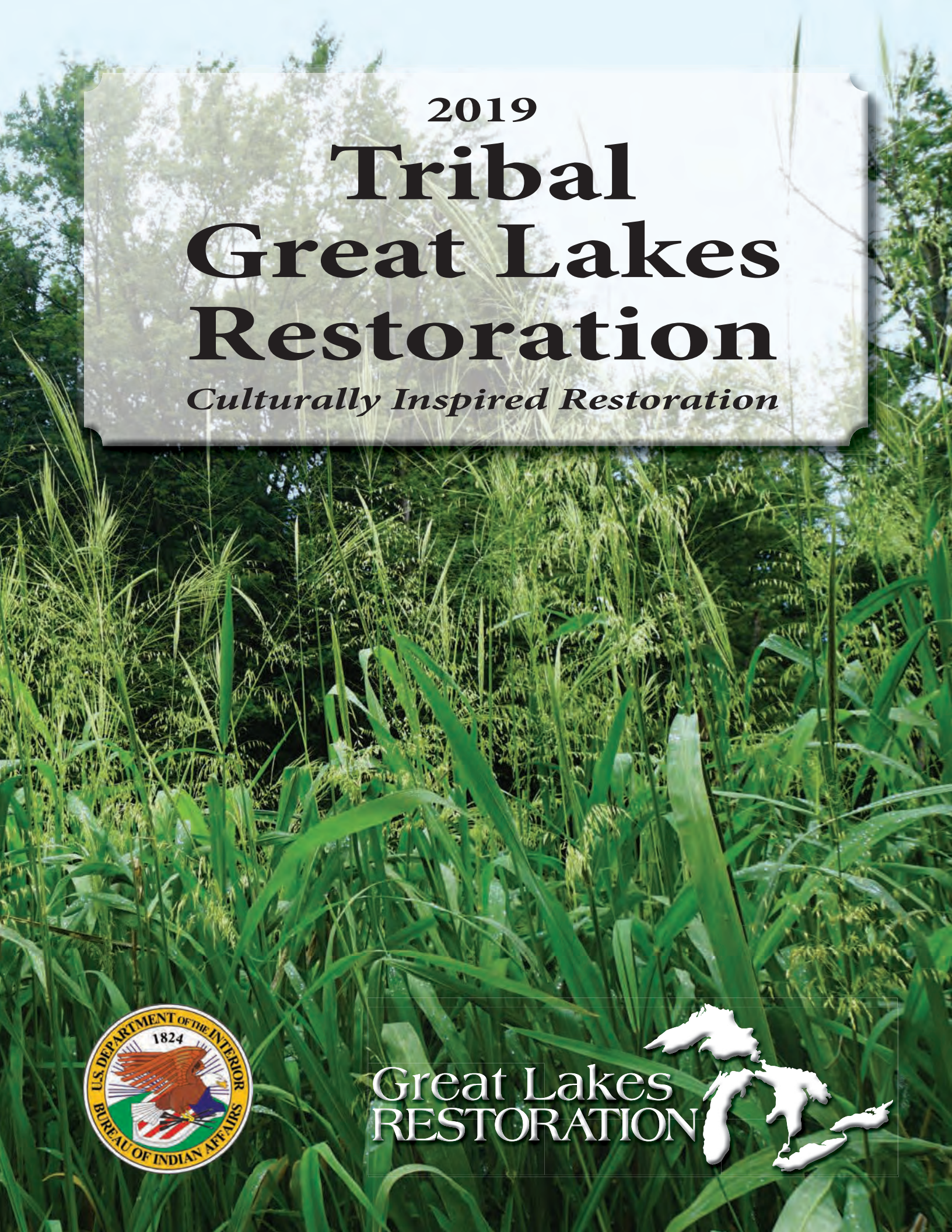
2019

Tribal Great Lakes Restoration

Culturally Inspired Restoration



U.S. DEPARTMENT OF THE INTERIOR 1824 BUREAU OF INDIAN AFFAIRS

Great Lakes RESTORATION

Sabin Dam Removal - Grand Traverse Band

Invasive Species Control -
Match-E-Be-Nash-She-Wish Band

Aerial Moose Survey -
1854 Treaty Authority

Cover Photo: Wild Rice restored on Nottawa Creek near the Nottawaseppi Huron Band of the Potawatomi Reservation

Welcome Readers

Dear Reader,

The Great Lakes Restoration Initiative (GLRI) began in 2010 to accelerate efforts to protect and restore the Great Lakes. With the support of GLRI, tribes have substantially increased their capacity to participate in intergovernmental resource management activities for the Great Lakes alongside federal, state and other partners to address some of the most pressing challenges facing the Great Lakes. Indian country, comprised of reservation land bases and ceded territories where tribes retain rights, represents millions of acres within the Great Lakes Basin.

Since 2010, the Bureau of Indian Affairs (BIA), with support from the U.S. Environmental Protection Agency, has provided GLRI funding to more than 30 tribes and tribal organizations in the Midwest and Eastern Regions for Great Lakes protection and restoration projects. The BIA GLRI program has gradually increased, growing from $3 million in 2010 to over $11 million in 2019. In total, BIA has provided approximately $60 million in GLRI funding to tribes as of fall 2019 to implement over 500 tribally led restoration projects. These projects protected and restored 190,000 acres of habitat and approximately 550 miles of Great Lakes tributaries, and include over 40 distinct projects to protect and restore native species. The majority of tribal GLRI projects work to assess, monitor, protect and restore local waterways, habitats, and species such as lake sturgeon, moose, and wild rice essential for tribal life-ways and cultural continuity. In this way, the GLRI has been a catalyst for not only the restoration of the natural environment of the Great Lakes, but for strengthening and revitalizing tribal cultures and traditions interconnected to the health of the Great Lakes and its ecosystems.

In 2019, the GLRI continued to be a significant source of funding for tribal communities to lead on-the-ground work and support local partnerships to prevent and control invasive species; reduce nutrient and phosphorous loadings into waterways; restore stream passage and riparian habitats for native fish populations; protect Great Lakes coastal wetlands; and continue long-term steps necessary to restore several Great Lakes endemic species including lake sturgeon and moose. Tribes provide unique expertise for Great Lakes resource protection, including serving as the premier experts in wild rice management. As the original caretakers of the Great Lakes, tribes have critical place-based insight and traditional ecological perspectives for understanding and protecting the Great Lakes for generations to come.

I invite you to read the success stories that follow to learn how tribes have been key contributors to the success of the GLRI overall, and most notably to the protection of habitat and native fish, plants and wildlife populations throughout the Great Lakes.

Jessica L. Koski
Regional Fish & Wildlife Biologist
Bureau of Indian Affairs Midwest Region

Great Lakes Reservation Map

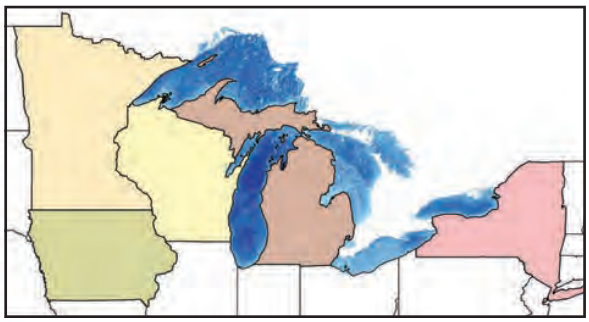


Table of Contents

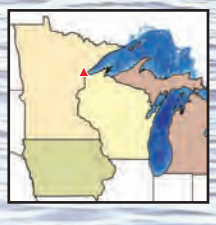
Sturgeon Restoration and Protection - Little River Band

Protecting a Piping Plover Nest- Little Traverse Bay Bands

Lake Superior Day - Bad River Band

1854 Treaty Authority

Great Lakes Issues and Environmental Review, Invasive Species Management, Fisheries and Wildlife



The 1854 Treaty Authority is an inter-tribal resource management agency governed by the Bois Forte Band of Chippewa and Grand Portage Band of Lake Superior Chippewa. The organization is charged to preserve, protect, and enhance treaty rights and related resources in the 1854 Ceded Territory. This ceded territory encompasses approximately 5.5 million acres of present-day northeastern Minnesota. Funding has supported many projects and programs in efforts to protect resources in the 1854 Ceded Territory.

Tribal Capacity Building

The 1854 Treaty Authority remained active in 2018 on issues impacting Lake Superior and its watershed. Participation was ongoing in the Lake Superior Partnership and other Great Lakes committees and workgroups. Staff participated in environmental review of projects or policies impacting the Lake Superior basin and 1854 Ceded Territory. Ongoing work occurred in the implementation of our climate change vulnerabillty assessment and adaptation plan. Oversight was provided to the invasive species program and coordination occurred with other management organizations.

Invasive Species

Funding supported an invasive species aide position at the 1854 Treaty Authority in summer 2018. The position assisted with a variety of invasive species detection, monitoring, and control efforts. Activities in 2018 included boat inspections and decontaminations, rusty crayfish trapping, spiny waterflea surveys, trawling surveys for invasive fish species, bloody red shrimp survey in St. Louis River estuary, aquatic vegetation surveys, zebra mussel detection, emerald ash borer surveys, and terrestrial plant detection and control. Education and outreach in cooperation with other partners occurred at powwows, schools, fairs, trade shows, and other community events.

Bloody red shrimp survey

Habitat and Species

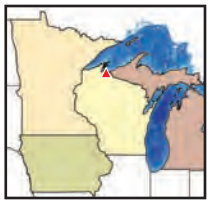
Sturgeon assessments completed in 2018 in Lake Superior and the St. Louis River estuary included larval drift net surveys, juvenile trawl surveys, and a gill netting assessment targeting juveniles and sub-adults. Three seasonal (spring, summer, fall) bottom trawl surveys were completed in 2018 to monitor annual and seasonal population trends of native and non-native fish communities within the St. Louis River estuary. Activities related to moose included assisting with the annual aerial moose survey, completing vegetation surveys for habitat use, and exploring moose/deer/parasite interactions. Additional work was completed capturing and collaring wolves to understand pack size and distribution, mortality, and pup production and survival.

Sturgeon capture

Aerial moose survey

Bad River Band of the Lake Superior Tribe of Chippewa Indians

Natural Resources Program Capacity, Education and Outreach, and a Functional Wetland Assessment



The Bad River Reservation is comprised of 125,000 acres in Northern Wisconsin. It is a water-rich environment where naturally-meandering streams support expansive, intact wetlands and diverse communities of native flora and fauna.

Tribal Capacity

In 2018, Bad River Natural Resources Department (BRNRD) staff participated in numerous meetings, calls, trainings, and conferences, including attending the Lake Superior Working Group Partnership in-person meeting in Beaver Bay, MN and the IAGLR State of Lake Superior Conference in Houghton, MI. By participating in these events, BRNRD staff share critical perspectives and input with other agencies to help protect Lake Superior and gather knowledge to help them in their own positions. In addition, the BRNRD hosted their annual Lake Superior Day Celebration, which gave the surrounding community an opportunity to learn about lake issues, have fun, and celebrate Lake Superior.

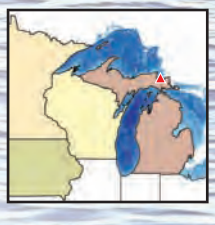
Photos from Lake Superior Day

Participants of Bad River's Lake Superior Day Celebration can talk with BRNRD staff and learn about traditional activities, like basket making.

Habitat & Species

In 2018, the Bad River Natural Resoruces Department contracted WSB & Associates to assist with a wetland functional assessment of the Lower Bad River Watershed on the Bad River Reservation. This work has been completed and BRNRD and WSB & Associates are expanding this work into other sub-watersheds on the Reservation. This project will help inform BRNRD staff on how to prioritize protection of wetland resources as well as current and future restoration and enhancement activities within the Bad River Reservation.

Bay Mills Indian Community



Wild Rice

Acoustic tags were surgically implanted into 10 common carp ranging in size from 720-950 mm (28-37 inches).

Wild rice is an important resource to Lake Superior Ojibwe. Efforts to re-establish wild rice within lands managed by the BMIC have produced mixed results. Seeding efforts in Waishkey Bay began in the mid-1990s and have continued inconsistently with low success. While there have been no seeding efforts in the past 5 years, some wild rice continues to grow. Disruption of biological conditions as a result of introduced species may have a substantial effect on the likelihood of wild rice rehabilitation. Common carp (Cyprinus carpio) are an invasive species which has been described as an ecosystem engineer due to its ability to impact biotic and abiotic factors within a waterbody. Common carp are present throughout the Great Lakes, including Waishkey Bay. This project began in spring, 2019. It uses acoustic telemetry to track the movements of common carp, relative to areas suitable for wild rice growth in Waishkey Bay. Gridded, stationary receivers triangulate carp movement within the bay. Other stationary receivers are placed to monitor movements out of Waishkey Bay into the St. Marys River and Waishkey River. Additionally, paired exclosures are set up across the bay to measure wild rice seeding success under conditions both protected and exposed to common carp. Initial results will be assessed this winter.

Paired exclosures (seeded/unseeded, fenced/unfenced) were installed across the bay in areas suitable for wild rice growth.

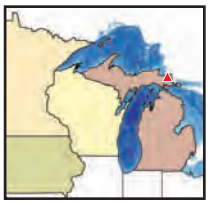
The Highs and Lows of Back Bay Water Levels

In 2017, Biological Services placed two water temperature and depth measuring devices in Waishkey Bay. These instruments collect temperature and depth measurements every 15 minutes during the ice-off season. Data collected from these devices is used across other projects that occur in the bay, including a project that will begin in summer 2019 looking at the effects of common carp on wild rice restoration efforts. The data also serves as a long-term monitoring effort of temperature and water level changes in our area which is important for managing resources, such as wild rice, in the lake. The figure below shows a seiche event which occurred during 2018 and was captured by these devices. This data highlights the extreme fluctuations in water levels that can occur in the bay.

Two photos showing Back Bay water levels corresponds to peak high (left) and low (right) water levels.

Chippewa Ottawa Resource Authority

Tribal Capacity Building



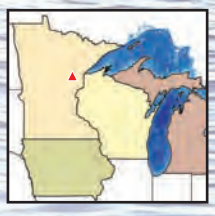
The Chippewa Ottawa Resource Authority (CORA) is composed of five Michigan Indian tribes (Bay Mills Indian Community, Grand Traverse Band of Ottawa and Chippewa Indians, Little River Band of Ottawa Indians, Little Traverse Bay Bands of Odawa Indians, and Sault Ste. Marie Tribe of Chippewa Indians) that have court affirmed treaty fishing rights, and associated regulatory authority, under the 1836 Treaty of Washington. Treaty fishing rights extend throughout the ceded waters of Lakes Huron, Michigan and Superior. CORA has been very successful at participating in activities that support achievement of the objectives and the goals in the Great Lakes Water Quality Agreement (GLWQA) including LAMPs and RAPs. CORA has been a leader in the Great Lakes tribal community and has increased tribal participation, education and understanding of the LAMP and RAP processes. The Environmental Coordinator represents CORA as a member of the Work Group for the Lake Michigan LAMP Partnership, a member of the Work Group and Mining Committee of the Lake Superior LAMP Partnership, the Work Group of the Lake Huron LAMP Partnership, the Saint Marys River Binational Public Advisory Council, the Great Lakes Commission (observer status), the Great Lakes Panel on Aquatic Nuisance Species and the Sault Area Watershed Association.

CORA's GLRI capacity grant allows us to participate not only in planning for projects through the Lake Huron LAMP Partnership but also in implementing LAMP actions at a local level like cleanup of Ashmun Creek in Sault Ste. Marie (above).

Public outreach on Lake Superior LAMP priorities.

Fond du Lac Band of Lake Superior Chippewa

Elk and sturgeon restoration, invasive species management, watershed modeling, and wild rice



The Fond du Lac Resource Management Division (FDLRMD) is charged with managing and protecting the natural resources of the Fond du Lac Band of Lake Superior Chippewa. In 2018 the FDLRMD used GLRI funding to accomplish work on elk and sturgeon restoration, invasive species management, watershed modeling, and wild rice management.

Habitat Restoration and Wildlife Protection and Restoration: The FDLRMD in partnership with the University of Minnesota and the Rocky Mountain Elk Foundation continued work in 2018 on a feasibility study for the restoration of omashkooz (elk) to eastern Minnesota. The study is to determine whether there is suitable habitat and sufficient public support to attempt a restoration effort. In addition, the FDLRMD continued restoration and management of wild rice in the Band's Ceded Territory and continued with reintroduction of lake sturgeon in the upper reaches of the St. Louis River.

Omashkooz (elk) restoration

Emerald Ash Borer surveillance

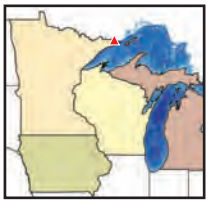
Invasive Species: FDLRMD focused on creating and implementing an invasive species management plan utilizing early detection and rapid response along with education and collaboration with other agencies. Some of the highlights for 2018 included implementing best management practices for decontamination of equipment, surveying for emerald ash borer, invasive invertebrates, and approximately 100 species of terrestrial invasive species and control efforts on 104 acres for wild parsnip, spotted knapweed, tansy, and others. In addition, the FDLRMD participated in several outreach events, including the "City Nature Challenge" and hosted the "We are Water" exhibit in March of 2019.

Foundations for Future Restorations: The FDLRMD assembled a tribal partnership (Minnesota Chippewa Tribe, Bois Forte Band, Mille Lacs Band, Leech Lake Band, Great Lakes Indian Fish and Wildlife Commission) to support the development of a groundwater model to assess hydrologic changes in the St. Louis River watershed due to ditching, mining, and other human activities. Details of the modeling efforts were presented at the State of Lake Superior Conference and the Minnesota Water Resources Conference.

St. Louis River model development

Grand Portage Band of Lake Superior Chippewa

Native Species Restoration, Wildlife and Fisheries Research and Management



The Grand Portage Reservation is located in the northeastern point of Minnesota along Lake Superior. The reservation land base encompasses approximately 47,500 acres. Grand Portage Anishinaabe rely on subsistence and culturally important species, such as moose, white-tailed deer, gray wolves, beaver, and black bear. Due to increasing populations of invasive species and impacts from climate change, populations of some native species, such as moose, have been in decline. With funding provided by the GLRI, the tribe has been performing long-term wildlife and fisheries research to effectively manage native populations, including moose, wolves, and cisco, within the Grand Portage Reservation.

Tribal Capacity Building

The Band utilized GLRI Tribal Capacity funding to participate in the Lake Superior Lakewide Action and Management Plan and Great Lakes Fisheries Commission Committees (Lake Superior Technical Committee, Lake Superior Committee, and Council of Lake Committees). This capacity allowed for coordination, implementation, and reporting on Lake Superior-wide projects to assess lake trout, siscowet, brook trout, lake sturgeon, and cisco populations. Results were used to determine safe harvest levels of Lake Superior fish stocks, determine impediments to native species restoration, and develop strategies to guide future efforts.

A recently captured white-tailed deer is outfitted with a GPS tracking collar to monitor movements and habitat use

Invasive Species

Grand Portage Natural Resources Management (GPNRM) found that white-tail deer populations in Grand Portage pose a significant risk to moose by carrying and shedding parasites (e.g., brainworm) on the landscape that contributed to about one-third of adult collared moose mortality. The band has been capturing and outfitting white-tailed deer with GPS radio-collars to monitor how deer respond to habitat modifications made to benefit moose. Additonally, to reduce the risk of parasite transmission from deer to moose, the band has added hunting seasons, regulations, and incentive programs to encourage hunter-harvest of deer.

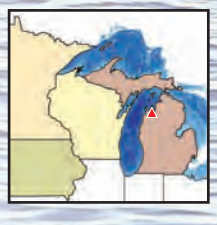
Habitat and Species

GPNRM captured and outfitted 12 adult moose, 8 moose calves, 9 wolves, and 18 white-tailed deer with GPS radio collars to assess population sizes, mortality rates and causes, and habitat use. The band performed an aerial survey of the Grand Portage Reservation by helicopter to estimate the moose and index the white-tailed deer populations, collected snow urine samples bi-weekly from pregnant collared adult moose to analyze moose nutritional health with calf health and survivorship, determined calf mortality and survivorship of both collared and non-collared calves, investigated calf mortality events, performed fixed wing flights over collared moose to assess moose calf survivorship and over collared wolves to determine average midwinter wolf pack size, and assessed cause-specific mortalities of deer, moose, and wolves through field necropsies.

A healthy Grand Portage wolf wears a GPS tracking collar to determine home range and pack size

Grand Traverse Band of Ottawa and Chippewa Indians

Boardman River Restoration Project – Sabin Dam Removal and Union Street Dam Modification Planning



The overall project goals are to restore habitat and connectivity within the Boardman River and the Great Lakes through dam removal and related efforts to restore stream function. With all three dams now removed, the project has successfully restored over 5 miles of cold-water stream channel and reconnected over 160 miles of high quality river habitat to the Great Lakes. This project would not be possible without the support of GLRI and scores of project partners from Bi-National and Federal Agencies, State and local governments, and non-profits.

Brown Bridge Dam Removed 2012

Habitats and Species

Phase I – Brown Bridge Dam Removed 2012. Efforts continue in bolstering the volume of large wood in the channel for stream function benefits. This work continues to benefit from monitoring and evaluation efforts in and around the restored channel, including fish community surveys, channel stability, stream bed form diversity, and vegetation growth in the bottomlands.

Boardman Dam Removed 2016
Photo provided by Conservation Resource Alliance and AECOM

Phase II – Boardman Dam Removed 2016. Nearly two miles of channel, 15 acres of wetland and 20 acres of associated riparian and upland have been restored and are now set for healing throughout the valley exposed with the removal of Boardman Dam.

Phase III – Sabin Dam Removed 2018. The last of 3 dams removed in the Boardman River Watershed has revealed, restored and served to link nearly a mile of new channel and floodplain with the balance of flow emanating from the entire 260 square mile watershed. After nearly a decade of work and tens of millions of collaboratively sourced funds, the largest dam removal / river restoration project in Michigan history has achieved a magnificent milestone to be celebrated in earnest.

Phase IV – Union Street Dam Modification (FISHPASS). Serving as the capstone to this unprecedented restoration project, FISHPASS is now nearing final design with anticipated construction contract(s) to be in place in early 2020. Once completed and on line, optimization of this near $20 million facility and its multifaceted technologies aimed at selective bi-directional fishery passage management will begin. This facility will be the first and only of its kind in the Great Lakes, if not the world.

Sabin Dam Removed December 2018

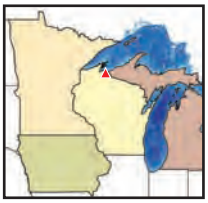
Capacity Building, Invasive Species

In 2018, GTB led a twenty-entity partnership in its second year of a five year, over $18 million initiative to strategically protect land from development and remove aquatic organism passage barriers in the lower portion of the 1836 Treaty Ceded Territory. A key 2018 highlight of this initiative is the completion of an update to the USDA Web Soil Survey to better reflect the productive agricultural soils in the region. GTB continued to hold a seat on the steering committee of a local five-county Cooperative Invasive Species Management Area. Planning for future collaborative invasive species projects has stepped up with the addition of a new staff member.

The synergy that has developed both within and among GTB and its dozens of conservation partners is both unprecedented and demonstrably invaluable to the programmatic success of Tribally led conservation efforts stemming from these funding mechanisms.

Great Lakes Indian Fish and Wildlife Commission

Invasive Species Education, Identification, and Control; Manoomin Restoration; and Identification of Threats to Aquatic Habitat



GLIFWC is a natural resources management agency of eleven member Ojibwe Tribes with resource management responsibilities over their ceded territory (off-reservation) hunting, fishing, and gathering rights. These ceded territories extend over a 60,000 square mile area in Minnesota, Wisconsin, and Michigan. With the help of Great Lakes Restoration Initiative Funding, GLIFWC has continued to expand its cooperative invasive species identification and treatment and manoomin restoration programs as well as to collect and share baseline watershed data meant to help identify threats to aquatic habitats in the ceded territories.

Invasive Species

Northwoods Cooperative Weed Management Area herbicide safety training, May 2018

GLIFWC's invasive species program worked to promote greater public education about the negative impacts of invasive species in the Great Lakes. Staff published several articles in GLIFWC's triannual publication, the Mazina'igan, which has a circulation of 18,000, and deployed a portable boat washing crew during the spring 2018 fish harvest season. The boat washing crew engaged with at least 41 tribal harvesters and washed 21 boats at the boat landings of high priority water bodies. Continuing to fight the spread of non-native phragmites in the Lake Superior basin, GLIFWC staff surveyed 97.2 km of shorelines and wetlands in Houghton County, MI, and 30.6 km of roads in northeast MN. GLIFWC staff surveyed and treated non-native phragmites at 12 previously known and 2 new sites on the Wisconsin side of the St. Louis River estuary. GLIFWC's invasive species program also continued to be actively engaged in the Northwoods Cooperative Weed Management Area to enhance interagency cooperation and coordination of efforts throughout the Lake Superior basin in northern Wisconsin. Activities included a field-based refresher in the safe handling and application of herbicides.

Habitat and Species

GLIFWC's manoomin program continues to support a highly cooperative restoration effort to restore a once-significant manoomin water. Spur Lake, in Oneida County, WI, was once a reliable manoomin lake for people and wildlife, but high water levels in recent years have decimated the lake's rice bed. In cooperation with the Wisconsin Department of Natural Resources and a local private landowner, the lake's outlet stream was lightly dredged in an area where sediment accumulation was acting as a dam, and thick encroaching vegetation was cleared from a critical culvert area to increase water flow. In the fall, the University of Minnesota installed a water-level gauge on the lake to help document the impact of stream improvements. While Spur Lake still has a long way to go towards recovery, the support of the GLRI and cooperative efforts has been fundamental to the project's progress.

Stream bed restoration underway at Spur Lake in Oneida County, WI. Photo credit WI DNR.

Keweenaw Bay Indian Community

Restoration of Wild Rice and Wetland Enhancement, Native Plants, Invasive Species Control, Stream Conductivity and Tribal Capacity

The Keweenaw Bay Indian Community (KBIC) is located on the L'Anse Indian Reservation in Baraga, Marquette, and Ontonagon Counties in Michigan's Upper Peninsula on Lake Superior. The entire L'Anse Indian Reservation includes 59,027 acres and is both the oldest and largest reservation in the state of Michigan. The L'Anse Indian Reservation is along the Lake Superior shoreline and habitat consists of coastal wetlands, hardwood forests, expanses of conifers and 80 miles of rivers and streams within 5 watersheds.

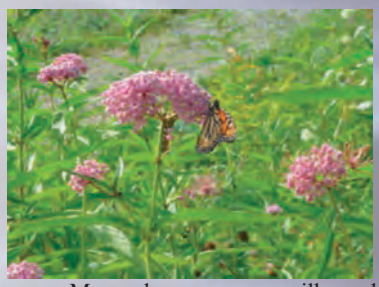
Outreach through Wild Rice Restoration and Wetland Enhancement

KBIC is receiving more and more teachings from manoomin and understanding more about the conditions where it likes to grow on our reservation lands and within Baraga County. Seeding wild rice in those lakes where it shows signs of establishment is where staff are focusing their efforts. This year NRD staff conducted surveys at 12 sites and with partnerships seeded over 12,000 pounds across 16 lakes. Wetland habitat restored with wild rice plantings have enhanced food sources for waterfowl and wildlife and in turn, deepen our respect and understanding for the far-reaching benefits of protecting wetlands. KBIC currently has 25 waterfowl nest boxes in various locations throughout the L'Anse Reservation that are checked each winter (weather permitting) for use by waterfowl and other wildlife. Waterfowl surveys are conducted annually in the fall. NRD staff also conduct herpetofauna surveys throughout the summer including frog/toad surveys and turtle basing surveys. KBIC wetland enhancement activities are a great way to involve local youth in conservation and monitoring of native species and associated habitats.

Wetlands teachings at the NRD outreach event

Native Plants Restoration

NRD staff are also dedicating more resources to improving habitat for the benefit of pollinating insects. The KBIC has signed on with the National Monarch Conservation Database and is adding valuable information to this database by tracking populations of monarchs and milkweeds from KBIC restoration sites. Seeds from three species of milkweed are harvested in the fall and youth are learning to gather information and record their observations in journals. Informal observations suggest many more monarchs were visiting milkweed in the summer of 2018 than in the previous 2 seasons. In addition, KBIC's valued partnership with the Superior Watershed resulted in 5000 culms of dune grass planted in the transitional zone between the Sand Point Restoration site and the Lake Superior shoreline.



Monarch on common milkweed

Stream Conductivity and Crossing Improvements

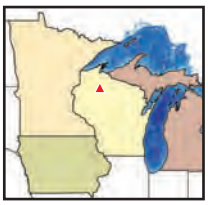
Reservation streams are home to brook trout and many other cold-water fish species. Maintaining connectivity of the aquatic systems on the reservation to conserve the overall health of aquatic communities and watersheds is increasingly important. Along with partners KBIC is prioritizing goals to restore connectivity between species and habitat. Restoration efforts become necessary because changes in landscape due to human development, logging, mining, extreme weather events, flooding and erosion all alter the water's pathways and impact the fish. With GLRI support, KBIC is working with watershed partners including USDA-NRCS, Baraga County Road Commission and MDNR to improve the health of stream systems within and around the Reservation. Replacing perched, undersized, or deteriorated culverts or bridges to restore passage for aquatic organisms upstream and downstream is the top priority in this effort. To date, nine culverts have been replaced, improving/restoring 44.93 stream miles since 2012. Plans are underway to replace another culvert in 2019. KBIC-NRD staff have been actively participating in partnerships focused on identifying common ecosystem challenges across the Lake Superior basin and ways to remedy them by incorporating tribal viewpoints.

Sand Point restoration

Manoomin finds a new home at Lake Plumbago

Lac Courte Oreilles Band of Lake Superior Chippewa Indians

Wild Rice Seeding and Assessments Provide Native Youth Opportunities



The Lac Courte Oreilles Reservation (LCO) includes 76,500 acres in Northern Wisconsin with a number of diverse habitats within its exterior boundaries including a large number of wetlands. This important habitat is home to Manoomin (Wild Rice), which the tribe considers of great importance for its nutritional value, as well as its cultural and spiritual significance. With the help of the Great Lakes Restoration Initiative, the tribe has been able to monitor and assess current and potential wild rice beds for seeding efforts, trend analysis, and educational opportunities.

Foundations for Future Habitat

In 1923, the Chippewa River was dammed; this in turn flooded a LCO tribal village as well as wild rice beds which had annual yields of 250,000 pounds-these beds have not been replaced in the 90 years since. Wild rice is an important Great Lakes species and its vulnerability to climate change makes the loss of habitat detrimental. To help mitigate this the LCO Conservation Department (LCOCD) has been monitoring established wild rice beds on and off the reservation. The LCOCD is also monitoring newly seeded beds to assess effectiveness and sustainablity.

Pike Lake in July 2018

Pike Lake, which is pictured to the left, is the newest restoration effort. Pike Lake was seeded in the Fall of 2016 and a successful bed appeared in the spring of 2017. Extreme rainfall events that year drowned the rice in its critical floating leaf stage. The LCOCD seeded again in the Fall of 2017 and were rewarded by a healthy bed in 2018. Continued monitoring and re-seeding efforts will be critical towards sustaining this bed for years to come.

Native Youth Participation

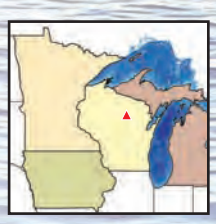
Tribal youth participation is very important to the program. To engage student participation a Wild Rice Internship was created to introduce the students to tribal resource management and restoration efforts for wild rice. Students begin in May and work through the harvest to monitor water quality in the beds, observe migratory birds and plant species, as well as writing program reports. In 2018, two Native interns monitored and observed 1,200 acres of wild rice beds both in and outside the Great Lakes Basin.

Other youth participation activities included a wild rice harvest presentation for a local high school, which covered the wild rice life cycle, Ojibwe importance of wild rice, and its relevance to treaty rights and scientific research. The final youth activity of 2018 was the Lac Courte Oreilles Ojibwe Schools' K-3 students taking part in harvesting wild rice at the LCO Wild Rice Complex.

Intern on Totgatic Lake in August 2017

Lac du Flambeau Band of Lake Superior Chippewa Indians

Wild Rice Seeding, Native & Cultural Plant Restoration, Education & Outreach, AIS & TIS Management, Habitat Restoration & Wildlife Monitoring



The Lac du Flambeau reservation covers approximately 86,500 acres which includes 41,733 acres of forested uplands, 24,000 acres of wetlands, and 17,897 acres of lakes and rivers. Nearly one-half (48.4%) of the reservation's overall surface is under water. Through the help of GLRI funds, the LDF Natural Resources Department is able to protect, maintain and prevent any negative impacts from LDF Tribal Members traveling through the Great Lakes basin while exercising their treaty rights.

Invasive Species

Through GLRI support the LDF Water Resource program collaborates with local lake associations to monitor, control and take preventative measures against aquatic and terrestrial invasive species in the Lac du Flambeau area. GLRI funds have helped monitor 88 miles of roads, 50 lakes, and approximately 200 acres of wetlands for invasive species such as purple loosestrife and spotted knapweed.

Habitats and Species

Using GLRI funds, the LDF Wildlife Program was able to maintain and upkeep 32 acres of wildlife habitat in the Powell Marsh complex while also conducting wildlife surveys for wolves and bears. The Programs also conducted wild rice surveys on 10 lakes and 2 rivers while reseeding 33 acres of wild rice on historic and potential wild rice waters. During the year, GLRI funding also supported other programs within the Natural Resource Department to work on educational opportunities for the tribal youth, such as providing an afterschool program in the LDF Public School and having a Natural Resource Internship for students.

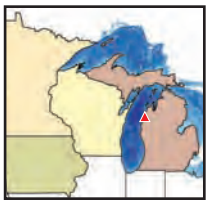
Wild rice seeding with LDF Water Resources

Flambeau Lake Cleanup

Macroinvertebrate sampling on Bear River with Tribal students

Little River Band of Ottawa Indians

Native Species Management through Research, Assessment and Stewardship



The Little River Band of Ottawa Indians (LRBOI) is located in the Lower Peninsula of Michigan along the lower portion of the Manistee River. The Tribe is committed to protection and restoration of important cultural and ecological natural resources through the implementation and development of Native Species Stewardship plans. With the help of GLRI grant funds, the Tribe has continued working on the restoration of the Manistee River Nmé (Lake Sturgeon) population, researched and community outreach for the re-introduction of Nmégos (Arctic Grayling), and Manoomin (Wild Rice) monitoring and restoration.

Nmé (Lake Sturgeon) Restoration and Protection

In 2018, LRBOI staff recaptured a 10 year-old lake sturgeon from Manistee Lake that was released in September 2008 on the Manistee River, having been raised at the nearby LRBOI sturgeon Streamside Rearing Facility. To the Band's knowledge, not only is this the first released sturgeon that has been documented returning into the Manistee River system from the LRBOI rearing facility, but it may be the first documented lake sturgeon from a streamside rearing facility to return to its natal stream within the entire Great Lakes Basin.

Corey Jerome, Fisheries Biologist, holding the first recaptured adult Lake Sturgeon from the LRBOI Rearing Facility

LRBOI Staff setting up RSI units for the grayling program field test project

Arctic Grayling (Nmégos) Re-Introduction Research and Community Outreach.

Nmégos (arctic grayling) is another iconic and culturally important native species to LRBOI. Recent studies by LRBOI have identified re-introduction criteria and techniques for creating self-sustaining populations of Nmégos. This investigation will refine re-introduction techniques with the goal of returning this native species to the Manistee River. LRBOI has partnered with Grand Valley State University to evaluate the Remote Site Incubators (RSI's) for the use in establishing Nmégos in the upper Manistee River.

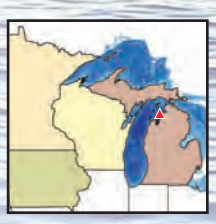
Wild Rice (Manoomin) Bed Fish Community

This project sampled two lakes that are part of the Tribe's wild rice monitoring program. There were 3,014 fish collected between spring, summer, and fall using different means of sampling; from boat electrofishing to fyke net/minnow traps. The main species captured during the sampling events were bluegill, yellow perch, pumpkinseed, and rock bass. The tribe continues to monitor the two different species of wild rice that are in lakes and rivers in the area for the gains and losses within the beds from year to year. Monitoring changes in density is also completed yearly to track density fluctuations of those beds.

Hamlin Lake Wild Rice Bed near a fish community assessment site

Little Traverse Bay Bands of Odawa Indians

Otoonapii and Adikameg Restoration, Piping Plover Monitoring, Great Lakes Policy



Based along Lake Michigan's northeastern coast, The Little Traverse Bay Bands of Odawa Indians (LTBB) has 215,954 acres of Tribal lands within the Lake Michigan and Lake Huron watersheds. This includes 103.5 miles of Great Lakes Shoreline, 394 miles of creeks, rivers, and streams, 27,553 acres of lakes, and 35,647 acres of wetlands. With the help of Great Lakes Restoration Initiative funds, the tribe has been able to continue restoration, monitoring, collaboration, and policy efforts within the Great Lakes basin.

Otoonapii and Adikameg Restoration

2018 marked the fourth year of LTBB's Cisco (Otoonapii in Anishinaabemowin) Restoration Project. With continued funding from GLRI, LTTB was able to remain a leader in the effort to restore native Otoonapii populations within Lake Michigan. The research and methods used for rearing Otoonapii will be beneficial to other agencies as the interest of Cisco rehabilitation across the Great Lakes continues to increase. In 2018, LTBB marked and stocked more than 87,000 Cisco and 30,000 Lake Whitefish (Adikameg in Anishinaabemowin) into Lake Michigan; additionally, LTBB collected and fertilized eggs from 30 Otoonapii and 12 Adikameg, totaling more than 1.1 million eggs for stocking efforts in 2019.

LTBB NRD staff conducting beach seines in an effort to recapture Otoonapii released earlier by our hatchery.

Piping Plover Monitoring

The LTBB Natural Resource Department (NRD) has partnered with the U.S. Fish & Wildlife Service in an effort to monitor Piping Plover, a federally listed endangered species, within the 1855 LTBB Reservation. Piping Plover monitoring has been LTBB's endangered species project focus since 2003. The LTBB Reservation contains designated critical habitat for Piping Plover, including high quality nesting habitat on High Island within the Beaver Island Archipelago of Lake Michigan. LTBB utilized GLRI funding to continue this monitoring in 2018.

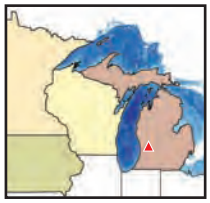
Mini exclosure set up by LTBB biologists to protect the piping plover nest in June 2018

Great Lakes Policy

The GLRI Tribal Capacity grant funds the LTBB Great Lakes Policy program which allows the tribe to stay involved with various partnerships that collaborate on the management of the Great Lakes. It also allows LTBB to monitor and respond to policies that might have an impact on the Great Lakes ecosystem, and thus tribal treaty rights.

Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians

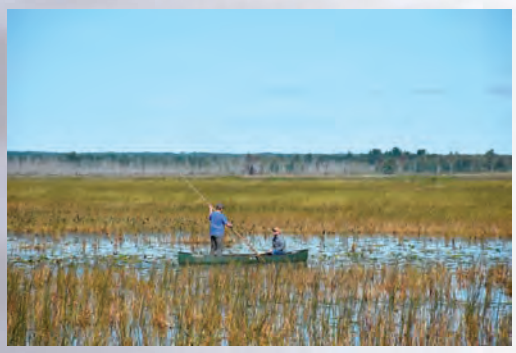
Mnomen Restoration, Aquatic Invasive Species Management, Turtle Conservation



The Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians (Gun Lake Tribe) is located in southwest Michigan. Mnomen conservation funded through GLRI is focused in the Kalamazoo River Watershed. In 2018, the Tribe expanded partnerships and implemented new approaches to their restoration efforts. The GLRI also allowed the Tribe to work on invasive species management on and off Tribal lands in partnership with local Cooperative Invasive Species Management Areas and work on mshike (turtle) conservation efforts.

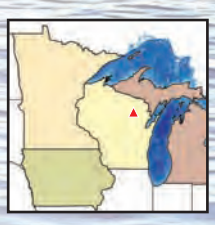
Great Lakes Restoration Initiative Accomplishments

- Over nine acres of mnomen were restored including over 500 lbs. of seed harvested in Michigan Waters.
- Over 100 mnomen bundles were transplanted to local lakes.
- A community Mnomen Harvest was hosted at Tawas Lake
- Eight lakes and twenty miles of river were surveyed and mapped for invasive species.
- Thirty seven acres of aquatic invasive species were treated including phragmites, purple loosestrife and European Frogbit.
- Work was coordinated with two local Cooperative Invasive Species Management Groups.
- A Mshike Education class was taught to 87 youth between the ages of 5 and 17 at Jijak Youth Camp.
- Five large mshike basking structures were created on tribal Lakes.
- Three mshike nesting sites were located on tribal lands.



Caption from top left photo, going clockwise: (1) Mnomen plants were bundled in five gallon buckets for transport to restoration sites. (2) The map depicts locations of Japanese Knotweed, Phragmites, and Purple Loosestrife in the Lower Kalamazoo River from New Richmond to Lake Michigan. The maps were created by the Gun Lake Tribe for the WMCISMA who then contacted landowners and provided treatments for invasive species using MISPG funding. (3) A GLT Aquative Invasive Species Strike Team Member treats a stand of phragmites. (4) Environmental Department employees participate in traditional mnomen harvest in order to collect seed for restoration sites.

Menominee Indian Tribe of Wisconsin



The Menominee Indian Reservation, nearly 236,000 acres, features some of the best-managed forestland within the Great Lakes Basin. Today the Reservation contains an abundance of pristine water resources, many with little or no connected development. Reservation waters drain, at the surface, into Lake Michigan via the Wolf River Watershed in the Lower Green Bay Basin, and the Oconto River Watershed in the Upper Green Bay Basin. Water quality conditions within the Reservation plays a role in water quality conditions of Lake Michigan and the entire Great Lakes Basin.

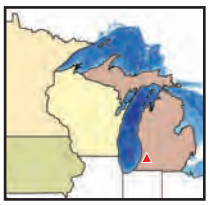
Brook Trout Movements in the West Branch of the Wolf River, Wisconsin

The tribe partnered with UW-Stevens Point to conduct a two year study examining the movements of brook trout throughout the year following the removal of two stone logging dams that were thought to be impediments to movement. Brook trout were Passive Integrated Transponder (PIT) tagged following capture by electro fishing and their movements were monitored using fixed antennae arrays. Analysis on recorded movements and probability of movements within the river system were completed throughout the seasons.

Fixed antennae array setup. Photo credit Emma Easterly

Nottawaseppi Huron Band of the Potawatomi

Pine Creek - Wild Rice Restoration



The Nottawaseppi Huron Band of the Potawatomi (NHBP) has stewardship over an approximately 80 acre wetland system within the Pine & Nottawa Creek. These wetlands are associated with a higher-value wetland complex that is part of the headwaters of St. Joseph River, which discharges into Lake Michigan. The Tribe considers Pine Creek as one of the crucial cultural and wildlife assets in their care. To demonstrate this, in 2001, the Tribe designated this area as the Chief Moguago Wetland Preserve via a Tribal Resolution.

Multiple Wild Rice stands were identified and are annually monitored for productivity within this watershed using fixed-wing aircraft images and other remote sensing technologies (Photo 1), including seasonal status verification (Photo 2). Wild Rice seed is collected for redistribution and customary use. This local seed has been installed and live root-stock transplanted onto reservation lands, continuing the process of returning a vigorous Wild Rice population onto tribal lands, and expanding into the Kalamazoo River. Wetland wildlife and birds are also monitored.

The NHBP, along with cooperating partners, have strived to increase Wild Rice education and awareness in the community and region by: educating residents and stakeholders about the project results, with on-the-water excursions, as well as conducting Wild Rice Camps; hosting a state-wide Wild Rice Summit, for further discussion and planning for protection and harvest of rice resources throughout Michigan (Photo 3); and beginning filming of a short documentary focusing on in-water life history of Wild Rice and complimentary wildlife associations.

These activities continue to assist NHBP in determining how Pine Creek and associated wetlands can support Wild Rice at historic levels for the benefit of tribal members, the wetland environment and wildlife habitat. Organizations that have assisted in initial planning on this project include: US Fish and Wildlife Service – Michigan Private Lands Office. Significant support for the NHBP Restoring Wild Rice to Pine Creek has come from GLRI Grant funding opportunities.

Classification demonstration of Z. pulustris in 2018

Drone Aerial Image of Wild Rice beds

Support Wild Rice planning and State of Michigan resource management.

Oneida Indian Nation

Invasive species mitigation and wetland planning

Oneida Indian Nation lands are comprised of an approximately 300,000-acre Reservation in Central New York State that was created and recognized by the 1794 Treaty of Canandaigua, which was entered into between the Nation and the fledgling United States of America. Approximately 17,844 non-continuous acres of Reservation land is possessed by the Nation or held in trust for the benefit of the Nation. Nation lands include many tributaries and water bodies located within the Great Lakes Basin along with related wildlife and their habitat, including species of Native American cultural or traditional importance and species that are not hunted or fished.

Reflective of enduring cultural values, the Nation's environmental policy is to require sound environmental management practices to preserve and protect its environment and natural resources to ensure a safe, healthful and productive environment for current residents and visitors on its lands, as well as for the seventh generation to come. Within the past year, with the assistance of Great Lakes Restoration Initiative funding, the Nation has begun a project to protect important wetlands within its jurisdiction and a program to control identified aquatic invasive species affecting water bodies within Nation lands.

Invasive Species Initiative (Giant Hogweed and Water Chestnut)

In recent years, the Oneida Indian Nation has identified invasive species within its jurisdiction. Two specific examples of aquatic invasive species identified on Nation lands are Giant hogweed (Heracleum mantegazzianum) and water chestnut (Trapa natans). Aquatic invasive plants adversely impact the ecology of Nation lands because they out-compete native plants, spread rapidly, and restrict recreational activities such as boating and swimming. During the summer of 2018, the Nation's Youth Work Learn Program, under the supervision of the Nation's Environmental Manager, participated in a project to control water chestnut present at the Nation's marinas on Oneida Lake. In addition, future efforts look to control and/or eradicate these invasive species in order to study and implement control techniques to address the presence of these and other aquatic invasive species.

Photo of water chestnut at Oneida Indian Nation marina on Oneida Lake.

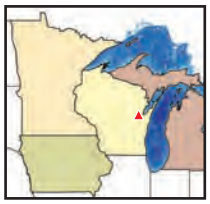
Tribal Wetland Mitigation Development Project

In 2018, the Oneida Indian Nation received funding awards to protect the quality of wetlands on Nation lands through the development of a wetlands mitigation plan. The Nation has contracted with an expert environmental firm to assist with this process and is finalizing a quality assurance program plan to ensure the integrety of data collected and analyzed during the course of the project. The Nation is currently waiting for EPA to complete its review and approval of the qualified assurance prorgram plan in order to move forward with this project. Upon the completion of the quality assurance program plan, the Nation will begin fieldwork and analysis to identify up to three priority wetlands and to create restoration plans for such wetlands.

Photo of representative wooded wetland land cover near Verona, New York.

Oneida Nation

Improving Soil by Converting Row Crops to Permanent Cover



The Oneida Nation Reservation is comprised of 65,400 acres in the Lake Michigan basin. The Nation owns about 26,900 acres; approximately 13,000 acres are in agricultural production. The majority of Oneida Nation lands drain into the Lower Green Bay and Fox River Watershed Area of Concern, where improvement of water quality is a top priority. Within this largely agricultural watershed, the Great Lakes Restoration Initiative funds multiple projects to accomplish the goal of phosphorus and sediment load reduction in surface waters from agricultural runoff.

Utilizing grazing and restoring stream corridors has created nesting habitat for threatened species such as the Bobolink

State Farm Grazing Project

503 acres of row crops were converted to permanent pasture for grazing, resulting in an expected annual reduction of 250 to 375 pounds of phosphorus that was otherwise destined for Trout Creek. 48,000 feet of four-strand and 76,500 feet of one-strand wildlife friendly, high tensile fence was installed. Approximately 480 animal units will utilize the property in an intensively managed grazing operation.

Oneida Nation Farm (ONF) Grazing Expansion

The addition of 87.5 acres completed the 415-acre ONF grazing operation while also making the operation more efficient. This project will result in an annual reduction of 45-50 pounds of phosphorus in the runoff that finds its way into Fish Creek. 13,800 feet of four-strand and 4,500 feet of one-strand wildlife friendly, high tensile fence was installed. A 250-foot stream crossing was also installed to allow cattle and equipment to cross a tributary to Fish Creek, connecting old and new pastures in a way that does not impede fish passage.

Protecting Fish Creek watershed by having cattle cross a stream at a protected area between pastures

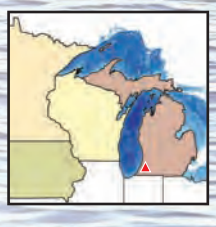
Expanding the grazing operation at Tsyunhehkwa Farm to incorporate the growing of white corn into the system

Tsyunhehkwa Grazing Expansion

The expansion completed the 53-acre grazing operation with the addition of 27 acres of white corn production. By incorporating white corn production into the grazing rotation, the project reduces the use of commercial fertilizers needed to grow white corn, ultimately improving soil health while reducing nutrient rich runoff into Duck Creek. The field closest to Duck Creek is now in permanent pasture, while the other four fields have a three-year pasture, one-year corn rotation.

Pokagon Band of Potawatomi Indians

Hydraulic Reconfigurations and Wildlife Surveys



Throughout the year, hydraulic engineers worked diligently to reconfigure the placement of meanders for the restoration of the Dowagiac River. The intent of the reconfiguration was to not cause any change in water levels to surrounding land-owners during a 100-year storm event. Through a myriad of scenarios and configurations, engineers were able to find a modification that fits the intent of no net change. This hydraulic report with 90% engineered drawings has been submitted to MIDEQ for permitting consideration (Figure 1).

Additionally, multiple species surveys were completed within the area of impact to determine possible impacts to species of interest. Acoustic monitoring as well as ultrasonic monitoring was conducted to survey for bird species and bat species within the impact area. Herp surveys were completed through drift fence traps, minnow traps, and coverboards checks to determine species assemblages within the current wetland configurations of the floodplains. The findings of the surveys are being compiled into an environmental assessment for submission to and evaluation by federal agencies.

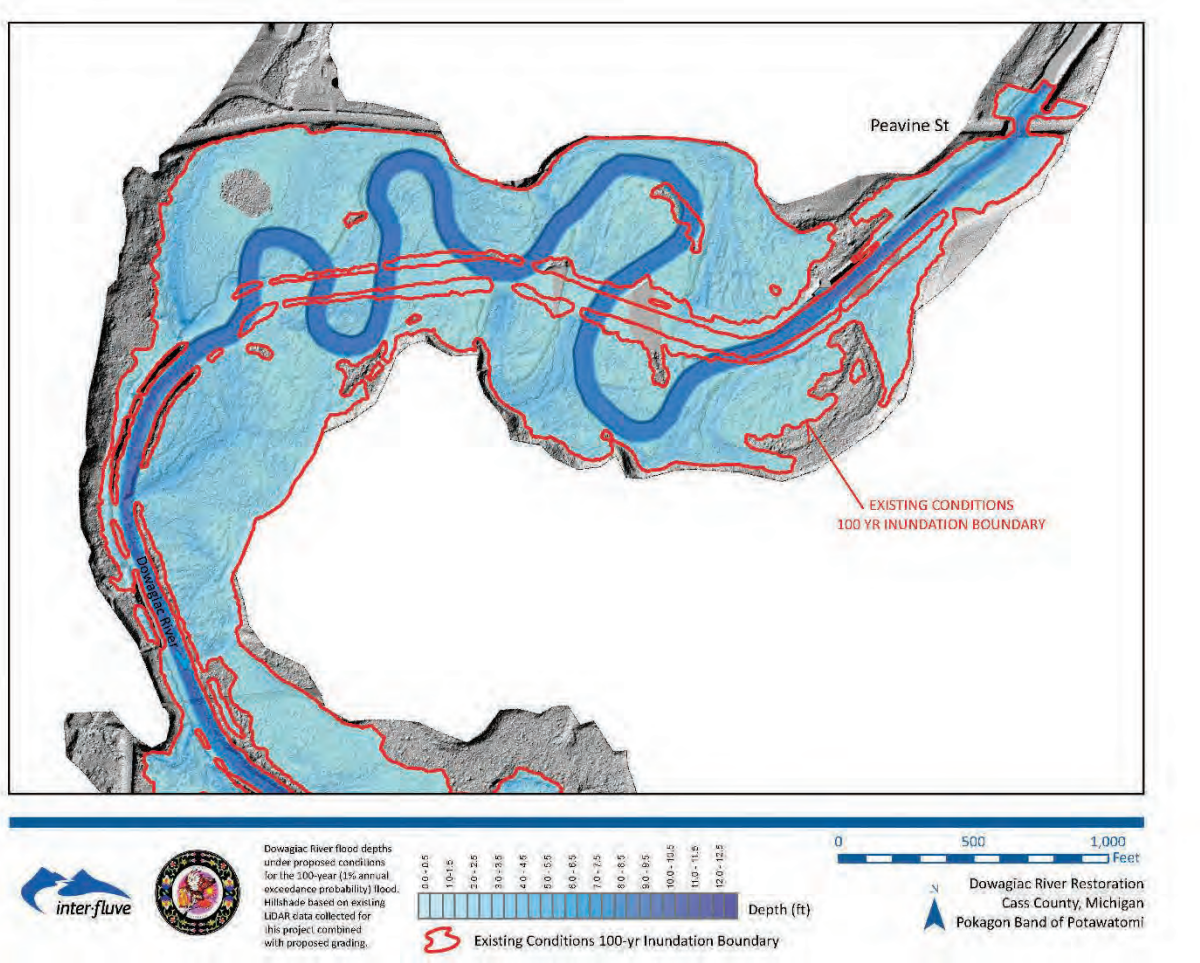
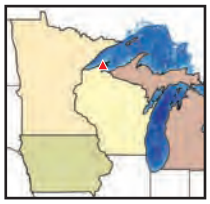


Figure 1. Dowagiac River flood depths under proposed conditions for the 100-year flood.

Red Cliff Band of Lake Superior Chippewa

Non-native Phragmites Project at Chequamegon Bay Wastewater Treatment Plants a Success



In 2018, utilizing GLRI funds from both BIA and EPA, the Red Cliff Band of Lake Superior Chippewa's Treaty Natural Resources Division led a project in cooperation with Strand Associates, the Greater Bayfield area, and the City of Washburn, to eliminate three large seed sources of non-native Phragmites (common reed) in Bayfield County, WI.

The project area included WWTPs at Red Cliff, greater Bayfield, and Washburn

Red Cliff and GLIFWC staff began finding small populations of non-native Phragmites in 2013, primarily within one mile of each of the three Bayfield Peninsula wastewater treatment plants (WWTPs, see map). An additional outbreak of the invasive plant was found across the Chequamegon Bay near the Kakagon Sloughs in 2015, which has been treated by Bad River and GLIFWC staff. At the time, these WWTPs were utilizing non-native Phragmites reed beds (see photo below) to dewater biosolids as part of the wastewater treatment process.

A 2016 genetic study led by Red Cliff confirmed the external populations originated from seed and showed some genetic similarity to the reed bed Phragmites. When these reed bed installations occurred during the late 1990's and early 2000's, there was a widespread belief that non-native Phragmites would only spread by rhizomes (roots) and not by seed, so the plants were expected to have been contained by the concrete walls of the reed beds.

Dump trucks hauling reed bed materials await washing and inspection

2018 efforts included removal of the non-native Phragmites plants and all other material (biosolids, soil, bed liner, etc.) from the reed beds at the three WWTPs. To prevent any further spread of the invasive plant, all material that was removed from the reed beds was landfilled, with every truck and piece of equipment that operated onsite being washed and inspected through each phase of the project.

The existing reed bed infrastructure will continue to be utilized, now with the non-invasive, native Phragmites subspecies. The new plants were sourced from within Bayfield County and genetic testing confirmed that they are indeed the native subspecies of Phragmites.

Red Cliff and GLIFWC staff will continue to monitor throughout the region for non-native Phragmites and treat new populations as necessary. Red Cliff staff will also work closely with the WWTP operators to monitor within the newly established reed beds and around each facility to ensure long term project success.

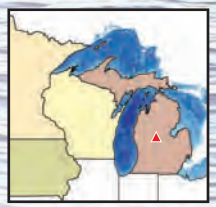
Newly planted native Phragmites reed beds.

By removing the previous reed bed populations, the only known Chequamegon Bay local seed source of non-native Phragmites has been eradicated, and 14,000+ acres of coastal wetlands among countless inland wetlands have been protected from this highly invasive plant.

Non-native Phragmites reed beds.

Saginaw Chippewa Indian Tribe of Michigan

Building tribal capacity to manage invasive species and protect culturally significant resources within the Saginaw Chippewa Historical Territories



The Saginaw Chippewa Indian Tribe is comprised of 4,830 acres in Michigan's Isabella, Arenac, and Iosco counties. Many of the Tribe's properties have been taken over by both terrestrial and aquatic invasive species that threaten native species culturally significant to the Saginaw Chippewa Tribe. The Tribe has received a GLRI funding to establish an invasive species program and to begin treating invasive species so the lands can be restored with native plants.

Building Tribal Capacity

In 2016 the Saginaw Chippewa Indian Tribe received a GLRI grant to establish an invasive species program. The Tribe has used these funds to hire an invasive species coordinator and purchase the necessary equipment to begin an invasive species program. The Tribe's invasive species coordinator has conducted surveys on most of the Tribe's properties and has begun to treat priority species on tribal lands while also continuing to seek funding opportunities to expand the capabilities of the Tribe's invasive species program.

Frog-bit that was removed from the Saginaw Bay during a frog-bit conducted by the Saginaw Chippewa Tribe and the Saginaw Bay CISMA

Invasive Species Program

To date a total of 3,660 acres of tribal property have been survyed for invasive species and maps of these areas have been created. Invasive species have been treated on 79 acres of tribal property, this includes over 4,000 pounds of European frog-bit removed from the Saginaw Bay. The Tribe has received additional GLRI funding to treat 200 acres of invasive phragmites and will be carrying out those treatments in the coming year.

Saginaw Chippewa Tribal member Cecilia Stevens and Tribal youth Elijah Fox participate in a frog-bit pull to remove frog-bit from the Saginaw Bay

Saint Regis Mohawk Tribe, Akwesasne Mohawk Community

Native Fish Species Restoration, St. Lawrence River Area of Concern (AOC) at Massena/Akwesasne

The Saint Regis Mohawk Tribe is located on the southern shore of the St. Lawrence River with tribal waters in the St. Regis and Raquette River, and Treaty Rights in the Grasse and Salmon Rivers. Fishing, trapping, medicinal plant harvesting and basket making are just some of the thriving cultural practices that depend upon the vitality of surrounding environment habitats.

St. Lawrence River Area of Concern (AOC) at Massena/Akwesasne

The Tribe has been exposed to historic industrial releases containing legacy contaminants in elevated concentrations from upstream sources, thus identifying portions of the Territory an Area of Concern (AOC). Remediation and restoration efforts by EPA, NYSDEC, and the Tribe continue today in the St. Lawrence River AOC at Massena/Akwesasne. Capacity building funds have contributed to a renewed and strengthened relationship between NYSDEC and the Tribe in a formalized December 2018 letter to co-coordinate and co-manage resources in the AOC for ecological, human, and cultural use benefits.

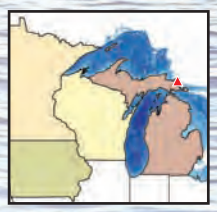
Native Fish Species Restoration - Atlantic Salmon Stocking

In April of 2018 the Saint Regis Mohawk Tribe (SRMT) released 16,000 Atlantic salmon smolts into a tributary to the St. Regis River, part of the Great Lakes-St. Lawrence drainage. These 1+ year old salmon were reared at the U.S. Geological Survey, Tunison Laboratory. SRMT removed a dam in 2016 and reopened over 500 miles of habitat within the St. Regis drainage. The stocking of salmon is part of SRMT's long-term strategy to improve native fish populations and restore an extirpated species that has been gone for over 130 years.

SRMT's 2016 dam removal project reconnected this Atlantic salmon stocking site with the Great Lakes-St. Lawrence drainage basin and reopened over 500 river and stream miles of migratory fish habitat.

Sault Ste. Marie Tribe of Chippewa Indians

Experimental Lake Whitefish Rearing



The Sault Ste. Marie Tribe of Chippewa Indians received GLRI funds to experimentally rear lake whitefish (Coregonus clupeaformis) in 2018. The goal of this project was to rear lake whitefish to varying lengths in order to evaluate the efficacy of stocking various size classes, which will inform future large scale stocking actions. This project started in October of 2018 with the collection of brood stock whitefish from Lake Huron. The fish were collected via gillnets using short sets. Trap nets were attempted but no whitefish were caught. In total, thirty-four fish were spawned out in the Nunn's Creek Fishery Enhancement Facility. An estimated 103,000 fish hatched and are currently in flow through tanks being raised to a large enough size to place in a recirculating aquaculture system. These fish will continue to be raised and then released into northern Lake Huron.

Developing Adaptive Habitat Management Strategies for Ruffed Grouse

The Sault Tribe Wildlife Program has been evaluating ruffed grouse habitat use in the eastern Upper Peninsula. In collaboration with the Applied Forest and Wildlife Ecology Laboratory at Michigan State University the Tribe began collecting resource selection data using trained pointing dogs to locate ruffed grouse during the nesting and brood rearing season. These GLRI funds are being used along-side a USFWS Tribal Wildlife Grant to collect fine-scale habitat resource utilization information using GPS transmitters on live-trapped birds. This information will be used to develop an adaptive ruffed grouse habitat management plan.

Trapping and putting transmitters on grouse

Invasive Species Management in the eastern Upper Peninsula

Since 2011, the Sault Ste. Marie Tribe's Environmental and Wildlife Program has worked to manage aquatic invasive plants in the Coastal Marshes in northern Lake Huron and the Upper St. Marys River Watershed in collaboration a variety of institutions and organization. During this time, Sault Tribe has treated over 176 acres of coastal marsh for hybrid cattail, purple loosestrife, phragmites, and European frogbit. The Tribe has assessed over 490 miles of coastal marsh for aquatic invasive plants with small Unmanned Aerial Vehicles. In 2018, staff acquired RapidEye satellite imagery for the entire eastern Upper Peninsula and are currently working with Boise State University and the University of Michigan Biological Station to develop classification protocols focused on the identification of aquatic invasive plant.

Treated coastal marsh on St. Mary's River

Seneca Nation of Indians

The Seneca Nation's Cattaraugus Territory comprises 22,060.77 acres (34.47 square miles) in a primarily rural region of southwestern New York State. Located in the Great Lakes Basin, the Cattaraugus Territory has 1.1 miles of Lake Erie shoreline, with an additional 56.6 miles of streams and creeks. With funding from the Great Lakes Restoration Initiative (GLRI), the Nation's Cattaraugus Territory has made great strides in habitat and species protection and restoration, as well as in eradication of invasive species.

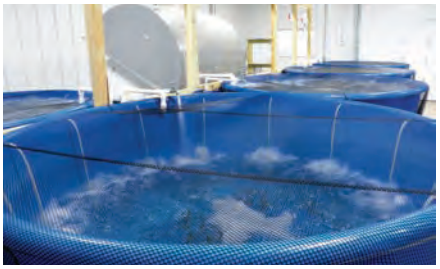
Species Preservation and Reintroduction:

Eastern Brook Trout Project: Western New York is currently experiencing a limited or extirpated stream population of native brook trout. The Seneca Nation of Indians is fortunate enough to have a small brook trout population that has survived for generations. The current population on the Cattaraugus Territory is classified as a "wild, heritage" population.

The Seneca Nation has completed construction of their fresh water hatchery that will be able to provide the opportunity to preserve the genetic diversity of this species as well as provide others with a certified wild population for re-introduction efforts in the Region. The fresh water hatchery has the capacity to produce an estimated 5,000 eastern brook trout, a rare species of native brook trout only found on the Seneca Nation's Cattaraugus Territory.

The Seneca Nation Cattarugus Territory Freshwater Hatchery is located on a 30 acre site for the ongoing conservation of species and wildlife

Cattaraugus Territory Fresh Water Hatchery – 600 Gallon holding tanks, with the capacity to hold 500 Eastern Brook Trout

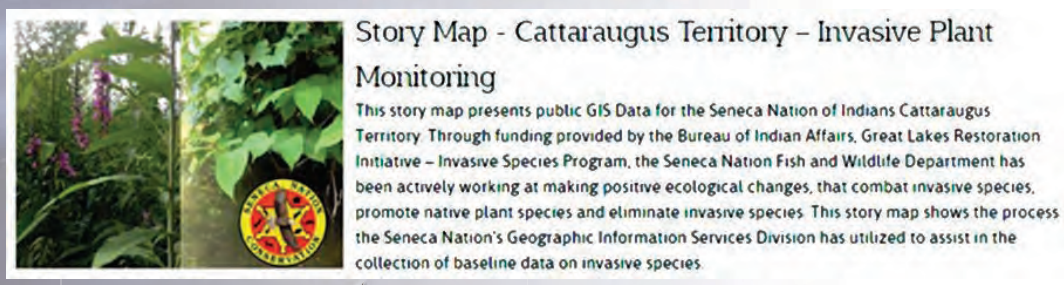


New aeration system demonstration during tank filling at the hatchery

Nine-month old Eastern Brook Trouth fingerlings, hatched in November 2018

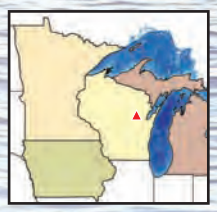
Invasive Species Work:

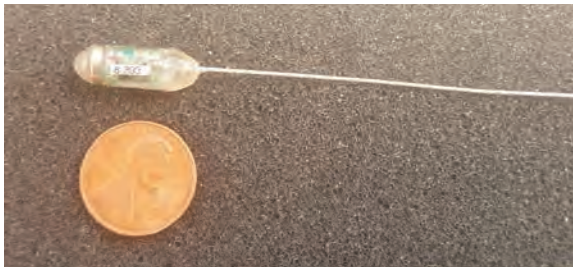
From January 2017 through October 2018 the Seneca Nation Geographical Information Services (https://gis.sni.org/Public/) and the Department of Conservation assessed, identified and mapped invasive species along the shoreline, within the water of and in the riparian area around Clear Creek, a tributary to Cattaraugus Creek and Lake Erie. The assessment and mapping of Clear Creek was completed in October 2018 and a full story board is available online at the SNI-GIS homepage - https://sni.org/departments/gis-department/



Sokaogon Chippewa Community

Evaluation and Protection of Walleye Spawning Habitat





Close up of tracking tag

Walleye are an important fish species to the Sokaogon Chippewa Community. The Tribe is proactively involved in the management of walleye with the goal of maintaining healthy populations for generations to come. Many walleye populations are down from historic levels for a variety of reasons, most often from the reduction or elimination of natural recruitment. Possible causes include the impacts from invasive species, climate change, fish community shifts, and habitat loss.

Walleye spawn in the spring just after ice-out. Female walleye selectively spawn on shallow, wind-swept shorelines with clean rock substrate. Quality habitat consists of deep rock beds with interstitial spaces that are not filled with sand and fine sediments. Fertilized eggs fall into interstitial spaces for protection and good oxygenation during incubation, and eggs remain there until hatch. In many lakes, these habitats have been lost or impaired due to shoreline development and lake aging-sedimentation processes.

Tracking tag inserted into female walleye

The Tribe is currently involved in a multi-year study to better understand the site-habitat selectivity and quality of habitat used by walleye in a local lake. This lake was historically a thriving walleye fishery, but walleye natural recruitment has been lost, and adult walleye levels have fallen to low levels. It is possible that spawning habitat has degraded over time, yet walleye are still using historic spawning sites, resulting in poor egg survival and the loss of natural recruitment.

The project uses oviduct radio tracking tags to determine what location and type of habitat female adult walleye are selecting for egg deposition. Oviduct tags are very small tags with an antennae that are inserted into the urogenital opening of female fish. Once gently inserted, they are held in place by the urogenital sphincter. During spawning activity, the female releases the oviduct tag when eggs are ejected onto spawning habitat. Ejected tracking tags are located and underwater video is taken of the ejection site to visually record the habitat. Once preferred sites are known, habitat surveys of preferred areas will be performed via dives and include measurements of water depth, substrate size and makeup, and embeddedness.

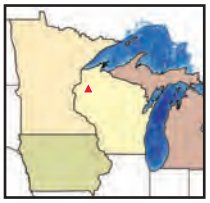
Tracking tag found on walleye spawning habitat

Preliminary results show that female walleye are favoring specific shoreline areas on the lake, some previously unknown spawning areas, and most tracking tags were found in a depth range of 1-4 feet. The project will be continued for 2019. It is believed that with another year of study, and an increase in the tag location sample size, preferred shoreline areas and depth ranges will become more clear and obvious. Once specific shoreline areas and a depth range are selected, detailed habitat surveys and mapping will occur.

Study results will help determine whether current walleye spawning habitat in the lake is limited and whether additional actions such as habitat enhancement are needed in the future. In addition, walleye preferred spawning sites in the lake will be included in future management plans and these sites will be designated as sensitive habitats that should be protected from future development.

St. Croix Chippewa Indians of Wisconsin

Extended Growth Walleye Rearing



Ogaa, or walleye (Sander vitreus) is a species of cultural significance to Native American tribes. The long term sustainability of the species is a primary objective for the St. Croix EPA/Natural Resources Department. Today, waterbodies that contain naturally reproducing Ogaa are changing due to environmental stressors and human activity which in turn is decreasing the ability of the fish to sustain natural populations on its own.

The St. Croix Tribe partnered with the Red Cliff Band of Lake Superior Chippewa to provide extended growth walleye fingerlings for stocking into waterbodies designated by the Red Cliff Tribe. Once the fingerlings mature, these stocked walleye will help enhance or create an age class for the lakes' spawning populations.

In 2018, a total of 5,690 fingerlings averaging 6.5" were collected at the St. Croix Tribes Gaslyn Lake Walleye Rearing Ponds and transported by Red Cliff Tribe for stocking.

Harvest at kettle

Walleye fingerlings

Stockbridge-Munsee Community

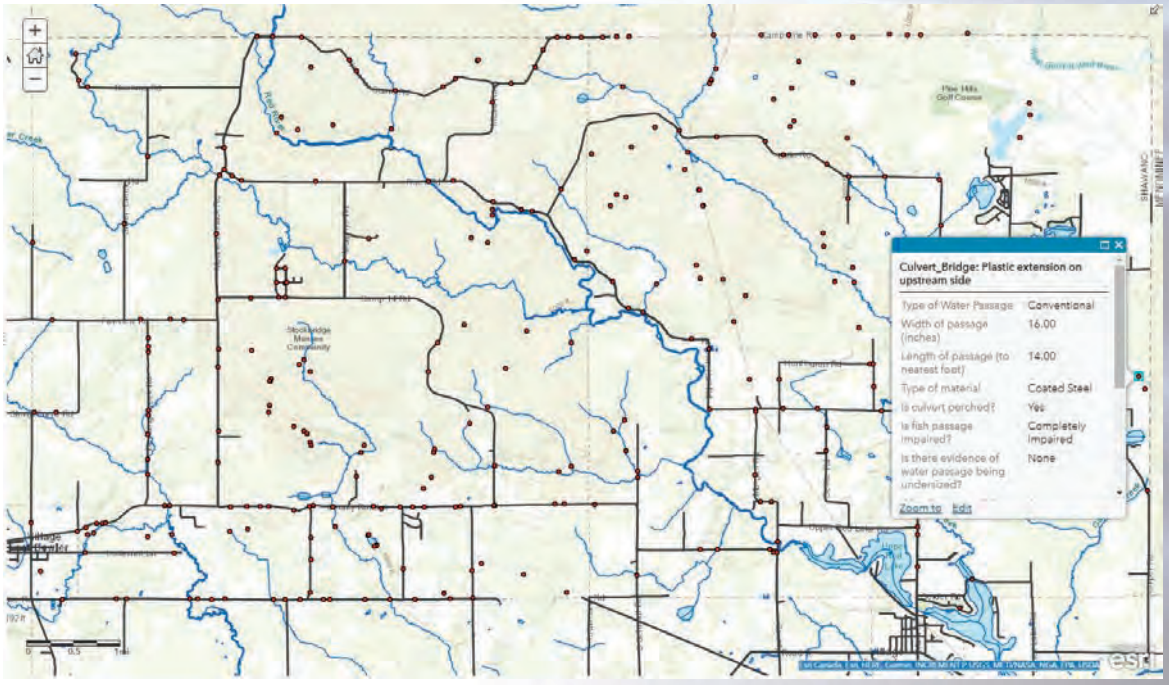
Aquatic Organism Passage Inventory

The Stockbridge-Munsee Community (SMC) is a federally recognized Indian Tribe occupying the Reservation established by the Treaty of 1856 in the Townships of Bartelme and Red Springs, Shawano County, Wisconsin. SMC oversees the management of approximately 24,928 acres of land and a wide variety of fish and wildlife that reside within reservation boundaries.

Aquatic Organism Passage Inventory

SMC completed a reservation-wide culvert inventory in 2018 to identify aquatic organism passage (AOP) issues. A database using ArcGIS online was created and SMC staff identified and inventoried 315 culverts. Several problem culverts (perched, failing, AOP issues, etc.) have been identified and planning is currently underway to replace these culverts starting in 2019. SMC staff who have undergone stream simulation training will be working with SMC's Road Department to build capacity and reconnect several miles of Great Lakes Tributaries.

Perched culvert impairing aquatic organism passage



Road stream crossing database created with ArcGIS online

FY 2019 Funding Requests for GLRI Projects

MICHIGAN

Bay Mills Indian Community	Great Lakes Tribal Capacity Building Program	$80,000
	Wetland Monitoring on the Bay Mills Indian Community Reservation (GLRI Tribal Initiative)	$56,287
Chippewa Ottawa Resource Authority	Great Lakes Tribal Capacity Building Program	$75,000
Grand Traverse Band of Ottawa and Chippewa Indians	Great Lakes Tribal Capacity Building Program	$100,000
	Crystal River Stream Crossing Improvements (GLRI Tribal Initiative)	$100,000
	Ziibiika manezi noojimo'iwewin - Healing Rivers	$276,204
	Monitoring Wild Rice Bed Health in Northern Michigan	$75,412
Keweenaw Bay Indian Community	Great Lakes Tribal Capacity Building Program	$225,000
	Conserving Keweenaw Bay Indian Community's Natural Heritage (GLRI Tribal Initiative)	$100,000
	Invasive Species Control and Prevention on the L'Anse Indian Reservation	$183,428
	Wild Rice and Native Plant Species Restoration on the L'Anse Indian Reservation	$225,210
	Wetland Ecosystem Monitoring on the Keweenaw Bay Indian Community L'Anse Indian Reservation	$88,752
	Inventory and Assessment of Road Stream Crossings of the L'Anse Indian Reservation to Enhance Habitat for Native Brook Trout and Other Aquatic Organisms	$50,345
	Water Quality Monitoring Following Significant Rain Events to Identify Nonpoint Influences	$57,478
	Tribal Moose Research Collaborative	$35,500
Little River Band of Ottawa Indians	Arctic Grayling (Nmégos) Re-Introduction Research and Community Outreach	$84,500
	Nmé Restoration and Protection	$81,500
	Wild Rice Management through Research, Assessment and Stewardship	$28,000
	Impacts of Timber Harvest and Habitat Improvements on American Marten	$83,280
Little Traverse Bay Bands of Odawa Indians	Great Lakes Tribal Capacity Building Program	$100,000
	Investigating Opportunities to Improve Little Traverse Bay Bands Manoomin Restoration (GLRI Tribal Initiative)	$100,000
	Tannery Creek Road-Stream Crossing Improvements: Phase II	$93,000
	Coregonid Assessment Project Phase 2	$155,961
Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians	Grand River Nmé Rehabilitation (GLRI Tribal Initiative)	$100,000
	Kalamazoo River Nmé Rehabilitation	$99,531
	Mnomen Restoration	$105,002
	Gun Lake Tribe Aquatic Invasive Species Response and Control	$65,098
Pokagon Band of Potawatomi Indians	Surveying, Restoration, and Protection of Mnomen (Wild Rice) in Great Lakes Basin Wetlands and Waters on Pokagon Band Tribal Lands and Surrounding Service Area (GLRI Tribal Initiative)	$99,563
	Restoring Hydrological Function of the Dowagiac River – Phase IV-B3	$400,000

Saginaw Chippewa Indian Tribe of Michigan	Great Lakes Tribal Capacity Building Program	$80,000
	Saginaw Chippewa Indian Tribe Watershed Protection Project (GLRI Tribal Initiative)	$99,999
	Mobilization of Aquatic Invasive Species Boat Wash Station	$51,362
	Managing Invasive Species and Protecting Culturally Significant Resources Within the Saginaw Chippewa Historical Territories	$239,228
	Reduce Runoff, Nutrients, and Erosion in the Chippewa River Watershed and Other Tribal Waters	$231,090
	Evaluation of GLRI Streambank Resoration Projects for Erosion Control and Nutrient Reduction Effectiveness	$14,000
Sault Ste. Marie Tribe of Chippewa Indians	Great Lakes Tribal Capacity Building Program	$100,000
	Lake Whitefish Recruitment Bottleneck in the 1836 Ceded Territory (GLRI Tribal Initiative)	$83,843
	Coastal Marsh Restoration in the St. Marys River	$85,000
	Experimental Lake Whitefish (Coregonus clupeaformis) Rearing	$50,707
	Ecological Surveys for Tribally Important Species Following Fire Management in the Eastern Upper Peninsula	$112,214

MINNESOTA

1854 Treaty Authority	Great Lakes Tribal Capacity Building Program	$110,000
	Tribal Moose Research Collaborative	$200,000
Bois Forte Band of Chippewa	Developing a Research Framework for a Regional Collaborative on Moose Ecology and Health (GLRI Tribal Initiative)	$99,731
	Tribal Moose Research Collaborative	$43,000
Fond du Lac Band of Lake Superior Chippewa	Great Lakes Tribal Capacity Building Program	$110,000
	Ogidaajiwan Chi-gamii-ziibi Namekaaning Anji-nitaawigichigaazowag (Upper St. Louis River Lake Sturgeon Restoration Project)	$107,950
	Ganawenjigewin Manoomin (Taking care of wild rice)	$238,000
Grand Portage Band of Lake Superior Chippewa	Great Lakes Tribal Capacity Building Program	$100,000
	Developing a Research Framework for a Regional Collaborative on Moose Ecology and Health (GLRI Tribal Initiative)	$99,985
	Managing White-Tailed Deer Populations in the Grand Portage Indian Reservation	$94,685
	Restoring and Protecting Moose Populations	$246,756
	Research and Management of Wolf Populations	$116,492
	Riparian Habitat Management	$18,765
	Contaminants in Wildlife Subsistence Species	$77,470
	Tribal Youth Outreach and Education	$60,254
	Tribal Moose Research Collaborative	$83,500
	Development of a Tribal Great Lakes Education Program in Grand Portage, MN	$112,000
Minnesota Chippewa Tribe	Developing a Research Framework for a Regional Collaborative on Moose Ecology and Health (GLRI Tribal Initiative)	$99,502

NEW YORK

Oneida Indian Nation	Oneida Indian Nation Invasive Species Initiative (Giant Hogweed and Water Chestnut) (GLRI Tribal Initiative)	$42,418
Saint Regis Mohawk Tribe	Great Lakes Tribal Capacity Building Program	$238,476
	Contaminant Screening in Indigenous Medicinal and Traditional Food Plants in the St. Lawrence River Area of Concern (AOC) – Phase I (GLRI Tribal Intiative)	$99,798
	Tribal Shoreline Invasive Plant Management	$603,666
Seneca Nation of Indians	Cattaraugus Conservations Species Preservation, Habitat Restoration and Community/Youth Education Program	$158,392
	Engaging Tribal Youth in Resiliency and Watershed Stewardship Action	$150,000

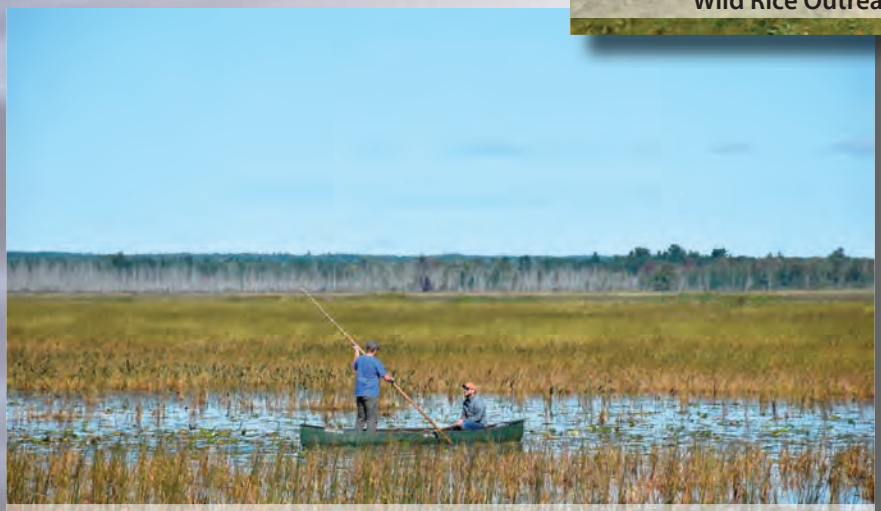
WISCONSIN

Bad River Band of the Lake Superior Tribe of Chippewa Indians	Great Lakes Tribal Capacity Building Program	$100,000
	"Bad River Natural Resources Department Watershed Study Project (GLRI Tribal Initiative) "	$100,000
	Hydrodynamic and Biological Interactions Modeling Needs Assessment for Kakagon-Bad River Sloughs Complex, Bad River Indian Reservation	$197,497
	Noskoviak/Superior Outfitters Land Acquisition on the Bad River Reservation	$240,992
Great Lakes Indian Fish & Wildlife Commission	Great Lakes Tribal Capacity Building Program	$400,000
	GLIFWC Invasive Species Prevention and Control Project	$68,820
	FY 2019 Wild Rice Implementation Program	$168,350
	Protecting Aquatic Habitats in the Lake Superior and Lake Michigan Basins in Response to Expanded Mineral Development	$160,645
	Lake Trout Sampling for EPA Contaminant Testing	$10,000
Ho-Chunk Nation	Invasive Species Control (GLRI Tribal Initiative)	$58,000
Lac Courte Oreilles Band of Lake Superior Chippewa	Lac Courte Oreilles Wild Rice Complex Habitat Improvement & Wild Rice Binding Pilot Project (GLRI Tribal Initiative)	$100,000
	Manoomin (Wild Rice) Education and Resiliency	$67,040
Lac du Flambeau Band of Lake Superior Chippewa	Lac du Flambeau Species Monitoring and Habitat Protection	$262,999
Oneida Nation	Oneida Nation Nonpoint Pollution Abatement Program	$641,621
	Fish Passage Barrier Removal on Oneida Creek	$70,000
	Capacity Building to Successfully Restore and Manage Habitat	$100,864
	Restoration and Maintenance of Wetland, Grassland and Edge Habitat	$70,386
	Evaluating Avian Habitat Restoration on Oneida Lands	$76,600
	Biological Assessment in Great Lakes Streams and Wetlands to Assess Habitat Enhancement and Restoration Projects	$20,000

Red Cliff Band of Lake Superior Chippewa	Great Lakes Tribal Capacity Building Program	$80,000
	Coastal Land Acquisition and Protection on the Red Cliff Band of Lake Superior Chippewa Reservation (GLRI Tribal Initiative)	$100,000
	Coastal Land Acquisition and Protection on the Red Cliff Band of Lake Superior Chippewa Reservation	$450,000
	Use of Continuous Monitoring Equipment to Evaluate and Identify Restoration Projects	$141,321
	Coastal Wetland Protection and Access on the Red Cliff Band of Lake Superior Chippewa Reservation	$78,720
	Mainland-Island Black Bears: Quantifying Connectivity and Viability of Bear Populations Between Red Cliff and the Apostle Islands National Lakeshore	$118,339
Sokaogon Chippewa Community	Stream Crossing Improvement-Phase III: Rehabilitation of Wild Rice Beds (GLRI Tribal Initiative)	$100,000
	Rehabilitation of Wild Rice Beds: Infrastructure Development and Operations	$62,000
	Protection of Lake-Wetland Habitats: Aquatic Invasive Species Education/ Watercraft Inspection Program	$30,000
St. Croix Chippewa Indians of Wisconsin	Restore and Protect Culturally Significant Native Walleye Populations (GLRI Tribal Initiative)	$31,193
	Electrofishing in the Great Lakes Basin	$95,000
Stockbridge-Munsee Community	Miller Creek Tributary Project	$81,662
		$12,064,383

Monitoring Wild "River" Rice -
Nottawaseppi Huron Band

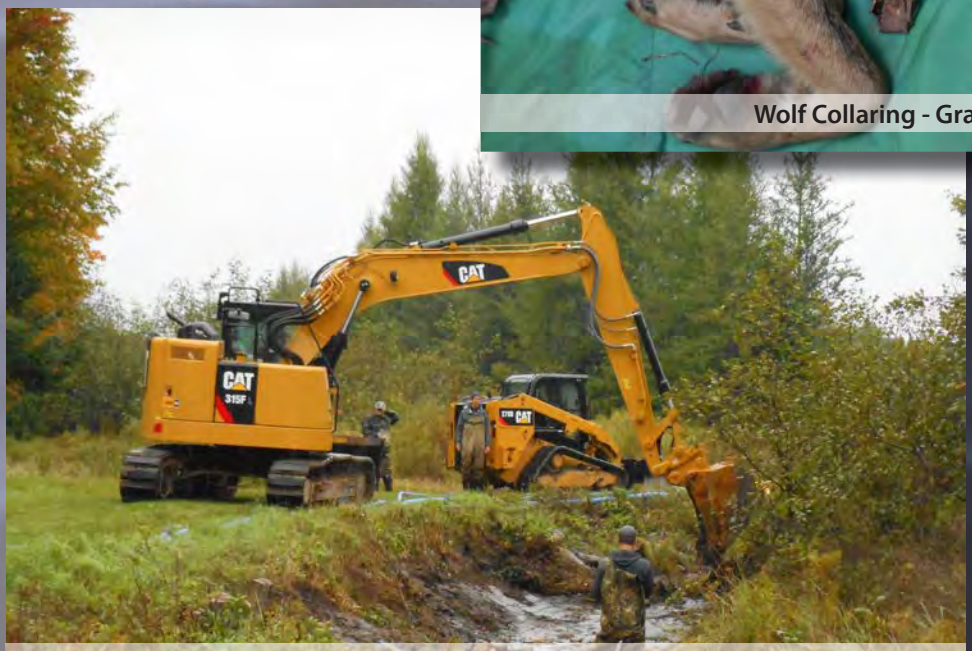
Wild Rice Outreach - Keweenaw Bay Indian Community



Traditional Wild Rice Harvest for Restoration Seed-
Match-E-Be-Nash-She-Wish Band

Invasive Species Control -
Oneida Indian Nation

Wolf Collaring - Grand Portage Band



Spur Lake Wild Rice Restoration -
Great Lakes Indian Fish and Wildlife Commission


Great Lakes
RESTORATION