Name of Organization: Great Lakes Indian Fish and Wildlife Commission

Type of Organization: Tribal Organization

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Project Title: GIS mapping of Lake Superior Spawning and Nursery Areas

Project Category: Habitat (Ecological) Protection and Rest

Rank by Organization (if applicable): 1

Total Funding Requested ($): 15,585 **Project Duration:** 1 Years

Abstract:

The Great Lakes Indian Fish and Wildlife Commission is committed to working cooperatively with its partners to preserve the habitats that maintain the fish stocks harvested by tribal members for cultural, subsistence, and economic purposes under federal treaties. Over fishing, parasitic sea lamprey, pollution, and destruction of physical habitat have had drastic impacts upon Lake Superior's fishery. Lake trout harvests dropped from 3.1 million pounds in 1951 to 380,000 pounds in 1960. Since this time, intensive efforts have been made to reestablish self-sustaining fish communities by reducing lamprey abundance, stocking hatchery reared fish, and limiting the harvest of native stocks.

While significant impovements have been realized, greater emphasis is needed to protect and improve the overall quality of fish habitat and ensure preservation of specialized habitat required by sensitive, embryonic-juvenile life stages of native fish. The Aquatic Committee has developed habitat protection and monitoring objectives which have been formalized in both Binational Program and SOLEC documents.

The Commission is proposing to utilize The Atlas of the Spawning and Nursery Areas of Great Lakes Fishes, Volume II, Lake Superior (Goodyear et al. 1982) to prepare GIS coverages identifying known spawning and nursery locations for native fish species in Lake Superior and its tributaries. Once GIS coverages are completed, GIS maps of various scale and aquatic habitat characteristics will be prepared and distributed through print, CD ROM, and web sites. This will assist state, federal, and tribal natural resource agencies to coordinate resources to more effectively monitor and protect habitat integrity and develop future strategies to protect Lake Superior's aquatic bio-diversity.

Geographic Areas Affected by the Project

States:

- [ ] Illinois
- [ ] Indiana
- [x] Michigan
- [x] Minnesota
- [ ] New York
- [ ] Pennsylvania
- [x] Wisconsin
- [ ] Ohio

Lakes:

- [x] Superior
- [ ] Huron
- [ ] Michigan
- [ ] Erie
- [ ] Ontario
- [ ] All Lakes

Geographic Initiatives:

- [ ] Greater Chicago
- [ ] NE Ohio
- [ ] NW Indiana
- [ ] SE Michigan
- [ ] Lake St. Clair

Primary Affected Area of Concern: All AOCs

Other Affected Areas of Concern: St. Marys River, MI;Deer Lake,MI; Torch Lake, MI; St. Louis River, MN;

For Habitat Projects Only:

Primary Affected Biodiversity Investment Area: All BIAs

Other Affected Biodiversity Investment Areas: Lake Superior Highlands/Isle Royale; Bad River Watershed/Bayfield Peninsula; Keweenaw Peninsula;

Problem Statement:

The Commission, through membership in the Lake Superior Technical Committee, participated in developing the Lake Superior Binational Program's Ecosystem Principles and Objectives, Indicators and Targets for Lake Superior (1995).

The Aquatic Committee (i.e. Lake Superior Technical Committee) established the Objective - - "Achieve no net loss of habitat that presently support Lake Superior fisheries; restore and maintain the productive capacity of aquatic habitats that have suffered damage". To meet this objective the Aquatic Committee proposes to "monitor and document habitat loss or restoration" in the Nearshore Community (< 80 m deep); in Habor-Embayments-Estuaries; and Tributaries. In addition, the Aquatic Committee proposed to "monitor toxic contaminants in aquatic organisms".

The Commission has also participated in SOLEC and the organization's establishment of an indicator for aquatic habitat. Aquatic Habitat (Indicator #0006) - - "will assess the quality and amount of aquatic habitat in the Great Lakes ecosystem, and it will be used to infer progress in rehabilitating degraded habitat and associated aquatic communities".

The assessment of the quality and amount of habitat in the Great Lakes ecosystem and the monitoring and documentation of habitat loss will require the Aquatic Committee to:
- inventory important aquatic habitat sites such as known spawning and nursery areas,
- map important aquatic habitat sites using GIS and hydroacoustic techniques,
- and develop intergovernmental habitat monitoring, protection, and rehabilitation strategies.

In 1982, U.S. Fish and Wildlife Service and Army Corps of Engineers published, The Atlas of the Spawning and Nursery Areas of Great Lakes Fishes, Volume II, Lake Superior (Goodyear et a. 1982). This document identified the historical spawning and nursery locations, (i.e. latitude and longitude), bottom characteristics, and species using identified sites. This document provides the most comprehensive and extensive inventory of spawning and nursery habitat sites prepared for Lake Superior fish species. Unfortunately this information has not been digitized for use in GIS applications to monitor or protect aquatic habitats.

Locational coverages are needed of fish spawning and nursery sites so they can be integrated into existing GLIFWC Lake Superior GIS data coverages for watersheds, hydrology, bathymetry, statistical grids (used by management agencies), lake trout management boundaries, lamprey spawning assessment sites, Area's of Concern (AOC's), and International and State boundaries. This GIS tool will provide a critical foundation to support future work by the Aquatic Committee.

Proposed Work Outcome:

PROJECT DELIVERABLES:

Lake Superior (lake wide) maps and GIS coverages:
- Polygons illustrating the Aquatic Committee's four habitat zones (i.e. Open Water, Nearshore, Habor-Embayments-Estuaries, and Tributaries)
- GIS coverage of locational points of major spawning and nursery locations for native fish,
- GIS coverage of locational points of major spawning and nursery locations for exotics,
- GIS coverage of locational points of lake sturgeon spawning and nursury sites,
- GIS coverage of known shipping lanes and historical disposal sites (i.e. battery dumps from lighthouses),
** The GIS lake wide mapping proposed by GLIFWC would be structured for integration with the Lake Superior Binational Program's "Important Habitat in the Lake Superior Basin" (1996) by Michael A. Koutnik.

Detailed scale (i.e. approximately 1 inch = 2 miles) Lake Superior Maps with GIS coverages:
- create data table(s) including the location, spawning area (i.e. ft2), habitat zone, bottom characteristic (i.e. sand, rock, gravel, etc), depth, statistical grids, management unit, fish species, and species status (i.e. threatened, endangered, native, or exotic).
- prepare a GIS coverage and maps illustrating aquatic habitat by bottom characteristics for spawning and nursery areas,
- prepare a GIS coverage and maps illustrating spawning and nursery locations for lake sturgeon (i.e. a threatened species - MI listing; and Species of Special Concern - WI & MN listing), Lake Trout (lean and siscowet), whitefish, herring, chubs, and walleye.
- explore alternatives for linking GIS data coverages with data bases on relative abundance and other biological and contaminant information.
- explore alternatives for using GIS data coverages to assess aquatic bio-diversity of selective spawning and nursery sites between predator, prey, and bottom feeder species.

Demonstrations and Workshops:
- the Commission will provide demonstrations to facilitate use of the GIS coverages to the Lake Committee (i.e. GLIFWC member tribes), the Aquatic Committee (i.e. Lake Superior Technical Committee), and its partners.
- the Commission will produce 25 CD ROMs containing JPEG files of maps and Lake Superior Data coverages compatable with Archview GIS software for distribution to Aquatic Habitat Committee members, EPA, and GLIN.

Website development:
- JPEG files will be developed of all Lake Superior fish spawning and nursury site maps for use on the Internet,
- GLIFWC will establish a web site to provide access to JPEG map files and GIS data coverages for federal, state, and local agencies working to protect aquatic habitats in Lake Superior.

PROJECT BENEFITS:

- GIS data coverages and useable maps are essential for protecting fish spawning and nursery habitat. Grant deliverables will provide a new tool to facilitate efforts in protecting Lake Superior's bio-diversity of native fish species and assist regulators in protecting critical aquatic habitats. In addition, it will assist state, federal, and tribal natural resource agencies to coordinate resources and more effectively monitor habitat integrity.

- Bringing critical aquatic habitat information from a technical scientific source into the mainstream media (i.e. GLIFWC, Binational Program, & EPA publications; websites; and new scientific publications) will increase the public visability of

Lake Superior aquatic habitat issues, improve public awareness of their importance, and build support for aquatic habitat protection.

- The Lake Superior Technical Committee is proposing to undertake hydroacoustic mapping in Lake Superior. This is an expensive and lengthy undertaking. Preparation of GIS maps detailing aquatic habitat will assist the Aquatic Committee in establishing priorities for
hydroacoustic mapping.

Project Milestones:	Dates:
Project Start	10/2000
Compile data sets - NOAA, EPA, USGS, etc	11/2000
Create data table structures	12/2000
Digitize spawning and nursery sites	02/2001
Prepare draft maps for comment	06/2001
Revise maps as directed	07/2001
Demonstrations & data/map distribution	08/2001
Project End	09/2001

☒ Project Addresses Environmental Justice

If So, Description of How:

According to the teachings of the Anishinaabe people, also known as the Chippewa or Ojibwe, it was the sacred Megis Shell that first guided the people to the rich regions of the Great Lakes. Here the people used large large birch bark canoes and gill nets constructed from twisted and knotted strands of willow bark to harvest trout, whitefish, and sturgeon. It is also important to acknowledge that fish historically played an important role in the culture of Anishinabe people as evident by their decision to include sturgeon into their social clan structure.

As Europeans pushed into the Great Lakes region, the Anishinaabe people used fish to trade with French and English outposts. In the late 1800's and early 1900's a growing number of non-Indian Commercial fishermen used new technology to efficently take large numbers of fish from Lake Superior. Lake Superior fish stocks were decimated by the early 1960's due to overfishing, introduction of parasitic sea lamprey, lowered water quality, and destruction of physical habitat including spawning grounds.

Anishinabe (Chippewa) tribal members continue to exercise off-reservation treaty rights to hunt, fish, and gather in the 1836, 1837, and 1842 ceded territories throughout Wisconsin, Minnesota, and Michigan and in the waters of Lake Superior. In 1998 Tribes harvested 1,551,433 lbs of fish from the Michigan waters of Lake Superior including: 193,676 pounds of lake trout; 1,238,802 pounds of whitefish; 61,271 pounds of siscowet trout; and 45,011 pounds of herring (Commercial Fisheries Newsline Vol. XIX, No.1, January 2000). Identifying and protecting the aquatic spawning and nursery habitat of native Lake Superior fish species is important for the economic and cultural survival of the Anishinabe people.

☒ Project Addresses Education/Outreach

If So, Description of How:

The Commission will work to distribute the GIS maps prepared under this grant as follows:

Aquatic Committee: GIS maps identifying spawning and nursery habitat of Lake Superior fish species will be distributed to members of the Aquatic Committee for their use in implementing the aquatic habitat monitoring and protection objectives identified in the Lake Superior Binational Program's Ecosystem Principles and Objectives, Indicators and Targets for Lake Superior and SOLEC documents.

MSU Michigan SeaGrant: SeaGrant will assist GLIFWC in distributing information on the location of fish spawning and nursery areas to promote habitat protection for actions taken by local policy makers (i.e. zoning administrators, county boards, city officals, etc) and developers/regulators preparing Environmental Assessments and Environmental Impact Statements.

Northland College and Sigurd Olsen Environmental Institute: The Commission has established a M.O.U with Northland College and Sigurd Olsen Environmental Institute to maintain an interactive GIS web site. GLIFWC has purchased and stationed a GIS network server at Northland that is currently being utilized by federal, state, and tribal agencies to cooperatively control invasive plants. GIS Lake Superior data coverages will be added to this site.

Tribal Governments: GLIFWC will provide its tribal governments with both large and small scale GIS maps identifying fish spawning and nursery habitats to facilitate their future participation in the Bi-national program.

Project Budget:

	Federal Share Requested ($)	Applicant's Share ($)
Personnel:	6,804	0
Fringe:	1,361	0
Travel:	2,500	0
Equipment:	0	0
Supplies:	500	0
Contracts:	0	0
Construction:	0	0
Other:	2,750	3,700
Total Direct Costs:	13,915	3,700
Indirect Costs:	1,670	0
Total:	15,585	3,700
Projected Income:	0	0

Funding by Other Organizations (Names, Amounts, Description of Commitments):

The budget reflects a 23.74% match which exceeds the 5% minimium match required. GLIFWC will utilize Tribal 638 funds and interest income to cover the cost of purchasing computer upgrades, GIS software, and data coverages at a cost of $3,700.

In addition the Commission will continue its participation in the Aquatic Committee (i.e. Lake Superior Technical Committee) and work with member tribes, federal agencies, and state agencies to develop and coordinate aquatic habitat monitoring, protection, and rehabilitation strategies.

Description of Collaboration/Community Based Support:

The Great Lakes Indian Fish and Wildlife Commission is comprised of 11 tribal governments located throughout Minnnesota, Wisconsin, and Michigan. Member tribes include Mille Lacs, Fond du Lac, St. Croix, Lac Courte Oreilles, Red Cliff, Bad River, Lac du Flambeau, Sokaogon, Lac Vieux Desert, Keweenaw Bay, and Bay Mills. Tribal Chairs, or their designee, form the Board of Commissioners. The Board of Commissioners establish GLIFWC policies and set direction of staff activities.

In addition to its member tribes, the Commission is proposing to utilize the following partnerships:

Aquatic Habitat Committee (i.e. Lake Superior Technical Committee): Drafts of GIS maps prepare from The Atlas of the Spawning and Nursery Areas of Great Lakes Fishes, Volume II, Lake Superior will be submitted for review and comment.

MSU Michigan SeaGrant-Ron Kinnunen: The Commission will work with SeaGrant to distribute information on the location of fish spawning and nursery areas to promote habitat protection.

University of Wisconsin-Madison: The Commission has entered into a Memorandum of Understanding to support natural resource management and protection intiatives with the University of Wisconsin Madision. The Commission also maintains a GIS office at the University of Wisconsin- Land Information Computer Graphics Facility. The Commission proposes to staff a LTE position under the direction of Dr. John Coleman to digitize these coverages under this partnership.