Investing in
renewal
Ten Years of Grantmaking
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Background

The Great Lakes Fishery Trust (GLFT) was created in May 1996 to compensate the residents of Michigan for the lost use and enjoyment of the fishery resources of Lake Michigan caused by the operation of the Ludington Pumped Storage Plant (LPSP), located in Ludington, Michigan.

In 1973, Consumers Energy (formerly Consumers Power Company) and the Detroit Edison Company began commercial operation of the LPSP. The jointly owned hydroelectric generating facility draws water from Lake Michigan into an upland reservoir through large, reversible pump-turbines during periods of low electric demand and generates power by discharging water from the reservoir during periods of peak demand.
The Creation of the Trust

By 1986, it had become apparent that the plant’s operations were causing fish losses. When the utilities were unable to implement effective barriers to prevent fish losses at the facility as required under their Michigan Great Lakes Bottomlands lease and their Federal Energy Regulatory Commission (FERC) license, the Michigan United Conservation Clubs (MUCC) and the National Wildlife Federation (NWF) initiated legal actions. The State of Michigan also intervened in the federal licensing proceeding to require installation of devices to minimize future fish losses, and filed a separate action in state court seeking compensation for fish losses.

After nearly ten years of legal proceedings and negotiations, MUCC, NWF, the U.S. Department of the Interior, and several Indian tribes joined the state of Michigan in a comprehensive settlement with the utilities. The complex settlement involves several components, including the installation of seasonal barrier nets to reduce future losses of fish at the facility, compensation for past damage to fish, and payments for unavoidable future losses that will occur. In exchange, the utilities are authorized to operate the facility under a federal license that expires in 2019.

Essential components of the settlement, approved by the Michigan Public Service Commission and the Federal Energy Regulatory Commission in 1996, included the creation of the GLFT, a trust fund to mitigate for the unavoidable fish losses. A cash payment by the two utilities of $5 million and the transfer of approximately 10,800 acres of company properties established the initial corpus of GLFT. In addition, the settlement provided for the transfer of over 15,600 acres of undeveloped company lands to the State of Michigan, funding of seven fishing access improvements near utility-owned Great Lakes shoreline generating facilities, annual payments to support the work of a Scientific Advisory Team, and annual compensation payments to the GLFT for future fish losses occurring at the facility.
Uses of the GLFT

GLFT grant funds awarded under the agreement give preference to Lake Michigan projects with a focus on the following activities:

- Research directed at increasing the benefits associated with Great Lakes fishery resources
- Rehabilitation of lake trout, lake sturgeon, and other fish populations
- Protection and enhancement of fisheries habitat, including Great Lakes wetlands
- Public education concerning the Great Lakes fisheries
- Acquisition of real property for the above purposes, or to provide access to the Great Lakes fisheries

Under the terms of the settlement, the GLFT trustees are also authorized to grant funds for other purposes consistent with the types of projects outlined above.

GLFT Members

The GLFT is administered by a board of trustees representing parties to the settlement. The board consists of six members plus two provisional members (see page 13 for a listing of current board members). The Michigan Department of Natural Resources (MDNR) director is the permanent chair of the board.

The Scientific Advisory Team (SAT) is composed of representatives of the organizations serving on the GLFT Board of Trustees (except for the Michigan Department of Attorney General) and includes representatives from Consumers Energy and the Detroit Edison Company, the Chippewa Ottawa Resource Authority, and one representative selected by mutual agreement of the NWF, MUCC, and MDNR. As its name implies, the SAT plays an advisory role to the GLFT, but also has some independent responsibilities with respect to overseeing and approving certain technical provisions of the FERC license requirements for the LPSP and fish-loss prevention strategies. A list of SAT members is provided on page 13.

The GLFT is a private, nonprofit corporation operating independently of the public agencies, Indian tribes, and private conservation organizations that make up its board of trustees. Using funds derived from the settlement, the GLFT contracts for its administrative and management support services through a private firm, Public Sector Consultants, located in Lansing, Michigan. Over ninety percent of the expenditures of the GLFT have been for grants to governmental and nonprofit organizations. The management expenses for the contracted staff services as well as the expenses for legal, investment management, auditing, real estate services, and other contract work essential to operation of the trust have been less than ten percent of the total expenditures.
Accomplishments to Date

The GLFT has liquidated all of the 10,800 acres of land it received under the settlement and has invested the revenue received to support its grant programs. The proceeds from the land sales, the original $5 million payment, and the annual compensation for fish losses averaging approximately $2.5 million each year have been invested in the corpus of the GLFT or used to fund operations and grant projects. Since the first pilot project grants were awarded in 1998, the GLFT has provided in excess of $40 million in grants and has approximately $24 million in invested assets.

Funded grant projects and related activities focus on the types of projects specifically identified in the settlement. The GLFT has worked cooperatively with research institutions; state, tribal, and federal management agencies; regional authorities; non-governmental organizations; and private foundations to maximize the effectiveness of its grant programs and to encourage collaboration to address issues of common concern. The GLFT uses a variety of approaches to solicit proposals for funding. Requests for proposals are sent to potentially interested parties around the Great Lakes via mail, e-mail, and Web-based Listservs. An online application system for proposals is now used for all grant solicitations. The GLFT has also contributed resources to seminars, forums, and conferences to encourage collaboration and transfer of information on the Great Lakes fishery and ecosystem among researchers, managers, funders, and stakeholders.

The following are GLFT's grant categories and their respective goals. The amount of grants awarded in each category is shown on the next page.

- Great Lakes Stewardship: Increase awareness and understanding of Great Lakes ecology so that Michigan's residents become (1) active and effective stewards of the Great Lakes and (2) advocates for strategies that support the long-term sustainability of the Great Lakes fisheries.

- Ecosystem Health and Sustainable Fish Populations: Develop knowledge and management capability that will restore and maintain the biological integrity of the Lake Michigan fish community so that production of desirable fish is sustainable and ecologically efficient.

- Access to the Great Lakes Fishery: Improve or create new tribal and/or shore-based recreational access to fish for Great Lakes species.

- Muskegon River Initiative: The GLFT selected the Muskegon River Watershed for a special initiative to fund intensive habitat restoration and protection efforts.

- Special Projects: Allow for proposals that fall outside of the GLFT’s routine, regularly scheduled, competitive grant programs to assure timely response to important issues affecting the Great Lakes ecosystem and seize unique opportunities that fit within the GLFT’s mission.
Grant Awards by Category
1998–2008
Total: $40,838,562

- Ecosystem Health and Sustainable Fish Populations: $19,623,397
  - Access to the Great Lakes Fishery: $9,563,863
  - Great Lakes Stewardship: $6,169,552
  - Exotics/Food Web Disruption: $3,674,991
  - Fishery Health: $5,356,409
  - Fishery Recruitment: $3,225,565
  - Habitat Protection/Restoration: $3,209,036
  - Lake Sturgeon Rehabilitation: $4,157,396
  - Special Projects: $5,318,233
- Great Lakes Stewardship: $6,169,552
- Muskegon River Initiative: $1,942,516
- Muskegon River Initiative: $1,942,516
Selected Grantee Highlights

A list of all the grants the GLFT has made can be found beginning on page 15 and at www.glft.org. The following are descriptions of four grants the GLFT has made that exemplify the trust’s unique nature, willingness to collaborate, and ability to respond quickly to Great Lakes threats.
Great Lakes Stewardship Initiative

At a time when young people are increasingly disconnected from the outdoors, the GLFT is investing in an initiative that promises to help them discover that each of us has an important role to play as a steward of Michigan's environment. To encourage stewardship of the Great Lakes, the GLFT worked with foundations, community organizations, and educators to create the Great Lakes Stewardship Initiative (GLSI). The GLSI connects K–12 schools with their communities to create opportunities for learning that are meaningful for students and have a lasting impact on the environment. Regional hubs offer professional development that helps teachers facilitate inquiry-based learning and problem-solving. Hubs also help organize and sustain school-community partnerships and provide leadership within their regions. The initiative’s approach to teaching and learning results in vibrant, hands-on experiences that increase student achievement and help young Michigan residents become lifelong stewards of the Great Lakes. The GLFT has committed $10 million to the GLSI over the next ten years. For more information about the Great Lakes Stewardship Initiative, go to www.glstewardship.org.
The Muskegon River Initiative

In 2000, the GLFT selected the Muskegon River for a special initiative to fund intensive habitat evaluation, restoration and protection efforts. At the same time, Michigan State University invited the staff of the GLFT to partner with the Wege Foundation, which had decided to support a forum of Michigan scientists to develop collaborative research proposals for enhancement and protection of the Muskegon River Watershed. With assistance from the Community Foundation for Muskegon County, the Wege Foundation invited local stakeholders to join scientists from a variety of Michigan colleges and universities for a weeklong conference.

Collaborative proposals were developed as a result of the conference and funded by a variety of organizations. The GLFT invested nearly $5 million in the watershed, funding two research projects and capacity-building at the Muskegon Watershed Assembly. The two research projects, conducted by a coalition of scientists from Michigan State University, University of Michigan, Grand Valley State University, and Purdue University, document the condition of the Muskegon River system in order to preserve its most valuable natural features. Researchers assessed the ecological health of 93 tributaries, 64 lakes, and 85 wetlands in the Muskegon River system. The information has been fed into a model, created by the researchers, to evaluate the risks and benefits of alternate land and water management strategies. To learn more about the project, go to www.mrwp.net.
Addressing the Threat of VHS

When news spread that a deadly fish virus had made
its way to the Great Lakes, the GLFT responded quickly
with a $750,000 grant in early 2008. The grant is helping
researchers from the U.S. Geological Survey’s Western
Fisheries Research Center, Michigan State University, and
Cornell University to provide resource managers in the
Great Lakes region with new tools and information to better
understand, predict, and manage the threat posed by viral
hemorrhagic septicemia, or VHS. The research will compare
the effects of VHS on native and Great Lakes sportfish,
including lake trout and Pacific salmon, and develop new
and faster detection techniques that address key information
gaps identified by the Michigan Department of Natural
Resources. VHS doesn’t affect humans, but significant losses
among muskellunge, walleye, yellow perch, smallmouth
bass, round gobies, bluegill, black crappie, and gizzard shad
have been seen during the period from 2005 to 2007. The
discharge of ballast water from ocean-going vessels is a
suspect in the introduction of the disease to the lakes.
Lake Sturgeon Rehabilitation

The history of this ancient family of fishes stretches back to the time when dinosaurs roamed the earth. By the early 1900s many populations had been greatly reduced or destroyed through loss of habitat, dam construction, overfishing, and pollution. GLFT has invested $4.1 million in the rehabilitation of lake sturgeon populations. Projects include disease research, monitoring and assessment, reef construction, mortality and recruitment mechanisms, and genetic identification (for a complete list of projects, see pages 33–38). Since 2000, the GLFT has funded semi-annual Great Lakes Basin-wide sturgeon coordination meetings. The first meeting was designed to convene lake sturgeon researchers and fisheries managers to better understand the most pressing research questions for lake sturgeon rehabilitation. The GLFT used the proceedings from that meeting to guide its funding strategies for lake sturgeon rehabilitation.

Subsequent meetings have provided a biannual forum to foster communication and exchange of information relating to the study, management, and restoration of lake sturgeon in the Great Lakes Basin; address priority research and assessment needs and selected emerging issues.

Since 2000, the research community has made important strides toward understanding the needs and challenges of lake sturgeon rehabilitation. There are now several management tools, including tagging programs, shared databases for sturgeon information, and genetic analyses, to assist in sturgeon restoration in the Great Lakes. The work of the lake sturgeon research community eventually led to the innovative use of mobile hatchery units that use water from the selected restoration river to rear small sturgeon for release. This ground-breaking streamside-rearing hatchery approach formed the foundation for a pilot stocking program in Wisconsin in 2005.

Because of the longevity of lake sturgeon and its naturally sporadic spawning cycles, its rehabilitation and management pose long-term challenges. The GLFT is confident, however, that its investments now in activities that lay a sound scientific foundation will help guide future management and rehabilitation decisions for decades to come.
Board, Scientific Advisory Team, Staff

**Board of Trustees**
Andy Buchsbaum, Director, Great Lakes Field Office, National Wildlife Federation
Michael Cox, Attorney General (James Riley, Assistant Attorney General, designee), Michigan Department of Attorney General
Doug Craven, Natural Resources Director, Little Traverse Bay Band of Odawa Indians (provisional)
Rebecca Humphries, Director, Michigan Department of Natural Resources
Vacant, Natural Resources Director, Little River Band of Ottawa Indians (provisional)
Suzanne McSawby, Vice Chairman of Tribal Council, Grand Traverse Band of Ottawa and Chippewa Indians
Dennis Muchmore, Executive Director, Michigan United Conservation Clubs
Charles Wooley, Deputy Regional Director, U.S. Fish and Wildlife Service, Department of the Interior

**Scientific Advisory Team**
Doug Denison, National Wildlife Federation
John Robertson, Michigan United Conservation Clubs
Tom Gorenflo, Chippewa Ottawa Resource Authority
Sharon Hanshue (Co-Chair), Michigan Department of Natural Resources
Mark Holey, U.S. Fish and Wildlife Service, Department of the Interior
Matt Shakelford, Detroit Edison Company
Steve Lenart, Little Traverse Bay Band of Odawa Indians
Archie Martell, Little River Band of Ottawa Indians
Erik Olsen, Grand Traverse Band of Ottawa and Chippewa Indians
Gary Dawson (Co-Chair), Consumers Energy
Bill Taylor, Michigan State University

**Staff / Public Sector Consultants**
Julie Metty Bennett, Manager
Mark Coscarelli, Manager
Shivaun Rayl Andrews, Assistant Manager
Carol Barish, Accounts Manager
Holly Madill, Operations Manager
Jack Bails, Manager, 1996–2008 (retired)
Projects Funded by the Great Lakes Fishery Trust
1998–2008
Access to the Great Lakes Fishery

Montague Fishing Access
Jerry Graham
City of Montague

The project improved angler access at an existing city park, Medbery Park. The park improvements include improved entrance road, paved parking for approximately 50 vehicles, pedestrian walkway connecting to the north channel of White Lake, vault toilet, landscaping, benches, and picnic tables.

Pentwater (Mears Walkway)
Roger MacLeod
Village of Pentwater
4/27/1998–10/31/2001 $54,000

The south project included a concrete walk from the street to the pier, a barrier-free fishing deck at the eastern end of the pier, vault toilet, and 21 parking spaces (one barrier-free) along Chester Street. There is no fee to use this facility.

Pentwater (Facility Construction)
Roger MacLeod
Village of Pentwater

The north project included two separate sites: Channel Lake Park and Bridge Street access site. Channel Lake Park features paved parking for 18 vehicles, a handicapped-accessible restroom, picnic facilities, and benches. The Bridge Street access site has paved parking for four vehicles.

Sutton’s Landing Improvements
Joanne Kelley
Pere Marquette Charter Township

The Pere Marquette Charter Township angler access improvement project at Sutton’s Landing was a pilot project (1998) of the Great Lakes Fishery Trust. This two-year project improved the Sutton’s Landing Park, which served 7,500 fishermen per year prior to improvements. The boat launch provides access to Pere Marquette Lake, the Pere Marquette River, and Lake Michigan.

Ludington, South Pier
Mary Beutell
City of Ludington
8/10/1998–10/26/2000 $80,000

The project improved angler access by connecting an existing parking area to the south pier. The improvements include the handicapped-accessible walkway and paved parking for approximately 12 vehicles.

Fruitland Township Public Access
Greg Boughton
Fruitland Township

(Preliminary Engineering)

The project provided funds for engineering design to improve angler access to the White Lake south pier. The improvement features improved parking at the White River Station Park and Dock Road, including handicapped parking, construction of a handicapped-accessible ramp to the pier, cement slab for port-a-john placement, and landscaping.
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Organizer</th>
<th>Dates</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruitland Township</td>
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<tr>
<td>The project improved angler access to the White Lake south pier. The improvement features improved parking at the White River Station Park and Dock Road, including handicapped parking, construction of a handicapped-accessible ramp to the pier, cement slab for port-a-potty placement, and landscaping.</td>
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<tr>
<td>U.S. Army Corps of Engineers</td>
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<td>This project expanded the White Lake pier by adding additional feet on both sides.</td>
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<tr>
<td>Chippewa Ottawa Resource Authority</td>
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<tr>
<td>This project identified potential projects to enhance public and tribal fishing access in northern Lake Huron, northern Lake Michigan, and eastern Lake Superior.</td>
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<tr>
<td>City of Ludington</td>
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<tr>
<td>The City of Ludington angler access improvement project is located in downtown Ludington and was completed in the fall of 2000. This project provided enhanced opportunities for shore fishing of Great Lakes species as part of the new downtown harbor redevelopment project on Pere Marquette Lake, adjacent to Lake Michigan.</td>
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<tr>
<td>National Wildlife Federation</td>
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<tr>
<td>This study assessed the potential fishing access sites in southeast Michigan along the Detroit River.</td>
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<tr>
<td>Construction of a Barrier-Free Fishing Platform at the Rogers City Boat Harbor</td>
<td>Robert Fairbanks</td>
<td>7/19/1999–7/19/2001</td>
<td>$150,000</td>
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<tr>
<td>City of Rogers City</td>
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<tr>
<td>This project provided enhanced angler access to Lake Huron fish populations as part of recreational improvements (including a new breakwall) at the city's boat harbor.</td>
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<tr>
<td>Village of Elberta</td>
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<tr>
<td>This project provided shore-fishing opportunities for Great Lakes species entering Betsie Lake as part of a larger recreational project involving creative re-use of the former car/railroad ferry site.</td>
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<tr>
<td>Arcadia Kid’s Fishing Dock</td>
<td>Janice McCraner</td>
<td>7/24/2000–7/24/2001</td>
<td>$14,950</td>
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<tr>
<td>Arcadia Township</td>
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<td>A barrier-free children's fishing dock was installed on the shore of Arcadia Lake near Arcadia in 1997. Through this grant, Arcadia extended that dock by 40 feet into the lake to enhance deep water fishing opportunities.</td>
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<tr>
<td>Montague Fishing Bridge</td>
<td>Tom Hamilton</td>
<td>7/27/2000–7/28/2002</td>
<td>$100,000</td>
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<tr>
<td>White Lake Area Sportfishing Association</td>
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<td>The railroad trestle crossing the White River between the cities of Montague and Whitehall in Muskegon County is now part of the Rails-to-Trails extension under construction. This project created a 244-foot-by-8-foot Americans with Disabilities Act (ADA)-accessible fishing bridge attached to the downstream side of the trestle.</td>
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Harbor Drive Angler Fishing Access Project  
Anthony Furton  
City of Menominee  
$172,000  
The city constructed an accessible walkway, which serves as a fishing site with direct access to the water and also provides pedestrian access to the U.S. Army Corps of Engineers Pier for fishing.

Betsie Valley Trail Fishing Bridge  
Sean DuPerron  
Benzie County  
12/14/2000–5/31/2001  
$75,000  
This bridge provides new shore-based, universally accessible fishing of migrating Lake Michigan trout and salmon at the mouth of the Betsie River as it enters Betsie Lake.

Suttons Bay Village Fishing Pier  
Philip Hamburg  
Village of Suttons Bay  
$180,000  
This project installed a fishing pier on a historic coal dock property, now the Village Municipal Marina, for the use and enjoyment of all local and tourist shore-based anglers.

Riverside Park Access Project  
Tim Karl  
City of Detroit  
2/20/2001–8/12/2003  
$545,000  
This project provided improvements to the promenade and development of an on-site fisheries education program.

Big Sable River Access Improvements at Ludington State Park  
Paul Peterson  
Michigan Department of Natural Resources  
5/1/2001–11/30/2003  
$378,453  
This project improved angler access by connecting an existing parking area to the south pier. The improvements include the handicapped-accessible walkway and paved parking for approximately 12 vehicles.

Dutcher’s McKay Bay Access Site Improvement Project  
Jane TenEyck  
Chippewa Ottawa Resource Authority  
$220,080  
The McKay Bay access site improvement project enhanced tribal and nontribal fishing opportunities in northern Lake Huron. The enhancements are for both recreational anglers and commercial fishing vessels at McKay Bay.
Lake Michigan Oval Park Improvement Project  
Steve Fleming  
Benona Township  
8/31/2002–6/30/2004  $74,700  
A community effort led by Benona Township to improve and beautify public access to this fishermen’s hot spot.

Black River Access Improvement Project  
Kevin Anderson  
City of South Haven  
8/31/2002–3/1/2004  $225,000  
Provided angler access amenities and general improvements along a 765-foot stretch of the Black River, just upstream of Lake Michigan. The site serves the City of South Haven and its surrounding regions.

City of Cheboygan Major City Park Public Fishing Access Phase II  
Scott McNeil  
City of Cheboygan  
8/31/2002–5/31/2006  $79,000  
Two additional fishing piers were added to the park. Each pier is 16 feet wide and 18 feet long. Amenities include barrier-free access benches, handicapped-accessible parking, and lighting.

Harrison Township/Lake St. Clair Great Lakes Fishing Site: Phase I Site Design/Engineering  
Kristen Bennett  
Michigan Department of Natural Resources  
The MDNR used this grant money for an engineering study and environmental assessment on a parcel of Lake St. Clair property on which the MDNR sought to enhance shoreline fishing opportunities and restore native vegetation.

Beaver Island Dock Expansion  
William Rastetter  
Grand Traverse Band of Ottawa and Chippewa Indians  
1/1/2003–12/31/2003  $578,662  
Enabled tribal trap net fishing vessels to access the commercial fishery targeting whitefish.

Beaver Island Tribal Fishing Access  
Doug Craven  
Little Traverse Bay Bands of Odawa Indians  
1/1/2003–12/31/2003  $215,000  
This project supported continued access for tribal commercial fishermen at Beaver Island. Improvements include new dock space, a sea wall, an icehouse, a well, a work area, and a security fence.

Distribute the Let’s Fish Lake Michigan Shore-Based Angling Guide  
Dennis Muchmore  
Michigan United Conservation Clubs  
The project updated, printed, and distributed the guide to approximately 65,000 MUCC members and distributed 35,000 copies at MUCC events.

Elizabeth Park North Fishing Point  
Steve Alman  
Wayne County  
5/1/2003–3/31/2006  $250,000  
Grant funds were used to stabilize the eroding shoreline, increase fishing access, and enhance the fishing habitat at Elizabeth Park in Trenton, Michigan, along the Detroit River.

Frankfort Lake Michigan Beach Restoration Project  
Joshua Mills  
City of Frankfort  
5/6/2003–5/6/2004  $81,000  
This project was the first construction phase of a multifaceted project to upgrade Frankfort’s waterfront parks and fishing access opportunities. This specific phase consisted of construction of a T-shaped fishing pier on Betsie Lake. The site planning for this project was completed with a matching grant from Coastal Management.
Betsie Valley Trail Railroad Causeway Bridge Amenities for Fishermen
Benzie County

This project included construction of a fishing platform and fishermen access to the banks of the Betsie River during renovation of the Railroad Causeway Bridge. This was part of a $1.7 million project to complete the Betsie Valley Trail from Frankfort to the Railroad Point Natural Area on Crystal Lake.

Heinz Waterfront Walkway
City of Holland

The Heinz Waterfront walkway extends approximately 2,000 linear feet west of the City of Holland's Kollen Park along the shore of Lake Macatawa. This project provides enhanced opportunities for shore fishing, meeting the needs of residents and visitors of all ages and abilities. The walkway is a combination of boardwalk and paved paths and includes six barrier-free overlook/fishing decks, seating areas, and lighting.

Escanaba River Shore-Fishing Access Project
City of Escanaba

Grant funds were used to construct an 8-foot-by-617-foot boardwalk at the North Shore Boat Launch in Wells Township. It is ADA-compliant and accessible from a previously existing paved parking area.

Bird Creek Park Recreational Shore Fishing
Huron County Road Commission

The Huron County Road Commission, in cooperation with the GLFT, completed the Bird Creek Park recreational shore fishing project, located in the Village of Port Austin. Improvements included the construction of four fishing platforms connected by a barrier-free sidewalk linked to the existing boardwalk and parking area. To complement the fishing platforms, 200 feet of fish lunkers were built in front of each platform.

Muskegon Lake Nature Preserve Boardwalk with Fishing Access
Muskegon Environmental Research & Education Society

The Wilder River Walk located at the Muskegon Lake Nature Preserve was constructed along the Muskegon River, near the mouth where it empties into Muskegon Lake. The 985-foot walkway includes an additional 400-foot extension spur into the Muskegon Lake Nature Preserve, and seven fishing platforms.

New Richmond Bridge County Park: Phase I
Kevin Ricco 11/1/2005–12/31/2008 $100,000
Allegan County Parks Commission

The project is on the north and south sides of the Kalamazoo River and consists of a renovated public access launch and parking area, new restroom building, five ADA fishing piers on the river, boardwalks along the river, interpretive signage, and a small picnic area.

Tribal Fishing and Recreational Fishing Access Project: Mackinaw City
Doug Craven 11/1/2005–12/31/2008 $651,251
Little Traverse Bay Bands of Odawa Indians

The Little Traverse Bay Bands of Odawa Indians constructed a floating dock system attached to tribal property adjacent to an LTBB-owned fish market in Mackinaw City. This dock will accommodate tribal commercial fishing vessels, conservation enforcement vessels, and other authorized watercraft plus public access for recreational fishing.
<table>
<thead>
<tr>
<th>Project</th>
<th>Contact Person</th>
<th>Dates</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gladstone 10th Street Fishing Pier</strong></td>
<td>Nicole Sanderson</td>
<td>11/1/2005–11/30/2007</td>
<td>$350,000</td>
</tr>
<tr>
<td>City of Gladstone</td>
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<tr>
<td>The 10th Street Pier project converted a hazardous attractive nuisance into a facility that allows access to Little Bay de Noc and provides quality shore-fishing opportunities for anglers of all ages and abilities.</td>
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<tr>
<td>Detroit RiverFront Conservancy</td>
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<td>The Detroit Riverfront Conservancy is constructing a three-and-one-half-mile pathway along the Detroit River known as the Detroit RiverWalk. With GLFT funding, the Conservancy provided designated and separated access that caters to anglers. It enhanced two distinct access sites along the RiverWalk that are identified for angler use.</td>
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<tr>
<td><strong>Frankfort Lake Michigan Beach Pier Access Project</strong></td>
<td>Joshua Mills</td>
<td>11/7/2006–11/7/2007</td>
<td>$44,045</td>
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<tr>
<td>City of Frankfort</td>
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<tr>
<td>An ADA-accessible walkway was constructed on the Lake Michigan beach in the City of Frankfort. The site has free parking, restrooms, a footwash station, swingsets, benches, trash receptacles, and educational signage about the dangers of waves and surges along with safety rules associated with the pier.</td>
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<tr>
<td><strong>Walkway Access to the Portage Lake/ Lake Michigan South Pier</strong></td>
<td>David Meister</td>
<td>11/7/2006–12/7/2007</td>
<td>$89,016</td>
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<td>Onekama Township</td>
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<td>This project provided barrier-free access to excellent recreational fishing through the construction of a walkway and related facilities to the south pier of Portage Lake on Lake Michigan, a pier maintained by the U.S. Corps of Engineers.</td>
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<tr>
<td><strong>Dingell Park Boardwalk and Fishing Access</strong></td>
<td>Jim Moran</td>
<td>11/7/2006–12/31/2007</td>
<td>$400,000</td>
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<td>City of Ecorse</td>
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<td>With matching input from the City of Ecorse, the old, decaying boardwalk at Dingell Park, on the Detroit River, has been completely refurbished, and transformed into the John D. Dingell Riverwalk, thus beautifying the park and allowing greater fishing access for local anglers.</td>
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</table>
Detroit River International Wildlife Refuge Gateway Fishing Access Facility

This project will allow construction of a new fishing pier and boat dock at the Detroit River International Wildlife Refuge Gateway site. The project includes construction of an aggregate access road, a boardwalk out into the Detroit River, a floating dock system, and a newly constructed dike providing accessible fishing access to one of the largest walleye fisheries in North America. The GLFT provided the funding for engineering and design of the site.

Manistee Lake Fishing Piers
Renee Ihlenfeldt 11/6/2007–8/30/2009 $289,450

This project will provide increased recreational access to the Great Lakes fishery, including increased access for tribal recreational and subsistence fishing. Universally accessible fishing piers and directional and educational signage will be constructed at two optimal locations on Manistee Lake for targeting migratory Great Lakes species and migrating coolwater species.

Sebewaing County Park Shore-Fishing Access
Steve Romzek 11/6/2007–9/30/2009 $192,000

Huron County Road Commission

The Sebewaing County Park shore-fishing access project will provide for free, handicapped-accessible shore fishing on three different platforms in the popular County Park at the mouth of the Sebewaing River on Lake Huron. The project will include new access to a shore island via a footbridge, bank stabilization, and handicapped-accessible walkways.

Manistique River Shore-Fishing Access Site Project

City of Manistique

The project is intended to provide public access shore-fishing opportunities on the only publicly owned river frontage within the City of Manistique. The project will include construction of public access piers on the Manistique River 1,600 feet above the river mouth utilizing existing shore support facilities at the West Shore Boat Launching Facility and the installation of three 30-foot-by-24-foot ADA-compliant cantilevered piers.

Lake Fanny Hooe Fishing Pier at Fort Wilkins State Park

Michigan Department of Natural Resources

This project will provide new recreational fishing access by constructing a fishing pier on Lake Fanny Hooe, which is connected to Lake Superior.

River Woods on the Trail: Black River Access and Kal-Haven Trail Interconnectivity

Van Buren County Drain Commission

This project is a recreational fishing and walking interconnectivity between the Black River, Kal-Haven Trail, the public, and “RiverWoods on the Trail” single-family subdivision.

Access to Amenities in Mears State Park
Troy Rife 11/6/2007–11/30/2008 $140,500

Michigan Department of Natural Resources

This project will provide anglers using the Pentwater Pier and the canal with access to amenities within Mears State Park via a concrete walkway that connects to a Corps of Engineers walkway spur.
Bridgeton Township Land Acquisition

Bridgeton Township

This grant will allow for the acquisition of approximately five acres of property adjacent to the Bridgeton Township Boat Launch Facility on the Muskegon River to provide for current and future use, access, and safety.

Deerlick Creek Park

South Haven Charter Township

This grant will allow South Haven Township to purchase 2.1 acres to provide access to 170 feet of Lake Michigan frontage and 0.82 acres of wetland and floodplain along Deerlick Creek (an MDNR-designated trout stream and smelt dipping area). This area has been important to fishermen for over 100 years.

Ecosystem Health and Sustainable Fish Populations

Conference

Preparing for Climate Change in the Great Lakes Region

Don Scavia 4/10/2008–9/30/2008 $10,000
University of Michigan

This workshop will address adaptation needs for climate change in the Great Lakes region and begin the development of strategies for addressing those needs in decision making.

Fourth Annual Great Lakes Restoration Conference

Chris Grubb 8/5/2008–10/1/2008 $10,000
National Wildlife Federation

The Healing Our Waters–Great Lakes Coalition, which administers the Healthy Lakes, Healthy Lives public awareness campaign, was launched with the generous support of the Wege Foundation and Peter Wege.

Great Lakes Urban Habitat Restoration Symposium

Marc Gaden 9/1/2008–2/1/2009 $5,000
Great Lakes Fishery Commission

The focus of the symposium is on habitat restoration in urban areas. The urban nearshore zone, with over 17,000 kilometers, is heavily stressed by habitat alterations associated with increasing populations, heavy industry, commercial navigation, and pollution. This symposium will provide technical knowledge, coordinate existing efforts to maximize the effectiveness of work being done, and improve attendees’ ability to define what comprises a successful urban restoration project.

Economics

Economic Summit on Lake Michigan Invasive Species

Frank Lupi 9/1/2006–12/31/2007 $19,691
Michigan State University

This workshop/summit was designed to stimulate and inform economic research on the growing problem of invasive species in Lake Michigan. The summit brought university ecologists and economists together with policymakers from the Michigan Department of Environmental Quality, USFWS, EPA, and Great Lakes agencies to foster dialogue and collaborations, and to stimulate research informed by real agency concerns and needs.
Economics of the Lake Michigan Recreational Fishery
Frank Lupi 9/1/2006–9/1/2009 $259,349
Michigan State University
The project will measure the economic effects (expenditures and value) of recreational fishing on Lake Michigan and other Great Lakes. In addition to providing contemporary economic baseline data, the model will permit managers to assess the economic effects of fishery decisions.

Exotics/Food Web Disruption

The Feasibility of Biocide Application in Controlling the Release of Non-Indigenous Species from Ballast Water
National Oceanic and Atmospheric Administration
This project sought to investigate further the use of glutaraldehyde to treat both no-ballast-on-board (NOBOB) and ballast-on-board (BOB) shipping vessels. The main focus of this study was to access the logistics, efficacy, and environmental acceptability of treating vessels claiming NOBOB. A secondary goal was to evaluate the treatment of BOB vessels.

Effect of Diporeia Declines on Fish Diet, Growth, and Food Web Dynamics in Southeast Lake Michigan
University of Michigan
This project related the potential differences in fish diet and food web dynamics between St. Joseph and Little Sable Pointe to recent declines in Diporeia (an invertebrate food source).

Exotic Invertebrates, Food-Web Disruption, and Lost Fish Production
Ann Krause 8/15/2000–1/15/2002 $12,000
Great Lakes Fishery Commission
This project helped promote understanding of the impacts of dreissenid and cladococera invaders on lower-lakes fish communities and forecasting invasion impacts on upper-lakes fish communities.

An Evaluation of Bioenergetics Modeling for Lake Whitefish in Lake Michigan
Stephen Brandt 8/1/2001–6/30/2005 $201,114
University of Michigan
The goal of this project was to determine the age-specific diet and energy density of lake whitefish on a seasonal basis, as well as the seasonal energy density of major food types of lake whitefish.

Effects of Exotic Species and Human Impacts on Essential Fatty Acid Availability on the Lake Michigan Food Web
John Dettmers 9/1/2002–9/30/2006 $306,000
Great Lakes Fishery Commission
The goal of this project was to determine whether the availability of essential fatty acids to yellow perch has been affected by the changing food web and contributed to poor recruitment of this important sport fish.

Magnitude and Potential Causes of Mortality in Four Lake Whitefish Populations in Lakes Michigan and Huron: A Multidisciplinary Approach
Michigan State University
The goal of this project was to estimate the number of mature whitefish that die annually from natural causes in two populations from both Lake Michigan and Lake Huron in each of three years. Health-related data were gathered on whitefish sampled from these populations, and these data were used to identify possible mechanisms for that mortality, using a comparative approach.
Does Adult Body Condition Affect Recruitment Potential in Lake Whitefish?  
Trent Sutton  
Purdue University  
$413,375  
Lake whitefish have historically been an important commercial species harvested from Lake Michigan. Recent declines in lake whitefish growth and condition have been attributed to reductions in their primary prey, the amphipod Diporeia. The loss of this high-quality food source may result in lower growth and survival of juveniles during the first year of life. By examining these relationships, the goal of this research was to improve our ability to predict year-class strength of lake whitefish populations.

Preliminary Feasibility of Ecologic Separation of the Mississippi River and the Great Lakes via the Chicago Waterway System to Prevent the Transfer of Aquatic Nuisance Species  
Joel Brammeier  
Alliance for the Great Lakes  
7/21/2005–8/15/2008  
$67,000  
This project will explore aquatic ecological separation of the Great Lakes and Mississippi River basins at Chicago with the long-term goal of preventing the inter-basin transfer of aquatic species.

Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS)  
David Reid  
National Oceanic and Atmospheric Administration  
$35,000  
NOAA (National Center for Research on Aquatic Invasive Species) and USGS (Center for Aquatic Resource Studies), working with university colleagues, accelerated construction of the Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS).

Identifying Trophic Pathways Associated with Thiamine Deficiency Complex  
Charles Krueger  
Great Lakes Fishery Commission  
9/1/2006–12/31/2008  
$257,800  
Sources and trophic transfer pathways of thiaminase in food webs have not been characterized. We will identify species (including plankton, benthos, and fish) and trophic pathways associated with thiaminase in Great Lakes food webs. Identification of thiaminase sources and their trophic pathways is required for the development of management strategies to mitigate Thiamine Deficiency Complex.

Trophic Disruption Effects on the Diet and Condition of Lake Whitefish  
Marten Koops  
Department of Fisheries and Oceans  
9/1/2006–9/1/2009  
$90,000  
We will test the hypothesis that low Diporeia abundance caused by dreissenid invasion is associated with poorer diets and slower-growing, low-condition lake whitefish. The diet-condition link will be examined by stable isotope analyses of whitefish from Lakes Michigan, Erie, and Superior, along a spectrum from invaded with complete Diporeia loss (Erie), to invaded with partial Diporeia loss (Michigan), to uninvaded with no Diporeia loss (Superior).

Impacts of Introduced Pacific Salmon on Ecological Communities of Great Lakes Tributaries  
Gary Lamberti  
University of Notre Dame  
$150,637  
We will determine how introduced Pacific salmon affect food web composition, energy flow, and contaminant biotransport in Great Lakes tributary streams. Impacts will be assessed by measuring the responses of algae, macroinvertebrates, and native stream fish to salmon spawners, including the incorporation of nutrients and pollutants transported by salmon. The results of this project will help Great Lakes states and provinces preserve native stream communities that might otherwise be altered by introduced Pacific salmon.
Mapping the Condition of Diporeia: Insights to Mechanisms of Declines
Maria Sepulveda 1/1/2008–12/31/2011 $569,513
Purdue University

Although the collapse of Diporeia in the Great Lakes is a well-documented phenomenon, causes for their demise remain unknown. The objectives of this project are three-fold: 1) in the laboratory, characterize metabolite profiles in Diporeia after exposure to environmental stressors using metabolomics; 2) apply these findings to natural populations to aid in the identification of causes for population declines; and 3) evaluate the extent of genetic variation of Diporeia spp. populations in the Great Lakes.

Use of Fatty Acid Signatures to Assess Food Web Dysfunction
State University of New York–Brockport

Through a combination of field and laboratory studies, this project seeks to evaluate how fatty acid signatures can provide time-integrated and energy-based depictions of food web structure. Researchers will develop a fatty acid signature library of available prey for two target species, lake trout and yellow perch, both of which exhibit poor reproductive success in Lake Michigan.

Habitat or Food? The Demise of the Benthic Food Web in Lake Michigan
Mark Edlund 1/1/2009–12/31/2011 $148,008
Science Museum of Minnesota

Diporeia, a critical fish food, has declined in Lake Michigan. Dreissenid-driven changes in algal density and species composition are cited as probable causes, but there may be other reasons. Paleolimnological analysis of the sediment record will document whether a loss of lipid-rich diatoms was associated with the influx of dreissenids. Examination of the diets of Diporeia before and after the dreissenid influx from Lakes Michigan and Superior will confirm or refute mussels as the likely cause of the Diporeia decline.

Fishery Health
Host Range and Pathogenesis of Viral Hemorrhagic Septicemia Virus in the Great Lakes
James Winton 4/15/08–6/30/10 $782,413
U.S. Geological Survey

We will conduct field and laboratory studies to investigate the host range and geographic distribution of viral hemorrhagic septicemia virus (VHSV) in Great Lakes fishes. Virus challenge studies will assess the threat of VHSV to important species including muskellunge, drum and salmonids.
Investigating Solutions to Early Mortality Syndrome in Lake Michigan

Managing for sustainable salmon and trout fisheries in Lake Michigan is threatened by the occurrence of early mortality syndrome (EMS), a syndrome that reduces egg survival. This three-year project identified the most effective thiamine treatment methodology to maintain Lake Michigan hatchery production.

Characterization of the Humoral and Cellular Immune Response of Salmonids to Renibacterium Salmoninarum (BKD Phase II)

This project completed laboratory testing and began field evaluation of nonlethal and environmental sampling methods for detecting the agent of bacterial kidney disease (BKD) in Great Lakes salmonid fishes and water, respectively. Nonlethal detection methods that enable monitoring of performance and survival of fish after testing, and methods for monitoring the pathogen in the environment, enhanced evaluation of the impacts of this important pathogen on Great Lakes salmonids.

Studies on the Detection, Transmission, and Development of Renibacterium Salmoninarum Infection in Great Lakes Salmonid Fishes (BKD Phase I)

Laboratory research compared diagnostic methods for bacterial kidney disease and investigated the effects of hatchery practices on the transmission of the pathogen and the development of the disease.

Evaluation of Cartilage-Bone Biopsy and Polymerase Chain Reaction Procedures for Nonlethal Detection of Whirling Disease

Whirling Disease (WD) is a serious disease of salmonids caused by the myxosporean parasite Myxobolus cerebralis (Mc). Introduction of WD into the Great Lakes, Wisconsin, and Minnesota would pose a risk to the multibillion-dollar-a-year Great Lakes freshwater salmonid fishery. This study validated a nonlethal test for Mc in salmonids, thereby preventing unnecessary sacrifice of suspect hatchery and feral fish, valuable broodstock, and threatened and endangered species.

Energy Dynamics of Lake Michigan Chinook Salmon

Lake Michigan fishery managers seek reliable indicators of nutritional stress in Chinook salmon populations. Project managers collected wild-ranging Chinook salmon from Lake Michigan and measured various indicators of fish nutritional state in spring and fall over a three-year period. The goal of this study was to determine which indicators provide the best measure of stress and estimate the number of fish needed to provide an adequately precise estimate of stress on the population.

Investigations into the Causes of Thiamine Deficiency in Great Lakes Salmonids and the Effects of Low Thiamine on Swim-Up Fry Behavior (EMS)

Early mortality syndrome (EMS) of Great Lakes salmonid species is a result of a deficiency in the vitamin thiamine. The goal of this research was twofold: 1) to provide fishery management agencies with information for management of forage fish, such as alewife, to minimize thiamine-related loss of lake trout, coho, and Chinook salmon; and 2) to determine if neurological and other abnormalities in thiamine-deficient fry contribute to the observed recruitment failure in Lake Michigan lake trout populations.
### Identification of Renibacterium Salmoninarum Strains of Potential Threat to Great Lakes Salmon Populations

Bacterial kidney disease (BKD), caused by Renibacterium salmoninarum, is a devastating disease of Great Lakes salmonids. Researchers for this project enhanced diagnosis of BKD by developing sensitive molecular probes that will differentiate between virulent and avirulent strain(s). This new diagnostic procedure will be useful in epizootiological surveys and disease control.

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### Elucidation of Etiology and Pathogenesis of Early Mortality Syndrome by cDNA Microarray-Based Identification of Expressed Genes

Early mortality syndrome (EMS) causes massive mortality to many salmonid species in Lakes Michigan and Ontario. In this project researchers studied the etiology of EMS using an extensive fish health investigation and novel cDNA microarray (“gene chip”) technology to study fish health, toxicology, and nutrition.

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### Thiaminase: New Tools in the Fight against EMS

This project addressed early mortality syndrome (EMS) in Great Lakes predatory fish from a biochemical perspective, and had two major objectives: 1) purify and characterize thiaminase, the presumed causative agent of EMS, derived from alewife; and 2) develop new tools for the rapid identification and quantification of thiaminase.

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### Validation of Non-Culture Methods to Detect and Quantify Renibacterium Salmoninarum in Diagnostic Samples from Great Lakes Salmonids

This project will complete laboratory studies for validation and standardization of methods for detecting and quantifying the causative agent of bacterial kidney disease (BKD) in Great Lakes salmonid fishes.

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<th>Project Title</th>
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<tr>
<td>Validation of Non-Culture Methods to Detect and Quantify Renibacterium Salmoninarum in Diagnostic Samples from Great Lakes Salmonids</td>
<td>Diane Elliott</td>
<td>9/1/2004–12/31/2008</td>
<td>$338,146</td>
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### Ecological and Genetic Approaches to Develop Sustainable and Disease Free Fishes in the Great Lakes

The project identified markers indicative of genetic predisposition to disease to identify salmonids and whitefish with heightened disease resistance. A mesocosm was used to evaluate performance and disease susceptibility, and role of native and introduced forage fish in pathogen dissemination.

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<th>Funding</th>
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<tr>
<td>Ecological and Genetic Approaches to Develop Sustainable and Disease Free Fishes in the Great Lakes</td>
<td>Kim Scribner</td>
<td>9/1/2004–8/31/2008</td>
<td>$358,514</td>
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### Modeling Renibacterium Salmoninarum Dynamics among Chinook Salmon and Lake Whitefish Populations in the Great Lakes

The goal of this project was to develop models of the multiple host-pathogen system of Renibacterium salmoninarum, Chinook salmon, and lake whitefish, using modeling methods developed for terrestrial diseases.

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Thiaminase in the Lower Food Web: Spatial and Temporal Trends, and Potential Impacts on the Thiamine Dynamics and Growth and Survival of Juvenile Fish

John Fitzsimons 4/1/2006–4/1/2009 $360,000
Department of Fisheries and Oceans

Early life stage mortality in salmonines of the Great Lakes continues to be problematic. Thiamine deficiency, related to the thiaminase content of planktivorous alewives, has been causally linked to early life stage mortality. The factors responsible for spatial and temporal differences in thiaminase in the food web that influence thiaminase in alewives are unidentified. This project is designed to assess the dynamics of planktonic thiaminase and determine the risk of current levels to juvenile lake trout.

Testing of Nonlethal and Environmental Sampling Methods for Detection of the Fish Pathogen Renibacterium Salmoninarum

Diane Elliott 9/1/2006–12/31/2009 $327,971
U.S. Geological Survey

This project will complete laboratory testing and begin field evaluation of nonlethal and environmental sampling methods for detecting the agent of bacterial kidney disease (BKD) in Great Lakes salmonid fishes and water, respectively.

Development and Application of Biomarkers for Thiamin Deficiency

Weiming Li 10/1/2007–10/31/2008 $180,000
Michigan State University

Early mortality syndrome (EMS) causes significant fry mortality in salmonine and may limit their abundance in Lakes Michigan, Huron, and Ontario. Biologists have found strong evidence that links EMS to thiamin deficiency in Great Lakes salmonines. We will induce thiamin deficiency and then analyze expression of 10K genes in salmonines embryos with a cDNA microarray (gene chip). Biomarkers developed from these experiments will be diagnostic of thiamin deficiency in feral fish.

Viral Hemorrhagic Septicemia Virus in the Great Lakes

James Winton 10/1/2007–1/15/2010 $500,000
U.S. Geological Survey

We will use laboratory challenges to compare the effects of viral hemorrhagic septicemia virus (VHSV) on important native and introduced Great Lakes species including salmonids. New detection tools for water or tissue samples will be developed and validated. Nonlethal sampling methods and serological assays will be tested. Results and recommendations will be presented at workshops.
Characterization of the Adaptive Potential of Lake Michigan Chinook Salmon to Resist Disease in the Presence of Environmental Stressors

The project will characterize the genetic basis for survival following Renibacterium salmoninarum (Rs) infection in a Lake Michigan population of Chinook (Chk) salmon. Plasticity of Rs survival will be evaluated in the presence of a model environmental variable. A second project goal is to validate biomarkers associated with disease prognosis. Results will provide insight into the ability of Lake Michigan Chk to respond and adapt to Rs and will form the foundation for future studies aimed at identifying genes.

**Fishery Recruitment**

**Success of Current Strategies to Recolonize Lake Trout Spawning Reefs in Northern Lake Michigan**

This project evaluated the success of existing lake trout stocking strategies which started in 1985 because of the lakewide plan to rehabilitate Lake Michigan. Since 1985, the majority (more than 76 percent) of lake trout stocked have been transported and released directly above 24 specific spawning reefs, compared to less than 27 percent in 1965–84. Recolonization of historically productive spawning reefs will likely play a major role in lake trout finally achieving sustained natural reproduction in Lake Michigan.

**Molecular Genetic Assessment of Stocking Success and Sources of Natural Lake Trout Recruitment in the Great Lakes**

This research provided a means of evaluating the success of rehabilitation programs by elucidating the proportional contribution of various hatchery stocks to adult recruitment onto spawning reefs and to natural reproduction. Researchers identified the reproductive success of reintroduced lake trout from different hatchery strains.

**Hydroacoustic Equipment Purchase**

Funds for this project were used to purchase hydroacoustic sampling gear that will be used by multiple agencies to enhance their ability to conduct prey fish surveys in Lake Michigan and provide critical abundance information to Great Lakes fisheries managers.

**Mechanisms Affecting Recruitment of Yellow Perch in Lake Michigan**

The primary goal of this study was to research the factors controlling the recruitment of yellow perch in Lake Michigan.

**Salmonid Spawning Stock Abundance, Recruitment, and Exploitation in the Muskegon River**

The grant's specific objectives included evaluating the feasibility of using fixed-location riverine hydroacoustic technology to measure smolt abundance, quantifying smolt behavior during migration, and estimating abundance of out-migrating smolts.
Interactive Role of Transport and Foraging Success in the Determination of Growth Variability for Larval Yellow Perch in Southern Lake Michigan

The project team investigated consequences of larval yellow perch being transported out of productive near-shore areas of Lake Michigan. The primary concern regarding this transport is availability of optimal food for larval yellow perch in offshore areas. The team examined whether offshore transport inhibits larval growth and whether this growth change increases probability of mortality.

Effects of Egg and Fry Predators on Lake Trout Recruitment in Lake Michigan

The influence of egg and fry predators on the lack of successful reproduction by lake trout in the Great Lakes is poorly understood. Researchers evaluated egg, fry, and predator abundance at spawning reefs in northeastern Lake Michigan, and used egg seeding, alewife exclosures, and laboratory experiments to assess the current effect of predation on recruitment.

Dynamics of Alewife Recruitment Variability in Lake Michigan

Fluctuating abundances of alewife affect early survival and management of salmon, lake trout, and yellow perch in Lake Michigan. This project used field studies and analyzed historical data to determine factors affecting alewife abundance, growth, and survival. Researchers used natural chemical tracers present in alewife ear bones to determine alewife environmental histories and identify those habitats producing the most survivors.

Modeling the Influence of Lake Circulation Patterns, Upwelling Events, and Turbulence on Fish Recruitment Variability in Lake Michigan

The project quantified the relative effects of lake physics (meso-scale circulation features, small-scale turbulence, turbidity, water temperature) on distributions, survival, feeding, growth, and potential recruitment of young alewife and yellow perch.

Lake Trout Spawning Habitat at the Southern Refuge, Lake Michigan

This project produced a lake trout spawning habitat map, via multibeam sonar and sidescan sonar, that has facilitated ROV (unmanned submersible)-based studies of lake trout reproduction at Lake Michigan's Southern Refuge. Via ROV we have been able to confirm egg deposition at steep dropoffs, at depths of about 50 meters. The dropoff habitat is abundant at the Southern Refuge, and a map of part of this habitat has greatly facilitated finding the best available habitat for study and future rehabilitation efforts.

Evaluation of Lake Trout Spawning Habitat for Lake Michigan Deep Reefs

This project located sites for lake trout restoration at Lake Michigan's Southern Refuge. In years one and two researchers used a remotely operated vehicle and beam trawling to identify spawning sites and began qualitative evaluation (presence/absence) of egg deposition density and fry production. In year two and continuing into year three researchers evaluated sites using quantitative techniques adapted from well-established scuba methodology.
Historic and Spatial Variation of Lake Whitefish Maturation Schedules

Tomas Hook
University of Michigan
9/1/2005–12/31/2007 $107,691

Harvesting of fish stocks removes individuals based upon traits including size, behavior, and location. Researchers evaluated whether whitefish maturation schedules have changed over time, estimated genetically based effects of selective harvesting, and provide recommendations for minimizing these effects.

A Workshop to Determine Research Priorities for Great Lakes Walleyes

Patrick Kocovsky
U.S. Geological Survey
8/1/2006–8/1/2007 $20,000

This workshop brought together experts on walleye ecology and management from across the Great Lakes basin and beyond to discuss research needs related to walleye in the Great Lakes. Presentations were solicited from experts in various fields of fisheries science to highlight the critical research needs of selected walleye populations. A facilitated discussion followed. A summary document was prepared that sets forth research priorities for walleye in the Great Lakes.

Analysis of Tagging Data to Quantify Lake Trout Migration in Lake Michigan

Sara Adlerstein
University of Michigan
10/1/2007–10/31/2009 $120,381

This is a two-year study aimed at improving understanding of movement patterns and seasonal distributions of lake trout populations in Lake Michigan. Researchers will derive effort-corrected and statistically based estimates utilizing existing data from coded-wire-tag (CWT) recoveries. Results from the study will aid restoration efforts and help in achieving management objectives defined in lake trout restoration plans.

Assessing Lake Michigan Salmonine Stocking Policies Using Decision Analysis

Michael L. Jones
Michigan State University
11/1/2008–11/1/2011 $326,139

Working with Lake Michigan fishery managers and key stakeholders, researchers will develop an updated decision model to assess the performance of alternative policies for stocking of salmonine fishes into Lake Michigan.

Evaluation of Lake Trout Spawning Habitat at Lake Michigan’s Mid-Lake Reef Complex

John Janssen
University of Wisconsin–Milwaukee

Lake Michigan's Mid-Lake Reef Complex (MLRC) was a very important spawning area for indigenous lake trout. Techniques developed for a concluding (June 2008) GLFT project demonstrate distinct smaller sub-reefs within each main reef, each with eggs deposited and sac-fry produced, of statistically distinguishable egg deposition densities. This study will provide a more complete assessment of the MLRC’s total spawning habitat by a targeted search for additional sub-reefs.

Habitat Protection and Restoration

Big South Branch Pere Marquette River Habitat Improvements

Richard Schwikert
Pere Marquette Watershed Council Inc

This project implemented erosion control and habitat improvement measures on the Big South Branch of the Pere Marquette River. Baseline data were taken prior to improvements for benchmarking and evaluation purposes. Sampling occurred (following improvement measures) to determine the effect of the habitat improvements on natural salmonid reproduction.

Research, Assessment and Data Management Needs to Promote Protection of Great Lakes Nearshore Fisheries Habitat

Reuben Goforth
Purdue University
9/1/2002–5/31/2003 $30,000

Human activities in coastal areas influence nearshore ecosystems, although spatial scales of response by nearshore communities are largely unknown. The goal of this study was to identify differences in fish and prey populations in response to local and larger-scale environmental properties of shoreline areas along the eastern Lake Michigan coastline.
White Lake Pier, Fruitland Township, Lake Michigan Dune Erosion Project  
Greg Boughton  
Fruitland Township  
2/5/2003–9/30/2007 $11,965

This grant funded activities to stabilize dune erosion along the White Lake Channel Pier's south side in Fruitland Township. At the start of the project, after windy days, the sand was often two feet deep on the pier. With the installation of the snow fence and dune grass planting, the dune stabilized and sand did not cover the pier.

Nearshore Habitat Mapping of Grand Traverse Bay  
Brett Fessell  
Grand Traverse Band of Ottawa and Chippewa Indians  
9/1/2004–8/31/2005 $25,000

The Grand Traverse Band of Ottawa and Chippewa Indians contracted with Abrams Aerial Photography to photograph the nearshore area of Grand Traverse Bay. As a result of this work 147 photos were produced. With this grant, the tribe purchased a GIS workstation and contracted with a local company for GIS training and to convert the photos into digital format for GIS mapping. These results are being used to delineate the nearshore habitat types and the data are available to local agencies for land use planning.

Evaluation and Synthesis of Methods for Identifying and Quantifying Critical Fisheries Habitat for Great Lakes Lower Riverine and Nearshore Zones  
Barb Staples  
Great Lakes Fishery Commission  
7/1/2005–8/31/2007 $31,543

The Trust and Commission, in cooperation with the U.S. Environmental Protection Agency (EPA), funded an evaluation and synthesis of methods for identifying and quantifying critical fisheries habitat for Great Lakes lower riverine and nearshore zones. The work was carried out through a contract administered by the Commission with the University of Michigan.

Fate of the Boardman River Dams  
Marsha Smith  
Rotary Camps and Services  
1/1/2006–1/31/2009 $476,000

This multi-year grant supports the process to determine the future of four dams on the Boardman River and helps build the capacity of organizations’ involvement with the management of the river’s watershed.

Bete Grise Wetlands Acquisition Project  
Jeff Knoop  
The Nature Conservancy  
6/1/2006–12/31/2007 $752,800

The Bete Grise Wetlands project was a multi-partner effort to secure conservation protection for 1,875 acres of Great Lakes fishery habitat through land acquisition coupled with a long-term joint management agreement among partner organizations. A combination of USFWS, NOAA, and private funds completed protection of 1,104 acres of the Bete Grise Wetlands, and the Nature Conservancy used this match funding to secure the remaining 771 acres.

Dair Creek Fish Passage Project  
Amy Beyer  
Conservation Resource Alliance  
1/1/2007–1/1/2008 $50,000

The Dair Creek Fish Passage Project provided the following habitat and species benefits: 1) full fish passage to brook and brown trout, steelhead, and salmon to 8 miles of heavily forested, coldwater habitat in Dair Creek; 2) restored creek flows to almost a quarter mile of original streambed that has been dry; and 3) prevented additional erosion of the man-made channel due to the current condition of the barrier and the steep embankments that were established when the channel was originally excavated.
Lake Sturgeon Rehabilitation

Building a Prototype Fishway for Lake Sturgeon

Boyd Kynard
University of Massachusetts

1/8/1999–1/8/2003 $133,452

This project resulted in the building and testing of a prototype fish passage for lake sturgeon. Primary components included continued telemetry studies at White Rapids Dam to determine the best location for a fishway passage; tests with juvenile lake sturgeon to determine the best fishway design; and tests with other warm-water fish to determine the effectiveness for other species.

Lake Sturgeon Genetics Standardization Workshop

Chris Lowie
U.S. Fish and Wildlife Service

8/25/1999–8/24/2000 $6,800

Funding for this project was used to coordinate and host a workshop on standardizing genetic identification of lake sturgeon populations in December 1999 in Chicago.

4th International Sturgeon Symposium

Fred Binkowski
University of Wisconsin–Milwaukee

1/6/2000–7/6/2002 $25,000

The 4th International Symposium on Sturgeon was one of a series of symposia designed to facilitate worldwide information exchange, research stimulation, and professional networking in relation to sturgeon. Previous symposia in this specific series were held in Piacenza, Italy, in 1997; Moscow, Russia, in 1993; and Bordeaux, France, in 1989.

Annual Lake Sturgeon Coordination Meeting

Rob Elliott
U.S. Fish and Wildlife Service


This project facilitated communication and coordination between biologists, managers, and researchers working toward lake sturgeon rehabilitation in the Great Lakes through annual meetings.

Characterization of Early Life History Stages of Lake Sturgeon in the Peshtigo River and Green Bay

Trent Sutton
Purdue University

7/1/2001–6/30/2004 $132,000

This project focused on the distribution, movement patterns, and requirements of early life stages of lake sturgeon in relation to availability and utilization of physical, chemical, and biological resources in the lower Peshtigo River, Wisconsin, and inner waters of Green Bay, Lake Michigan.
### Status Assessment of Remnant Lake Sturgeon in the Lake Michigan Basin

Biologists and researchers from several universities and state and federal resource agencies coordinated efforts to study the status of remnant lake sturgeon stocks throughout Lake Michigan.

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<thead>
<tr>
<th>Project Description</th>
<th>Investigator</th>
<th>Start Date</th>
<th>End Date</th>
<th>Funding</th>
</tr>
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<tbody>
<tr>
<td>Historical Distribution and Abundance of Lake Sturgeon in the Lake Michigan Basin</td>
<td>Phil Cochran</td>
<td>11/1/2002–10/1/2007</td>
<td>Saint Mary’s University</td>
<td>$97,315</td>
</tr>
<tr>
<td>Sturgeon Habitat Restoration, Monitoring, and Education in the Detroit River</td>
<td>Jennifer Read</td>
<td>1/1/2003–12/31/2006</td>
<td>University of Michigan</td>
<td>$110,000</td>
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</table>

Throughout the Great Lakes Basin, remnant stocks of lake sturgeon exist at low abundance. Traditional fish sampling and assessment methods are marginally effective for these populations and can lead to fish mortality. Lake sturgeon congregate each spring when they spawn in large rivers. Nonlethal hydroacoustic technology, successfully used to count salmon in Pacific Northwest river systems, was used to evaluate the lake sturgeon population in the Sturgeon River, Michigan, and then applied to evaluation of the Muskegon River population.

This project completed Phases I and II of a three-phase project to develop a genetics-based management plan for lake sturgeon within the Great Lakes Basin. During the course of the project, researchers 1) standardized microsatellite and mtDNA genetic markers among all geneticists studying lake sturgeon, 2) sampled key populations that are not currently targeted by any management agencies, and 3) analyzed population genetic data from these sampled populations.

The Manistee River, with good potential habitat and a sturgeon population of remnant historic numbers, is highly suitable for sturgeon rehabilitation. Evidence suggests poor recruitment and an insufficient spawner population are the culprits. This study focused on lake sturgeon recruitment in the Manistee River by monitoring egg deposition, larval drift, juvenile dispersal, and habitat utilization, and determined critical habitat for these life stages.

Rehabilitation of lake sturgeon in the Lake Michigan basin requires an understanding of the historical distribution and relative abundance of sturgeon within the basin. This project built on previous compilations of anecdotal data through completion of an intensive library search of historic documents.

This project consisted of three related components: construction of three demonstration lake sturgeon spawning reefs, a public education program, and a robust monitoring program. The project’s goal was to enhance a healthy and self-sustaining population of lake sturgeon in the river.
Great Lakes Basin Lake Sturgeon GIS Database Web Page
Emily Zollweg 8/5/2003–10/31/2004 $34,900
U.S. Fish and Wildlife Service
This project will enhance an interactive web-based GIS application and meta-database of Great Lakes lake sturgeon information. The updated database and GIS were used to enhance the existing maps and database developed for the 2000 and 2002 GLFT Lake Sturgeon Workshops.

Potential for Lake Sturgeon Habitat Rehabilitation in Green Bay Tributaries of Lake Michigan
Trent Sutton 10/1/2003–10/1/2006 $33,375
Purdue University
Sutton and the GRA organized a meeting held in Menominee and gave a presentation titled “Assessment of LS habitat availability in N. LM tributaries” which introduced the project objectives and methodology to members of the Fox River Natural Resource Damage Assessment, WI and MI DNRs, and USFWS. Following the meeting discussion, the sampling methodology and prioritization of river systems were finalized. Results from sampling will then be used to develop decision tools to determine appropriate LS rehabilitation strategies in each system.

Comparative Performance in Early-Life History of Streamside Reared and Wild Reared Lake Sturgeon in the Manistee River
Little River Band of Ottawa Indians
Managers are seeking techniques to increase reproductive success of sturgeon stocks while maintaining natural population performance attributes. This study evaluated a streamside rearing program in rehabilitating remnant sturgeon stocks by comparing growth, habitat use, movement, and parental contribution of reared sturgeon to wild.

Assessment of Simulated Lake Sturgeon Supplementations in Michigan Drainages of the Great Lakes
Michigan State University
Successful restoration of lake sturgeon throughout the Great Lakes requires knowledge of fundamental but little-known aspects of the species’ early life history and of the impacts of proposed restoration activities on remnant populations. Researchers conducted replicated experiments addressing the efficacy of alternative supplementation strategies for use in the Great Lakes basin.

Development of DNA-Based Sexing Assays for Lake Sturgeon
Purdue University
This project developed DNA markers that can identify the sex of lake sturgeon from nearly any tissue sample at any life history stage. This research greatly enhanced ongoing efforts to describe lake sturgeon distribution, abundance, and genetic variability.

Lake Sturgeon Tagging Database
Adam Kowalski 8/3/2004–12/31/2006 $11,000
U.S. Fish and Wildlife Service
This project enabled resource agencies and the general public to access contact information for tagged lake sturgeon still at large throughout the Great Lakes. Researchers developed a lake sturgeon tagging database that includes tag type, tag number, and contact information (phone and email) for tagged lake sturgeon. This database is posted on the Great Lakes Fisheries Commission Website to provide interested persons contact information about a tagged lake sturgeon.
Passive Integrated Tag Marking and Detection System Distribution for Lake Michigan Management Agencies

Grand Traverse Band of Ottawa and Chippewa Indians

Recent assessment strategies for lake sturgeon within the Lake Michigan basin are utilizing Passive Integrated (PIT) Tags to mark individual fish. Unfortunately, only a few agencies were able to "read" these tags when they were encountered. Funding obtained through this grant was used to acquire 12 Avid-Power Tracker V systems to distribute to seven agencies performing open-water assessments on Lake Michigan.

Status Assessment of Remnant Lake Sturgeon Populations in the Lake Michigan Basin

U.S. Fish and Wildlife Service

Biologists and researchers from throughout the region are continuing collaborative efforts to determine the current status of remnant lake sturgeon populations in Lake Michigan. Knowledge of current sturgeon distribution, abundance, and reproduction is critical to furthering conservation and rehabilitation efforts for the species.

Lake Sturgeon Rehabilitation Using Streamside Rearing Facilities

Rob Elliott 12/1/2005–6/30/2009 $583,212
U.S. Fish and Wildlife Service

Biologists and researchers from the Lake Michigan basin continue to work together to rehabilitate lake sturgeon in Lake Michigan. Streamside rearing facilities (SRF) have been identified as the preferred tool to use for stocking sturgeon in both extirpated and remnant sturgeon populations in Lake Michigan streams. This project will provide a critical evaluation of SRF while promoting lake sturgeon rehabilitation in four Lake Michigan streams.

Mortality and Recruitment Mechanisms Affecting Early Life Stages of Lake Sturgeon Population in Lake Michigan

Trent Sutton 1/1/2006–12/31/2008 $190,399
Purdue University

Protection and rehabilitation of lake sturgeon in the Great Lakes requires an understanding of the relationship among mortality and recruitment factors. As a result, there is a need to identify and quantify the sources of mortality that act on early life stages and determine how they influence lake sturgeon populations. This research will aid recovery efforts for lake sturgeon populations in Lake Michigan by examining these parameters within the context of ongoing and future rehabilitation activities.
### Development of DNA-Based Sexing Assays for Lake Sturgeon

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<tbody>
<tr>
<td>J. DeWoody</td>
<td>Purdue University</td>
<td>9/1/2006–9/30/2008</td>
<td>$150,200</td>
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The mechanism of sex determination in lake sturgeon is unknown, but is almost certainly genetic. If so, then it should be possible to develop a DNA test to sex fin clips, blood, or other tissue samples collected from live individuals. We propose to develop an inexpensive and accurate genetic test that can sex lake sturgeon from nearly any tissue sample. This research will greatly enhance efforts to describe lake sturgeon distribution, abundance, and genetic variability.

### Establishment of Basinwide PIT Tag Capabilities to Rehabilitate Great Lakes Lake Sturgeon

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Although PIT tags are a principal component of sturgeon assessment and management many agencies that target or encounter sturgeon lack the capability to detect or implant PIT tags, missing opportunities to share data. This grant was used to purchase two types of readers and tagging supplies; these were distributed to 12 agencies with 17 offices. Data is being exchanged through the Sturgeon Tag Database and at Sturgeon Coordination Meetings.

### Evaluation of Lake Sturgeon Rehabilitation Strategies Using an Individual-Based Model of Demographics and Genetics

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Rehabilitation of lake sturgeon in the Great Lakes basin needs to consider both the demographic and genetic response to management actions. Actions to rapidly rebuild abundance may have negative genetic consequences, but insufficient management may result in population extirpation. The goal of this project is to develop a model that represents the genetics and demographics of lake sturgeon, and use that model to evaluate stocking strategies that could be used for lake sturgeon rehabilitation.

### Determine the Critical Period of Olfactory Memory Imprinting in Lake Sturgeon

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<tbody>
<tr>
<td>Chunbo Zhang</td>
<td>Illinois Institute of Technology</td>
<td>9/1/2006–9/1/2009</td>
<td>$241,794</td>
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An important strategic plan for the management and restoration of lake sturgeon in the Great Lakes is to determine when and where to stock lake sturgeon, and what is the proper life stage of lake sturgeon for stocking. However, this issue cannot be properly addressed without knowledge of olfactory imprinting in this species. In this study, we will use cellular and molecular biology tools to study olfactory development and determine the critical period for olfactory memory imprinting in lake sturgeon.

### Mortality and Recruitment Mechanisms Affecting Early Life Stages of Lake Sturgeon Population in Lake Michigan

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Protection and rehabilitation of lake sturgeon in the Great Lakes requires an understanding of the relationship among mortality and recruitment factors. This research will aid recovery efforts for lake sturgeon populations in Lake Michigan by examining these parameters within the context of ongoing and future rehabilitation activities.

### Genetic Identification of Non-Spawning Lake Sturgeon in the Great Lakes

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The comprehensive genetic database for breeding populations of lake sturgeon collected by researchers will be used to identify the natal origin of lake sturgeon collected from river and open-water habitats across the upper Great Lakes. We will identify occupancy of critical nearshore and open-water habitats, identify habitat characteristics that facilitate dispersal, and identify populations at risk from exploitation or from catastrophic natural or anthropogenic events.
Enhancement of PIT Tag Detection Capabilities
Adam Kowalski 12/1/2008–12/31/2009 $17,575
U.S. Fish and Wildlife Service
This project builds on the recently funded Sturgeon Tag Identification Database, by providing PIT tag reading capabilities to agencies and partners that frequently encounter lake sturgeon.

Humbug Marsh Acquisition
Alan Raymond 3/1/2004–12/31/2004 $500,000
The Trust for Public Land
This grant enabled the purchase of a 409-acre wetland and surrounding upland known as Humbug Marsh on the Detroit River. This parcel will ultimately be conveyed to the U.S. Fish and Wildlife Service as part of the Detroit River International Wildlife Refuge. GLFT funds joined with several federal, state, private, and corporate donations for the purchase of the property.

Lightfoot Bay Cooperative Coastal Wetlands Acquisition Project
Patricia Toczydlowksi 3/1/2007–12/31/2008 $150,000
Keweenaw Land Trust
The Lightfoot Bay Wetlands project is a multi-partner effort to secure conservation protection of 214 acres of Great Lakes coastal wetland and fishery habitat including 6,500 feet of wetlands shoreline and a half-mile of Great Lakes shoreline through acquisition and long-term management. The project yields substantive and unique public access, recreation, and educational opportunities.

Great Lakes Stewardship
Project F.I.S.H.
Michigan State University
This project promoted better understanding of Great Lakes fisheries and factors required to sustain this natural resource through providing materials, training, and support for teachers and volunteer mentors who work with youth in schools, sport fishing clubs, and locally sponsored sport fishing events.

Fish for All
Western Michigan University
This project produced two education resources relating to Lake Michigan fisheries: a traveling exhibit and an exhibit catalog. These education resources enabled the public to contextualize present-day fisheries policies.

Development of a Statewide Great Lakes Ecological Information System at Michigan’s State Fish Hatcheries
Michigan State University
This project developed integrated and comprehensive Great Lakes ecological information/interpretive centers at state fish hatcheries.

Educating the Public on the Great Lakes Fishery Trust
Jimmy Gretzinger 11/1/2000–10/31/2003 $30,000
Michigan United Conservation Clubs
A video of the Great Lakes Fishery Trust was produced that provides general information on the GLFT and also highlights some of its grants and granting categories.
### Extending Great Lakes Fisheries Education and Project F.I.S.H. in Michigan: A Targeted Program within the Muskegon River Watershed

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<th>Project Description</th>
<th>PI</th>
<th>Start Date–End Date</th>
<th>Funding</th>
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<tbody>
<tr>
<td>Shari L. Dann</td>
<td>Michigan State University</td>
<td>1/30/2001–1/30/2002</td>
<td>$46,680</td>
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</tbody>
</table>

This project promoted better understanding of Great Lakes fisheries and factors required to sustain this natural resource by providing materials, training, and support for teachers and volunteer mentors who work with youth in schools, sport fishing clubs, and locally sponsored sport fishing events.

### Advancing Great Lakes Fisheries Education through Project F.I.S.H., Salmon in the Classroom, and Michigan Hatchery-Based Volunteer Training and Support

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Salmon in the Classroom is a hands-on K–12 curriculum for teachers, classrooms and sponsoring organizations willing to put in intensive work on raising fish, studying water quality, watersheds and conservation, and on the importance of fisheries conservation and management in Michigan waters of the Great Lakes.

### Coastal Wetland Landowner Education Campaign

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<tr>
<td>Gail Fruewald</td>
<td>Tip of the Mitt Watershed Council</td>
<td>5/1/2003–8/31/2004</td>
<td>$45,000</td>
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This grant produced a high-quality brochure that was distributed to all shoreline property owners along Saginaw and Grand Traverse Bays. The brochure included information on West Nile virus, property values associated with vegetated beaches versus “groomed” beaches, fish and wildlife habitat values of coastal marshes, and economic values of intact coastal wetlands.

### Great Lakes Discovery Center

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Funds were used to support the development of a business plan for the Great Lakes Discovery Center including preliminary design, marketing and business plan, and program elements.

### A Web-Based Information Clearinghouse for Great Lakes Education

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<th>Start Date–End Date</th>
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<tr>
<td>Michaela Zint</td>
<td>University of Michigan</td>
<td>3/1/2004–7/31/2006</td>
<td>$90,000</td>
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</table>

This project resulted in the creation of a Website that now provides an easy means for educators to identify, select, and access Great Lakes education resources and to obtain assistance with specific questions by networking with other educators and providers. This Website meets the Great Lakes education needs of formal, nonformal, and informal educators.

### Fisheries Learning on the Web

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Fisheries Learning On the Web (Project FLOW) enhanced Great Lakes science education by transforming existing, award-winning curriculum into a series of Web-based lessons for Michigan science teachers and their students. This online science education project uses the Great Lakes as a teaching resource, engaging students in activities about fisheries and stewardship.

### Tracks: Catching Up on the Great Lakes Fisheries

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Michigan United Conservation Clubs dedicated nine editions of *Tracks* to Great Lakes fisheries issues as identified by the Great Lakes Fishery Trust. *Tracks* is a magazine targeted for upper elementary youth which has been published by MUCC for 26 years. Five thousand free subscriptions of *Tracks* were made available to organizations and individuals who purchased a second year.
| **Coastal Wetland Landowner Education** | Jennifer McKay | 2/7/2006–5/31/2006 | $20,000 |
| **Campaign Phase II** | Tip of the Mitt Watershed Council |
| This project was a continuation of GLFT support of Tip of the Mitt’s coastal wetland landowner education campaign. Grant funds were used to produce a brochure summarizing a MDEQ report that evaluates Great Lakes bottomland grooming activities and describes the ecological impacts on the affected areas. The brochure was distributed to 10,000 shoreline property owners whose homes are located on some of the most important and threatened coastal wetland systems. |

| **GLRC Great Lakes Fishery Series** | Karis Crawford | 7/1/2006–12/31/2006 | $20,000 |
| University of Michigan |
| The Great Lakes Radio Consortium (GLRC), a free environmental news service for public radio stations nationwide, produced the Great Lakes Fishery Series. These eight radio stories were designed to educate the public on fishery habitat, fish populations and health, angling access, and the integrity of the Great Lakes ecosystem. |

| National Wild Turkey Federation |
| This three-year project grant allows Wheelin’ Sportsmen NWTF to provide angler education, access information, and equipment to children with disabilities in Michigan. |

| **The Great Lakes: The World’s Freshwater Seas** | Jeff Forster | 1/1/2007–4/30/2009 | $300,000 |
| Detroit Public Television |
| This is a multimedia education project. It includes a documentary film on the Great Lakes, a Website, museum exhibit, and complementary educational publications. |

| **The Environment Report** | Mark Brush | 10/1/2007–7/1/2008 | $20,000 |
| University of Michigan |
| The Environment Report, a free environmental news service for public radio stations nationwide, used this grant for the production of eight feature-length radio stories that will educate the public on fishery habitat, fish populations and health, angling access, and the integrity of the Great Lakes ecosystem. The project had an advisory group that was consulted as needed throughout the year and provided post-production evaluative advice for the ongoing direction of projects. |

| **Great Lakes Education Collaborative** | Stephanie Smith | 9/1/2008–9/1/2009 | $93,500 |
| Alliance for the Great Lakes |
| The Alliance for the Great Lakes will work with key partners to establish the Great Lakes Education Collaborative, a sustainable framework to promote and expand Great Lakes education and stewardship in the eight Great Lakes states: Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin. |

| **Jordan River Electrical Weir Removal Project** | Mark Johnson | 9/1/2008–9/1/2009 | $25,000 |
| Conservation Resource Alliance |
| The project will remove a wooden box structure running the width of the river, a wooden retaining wall at each end of the structure, an adjacent generator shed and underground wiring, and fencing around the area. Banks and other areas of the site will be restored. Removal of the barrier will reconnect the lower two miles of stream with the upper 21 miles of river. |
### Great Lakes Stewardship Initiative

**The Headwaters Project: Sustainable Great Lakes Stewardship in the Upper Peninsula of Michigan**  
Carl Lindquist  
Superior Watershed Partnership  
$20,000

As the largest city in the Upper Peninsula, Marquette served as the regional hub for most planning activities of the numerous project partners. Marquette is also home to the Superior Watershed Partnership and the Marquette Alger Regional Educational Service Agency, which jointly coordinated the planning process for this project.

**Making Connections in the River Raisin Watershed**  
William Green  
Monroe Public Schools  
$19,900

The focus of the study was the River Raisin Watershed, though schools that are adjacent to this watershed were not excluded. The entire watershed is approximately 1,072 square miles and the River Raisin itself is approximately 150 miles long. As of 2000, the watershed was home to 140,000 people.

**Planning for a Southeastern Michigan Regional Hub for Place-Based Education**  
Rebecca Martusewicz  
Eastern Michigan University  
$20,000

A regional hub promoted a vision of shared stewardship for southeastern Michigan, a 4,602-square-mile region that includes Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties.

**UM–Dearborn Stewardship Initiative**  
Orin Gelderloos  
The University of Michigan–Dearborn  
$20,000

This Great Lakes Stewardship Initiative Planning Grant focused on increasing environmental stewardship of the Great Lakes within the Alliances of Rouge Communities and Downriver Communities, which includes 77 municipalities, three major universities, three community college systems, and more than 40 K–12 school districts. Its geographic and programmatic hub was the Environmental Interpretive Center at the University of Michigan–Dearborn.

**Northeast Michigan Great Lakes Stewardship Planning Initiative**  
Gary Goren  
Alpena-Montmorency-Alcona Educational Service District  
$5,213

Alpena-Montmorency-Alcona Educational Service District received a capacity-building grant through the Great Lakes Stewardship Initiative to continue a discussion in the region about how best to promote and support Great Lakes and aquatic educational programs for K–12 students. Grant funds were used to convene the second annual Northeast Michigan Great Lakes and Aquatic Education Networking Meeting in Alpena in November 2007.
### Nurturing Teacher-Leaders for Advancement of Place-Based Great Lakes Stewardship Education in Mid-Michigan

Shari L. Dann  
Michigan State University  
$19,673

This project to plan for place-based stewardship education in the mid-Michigan, Grand River Watershed region engaged schools and community partners from four counties surrounding Lansing (Ingham, Eaton, Clinton and Shiawassee Counties). Five school districts were involved, ranging from urban (Lansing's Cavanaugh and Post Oak Elementary Schools), to a suburban school (Holt), a highly resourced school (Haslett), a rapidly suburbanizing district (Bath), and a rural school (Laingsburg). From August through October 2007, 86 people were convened to plan place-based Great Lakes Stewardship Education.

### GLSI Planning Grant for a West Michigan Stewardship Hub

Dave Krebs  
Muskegon Area Intermediate School District  
$20,000

The region serviced by this grant (Muskegon, Oceana, Newaygo, and the northern portion of Ottawa County) is in the southwestern part of the Lower Peninsula of Michigan and encompasses just over one million acres. The 22 public K–12 school districts in the region span the entire urban/rural and rich/poor continuum.

### Manistee County Great Lakes Water Stewardship Satellite Plan

Tim Ervin  
Manistee County Community Foundation  
$5,213

The foundation was awarded a capacity-building grant through the Great Lakes Stewardship Initiative to explore how a community interested in pursuing the initiative's goals and strategies might collaborate with one of the initiative's regional hubs to develop a “satellite” that serves K–12 teachers, students, and community organizations.

### Lake Superior Stewardship Initiative

Shawn Oppliger  
Western UP Center for Science, Math and Environmental Education  
$19,667

The Western Upper Peninsula Center for Science, Mathematics and Environmental Education focused its Great Lakes stewardship efforts in the five western counties of Michigan's Upper Peninsula: Houghton, Baraga, Keweenaw, Gogebic, and Ontonagon. The Center worked closely with the other five math/science centers in the Upper Peninsula to share strategies, resources, and professional development opportunities in order to facilitate their future engagement in this effort.

### West Michigan Hub for Place-Based Education and Environmental Stewardship

Dave Krebs  
Muskegon Area Intermediate School District  
$202,690

The Hub will establish and support a durable network of relationships among schools and community agencies to address local environmental issues. Audiences for the work will include 1,000 students and teams of 2–3 teachers from 14 schools. Many of the Hub's strategies will focus on institutionalizing place-based education within schools and community organizations through targeted efforts that focus on academic achievement, citizenship skills and student engagement.

### Lake Superior Stewardship Initiative

Shawn Oppliger  
Western UP Center for Science, Math and Environmental Education  
$200,000

Five themes will guide the implementation of the Initiative: understanding, sense of place, responsibility, collaboration, and active stewardship. The audiences are 68 teachers and 1,350 students in the Copper Country Intermediate School District. In addition, outreach will target schools in the Gogebic Ontonagon Intermediate School District schools, and five regional Mathematics and Science Centers in the Upper Peninsula.
Implementing the Southeastern Michigan Center for Place-Based Education

Rebecca Martusewicz  
Eastern Michigan University  
$199,766

The Southeastern Michigan Center for Place-Based Education links three entities – Eastern Michigan University, Creative Change Educational Solutions, and the Michigan Coalition of Essential Schools – in a leadership role to integrate students’ learning about the ecological, social, and cultural systems of the Great Lakes region. The initial intended audience for the Center’s work will be 560 students in grades 6–12, and 16 teachers (representing one school in Ann Arbor and one in Detroit).

The GRAND Learning Network: An Implementation Model for Place-Based Great Lakes Stewardship Education in Mid-Michigan

Shari L. Dann  
Michigan State University  
$199,688

The GRAND Learning Network will feature a formalized professional learning community of teachers, who thoroughly understand place-based education and Great Lakes stewardship and will provide leadership to colleagues. Leadership for the Network’s operation also comes from Michigan State University (the College of Agriculture and Natural Resources and the College of Education and Natural Science), a practicing K–12 teacher, and a distinguished advisory group. The intended audiences are about 2,000 students and 160 K–12 teachers, representing five school districts in the Greater Lansing area (ranging from rural to urban), and about 10 community organizations. A core group of teachers will first develop and then share tools and resources with their colleagues, who in turn will work with their students to carry out place-based education projects of local relevance.

Stewardship Planning

Great Lakes Fisheries Education Assessment and Summary of Needs  
Michaela Zint  
University of Michigan  
$79,107

This project assessed fisheries education needs in order to assist the GLFT in targeting education-related funds where they will be most effective.

The Great Lakes Ecosystem and Fisheries Education Networking Conference  
Shari L. Dann  
Michigan State University  
$30,000

The Great Lakes Fishery Trust sponsored the Great Lakes Fisheries and Ecosystem Education Networking Conference on May 5–6, 2003, in East Lansing, Michigan. The overall purpose of the networking conference was to assist the GLFT Board in developing and focusing its efforts in support of Great Lakes fisheries and ecosystem education throughout the region.

Creating Stewards of the Great Lakes  
Marguerite Cotto  
Northwestern Michigan College  
$54,500

The Great Lakes Water Studies Institute (GLWSI) at Northwestern Michigan College (NMC) undertook a short-term, comprehensive study about integrating place-based education, professional development for teachers, and community partnerships as a strategy to increase stewardship of the Great Lakes.

The Continued Development of a Place-Based Education Initiative in Michigan  
Marguerite Cotto  
Northwestern Michigan College  
1/1/2006–5/2/2006  
$46,966

This project continued to support NMC in its effort to assist the GLFT in exploring the potential for a GLFT place-based education (PBE) initiative. Local and national place-based education, as well as Michigan stakeholders, were engaged in the development phase. NMC produced a document that summarized the research and input from experts and strategic partners, including a recommended infrastructure, organizational, and implementation plan for a place-based education initiative in Michigan. The GLFT Board is using this information to determine the length and level of financial commitment to this initiative. The document is also used to educate and leverage assets of other funders that might join the Trust in supporting place-based education.
**A Watcher on the Shore: Nature, Culture and the Imperiled Great Lakes**

Marguerite Cotto 8/1/2006–12/31/2008 $40,000
Northwestern Michigan College

Author Jerry Dennis will devote one year to living at different Great Lakes coastal locations. The outcome will be a published book aimed at compelling people worldwide to understand that the Great Lakes are priceless natural resources and fighting to protect them is worthwhile. The book will be based upon a year of place-based study and research in, on, and around all five of the Great Lakes.

**Proposal for Bridging Funds to Support Place-Based Education**

Marguerite Cotto 11/8/2006–12/31/2007 $72,500
Northwestern Michigan College

This grant supported the following activities and products:

1. Two teacher professional development institutes were held in Traverse City and Muskegon reaching 29 teachers. The institutes focused on methods for place-based education (PBE) instruction.
2. A toolkit was developed featuring resources, templates, products, and strategies to help hubs established by the Great Lakes Stewardship Initiative (GLSI) begin and improve their work in the field. A copy of the toolkit is available on the GLFT Website.
3. Consultants expert in fund-raising were retained to develop a “case for support” for PBE. A Donor Engagement Guide was developed containing a seven-step process by which new hubs may create their own cases for support for their work. The guide helps hubs clearly describe the PBE philosophy and goals all hubs share, identify their own unique attributes and potential funding sources, and engage different types of funders using creative methods and techniques. The guide is available on the GLFT website.

**Muskegon River Initiative**

**Habitat Protection and Restoration**

**Big Rapids Dam Removal and Riverwalk Construction Project**

City of Big Rapids

The city’s Muskegon River dam was removed, eliminating an obstruction and reconnecting portions of the Muskegon River. The high gradient portion of the Muskegon River was recovered which, based on previous work on the Muskegon River, will directly and positively affect the ecology of the river. Following the removal, the city used its remaining GLFT grant funds to construct a riverwalk around the site, providing angler access, bank stabilization, and interpretative educational signage.
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Responsible Party</th>
<th>Start Date—End Date</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Funds for this project were used to build capacity of the Muskegon River Watershed Assembly. This project was part of the Great Lakes Fishery Trust’s Muskegon River Initiative.</td>
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<td>A Collaborative Approach to Understanding the Dynamics of the Muskegon River Watershed</td>
<td>Mike Wiley</td>
<td>4/1/2001—12/31/2008</td>
<td>$2,090,582</td>
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<td>Researchers from the University of Michigan, Michigan State University, Grand Valley State University, and the Michigan Department of Natural Resources, together with the Muskegon River Watershed Assembly and other local stakeholders, are collaborating to develop a modeling framework for risk assessment and ecosystem management in the Muskegon River Watershed.</td>
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<td>An Ecological Assessment of the Muskegon River Watershed to Solve and Prevent Environmental Problems</td>
<td>R. Jan Stevenson</td>
<td>4/1/2001—12/31/2008</td>
<td>$2,253,948</td>
</tr>
<tr>
<td>Researchers from Michigan State University, University of Michigan, and Wayne State University, together with the Muskegon River Watershed Assembly and volunteers from the Michigan Lake and Stream Association and other local stakeholders, are collaborating to conduct an ecological survey of the Muskegon River watershed. The primary goal is to develop and apply new methods for assessing the ecological integrity of aquatic ecosystems. Project outcomes will be directed toward supporting ecosystem management and restoration of this important Great Lakes fisheries resource and, ultimately, other similar ecosystems worldwide.</td>
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<td>Big Rapids Dam Removal Communications Project</td>
<td>Cindy Plautz</td>
<td>11/1/2001—12/1/2002</td>
<td>$17,011</td>
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<td>This project tells the story of the Big Rapids Dam Removal project with a PowerPoint CD presentation that can be given to any community, along with a companion booklet.</td>
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<td>This grant produced a book on the Muskegon River watershed including its history and current direction of restoration efforts.</td>
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<td>Special Projects</td>
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<td>Ensure Continuity in Great Lakes Fisheries Management and Research Library</td>
<td>Lizhu Wang, Ph.D.</td>
<td>1/1/2004—12/31/2004</td>
<td>$7,993</td>
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<tr>
<td>Budget cuts in 2004 forced state agencies to stop all periodical subscriptions. This grant enabled the DNR Institute For Research (IFR) to acquire library reference materials for 2004 to support Great Lakes fisheries research and management, and to provide materials for public education concerning Great Lakes fisheries.</td>
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Kalkaska County Conservation Easement Transfers
Mike Okma 1/1/2007–2/1/2010 $520,240
Grand Traverse Regional Land Conservancy
This grant money is intended for Kalkaska County Conservation Easement Transfers.

A Voyage to Protect and Restore the Great Lakes
Jordan Lubetkin 3/1/2008–12/31/2008 $20,000
National Wildlife Federation
The Healing Our Waters® – Great Lakes Coalition used the grant fund for a public education initiative by the Great Lakes’ fastest sailboat: the Earthvoyager. This 60-foot ship, with a 95-foot-tall mast, in the summer of 2008 led a flotilla of ships through the Great Lakes, stopping at ports throughout its journey for publicity-generating events that created awareness of the need to restore the Great Lakes.
Great Lakes Fishery Trust Milestones

1997  GLFT developed its first strategic plan and contracted Public Sector Consultants to manage operations, including sale of lands, development of grant programs, and staff support of the SAT.

1998  First pilot grants (11 projects).

1999  Funding of the Great Lakes fisheries interpretive facilities at Michigan fish hatchery locations throughout the state. Sale of approximately 6,000 acres of GLFT lands to the U.S. Forest Service Huron-Manistee National Forest through the Trust for Public Lands. Purchase of 1,000 acres of GLFT lands by the Little River Band of Ottawa Indians.

2000  Joint funding with the Great Lakes Fisheries Commission and Great Lakes Sea Grant Universities to identify and fund research needs related to food web disruptions in the Great Lakes. Joint funding of the Big Rapids dam removal project. Sponsorship of the first Great Lakes Sturgeon Management Coordination Meeting.

2001  Collaborative funding for a comprehensive evaluation and restoration of the Muskegon River Watershed.

2003  First grant for tribal fishing access. Funding for coastal management education initiative for Great Lakes shoreline property owners. Publication and distribution of the Lake Michigan angler access guidebook and interactive Web access to Lake Michigan shore-fishing guidebook.

2004  Partnership funding for acquisition of the Humbug Marsh as part of the Detroit River International Wildlife Refuge. Funding of a Web-based clearinghouse for Great Lakes ecosystem education resources.

2006  Funding for acquisition of the Bete Grise Wetland in Lake Superior in cooperation with The Nature Conservancy. Supporting grants for a community involvement project to determine the fate of the Boardman River dams. Funding assistance to the National Oceanic and Atmospheric Administration's (NOAA) Great Lakes Aquatic Non-indigenous Species Information System.

2007  First GLFT Great Lakes Stewardship Initiative awards to four regional hubs in cooperation with the Wege Foundation, the Community Foundation for Muskegon County, and the Fremont Area Community Foundation. Initial funding for research and analysis of management options for addressing Viral Hemorrhagic Septicemia (VHS).

2008  Sale of the last 30 acres of 10,800 acres of property provided to the GLFT as part of the original settlement.