue butterfly. Reintroduction is expected by the year 2000. In addition to the Karner blue, the habitat is important for the frosted elfin and Persius dusky wing butterflies, both state endangered species. A targeted education outreach program is also being developed to promote stewardship of public lands in the Toledo area.

Project Actions:

- Using the latest ecological restoration technologies, more than 300 acres will be intensively managed, including invasive species removal, prescribed burning, and planting and seeding.
- Baseline community plots will be monitored for critical Karner blue habitat components and release sites selected.
- The Karner blue butterfly will be released and monitored as part of the endangered species plan.

Project Partners: Toledo Metroparks, The Nature Conservancy, Ohio Department of Natural Resources, University of Toledo, Bowling Green State University, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency.

Additional Needs: Actions 1 and 2 are in progress. Monitoring of Karner blue for success after release and continued management of restored sites will require additional funds.

34. SPRINGFIELD TOWNSHIP NATIVE VEGETATION ENHANCEMENT PROJECT, Michigan

Project Type: planning/coordination/collaboration

Project Goal: To revise Springfield Township standards and ordinances so that native vegetation plantings are encouraged in planning for development.

Project Status: *ongoing*

Narrative: This is a habitat project in Springfield Township, Michigan. Springfield Township will work in five areas: 1) develop education materials about the project and the benefits of using native vegetation, and provide a system for information dissemination to developers, builders, landscape designers, suppliers and homeowners; 2) analyze existing Township standards and ordinances for possible conflicts with native vegetation enhancement goals;

3) develop proposed revisions to standards and ordinances that encourage integration of native vegetation into design and development practices, such as stormwater management; 4) develop proposed guidelines for the protection and re-use of existing native vegetation on sites being developed; and 5) develop a database of native plants appropriate for use in the Township and identify sources for these plants.

Project Partners: Springfield Township, Oakland County, Michigan.

35. ST. CLAIR RIVER LAKEPLAIN PRAIRIE AND OAK SAVANNA ECOSYSTEM RESTORATION, Michigan

Project Type: inventory/classification, planning/coordination/collaboration, restoration

Project Goal: Restored lakeplain prairies and oak openings within the St. Clair River delta and the Algonac Area.

Project Status: ongoing

Narrative: The lakeplain prairies and oak openings within the St. Clair River delta and Algonac area are globally imperiled coastal communities. Less than 0.6 percent of Michigan's original lakeplain prairie and oak savanna communities remain. Several sites, including St. Clair Flats Game Area, Algonac State Park, and Dickinson and Harsens Islands, harbor state-endangered or threatened species (11 plants, 7 animals), and the federally threatened eastern prairie fringed orchid. This is one of the best opportunities for restoration of these community types. Restoration will benefit habitats closely associated with globally rare species particularly along the shoreline.

Project Actions:

- An inventory and monitoring plan for the natural areas of St. Clair Flats Game Area, Algonac State Park, and Dickinson and Harsens Islands is complete.
- Baseline inventories for plants and insects are being conducted.
- Restoration activities, including invasive species control and controlled burning, will begin once inventories are complete.
- Public education and volunteer stewardship training will be needed to accomplish restoration goals and raise public awareness of the resources.

Project Partners: Michigan Natural Heritage Program, Southeast Michigan Planning Council of Governments, Michigan Waterways for Wildlife Council.

Additional Needs: Additional resources are needed for stewardship training and material for public outreach.

36. TOUSSAINT RIVER IMPROVEMENT INCENTIVE PROGRAM, Ohio

Project Type: restoration

Project Goal: Improve the health of the Toussaint River by instituting conservation practices.

Project Status: ongoing

Narrative: This program offers financial incentives to install filter strips, set aside floodplain lands, and use conservation tillage practices to improve the health of the river by reducing sediment runoff and creating wildlife habitat.

Project Partners: Maumee RAP, U.S. Environmental Protection Agency.

37. URBAN DYNAMICS OF LAND USE CHANGE AND SHORELINE DEVELOPMENT ALONG THE DETROIT RIVER, Michigan, Ontario

Project Type: assessment/research, inventory/classification, education/outreach

Project Goal: Measure historic and landscape changes and predict ecological and natural resource impacts of proposed projects in master plans already approved by jurisdictions along the Detroit River.

Project Status: ongoing

Narrative: Geographic analysis combines an understanding of the demographic, economic, social, and geographic history of a region with the quantitative assessment of the spatial patterns, trends and rates of land use change. While goals of this program emphasize present-day environmental issues and local concerns, the historical component is crucial to

understand how the modern urban environment evolved. By combining the analysis of urban land use change with historical and geographic information, an **urban biography** can be derived that integrates temporal layers of geographic information with the pace, patterns, and extent of the urbanization process. The resulting interpretation integrates factors that drive, enable, shape, constrain, and sustain specific land use practices and patterns, such as urban sprawl.

Project Actions:

- Document rates of changes in wetlands, farmlands, forests, and lakeplain prairie resulting from transformation of the natural landscape into an urban environment in the Detroit-Windsor corridor.
- Assess losses of fish habitat over time caused by changes in the channels of the Detroit River, including increased water depth and cross-sectional area, as a result of numerous navigation projects that deepened the river, armored the shoreline, and altered shallow, gradually-sloping, littoral areas.
- Educate the public about the influences of human immigrations, water level fluctuations, intensity of international trade, drainage laws, ship building, industrialization, wetland protection by private and public agencies, and modern transportation on land use changes, landscape morphology, and shoreline development.

Project Partners: U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, International Joint Commission, Southeast Michigan Council of Governments, City of Detroit, City of Windsor, Essex Region Conservation Authority, Ontario Ministry of Natural Resources, Canada Fisheries and Oceans, Michigan Department of Natural Resources, Central Michigan University, Grosse Ile Township, Greater Detroit American Heritage Rivers.

PRELIMINARY LIST OF PROPOSED PROJECTS

1. AQUATIC RENEWAL PROGRAM/COMMUNITY RIVER KEEPERS, Ontario

Project Type: planning/coordination/collaboration, restoration, education/outreach

Project Goal: A community-based rehabilitation initiative of restoration projects undertaken through voluntary action with funding and support and technical advice from dedicated staff.

Project Status: *proposed*

Narrative: The current demand for community groups to work on a “backyard resource” is huge. Agencies and public groups cannot meet the demand and interest in this type of effort. The public wants to be involved in local projects to improve water quality and build a sense of environmental and community responsibility. Previous efforts have been tremendously successful in developing local stewardship of these precious resources and a passion for working together for a common interest. Funding would be put into a coordinated, prioritized program to accommodate the level of interest. Areas where plans for watercourses or sub-watersheds are currently waiting to be implemented or have restoration initiatives begun would have the highest priority. The need to service this interest goes beyond the urban fringes of the middle Grand River and will continue to grow as the public realizes that technical advisors and funding are available.

Project Partners: Grand River Conservation Authority.

Project Needs: \$150,000 for each of five years.

2. ATLAS OF BIODIVERSITY OF SOUTHEAST MICHIGAN WATERSHEDS: LAKE HURON TO LAKE ERIE CORRIDOR

Project Type: inventory/classification, assessment/research, education/outreach

Project Goal: To demonstrate the local and global significance of the biodiversity of the Lake Huron-Lake Erie corridor. To promote a broad-based understanding of the significance of the region’s biodiversity.

Project Status: *Proposed*

Narrative: The Atlas will be a compendium of information about the ecology and geology of the watersheds of the St. Clair River, Lake St. Clair, and the Detroit River. It will explain the geology of the area and delve into the various plant communities, including wetlands, prairies, woodlands, and riparian and upland zones. It will describe pre-European settlement vegetation, give examples of those remnant plant communities still existing, and outline steps we can take to protect and restore the resource for the future. It will highlight how these areas serve as important habitat for wildlife, and describe how they are an essential convergence point for hundreds of thousands of waterfowl during their migration along both the Atlantic and Mississippi flyways.

Project Actions:

- Identify, survey, describe, and map existing vegetative features along the Huron/Erie corridor and Lake St. Clair.
- Describe the geology of the watersheds.
- Describe pre-European settlement vegetative conditions, and identify the remnants of these communities.
- Highlight and explain the importance of this region as a major migration flyway.
- Produce an atlas that will be widely distributed to the public.

Project Partners: Wildlife Habitat Council, DTE Energy, U.S. Environmental Protection Agency, Michigan Department of Natural Resources, Michigan Natural Features Inventory, Greater Detroit American Heritage River Initiative, St. Clair River RAP, Clinton River RAP, Lampton Stewardship Network, City of Detroit, Great Lakes Commission, Environment Canada, Ontario Ministry of the Environment, Essex Region Conservation Authority.

3. ASSESSMENT OF MERCURY CONTAMINATION ON ENDOCRINE DISRUPTION AND REPRODUCTION POTENTIAL OF LAKE TROUT, New York

Project Type: assessment/research, inventory, restoration

Project Goal: Identification of cause and effect relationship between mercury contamination and reproductive impairment.

Project Status: proposed

Narrative: One of the major environmental problems in the Great Lakes ecosystem is the potential ecological and human health impacts of chemicals that disrupt the endocrine system and the immune system through chemical messengers known as hormones. The endocrine system is a network of glands and organs regulating many biological functions, including growth, metabolism and reproduction. Chemicals that elicit endocrine-disrupting effects in animals include a wide range of organic compounds and pesticides. Although significant progress has been made in the rehabilitation of fish communities in the Great Lakes in the past 25 years, fishery management agencies have been stocking lake trout into the Great Lakes for several decades with little success. Lack of sustained natural reproduction of lake trout and other salmonids highlight the need for further rehabilitation. Several factors, including bioaccumulation of contaminants in these fishes have been suspected to be responsible for their lack of natural reproduction. Mercury is a potential endocrine disruptor in fish and is responsible for lakewide impairments in Erie. The proposed study will focus on the endocrine-disrupting effects of mercury, and the results will be used to develop a model to help fishery managers predict reproductive potential of lake trout in Lake Erie based on the fish's mercury burden. The results of the proposed study can also be used to refine the beneficial use impairment assessments in the Lake Erie LaMP.

Project Actions:

- Investigate the effect of methyl mercury on reproductive hormones (testosterone and estrogen) and reproductive success of lake trout used by the U.S. Fish and Wildlife Service and New York State Department of Environmental Conservation to stock Lake Erie.
- Determine habitats in Lake Erie where lake trout populations will be most at risk of mercury contamination.
- Develop an empirical model to predict reproductive success of lake trout exposed to mercury contamination in Lake Erie.

Project Partners: U.S. Fish and Wildlife Service, New York State Department of Environmental Conservation, Pennsylvania Fish and Boat Commission, U.S. Geological Survey, and Buffalo State College.

Project Needs: Funding needed to accomplish project actions.

4. CALEDONIA FISHWAY IMPROVEMENTS, Ontario

Project Type: restoration

Project Goal: To replace a fishway located at the Caledonia Dam on the Grand River in order to improve passage of the fish community over this barrier.

Project Status: proposed

Narrative: The final design for this project has been completed and will emphasize the provision of passage for non-jumping fish species such as walleye, bass, pike, mooneye, crappie and various forage species. The Grand River Fisheries Management Plan indicated barriers to fish migration played a significant role in limiting fish production particularly in the lower Grand River and ultimately in Lake Erie. Fish needed access to high quality habitat upstream as far as Brantford but could not negotiate the fishways at the Caledonia Dam. Thus far, more than \$50,000 has been invested in biological investigations and engineering design to develop the best available fishway. Cost estimates range from \$400,000 to \$500,000 and corporate sponsors are actively being sought to participate in this venture. Ontario Ministry of Natural Resources has committed significant funds to the building of this fishway if partner funds can be secured.

Project Partners: Grand River Conservation Authority, Ontario Ministry of Natural Resources.

Project Needs: \$150,000 in the year 2000.

5. DETROIT RIVER ECOLOGICAL RISK ASSESSMENT

Project Type: assessment/research, inventory/classification

Project Goal: A completed ecological risk assessment of the Detroit River.

Project Status: *proposed*

Narrative: The initial focus of this project would be to conduct an ecological risk assessment of the entire Detroit River with an objective of evaluating the environmental and human health impacts of pollutants in the river. Cleanup actions are often triggered by human health standards, which differ from toxicity standards for benthic communities. Currently, there is no mechanism in place to address lower levels of contaminants in sediments under traditional federal regulatory authorities, so damage must be evaluated on a case-by-case basis using risk assessment tools. In order to move toward delisting degradation of benthos as an use impairment, a risk assessment is necessary to evaluate and establish authority over impaired areas that are below existing regulatory levels. This project would evaluate the entire river in order to understand the dynamics of the system and associated problems.

Project Partners: U.S. Environmental Protection Agency, Environment Canada, U.S. Army Corps of Engineers, Great Lakes Institute for Environmental Research, U.S. Geological Survey, U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, Ontario Ministry of Natural Resources.

6. DETROIT RIVER GIS AND OUTREACH MAPPING PROJECT

Project Type: inventory, assessment/research, education/outreach

Project Goal: To provide an easy, reliable, cost-effective, and accessible mechanism for distribution of a wide variety of standardized and geo-referenced data sets to stakeholders for spatial data analysis and thematic mapping purposes.

Project Status: *proposed*

Narrative: The Lake Huron/Lake Erie corridor is comprised of the St. Clair, Lake St. Clair, and Detroit River. The rivers are Areas of Concern (AOCs). In 1996, the third priority recommendation of the Detroit River RAP report was to develop a geographic information system (GIS) for the St. Clair/Detroit River AOCs. It was recognized that timely access to accurate spatial data in a GIS is a key tool for efficient and cost-effective decision making. Addressing the information needs outlined in the RAPs with a comprehensive GIS will greatly assist the environmental restoration goals of the Lake Erie LaMP. Along with addressing LaMP goals, GIS analysis and mapping would be instrumental in spills planning, the binational Lake Huron/Erie corridor monitoring strategy, habitat and biodiversity location mapping, and the Greater America Heritage Rivers historic features mapping. Available data sets on commercial, industrial, and environmental information, as well as habitat, cultural, transportation, hydrologic, and physical landform features would also be assembled and disseminated. The tool will provide a solid foundation for inter-agency spatial data sharing and collaboration across the region.

Project Actions:

- Develop and distribute a survey to United States and Canadian agencies responsible for AOC and Lake St. Clair remediation and habitat restoration efforts. The survey would evaluate data availability, cost of procurement, data needs and presentation standards required to assist stakeholders with Huron/Lake Erie corridor projects.
- Develop data processing and presentation protocols based on the survey.
- Process data and design customized mapping tools for standard mapping presentations.
- Distribute standardized data layers and mapping tools on CD-ROM media to stakeholder agencies.
- Disseminate information and mapping tools to the general public via Internet from a website and server located at Eastern Michigan University CEITA lab.

Project Partners: Eastern Michigan University, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, Michigan Department of Environmental Quality, National Oceanographic and Atmospheric Administration (NOAA), U.S. Geological Survey, Great Lakes Commission, Southeast Michigan Council of Governments, University of Windsor-GLIER, Environment Canada, Ontario Ministry of the Environment, Essex Region Conservation Authority.

7. DETROIT RIVER SOFT SHORELINE PROJECT

Project Type: restoration, education/outreach

Project Goal: To re-engineer the Detroit River and Belle Isle with soft shorelines to provide fish spawning habitat.

Project Status: *proposed*

Narrative: A Natural Resource Conservation Service staff person is needed to work in the Detroit metro area, particularly on Belle Isle, to offer assistance in re-engineering the shoreline. Currently, much of the shoreline is hardened, having little value as fish habitat. Re-engineering the shoreline to include soft shoreline would expand fish spawning habitat.

Project Partners: Natural Resource Conservation Service, Detroit American Heritage Rivers, City of Detroit.

8. EPHEMERAL WETLAND CONFERENCE

Project Type: education/outreach

Project Goal: Hold a conference that brings together ephemeral wetland and amphibian experts to compile information on the decline of ephemeral wetlands in the area and the effect on amphibian populations.

Project Status: *proposed*

Narrative: Ephemeral wetlands are critical ecosystems throughout the Great Lakes and the Midwest. Loss of these wetlands is contributing to an overall decline in amphibians. This conference would bring together ephemeral wetland and amphibian experts to share information and disseminate this information to a wider audience, thus laying the foundation for protection and restoration work.

Partners: U.S. Environmental Protection Agency, other federal and state agencies.

9. ESTIMATION OF LAKE TROUT MORTALITY FOLLOWING STOCKING IN LAKE ERIE, Pennsylvania, New York and Ontario

Project Type: restoration, monitoring, planning/coordination/collaboration

Project Goal: Restore a naturally reproducing lake trout population in the eastern basin of Lake Erie that will eventually yield an annual harvestable surplus.

Project Status: *proposed*

Narrative: The current lake trout restoration effort in Lake Erie began in 1976. Several strains of lake trout are raised to yearlings at the U. S. Fish and Wildlife Service Allegheny National Fish Hatchery. The U.S. Fish and Wildlife Service and the New York State Department of Environmental Conservation stock the yearlings at several locations in the lake. Assessments of the lake trout population have shown a decline in juvenile lake trout abundance since 1994 in Lake Erie. These observations have resulted in questions about the post-stocking survival of the hatchery reared fish. Is this due to changes in the quality of the stocked fish or have changes in the lake resulted in lower survival during the first year? Factors that may be responsible for post stocking lake trout mortality include stress due to transport and stocking, change in water quality, predation, and availability of food for the stocked fish. The stresses with stocking include transport in aerated truck tanks for several hours, release through hoses into the water, and changes in water chemistry. It is likely that any mortality from stocking would occur within a few days. The purpose of this study is to get a more accurate measure of the mortality associated with the stress of stocking the yearling lake trout. Holding the fish in net pens will eliminate increased risk of mortality due to predation on potentially stressed fish. Keeping the fish for a short period will rule out lack of food as a cause of mortality. Measurement of water chemistry parameters may identify potential causes of mortality.

Project Actions:

- Stock yearling lake trout following standard stocking protocol into several net pens and monitor mortality for a 48 hour period before releasing into the lake.
- Conduct study for two to three years and include strain and site differences.
- Develop a model to predict stocking mortality and stocking density needed to produce and maintain a naturally reproducing lake trout population.

Project Partners: U.S. Fish and Wildlife Service, New York Department of Environmental Conservation, Pennsylvania Fish and Boat Commission, U.S. Geological Survey/Biological Resources Division, Ontario Ministry of Natural Resources.

Additional Needs: Funds are needed to increase the number of replicates and include assessment of each strain stocked in Lake Erie.

10. HIBERNATION, SEASONAL ACTIVITY, MOVEMENT PATTERNS AND FORAGING BEHAVIOR OF ADULT LAKE ERIE WATER SNAKES (*Nerodia sipedon insularum*), Lake Erie Islands, Ohio

Project Type: habitat assessment/inventory/classification

Project Goals: 1) Locate and characterize hibernation sites used by adult Lake Erie water snakes on Kelleys, South Bass, Middle Bass, and North Bass Islands. This information is lacking and is needed for effective recovery plan development. 2) Characterize seasonal activity patterns of adult Lake Erie water snakes, especially the time of entry into and emergence from hibernation. This period of the life cycle may represent a time of increased vulnerability to human disturbance and natural enemies. 3) Characterize movement patterns of adult Lake Erie water snakes throughout the active season. Although previous data suggest that Lake Erie water snakes are fairly site specific, occasional documentation of snakes moving between islands and study sites occurs. In addition, many marked snakes are never recaptured, pointing to a need for more complete understanding of adult movement patterns. Once this data is obtained it will allow determination of the required habitat size needed to effectively protect the Lake Erie water snake. 4) Characterize the foraging behavior of adult Lake Erie water snakes. Although diet composition data are available, less is known about foraging locations and the length and frequency of foraging bouts. Boat traffic and other human activities may have an impact on the snakes that forage in the nearshore waters of Lake Erie. 5) Locate and characterize sites used by pregnant female snakes when giving birth.

Project Status: *proposed*

Narrative: The Lake Erie water snake is one of many wildlife species classified as impaired in the Lake Erie LaMP wildlife assessment. On August 30, 1999, the U.S. Fish and Wildlife Service listed the Lake Erie water snake as threatened under the Endangered Species Act. A species is designated as threatened if it is likely to become in danger of extinction within the foreseeable future throughout all or a significant portion of its range. Recent data show that the number of snakes per kilometer of shoreline has declined dramatically at key study sites - by 75% on North Bass Island and by 81% on Middle Bass Island. The current estimate for the U.S. population ranges from 1,520 to 2,030 adults. The Lake Erie water snake is primarily limited to 22 islands and rock outcroppings in western Lake Erie that are more than 1 mile from the Ohio and Canadian mainland. There are relatively few Lake Erie water snakes on the mainland and they often interbreed with other snake in these situations. Stated another way, 95% of the Lake Erie water snake population is currently restricted to an area with a diameter of less than 20 km (25 miles). The Lake Erie water snake uses habitat composed of shorelines that are rocky or contain limestone/dolomite shelves and ledges for sunning and shelter. The population suffers from three problems: 1) declines in population density, 2) current reproduction and survival rates appear insufficient to allow the population to increase to levels higher than existing vulnerable thresholds, and 3) low population densities and insular distribution make it vulnerable to extinction or extirpation. This project is designed to answer research questions so that a recovery plan can be developed.

Project Actions:

- Radio transmitters will be implanted in 20 adult males and 25 adult females, which will allow tracking for a 2-year period. The females will be captured while pregnant and maintained in captivity until they give birth. Then the transmitters will be implanted and they will be released.
- Throughout the course of this study, non-telemetered snakes will be captured, marked with subcutaneous PIT tags, measured, and released to provide updated census data. This includes the young born to the above-mentioned females.

Project Partners: *Potentially* U.S. Fish and Wildlife Service, Northern Illinois University,

Ohio Department of Natural Resources - Divisions of Wildlife and Parks and Recreation, The Ohio State University - F. T. Stone Laboratory, and Ohio Sea Grant. Discussions with all potential project partners have not occurred due to current lack of funding.

Project Needs: 1) Project Funding of approximately \$130,000 is needed over a 5-year period (\$50,000 for each of the first 2 years, and \$10,000 for each of the remaining 3 years). The major expenses include radio transmitters and tracking equipment, PIT tags, and other field equipment, travel, and personnel costs for the people tracking the snakes. 2) Linking Research - The Lake Erie LaMP Animal Deformities or Reproductive Problems Assessment indicates that Lake Erie water snake is exposed to considerable PCB levels in its diet from western Lake Erie. A Canadian study of biological effects of PCB exposure in Lake Erie water snakes at Pelee Island is underway. Because the proposed study of U.S. Lake Erie water snakes calls for handling many snakes, it may present a potential opportunity to expand research about PCB exposure effects into the U.S. population. 3) If desired, a subset of the Lake Erie water snakes born to the females in captivity could be used to repopulate Green and West Sister Islands.

11. HILLMAN MARSH MUDFLAT RESTORATION, Ontario

Project Type: restoration

Project Goal: Create and manage mudflat habitats for migratory bird species in Point Pelee National Park and Hillman Marsh Conservation Area.

Project Status: proposed

Narrative: Point Pelee National Park and Hillman Marsh Conservation Area are important stopover sites for migratory bird species on the Mississippi Flyway. While marsh habitat is abundant at Hillman, mudflat habitat is under-represented both at the Conservation Area and regionally. The restoration project will involve the creation of managed mudflat habitats through elevation modifications and water level controls to create one of the premier mudflat habitats in the Mississippi Flyway portion of the Great Lakes basin.

Project Partners: Essex Region Conservation Authority.

Additional Needs: Cost for this project is \$250,000.

12. LAKEWIDE COORDINATED LOWER TROPHIC LEVEL ASSESSMENT IN LAKE ERIE, Ontario, New York, Pennsylvania, Ohio, and Michigan

Project Type: monitoring, planning/coordination/collaboration

Project Goal: Provide a standardized lakewide database describing lower trophic levels.

Project Status: proposed

Narrative: Ecosystem change associated with zebra and quagga mussels, and phosphorus control has substantially altered the productive potential of the Lake. The amount of food at the base of Lake Erie's food web, as measured by phytoplankton production and chlorophyll *a*, has declined 49-90% since 1991 and may now be limiting the production of important fish species. Understanding the effects of changes in the environment and the food web, and their respective influences on the composition and productivity of the fish community are imperative for the sustainable management of fisheries in Lake Erie and elsewhere. This long-term, lakewide database describing lower trophic levels will be an invaluable resource to managers and researchers in modelling the Lake Erie ecosystem. Recognizing the extent of ecosystem change, and linking it to fisheries production will enable managers to seek conservative actions to ensure the fisheries remain sustainable in light of changing environmental conditions. The present paucity of information collected in a standardized and lakewide fashion limits our present ability to adaptively manage the resource during this period of transition. The coordinated, interagency approach, including the maintenance of a centralized database will ensure all information is available to all interested parties through the Forage Task Group report presented annually to the Great Lakes Fishery Commission. Sample processing will be coordinated through a minimum number of contractors to ensure consistency. Preliminary work was conducted in 1999.

Project Actions:

- Identified approximately 20 stations scattered throughout the lake.

- Collection of samples annually from May through September by each participating agency.
- Laboratory analysis of phosphorus, chlorophyll *a*, phytoplankton and zooplankton identification and biomass calculation, and benthic invertebrates.
- Maintenance of a centralized database. All information will be available to all interested parties through the Forage Task Group annual report.

Project Partners: Ohio Department of Natural Resources, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, New York State Department of Environmental Conservation, Pennsylvania Fish and Boat Commission, U.S. Geological Survey/Biological Resources Division, Ontario Ministry of Natural Resources.

Additional Needs: Although each participating agency will support the field collection of samples, a long-term source of funding is still needed for laboratory analysis.

13. LAND STEWARDSHIP INCENTIVE PROGRAM, Ontario

Project Type: restoration

Project Goal: Provide technical support and financial incentives for land stewardship activities which would address water quality and fish habitat degradation problems throughout the Grand River, Ontario watershed.

Project Status: *proposed*

Narrative: The intention of this proposed project is to reverse water quality and habitat losses due to nonpoint sources of sediment and nutrients. These improvements would be carried out through a coordinated program of streambank buffer development, instream rehabilitation, wetland creation, livestock access restriction, tree planting and education packages. The priority would be to undertake projects where impacts are the greatest and the potential for improvement is the highest, i.e. the main river and tributaries of the Nith River, Conestoga River and Grand River upstream of Belwood Reservoir. The incentive program would complement the Region of Waterloo/GRCA Rural Water Quality Program that is currently funding \$1.5 million over five years within the municipality. This project would target areas where these funds are not available.

Project Partners: Grand River Conservation Authority

Project Needs: Funding to initiate and sustain the project.

14. ONTARIO CONSERVATION RESERVE PROGRAM, Ontario

Project Type: restoration

Project Goal: Improved water quality and reduction in soil erosion.

Project Status: *proposed*

Narrative: This project would implement a pilot program on a watershed basis that mimics the Conservation Reserve Program available in the United States. Cultivated land adjacent to watercourses and wetlands would be targeted for retirement into a permanent grass cover or for reforestation. An expanded program would be implemented across southern agricultural Ontario. Objectives would be to reduce soil erosion, improve water quality and fish and wildlife habitat.

Project Partners (potential): Ducks Unlimited Canada, Ontario Federation of Anglers and Hunters, Trout Unlimited, National Wild Turkey Federation, Ruffed Grouse Society, Wildlife Habitat Canada, Ontario Stewardship, Ontario Soil and Crop Improvement Association, Conservation Ontario.

Project Needs: Resources necessary to implement this project.

15. PHRAGMITES CONTROL ON LONG POINT, Ontario

Project Type: restoration, assessment/research, monitoring

Project Goal: Control invasive *Phragmites australis* in Long Point wetlands.

Project Status: proposed

Narrative: *Phragmites australis* (common reed grass) is threatening coastal wetlands throughout the lower Great Lakes. Further research, monitoring, and control is warranted. Long Point in Ontario is a good potential study site.

Project Partners: Bird Studies Canada

Project Needs: Resources to initiate a research, restoration, and monitoring program at Long Point.

16. ROUND GOBY AS A VECTOR OF CONTAMINANTS FOR SELECTED LAKE ERIE LITTORAL-ZONE PISCIVORES

Project Type: monitoring, assessment/research

Project Goal: Estimate bioaccumulation of contaminant levels in selected littoral-zone piscivores that feed on the round goby.

Project Status: proposed

Narrative: In 1990, the round goby (*Neogobius melanostomus*) was first discovered in North America in the St. Clair River near Windsor, Ontario. Since then, the range of this non-indigenous benthic fish species has grown to include all five of the Great Lakes, as well as several tributaries within the Great Lakes watershed. Currently, the largest population of round goby within the basin can be found in Lake Erie, as a result of both introduction dynamics and the large amount of ideal habitat that the lake has to offer. Within the past 5 years, catch-per-unit-effort data from various state, federal, and provincial fishery surveys have shown a steady increase in round goby numbers. In addition, the detected range of the goby within the lake has consistently grown, demonstrating the ability of this species to rapidly colonize large portions of nearshore habitat. Recent investigations have shown that dreissenids (zebra and quagga mussels) comprise approximately 70 to 90% of the diet of adult round goby in Lake Erie. Because of this high reliance upon dreissenids, it is believed that goby may become recipients of contaminants (e.g. PCBs) previously isolated within dreissenid tissue. Over time, goby tissue may contain a significant contaminant burden as a result of biomagnification. Previous research has demonstrated the possibility that round goby consumption can cause increases in the PCB tissue levels of some predators. Lake Erie fishery surveys have shown that several fish species are becoming increasingly reliant upon round goby as a forage base. Because of this predator-prey interaction, larger, relatively long-lived piscivores may experience heightened contaminant burdens as a result of biomagnification, and potentially impair piscivore reproduction in the lake.

Project Actions:

- Assess the contaminant levels of round goby and selected piscivores.
- Analyze contaminant burden data for spatial and temporal heterogeneity.
- Assess diets of piscivores to determine proportion of round goby in diets.
- Develop a predator/prey model based on data collected during field surveys.
- Develop contaminant burden predictive model for round goby and selected piscivores.

Project Needs: Funding needed to accomplish project actions.

17. RURAL NONPOINT SOURCE POLLUTION REMEDIATION PROGRAM, Ontario

Project Type: restoration

Project Goal: Improve water quality and reduce loading to Lake Erie.

Project Status: proposed

Narrative: Presently, Environment Canada funds the Rural Nonpoint Source Program for the Detroit River and Muddy Creek watersheds. The balance of the region is not able to access incentive grant funds under this program to undertake riparian planting projects, implement sediment and erosion control projects (e.g. rock chute installation), purchase no-till planters, or upgrade faulty septic systems in high priority areas. The project would expand the Rural Nonpoint Source Program to the Lake St. Clair and Lake Erie watershed

to improve rural water quality and loadings to the Great Lakes.

Project Partners: Essex Region Conservation Authority

Project Needs: Approximately \$130,000 per year.

18. WESTERN LAKE ERIE WATERSHED CONSERVATION RESERVE ENHANCEMENT PROGRAM, Ohio

Project Type: restoration

Project Goal: To improve water quality in the Lake Erie watershed of Ohio.

Project Status: *proposed*

Narrative: The Ohio Conservation Reserve Program would like to commit environmentally sensitive land to the conservation reserve program in order to improve water quality. Riparian buffers, filter strips, and windbreaks would be installed. Wildlife habitat and wetlands would be protected and restored. Other best management practices would be instituted.

Project Partners: Ohio Conservation Reserve Enhancement Program, Ohio Department of Natural Resources.

19. NATURAL RESOURCE DAMAGE ASSESSMENT FOR ASHTABULA RIVER RAP, Ohio

Project Type: restoration, planning/coordination/collaboration

Project Goal: To atone for years of chemical stress on the aquatic community in the river and to restore habitat lost in the Ashtabula River AOC.

Project Status: *in the planning stages*

Narrative: As part of the Ashtabula River RAP, implementation of habitat restoration projects is being discussed. There are several areas in the river where habitat improvement can be accomplished now. There are other areas where habitat restoration cannot be done until the contaminated sediments have been dredged from the river. This won't be completed until 2005. The federal and state natural resource trustees are in the process of negotiating with the responsible parties for further habitat preservation and restoration in and near the Ashtabula River and Harbor.

Project Partners: Ashtabula River RAP, Ashtabula River Partnership, U.S. Fish and Wildlife Service, Ohio Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency.