

nmégos

ARCTIC GRAYLING • THYMALLUS ARCTICUS



STEWARDSHIP PLAN

FOR THE UPPER MANISTEE WATERSHED AND
1836 TREATY CEDED WATERS OF MICHIGAN

LITTLE RIVER BAND OF OTTAWA INDIANS



Banks of the Manistee River circa 1900, courtesy of Manistee County Historical Museum

CONTENTS

PURPOSE

PARTNERSHIP

NATIVE SPECIES STEWARDSHIP

VOICES OF ANISHINABEK

STORY OF NMÉGOS

REINTRODUCTION FOCUS AREA: UPPER MANISTEE WATERSHED

UNDERSTANDING THE RIVER AND IMPRINTING

REARING TECHNIQUES TO SUPPORT SELF-SUSTAINING GRAYLING

CHALLENGES WE FACE

TIMELINE

STEWARDSHIP GOALS & OBJECTIVES

EDUCATION & COMMUNITY

WE ARE THANKFUL

PURPOSE

This stewardship plan serves the Anishinabek people and neighbors on how to care for the Upper Manistee River watershed while reintroducing Arctic Grayling (Nmégos), a native fish that has been missing since 1936.

PARTNERSHIP

In 2010, the Little River Band of Ottawa Indians (LRBOI) began research to reintroduce Arctic Grayling (Nmégos) to northern Michigan. In 2016, to expand the workforce and research on Grayling, LRBOI and the Michigan Department of Natural Resources (MDNR) entered into a partnership to restore Grayling in northern lower Michigan.

The partnership formed the Michigan Arctic Grayling Initiative (MAGI), which now includes more than 45 organizations in support of this historic project. MAGI encourages collaboration, and efforts are underway to determine the most suitable watersheds to reintroduce Grayling.

The group receives financial support for research, rearing, and eventual stocking of Grayling in the Upper Manistee River watershed. In 2019, MDNR received the first eggs to serve as parents of fish (parental broodstock) that will eventually be stocked into the Upper Manistee watershed.

“More than 20 years have been dedicated to building a natural resources department for the Tribe, to develop projects for protecting Manistee River fish & wildlife.”

—Frank Beaver



NATIVE SPECIES STEWARDSHIP

Corey Wells, Tribal Citizen & Inland Fisheries Tech, LRBOI

Thinking and acting in ways that benefit the generations to follow is not only an important philosophy, but a founding core belief of the tribe.

Making decisions that benefit seven generations after your own is an ideology based on traditions among tribal nations in the Great Lakes region.

This way of thinking slows the decision-making process so that we may think about the effect(s) of our actions. If our forefathers

had not thought this way, LRBOI and many tribes in Michigan would not likely exist today.

Lumbering, habitat loss, and overexploitation led to the local extinction of Grayling. History is rife with examples of short-sighted overexploitation of resources that lead to the loss of biodiversity.

A thought process that looks to the future, to restore biodiversity will help bring Arctic Grayling back.

PERSEVERANCE: STURGEON RETURN

Corey Jerome, Fisheries Biologist, LRBOI / Dana Castle, Fisheries Biologist, LRBOI

The Nmé Stewardship plan serves as a vision for Lake Sturgeon restoration in the Manistee River. The creation of the plan led to thoughtful planning for the future by both tribal citizens and LRBOI Natural Resource Department employees. The plan also serves to keep goals and objectives of the program at the forefront of work conducted by LRBOI employees. Because of the work done by NRD staff at LRBOI, we have been fortunate to watch the Nmé program and population grow in the Manistee River.

“There’s nothing more important that the Tribe does than taking care of natural resources.” — Corey Wells

Above left: A family releases a Sturgeon into the Manistee River as part of LRBOI’s annual Sturgeon Release community ceremony. Below: Corey Jerome briefly holds a Sturgeon that returned to its natal waters after several years.





VOICES OF ANISHINABEK

Corey Wells, Tribal Citizen & Inland Fisheries Tech, LRBOI

Preserving LRBOI's way of life has always been a struggle. As tribal citizens routinely fought to keep communities together by securing land and rights, they typically met resistance, leading to great sorrow.

Although LRBOI citizens, were guaranteed many basic rights through agreements with the federal government,

European settlers continued to find ways to obtain land or infringe on native rights. For centuries, tribal citizens proved their persistence and will by fighting for land and rights that had been agreed upon with the federal government. Persistence rooted in LRBOI's culture will be especially important as we begin to reintroduce Grayling.



“The presence of native fish means that the land and water are being cared for.” —Jay Sam

Preserving our way of life and culture is important to tribal citizens and prevalent in the LRBOI community. Activities like spear-fishing, hunting, and gathering with other tribal citizens is helping to preserve and restore the Anishinabek way of life.

Above left: Indian Village Trading Post, 1936. Above right: Jim Peters paddles the Manistee River, courtesy of Manistee County Historical Museum.

Collecting sap and creating maple syrup is an example of preserving culture and bringing the tribal community together. Patrick Wilson in the Nmé (Lake Sturgeon) Stewardship Plan said, “Bringing back the sturgeon is bringing back our cultural heritage.” Bringing back Grayling will also serve as a restored piece of Littler River Band heritage.



A NICE CATCH ON BEAR CREEK.

STORY OF NMÉGOS

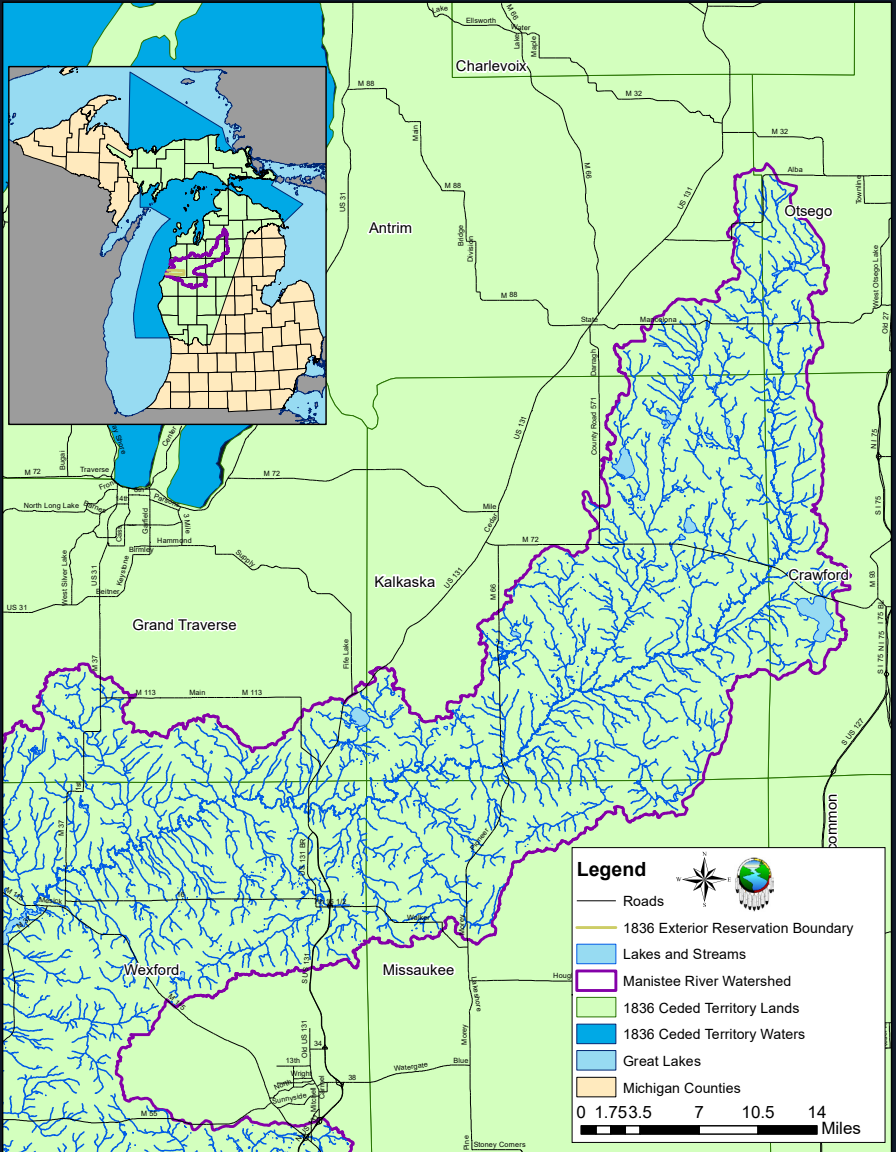
Dana Castle, Fisheries Biologist, LRBOI

Historically, Grayling are thought to have been abundant throughout lower northern Michigan waters, however, records reflecting population size before European settlement do not exist. Traditionally, Anishinabek created weirs, seines, and spears to harvest fish for sustenance (food).

Once settlement began, changes occurred that led to the demise of Grayling. Logging practices caused habitat loss; overfishing and competition with introduced fish species contributed to the disappearance of Grayling from Michigan by 1936.

In the 1900s, attempts were made to reintroduce Grayling by stocking fry and fingerlings, however, these attempts were not successful in Michigan.

In Montana, a population of Grayling is reestablished because of remote site incubators (RSIs). Recent research of RSI use in Michigan has provided promising results that RSIs (or other rearing devices) will likely increase survival rates for Grayling reintroduced to Michigan waters. LRBOI's Natural Resources Department continues to research the Upper Manistee watershed to find suitable places for Grayling to return.



Above left: One of the last documented catches of Grayling in Michigan's lower peninsula, Bear Creek, Manistee County, 1896. Courtesy of Manistee County Historical Museum. Above right: Map of the Upper Manistee Watershed, courtesy of Allison Smart, Little River Band of Ottawa Indians, Natural Resources Department.

REINTRODUCTION FOCUS AREA: UPPER MANISTEE RIVER WATERSHED

Dana Castle, Fisheries Biologist, LRBOI

The Little River Band of Ottawa Indians have been part of the Manistee River Watershed for centuries. To this day, LRBOI has a reservation in the Manistee River Watershed, and tribal citizens retain rights to hunt, fish, and gather on all tribal and public land surrounding it.

The Manistee River is surrounded by thousands of acres of state and federal land, which allow the watershed to be relatively protected from occupation, further habitat degradation; and is accessible to tribal citizens.

LRBOI's goal is to reintroduce Arctic Grayling to the Upper Manistee watershed—to restore a long missing link to Anishinabek culture. Other watersheds (Jordan, Boardman, and Maple) are also being explored, however, we plan to initiate reintroductions into the Upper Manistee system.

FACTORS FOR SURVIVAL

Research is currently being conducted to determine what areas will be best suited for Grayling reintroduction. LRBOI and partners of the Michigan Arctic Grayling Initiative are examining factors that Grayling need to survive.

“The Manistee River is a powerful system with lots of wildlife.” — Shirley Brauker

Water Temperature

LRBOI deploys temperature loggers into streams in the spring, which record water temperature every hour.

Hydrology

LRBOI and partners measure speed of water and determine the number of pools, riffles and runs that are in tributaries.

Competition with Introduced Trout

LRBOI and partners use electrofishing to collect trout (Brook and Brown) in tributaries that could support Grayling to estimate trout densities.

Substrate Evaluation

LRBOI and partners evaluate substrate by measuring particles in the river.

Structural Refuge

LRBOI and partners evaluate woody debris and vegetation in many tributaries throughout the Upper Manistee by measuring the size and amount occurring in reaches.

Novel Approaches to Restore Grayling

LRBOI and partners collaborate to research equipment and approaches to restore native fish. Biologists from LRBOI have worked with biologists in Montana to learn from their Grayling restoration program.

UNDERSTANDING THE RIVER & IMPRINTING

Archie Martell, Fisheries Division Manager, LRBOI

Dana Castle, Fisheries Biologist, LRBOI

Each stream has characteristics connected to the surrounding environment, which creates a unique chemical signature in the water, specific to the stream. Fish are able to detect these unique signatures via imprinting.

Imprinting is a type of learning that occurs at a specific life stage. Many migratory fish, like Grayling, imprint on the specific water they are hatched in. They use the chemical signature to return to the same stream to reproduce. Without imprinting, Grayling may migrate far from where they are planted, and fail to reproduce in streams and rivers that are best suited for survival. Grayling need to imprint on their home stream.

LRBOI, Michigan Technological University and Grand Valley State University (GVSU) have been researching Remote Site Incubators (RSIs) and other potential equipment to allow Grayling to imprint on streams.

Below: Dana Castle, Fisheries Biologist, studies a trout.



“The hope is for self-sustaining natural reproduction in the river.” —Virgil Johnson

REARING TECHNIQUES FOR SELF-SUSTAINING GRAYLING

Research conducted by LRBOI and GVSU show promising results that RSIs will provide a viable option for rearing Grayling in Michigan. However, LRBOI and MAGI partners continue to research other viable rearing devices as well. MDNR is currently raising the first broodstock of Arctic Grayling. These fish will provide LRBOI with eggs to place into rearing devices in the Upper Manistee watershed.

How do rearing devices work? Eggs are placed into the device where they imprint on the stream water. Grayling fry eventually hatch from their eggs, and swim out of the device, into the stream. Once those Grayling reach reproductive age, they will return to the area they hatched to reproduce themselves.

Prior to the construction of a permanent building in 2019, LRBOI biologists raised Nmé (Sturgeon) in a special trailer to increase their survival rate. LRBOI still has this trailer, and if needed, can use the trailer to raise Grayling to enhance their ability to survive.



Left: Archie Martell, Fisheries Division Manager, researches Remote Site Incubators in the Manistee watershed. Right: Dan Mays, Fisheries Biologist, Grand Traverse Band of Ottawa and Chippewa Indians, observes eggs in an RSI.



North Branch of the Manistee
River watershed, 2020

CHALLENGES WE FACE

Dana Castle, Fisheries Biologist, LRBOI

Acquiring Eggs & Fertilization Practices

In 2019, the Michigan DNR received the first Grayling eggs from Alaska. Looking ahead, fertilized eggs will be obtained during the next 3 years to insure genetic diversity. All fish are held in a containment facility until passing health checks to ensure they are safe to place in Michigan waters.

Once the fish are determined safe, they will serve as Michigan's first Grayling broodstock. Broodstock are fish that are used to generate offspring. Initially, eggs will be fertilized artificially in the hatchery, however, the ultimate goal is to create self-reproducing Grayling that naturally fertilize their own eggs in the river.

“Things change over time, so we will readjust as we learn, but we need clear goals.”—Ron Pete

Brown Trout Populations

LRBOI and partners have been examining rivers to determine the number of Brown and Brook trout that may pose threats to Grayling. Grayling will be placed into tributaries that have low numbers of potential predators and competitors.

Protecting Species From Harvest

Natural resources departments and law enforcement will draft regulations to protect Grayling from harvest. LRBOI will monitor population levels throughout the reintroduction process and will work with partners when Grayling achieve a population that can support harvest.

Climate Change

Average temperatures in the Upper Manistee watershed are projected to rise 5-6°F between 2041-2070 (Great Lakes Integrated Sciences and Assessments Program (GLISA)). This rise in air temperature will raise water temperatures, likely impacting Grayling. LRBOI and partners will continue to monitor water temperature throughout reintroduction and address potential problems.

Lampricide Treatment

The Manistee River is treated with a lampricide solution to reduce the number of sea lamprey (an invasive species). During this time LRBOI participates in a sturgeon rescue to remove vulnerable sturgeon from the water and protect them from lethal lampricide treatment. Because lamprey do not migrate past Tippy or Hodenpyl dam, there should be no need to treat the waters that are planned for Grayling reintroduction in the Upper Manistee River.

Covid-19

Due to the global pandemic we are experiencing, MDNR and partners were unable to obtain Arctic Grayling eggs in 2020. Half of the field season was lost to staff at LRBOI and involved agencies. Although these events have delayed potential dates for returning Grayling to Michigan, LRBOI and partners will continue to adapt and move forward.

TIMELINE

1880

- Michigan's logging industry is booming, producing as much lumber as the next three states combined.

*First stocking event recorded; adult Grayling transferred to streams outside native range

1900

- *First stocking record, Manistee River system; fry or eyed eggs total 21,000 in Crawford County

1918

- Tippy Dam (originally Junction Hydro) construction complete; blocking migratory fish

1900-1941

- Hodenpyl Dam construction complete. Adult Grayling transferred to streams outside native range.

- *Over 3 million Montana strain Arctic Grayling fry stocked into historical range of Grayling, Michigan. Michigan's Civilian Conservation Corp: first organization forms to help conserve natural resources

- *70,000 Grayling (yearlings) stocked into lakes and streams; fail to reproduce

- 1936: Michigan's last native Arctic Grayling recorded, caught in the Otter River, Upper Peninsula.



Above: Stump swamp near High Bridge, 1957, courtesy of Manistee County Historical Museum

* Nuhfer, Andrew J. 1992. Evaluation of the Reintroduction of the Arctic Grayling, into Michigan Lakes and Streams. MDNR Fisheries Division Research Report 1985.

**The projections for 2020-2029 are possibilities, but much of this will be based on when Michigan Grayling reach maturity and on their egg/milt production which is currently unknown.



In 2016, the Michigan Arctic Grayling Initiative forms, led by the Michigan Department of Natural Resources and the Little River Band of Ottawa Indians.

Pictured: Jim Dexter, Chief of Fisheries, Michigan Department of Natural Resources and Frank Beaver, Natural Resources Department Director, Little River Band of Ottawa Indians (2016). Photo by Suzanne Stone, MDNR.

1958-1972

- *300,000 Grayling fingerlings, eyed eggs, and fry planted in Lake Manganese and French Annie Creek; fail to reproduce.
- 1965: Michigan Dept. of Natural Resources created.

- 1972: Clean Water Act signed into law.

1987

- Michigan Dept. of Natural Resources attempts to reestablish Arctic Grayling.

1994-2020

- In 1994, LRBOI is reaffirmed
- LRBOI Natural Resources Dept. forms, participates in valuable natural resource conservation.
- 2016-2019: LRBOI biologists visit Montana to study Remote Site Incubators. Stream suitability studies, RSI testing in Manistee River begins.
- 2019: Michigan Department of Natural Resources obtains first eggs from Alaska and installs UV System at Oden State Hatchery, with support of LRBOI.

**2020-2029

- LRBOI releases Grayling Stewardship Plan for Upper Manistee.
- Continued testing of rearing devices and stream assessments to determine optimal placement for eggs.
- Development of Michigan's Arctic Grayling broodstock with eggs from Alaska
- Initial egg takes from brood placed into rearing devices in native streams. Stream monitoring, recruitment studies and evaluation follow.

STEWARDSHIP GOALS & OBJECTIVES

GOAL

Restore self-sustaining Arctic Grayling to the Upper Manistee watershed.

OBJECTIVES

- Evaluate streams that can support the full life history of Arctic Grayling in Michigan.
- Research incubation strategies that would allow for Arctic Grayling to imprint on home streams.
- Assess populations of Arctic Grayling (if established) and make recommendations to change regulations if harvest can be supported.
- Continue to collaborate with Michigan Arctic Grayling Initiative partners on research and management of Arctic Grayling.
- Care for the Upper Manistee watershed and the fish and wildlife that rely on it while conducting vital research.
- Inform/involve the community in caring for the Manistee watershed.



EDUCATION & COMMUNITY

There are opportunities for the Arctic Grayling project to reach the tribal community, the Manistee community, and the state of Michigan. The staff at the Natural Resources Department hopes to capitalize on opportunities that can provide information to tribal citizens and those in fisheries communities.

We plan to provide regular updates to tribal leadership, tribal citizens, partners, and the fisheries community, to increase awareness of the project.

We will provide newsworthy updates to the *Currents* on

a regular basis for the tribal community to gain insight as to where we are at with the project.

We will create educational tools to be shared with tribal citizens, the community, and/or at Grayling reintroduction sites.

We plan to host workshops to help tribal citizens and the community understand how we are researching and restoring Grayling in the Manistee River. For example, if the trailer is utilized to rear Grayling we will host a release event, inspired by the annual Nmé Sturgeon Release Ceremony.

Left: Larry Romanelli and Corey Jerome speak about sturgeon stewardship with the community at Little River Band's Annual Sturgeon Release Ceremony, 2015.

"Invite the children so they can learn and share the teachings of the Odawa; that all things are connected and have a place on our Mother. Let them learn of the scientific purposes of the fish and why the fish are important to our ecosystem."

—Patrick D. Wilson

WE ARE THANKFUL

The work that has and continues to go into this project has involved many people and organizations. LRBOI extends gratitude to current and future partners of this project, graduate students, advisors, past employees, Michigan tribes, and funders. We extend thanks to tribal citizens for continuing to care for the Manistee watershed and the fish and wildlife that rely on it.



Above: Grayling model on display at the Little River Band of Ottawa Indians, Natural Resources Department office in Manistee.

“My grandmother passed on Tribal traditions and knowledge to me. Now I share this with others who want to learn and keep the knowledge alive. It’s important for Elders to share the knowledge.”

—Debra Davis

ADDITIONAL RESOURCES

- Nuhfer, Andrew J. 1992. Evaluation of the Reintroduction of the Arctic Grayling, into Michigan Lakes and Streams. MDNR Fisheries Division Research Report 1985.
- Danhoff, Brian M. 2014. Big Manistee River Tributaries as Potential Arctic Grayling Habitat. Master's Thesis, Michigan Technological University.
- Goble, Cameron. 2017. Assessment of Arctic Grayling Re-introduction Potential in the Big Manistee River, Michigan. Dissertation, Michigan Technological University.
- Mock, Alan J. 2019. Evaluating remote site incubators to support restoration of Arctic Grayling in Michigan. Master's Thesis 958, Grand Valley State University.
- Wilson, Sunflower. 2017. Using Remote Site Incubators for Re-introduction of Arctic Grayling (*Thymallus Arcticus*) to the Big Manistee Watershed. Master's Thesis, Michigan Technological University.
- Michigan Arctic Grayling Initiative, www.MiGrayling.org

CONTRIBUTORS

*This would not be possible without
all of your support and dedication:*

Little River Band of Ottawa Indians past full-time and seasonal staff that have worked on this project • Graduate Students: Sunflower Wilson, Brian Danhoff, Cameron Goble, Alan Mock, Nicole Watson • Advisors to Graduate Students: Nancy Auer, Daniel Hayes, Carl Ruetz • Contributing Universities: Michigan Technological University, Michigan State University, Grand Valley State University, University of Michigan • Michigan Department of Natural Resources: Jim Dexter, Todd Grischke, Dan Sampson, Jim Aho, Jay Wesley, Troy Zorn, Heather Hettinger, Neal Godby, Mark Tonello • Montana Fish, Wildlife and Parks • Grand Traverse Band of Ottawa and Chippewa Indians: Dan Mays, Brett Fessel • Little Traverse Bay Band: Maxwell Field • U.S. Geological Survey: Kevin Keeler • University of Michigan Biological Station • Au Sable Institute • Boyne Outfitters: Ethan Winchester • Friends of the Jordan River • Partners of Michigan Arctic Grayling Initiative



**FOR MORE INFORMATION:
CONTACT THE NATURAL
RESOURCES DEPARTMENT**

ARCHIE MARTELL, FISHERIES DIVISION MANAGER
ARCHIEMARTELL@LRBOI-NSN.GOV • 231.398.2193

DANA CASTLE, FISHERIES BIOLOGIST
DANACASTLE@LRBOI-NSN.GOV • 231.398.2198

“There is a strong Tribal interest in reclaiming what was lost. To recapture what has been lost takes more effort, but as a Tribe, Little River Band of Ottawa Indians is committed to this project because it is the right thing to do.”

—Larry Romanelli



LITTLE RIVER BAND OF OTTAWA INDIANS

Natural Resources Department
2608 Government Center Drive
Manistee, MI 49660