



Projects Funded by the Great Lakes Fishery Trust 1998–2008



Access to the Great Lakes Fishery

Montague Fishing Access Jerry Graham 2/10/1998–10/10/2000 \$101,885
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 4/27/1998–10/31/2001 \$54,000
Village of Pentwater

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 4/27/1998–10/31/2001 \$540,214
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 5/16/1998–5/16/2001 \$209,375
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 8/10/1998–10/26/2000 \$80,000
City of Ludington

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 (Preliminary Engineering) Greg Boughton 9/11/1998–7/1/2000 \$21,174
Fruitland Township

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.

Fruitland Township Public Access (Construction)	Greg Boughton Fruitland Township	9/11/1998–6/10/2006	\$129,758
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-john placement, and landscaping.			
White Lake Pier Expansion	Tom Dziadosz U.S. Army Corps of Engineers	6/10/1999–1/6/2000	\$153,883
This project expanded the White Lake pier by adding additional feet on both sides.			
Identify the Plan for the Improvement of Access Sites	Jane TenEyck Chippewa Ottawa Resource Authority	6/28/1999–6/27/2000	\$24,771
This project identified potential projects to enhance public and tribal fishing access in northern Lake Huron, northern Lake Michigan, and eastern Lake Superior.			
Angler Access Improvement, Pere Marquette Lake	Mary Beutell City of Ludington	6/29/1999–6/29/2000	\$220,000
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.			
Feasibility Study of Public Access and Shore Fishing, Upper Detroit River Shoreline	Andy Buchsbaum National Wildlife Federation	6/29/1999–6/28/2000	\$23,640
This study assessed the potential fishing access sites in southeast Michigan along the Detroit River.			
Construction of a Barrier-Free Fishing Platform at the Rogers City Boat Harbor	Robert Fairbanks City of Rogers City	7/19/1999–7/19/2001	\$150,000
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.			
Village of Elberta Angler Access Improvement	Sharon Bower Village of Elberta	5/20/2000–5/19/2001	\$186,398
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.			
Arcadia Kid's Fishing Dock	Janice McCraner Arcadia Township	7/24/2000–7/24/2001	\$14,950
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.			
Montague Fishing Bridge	Tom Hamilton White Lake Area Sportfishing Association	7/27/2000–7/28/2002	\$100,000
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.			



Harbor Drive Angler Fishing Access Project	Anthony Furton City of Menominee	9/22/2000–5/1/2002	\$172,000
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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
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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	12/28/2000–5/1/2002	\$180,000
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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
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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
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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	11/6/2001–5/31/2003	\$220,080
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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
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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
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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
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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	11/5/2002–6/1/2004	\$48,500
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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
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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
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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	2/17/2003–2/17/2004	\$55,882
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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
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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
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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	Sean DuPerron Benzie County	5/6/2003–5/6/2004	\$24,437
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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	Gray Gogolin City of Holland	11/3/2004–10/15/2008	\$350,000
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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	Bill Farrell City of Escanaba	11/3/2004–11/30/2007	\$293,063
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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	Steve Romzek Huron County Road Commission	11/3/2004–11/30/2005	\$153,436
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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	Ron Brown Muskegon Environmental Research & Education Society	11/1/2005–9/30/2007	\$198,515
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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 Allegan County Parks Commission	11/1/2005–12/31/2008	\$100,000
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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 Little Traverse Bay Bands of Odawa Indians	11/1/2005–12/31/2008	\$651,251
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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.



Gladstone 10th Street Fishing Pier	Nicole Sanderson City of Gladstone	11/1/2005–11/30/2007	\$350,000
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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.

Detroit RiverWalk Fishing Access	Leonard P. Marszalek Detroit RiverFront Conservancy	11/1/2005–12/31/2006	\$254,506
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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.

Frankfort Lake Michigan Beach Pier Access Project	Joshua Mills City of Frankfort	11/7/2006–11/7/2007	\$44,045
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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.

Walkway Access to the Portage Lake/ Lake Michigan South Pier	David Meister Onokama Township	11/7/2006–12/7/2007	\$89,016
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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.

Dingell Park Boardwalk and Fishing Access	Jim Moran City of Ecorse	11/7/2006–12/31/2007	\$400,000
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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.

Detroit River International Wildlife Refuge Gateway Fishing Access Facility	Susan J. Phillips Metropolitan Affairs Coalition	11/6/2007–9/1/2009	\$170,000
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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 Alliance for Economic Success	11/6/2007–8/30/2009	\$289,450
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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 Huron County Road Commission	11/6/2007–9/30/2009	\$192,000
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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	Sheila Aldrich City of Manistique	11/6/2007–6/15/2009	\$384,700
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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	Keith Cheli Michigan Department of Natural Resources	11/6/2007–5/31/2009	\$137,374
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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	Joe Parman Van Buren County Drain Commission	11/6/2007–12/31/2008	\$15,709
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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 Michigan Department of Natural Resources	11/6/2007–11/30/2008	\$140,500
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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	Richard Kooistra Bridgeton Township	6/1/2007–10/1/2008	\$26,035
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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	Ross Stein South Haven Charter Township	11/6/2007–11/30/2008	\$111,500
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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 University of Michigan	4/10/2008–9/30/2008	\$10,000
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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 National Wildlife Federation	8/5/2008–10/1/2008	\$10,000
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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 Great Lakes Fishery Commission	9/1/2008–2/1/2009	\$5,000
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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 Michigan State University	9/1/2006–12/31/2007	\$19,691
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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 Michigan State University	9/1/2006–9/1/2009	\$259,349
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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	Michael Parsons National Oceanic and Atmospheric Administration	3/1/1998–8/31/2001	\$264,032
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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 assess 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	Stephen Brandt University of Michigan	6/2/2000–12/31/2003	\$276,868
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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 Great Lakes Fishery Commission	8/15/2000–1/15/2002	\$12,000
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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 University of Michigan	8/1/2001–6/30/2005	\$201,114
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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 Great Lakes Fishery Commission	9/1/2002–9/30/2006	\$306,000
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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	Michael L. Jones Michigan State University	9/1/2003–3/31/2008	\$359,298
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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	9/1/2004–7/31/2007	\$413,375
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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
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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	2/23/2006–12/31/2007	\$35,000
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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
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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
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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	11/1/2007–11/1/2009	\$150,637
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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
Purdue University

1/1/2008–12/31/2011

\$569,513

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**

Jacques Rinchar
State University of New York–Brockport

4/1/2008–3/31/2011

\$326,524

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
Science Museum of Minnesota

1/1/2009–12/31/2011

\$148,008

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
U.S. Geological Survey

4/15/08–6/30/10

\$782,413

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	Dale Honeyfield U.S. Geological Survey	8/1/1998–8/1/2001	\$452,000
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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)	Diane Elliott U.S. Geological Survey	10/13/1999–3/21/2004	\$332,114
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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)	Diane Elliott U.S. Geological Survey	10/13/1999–3/21/2004	\$267,050
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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	Becky Lasee U.S. Fish and Wildlife Service	9/26/2000–9/26/2001	\$22,232
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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	Michael L. Jones Michigan State University	10/2/2000–10/2/2003	\$265,426
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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)	Dale Honeyfield U.S. Geological Survey	8/1/2001–12/31/2004	\$465,000
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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	Mohamed Faisal Michigan State University	9/1/2002–3/31/2006	\$256,841
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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.

Elucidation of Etiology and Pathogenesis of Early Mortality Syndrome by cDNA Microarray-Based Identification of Expressed Genes	Weiming Li Michigan State University	9/1/2002–9/30/2006	\$359,295
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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.

Thiaminase: New Tools in the Fight against EMS	R. Marshall Werner Lake Superior State University	9/1/2003–2/28/2005	\$24,960
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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.

Validation of Non-Culture Methods to Detect and Quantify Renibacterium Salmoninarum in Diagnostic Samples from Great Lakes Salmonids	Diane Elliott U.S. Geological Survey	9/1/2004–12/31/2008	\$338,146
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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.

Ecological and Genetic Approaches to Develop Sustainable and Disease Free Fishes in the Great Lakes	Kim Scribner Michigan State University	9/1/2004–8/31/2008	\$358,514
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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.

Modeling Renibacterium Salmoninarum Dynamics among Chinook Salmon and Lake Whitefish Populations in the Great Lakes	Jean Tsao Michigan State University	9/1/2005–3/31/2007	\$43,287
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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.

Characterization of the Adaptive Potential of Lake Michigan Chinook Salmon to Resist Disease in the Presence of Environmental Stressors	Diane Elliott U.S. Geological Survey	10/1/2008–9/30/2012	\$373,152
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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.

Fisbery Recruitment

Success of Current Strategies to Recolonize Lake Trout Spawning Reefs in Northern Lake Michigan	Mark Holey U.S. Fish and Wildlife Service	9/23/1999–5/15/2003	\$157,360
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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	Kim Scribner Michigan State University	11/17/1999–12/31/2001	\$215,975
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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	Jaquie Craig USGS Great Lakes Science Center	1/18/2000–1/18/2001	\$100,000
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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	John Dettmers Great Lakes Fishery Commission	6/6/2000–12/31/2003	\$360,000
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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	Doran M. Mason, Ph.D. National Oceanic and Atmospheric Administration	7/5/2000–12/31/2004	\$306,045
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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	James Rice North Carolina State University	10/24/2000–10/24/2003	\$104,340
<p>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.</p>			
Effects of Egg and Fry Predators on Lake Trout Recruitment in Lake Michigan	John Fitzsimons Department of Fisheries and Oceans	10/24/2000–10/24/2003	\$346,400
<p>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.</p>			
Dynamics of Alewife Recruitment Variability in Lake Michigan	Edward Rutherford University of Michigan	10/30/2000–7/31/2004	\$358,456
<p>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.</p>			
Modeling the Influence of Lake Circulation Patterns, Upwelling Events, and Turbulence on Fish Recruitment Variability in Lake Michigan	Dmitry Beletsky National Oceanic and Atmospheric Administration	10/1/2001–12/31/2004	\$349,797
<p>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.</p>			
Lake Trout Spawning Habitat at the Southern Refuge, Lake Michigan	John Janssen University of Wisconsin–Milwaukee	9/1/2003–12/31/2004	\$24,211
<p>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.</p>			
Evaluation of Lake Trout Spawning Habitat for Lake Michigan Deep Reefs	John Janssen University of Wisconsin–Milwaukee	9/1/2004–6/30/2008	\$355,485
<p>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.</p>			

Historic and Spatial Variation of Lake Whitefish Maturation Schedules	Tomas Hook University of Michigan	9/1/2005–12/31/2007	\$107,691
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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
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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
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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
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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	1/1/2009–12/31/2011	\$299,424
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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	4/4/1998–4/4/2003	\$750,000
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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
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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
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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
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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
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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
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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
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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
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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 1/8/1999–1/8/2003 \$133,452
University of Massachusetts

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 8/25/1999–8/24/2000 \$6,800
U.S. Fish and Wildlife Service

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 1/6/2000–7/6/2002 \$25,000
University of Wisconsin–Milwaukee

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 6/1/2001–12/31/2007 \$25,500
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 7/1/2001–6/30/2004 \$132,000
Purdue University

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 Stock in the Lake Michigan Basin	Rob Elliott U.S. Fish and Wildlife Service	8/1/2001–7/31/2005	\$504,741
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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.

Rapid Assessment of Lake Sturgeon Spawning Stocks Using Instream Hydroacoustic Technology	Nancy Auer Michigan Technological University	8/27/2001–10/1/2005	\$237,920
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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.

Development of a Management Plan for Lake Sturgeon within the Great Lakes Basin Based on Population	Tracy Hill U.S. Fish and Wildlife Service	9/1/2001–8/1/2004	\$295,400
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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.

Evaluation of Recruitment Success, Habitat Preference, and River Retention of Young Lake Sturgeon in the Big Manistee River	Marty Holtgren Little River Band of Ottawa Indians	11/1/2002–11/1/2004	\$84,374
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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.

Historical Distribution and Abundance of Lake Sturgeon in the Lake Michigan Basin	Phil Cochran Saint Mary's University	11/1/2002–10/1/2007	\$97,315
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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.

Sturgeon Habitat Restoration, Monitoring, and Education in the Detroit River	Jennifer Read University of Michigan	1/1/2003–12/31/2006	\$110,000
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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 U.S. Fish and Wildlife Service	8/5/2003–10/31/2004	\$34,900
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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 Purdue University	10/1/2003–10/1/2006	\$33,375
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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	Marty Holtgren Little River Band of Ottawa Indians	8/3/2004–12/31/2007	\$144,393
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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	Kim Scribner Michigan State University	8/3/2004–12/31/2008	\$275,464
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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	J. DeWoody Purdue University	8/3/2004–3/31/2006	\$102,727
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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 U.S. Fish and Wildlife Service	8/3/2004–12/31/2006	\$11,000
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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

Erik Olsen
Grand Traverse Band of Ottawa and Chippewa Indians

8/3/2004–3/1/2005

\$17,053

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

Rob Elliott
U.S. Fish and Wildlife Service

8/3/2004–10/9/2008

\$292,143

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
U.S. Fish and Wildlife Service

12/1/2005–6/30/2009

\$583,212

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
Purdue University

1/1/2006–12/31/2008

\$190,399

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	J. DeWoody Purdue University	9/1/2006–9/30/2008	\$150,200
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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	Henry Quinlan U.S. Fish and Wildlife Service	9/1/2006–4/1/2007	\$24,696
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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	Daniel Hayes Michigan State University	9/1/2006–12/31/2009	\$110,372
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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	Chunbo Zhang Illinois Institute of Technology	9/1/2006–9/1/2009	\$241,794
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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	Trent Sutton University of Alaska–Fairbanks	9/1/2007–7/31/2009	\$104,719
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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	Amy Welsh State University of New York–Oswego	10/1/2007–8/31/2009	\$170,871
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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 U.S. Fish and Wildlife Service	12/1/2008–12/31/2009	\$17,575
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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 The Trust for Public Land	3/1/2004–12/31/2004	\$500,000
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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 Toczydlowski Keweenaw Land Trust	3/1/2007–12/31/2008	\$150,000
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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.	Shari L. Dann Michigan State University	10/12/1998–10/11/2000	\$210,620
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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	Michael J. Chiarappa Western Michigan University	11/18/1998–8/19/2001	\$198,720
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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	Juan Alvarez Michigan State University	6/2/1999–3/31/2004	\$3,344,696
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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 Michigan United Conservation Clubs	11/1/2000–10/31/2003	\$30,000
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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	Shari L. Dann Michigan State University	1/30/2001–1/30/2002	\$46,680
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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	Shari L. Dann Michigan State University	2/5/2003–4/30/2004	\$31,090
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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	Gail Fruenwald Tip of the Mitt Watershed Council	5/1/2003–8/31/2004	\$45,000
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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	Edward Becker Friends of the Shiawassee National Wildlife Refuge	10/5/2003–7/1/2004	\$250,000
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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	Michaela Zint University of Michigan	3/1/2004–7/31/2006	\$90,000
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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	Elizabeth LaPorte University of Michigan	5/4/2004–10/31/2005	\$50,000
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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	Donna Stine Michigan United Conservation Clubs	5/4/2004–7/1/2005	\$48,022
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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 Campaign Phase II	Jennifer McKay Tip of the Mitt Watershed Council	2/7/2006–5/31/2006	\$20,000
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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 University of Michigan	7/1/2006–12/31/2006	\$20,000
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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.

Wheelin’ Sportsmen: Let’s ALL Fish Lake Michigan Disability Fishing Recruitment Project	Nathan Harlan National Wild Turkey Federation	8/1/2006–7/31/2009	\$62,340
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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 Detroit Public Television	1/1/2007–4/30/2009	\$300,000
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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 University of Michigan	10/1/2007–7/1/2008	\$20,000
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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 Alliance for the Great Lakes	9/1/2008–9/1/2009	\$93,500
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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 Conservation Resource Alliance	9/1/2008–9/1/2009	\$25,000
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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	6/13/2007–10/25/2007	\$20,000
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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	6/13/2007–10/25/2007	\$19,900
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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	6/13/2007–10/25/2007	\$20,000
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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	6/13/2007–10/25/2007	\$20,000
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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	6/13/2007–12/31/2007	\$5,213
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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	6/13/2007–10/25/2007	\$19,673
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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	6/13/2007–10/25/2007	\$20,000
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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	6/13/2007–12/1/2007	\$5,213
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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	6/13/2007–10/25/2007	\$19,667
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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	11/30/2007–6/30/2009	\$202,690
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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	11/30/2007–6/30/2009	\$200,000
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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	11/30/2007–6/30/2009	\$199,766
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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	5/6/2008–12/31/2009	\$199,688
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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	4/1/2000–6/1/2001	\$79,107
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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	8/13/2002–6/4/2004	\$30,000
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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	2/1/2005–1/31/2006	\$54,500
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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
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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

Cindy Plautz 1/4/2000–7/31/2004 \$350,000
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.

Building Capacity in the Muskegon River Watershed Assembly	Gary Noble Muskegon River Watershed Assembly	4/1/2001–4/1/2004	\$162,975
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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.

A Collaborative Approach to Understanding the Dynamics of the Muskegon River Watershed	Mike Wiley University of Michigan	4/1/2001–12/31/2008	\$2,090,582
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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.

An Ecological Assessment of the Muskegon River Watershed to Solve and Prevent Environmental Problems	R. Jan Stevenson Michigan State University	4/1/2001–12/31/2008	\$2,253,948
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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.

Big Rapids Dam Removal Communications Project	Cindy Plautz City of Big Rapids	11/1/2001–12/1/2002	\$17,011
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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.

The Muskegon: The Majesty and Tragedy of Michigan's Rarest River	Gary Noble Muskegon River Watershed Assembly	10/1/2002–9/30/2005	\$68,000
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This grant produced a book on the Muskegon River watershed including its history and current direction of restoration efforts.

Special Projects

Ensure Continuity in Great Lakes Fisheries Management and Research Library	Lizhu Wang, Ph.D. Michigan Department of Natural Resources	1/1/2004–12/31/2004	\$7,993
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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.

Kalkaska County Conservation Easement Transfers	Mike Okma Grand Traverse Regional Land Conservancy	1/1/2007–2/1/2010	\$520,240
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This grant money is intended for Kalkaska County Conservation Easement Transfers.

A Voyage to Protect and Restore the Great Lakes	Jordan Lubetkin National Wildlife Federation	3/1/2008–12/31/2008	\$20,000
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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.