

Waabizheshi study combats Wisconsin cold, snow with culverts

By Abi Fergus, For Mazina'igan

Six GLIFWC employees and a graduate student lug culvert pieces off of a dirt road and into the forest. The group stakes down the insulated tubes in a grid and then repeats the process in additional hemlock and hardwood stands. The 150 culvert pieces are key elements to a study that builds on more than 30 years of waabizheshi (*Martes americana*, or American marten) research by GLIFWC.

"This research is a piece of the puzzle," said Tanya Aldred, GLIFWC furbearer and climate change biologist. The culvert towers will house live traps for small mammals this winter during a study on waabizheshi prey density. "Not much small mammal trapping has been done in the winter, because it's hard to keep animals warm," said Aldred. To overcome this issue and Wisconsin snow, the researchers are using culverts, insulation foam, and hand warmers as a buffer between the traps and the winter cold, according to Aldred.

Winter track surveys are used to study waabizheshi, according to Aldred. Summer density studies have been used to study small mammal density, so the seasonality of the data doesn't align with marten research. To better understand the density and quality of waabizheshi's prey, the researchers are exploring winter and summer small mammal densities for the first time, according to Aldred.

Waabizheshi became extinct in Wisconsin during the 1930s, because of unregulated trapping, timber harvest, and forest fires, according to a 2016-17 progress report by GLIFWC. Between 1975 and 1990, the Chequamegon-Nicolet National Forest reintroduced 172 martens into the Eagle River district and 139 martens into the Great Divide district. Between 2008 and 2010, 90 more martens were stocked in the Great Divide district. The Great Divide district is surrounded by the Bad River, Red Cliff, Lac Courte Oreilles, and Lac du Flambeau reservations. Despite these efforts, marten populations in Wisconsin have not grown the way they were expected to. This causes concern for biological and cultural reasons.

"The clan system is important to our governance," said Dylan Jennings, member of waabizheshi clan, or doodem. "The clan system used to be a lot stronger prior to European contact and the signing of treaties. It helped us stay organized and function as a society. In marten clan, we are strategists and warriors. The clan system is still very relevant today. Nowadays we engage in protection of our way of life—protecting culture and language. Martens are very tough and evasive creatures—that's how our warriors are."

Allison Scott, a graduate student in the Wildlife Ecology program and Jonathan Pauli's Lab at the University of Wisconsin-Madison said that while animals



GLIFWC Wildlife Biologist Tanya Aldred (second from right) issues instructions to a GLIFWC crew that installed Sherman small mammal traps within sections of culverts across a grid in the Chequamegon-Nicolet National Forest (A.Fergus photo)

are surviving, marten recovery in northern Wisconsin has been slow. Scott is conducting the small mammal density study, which depends on the success of the culvert warmers. During two 10-day trials in January, she will check the traps and identify small mammals found within them. The findings may help the researchers understand why waabizheshi recovery has not happened at the anticipated rate based on prey availability.

"Red-backed voles are the marten's highest quality food," said Scott. "[They've been found] eating shrews, mice and deer carcasses—not the highest quality food."

Studying prey density will help Scott and other collaborators understand whether waabizheshi's diet is affecting its re-population rate. A lack of preferred prey, in this case the red-backed vole, could limit waabizheshi numbers, according to Scott. Another aspect of Scott's research project is comparing prey density before and after a timber harvest. Findings from this facet of the study could help illuminate how human activity is affecting waabizheshi restoration.

"Martens are important to ecosystem stability," Scott said. "Small mammals are at the bottom of the food chain, not just for the marten. They also are important to seed dispersal and studying climate change. We're at the southern extent of the red-backed vole's range, so they might be pushed north due to climate change."

Scott hopes to give forest managers information, based on this study, on how to preserve habitat for waabizheshi and its prey.

Jon Gilbert, GLIFWC biological services director, developed the research project utilizing culverts in collaboration with Jonathan Pauli of the Pauli Lab. The culverts were tested by GLIFWC employees, with success, over the past two years, according to Gilbert. Trail camera rigs showed various small mammal entering holes at the bottom of the towers to eat sunflower seeds that were placed inside.

"The long-term goal is understanding of waabizheshi," said Gilbert. "It's the only mammal listed as endangered in Wisconsin. Michigan and Minnesota have plenty of martens, so much so that they have a trapping season."

Gilbert placed the Michigan and Minnesota populations in the 1000s. Waabizheshi's population size in Wisconsin is not fully understood, but Gilbert said it's estimated that there are less than 100 in the Great Divide District. The Eagle River district population may be about 200, and is connected to Michigan's marten range.

"[The marten's historical range in Wisconsin] may have went as far south as Wausau," said Gilbert. "Today there's suitable habitat that they're not using."

Hemlock stands have been found to be favorable to martens, according to Gilbert. This study on prey availability may help to answer why waabizheshi is not occupying more of this forest type in Wisconsin. Another factor that may be suppressing marten populations is competition with ojiiig (*Pekania pennanti*, or fishers).

"We're at the southern end of the marten's range," said Gilbert. "Any little change can force them north and would have negative consequences. Fishers kill martens. They don't like to eat them, but they're competition."

While martens and fishers coexist elsewhere in North America, they don't seem to segregate their habitat so they can do the same in Wisconsin, according to Gilbert. This may be related to climate change.

"Martens have fur on their feet that act like snowshoes, so they can navigate deep fluffy snow" said Gilbert. "Fishers are much bigger and don't have fur on their feet, so they can't navigate deep fluffy snow. As it gets warmer, we get crusty snow that makes fishers able to go anywhere."

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Allison Scott (right), University of Wisconsin graduate student and GLIFWC's Ron Parisian prepare a small mammal trap in a hemlock forest near Clam Lake, Wisconsin. (A. Fergus photo)



Red-backed vole. (©Alex Lamoreaux, some rights reserved (CC BY-NC))



Walleye unplugged: acoustic telemetry study underway in Mille Lacs

In late September, biologists from Mille Lacs Band, Fond du Lac, and GLIFWC worked together to implant 86 acoustic transmitters into ogaa (walleye) in Mille Lacs Lake. This study aims to understand which habitats are most important for juvenile and adult ogaa and identify when and under what conditions juveniles and adults overlap.

Biologists surgically implanted transmitters into 51 adult ogaa (18-28 inches) and 35 juvenile ogaa (7-10 inches) this past autumn from locations throughout the lake (Image 1 below). In addition to the 19 adult ogaa implanted with transmitters in July, a total of 70 adult ogaa and 35 juvenile ogaa are currently transmitting their location, depth, and temperature to 61 stationary listening stations in a grid design covering most of the lake (see Fall *Mazina 'igan* page 6 for details).

Transmitters in adult ogaa will last for ~4 years, while the tags in juvenile ogaa will last for ~200 days due to the smaller battery in the transmitter. Biologists will tag another 35 juvenile ogaa next spring which will allow them to evaluate habitat use over the summer months.

Data from the stationary listening stations will be downloaded next spring shortly after ice-out and biologists will begin to analyze habitat use of both life stages over the winter.

Please contact Mille Lacs Band Biologist Carl Klimah (320-532-5690) or the Inland Fisheries Section at the GLIFWC (715-682-6619) for more information about this research, or if you catch an adult ogaa with a green external tag (Image 2).

—Dr. Aaron Shultz, Dr. Adam Ray, Mark Luehring, Ben Michaels, Joe Dan Rose, and Carl Klimah

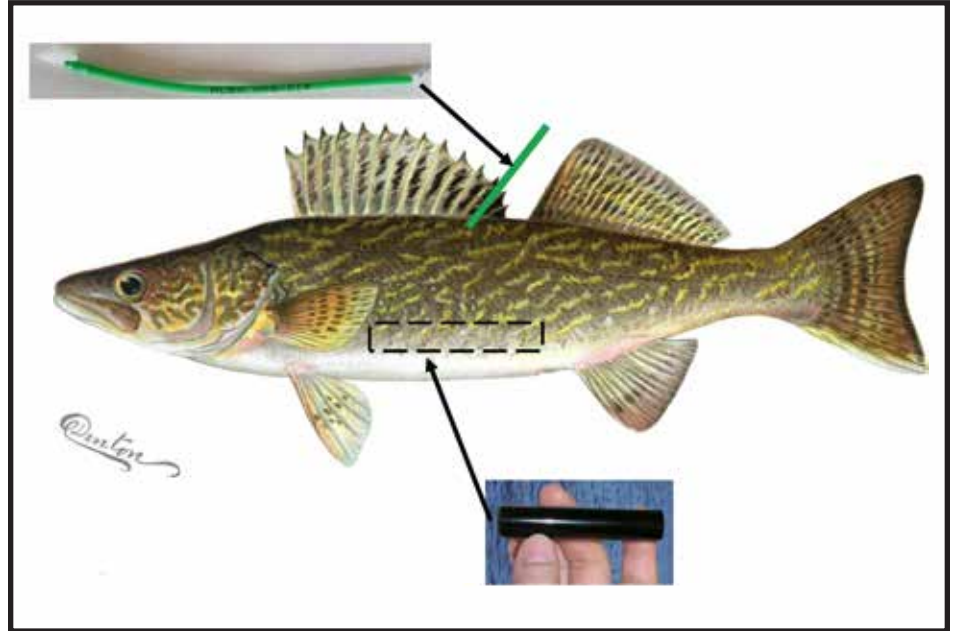


Image 2: Location of acoustic transmitter and external tag on adult ogaa in Mille Lacs Lake. Please report tag number and capture location to Carl. Klimah@millelacsband.com or 320-532-5690.

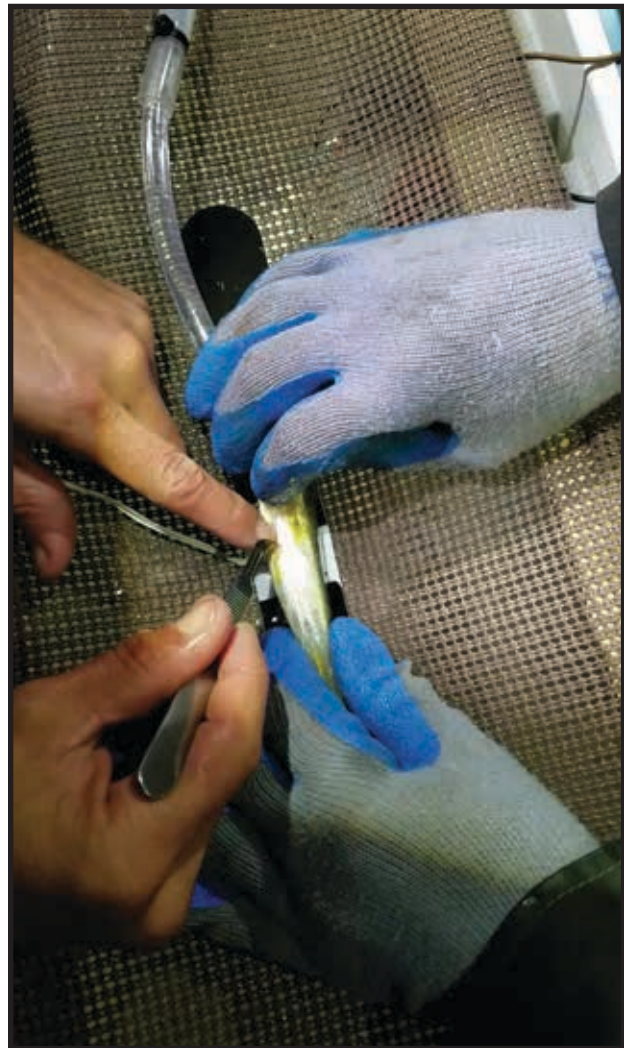


Image 1. Biologists perform surgery on a juvenile ogaa. (Brenda L. Chesshir photo)

Waabooz climate change vulnerability assessment

Editor's note: See page 17 for a traditional teaching about waabooz.



Waabooz (Snowshoe Hare)

Lepus americanus

Moderately - Extremely Vulnerable
(Confidence Level: High)



Figure 9. Range map of waabooz.

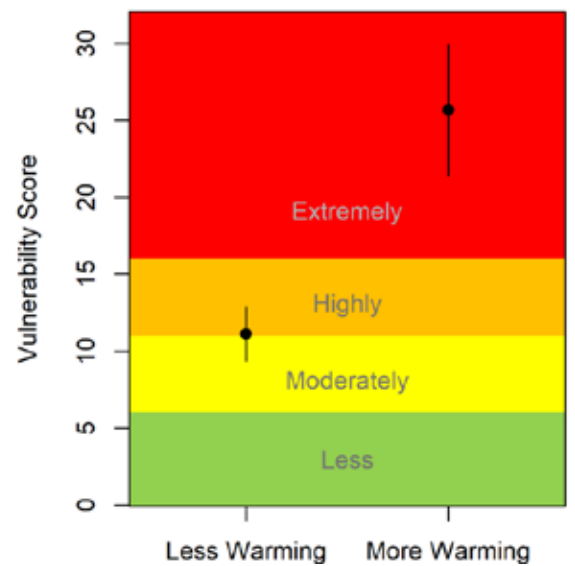


Figure 10. Climate change vulnerability scores for waabooz on a scale of 0 (lowest vulnerability) to 32 (highest vulnerability). Dots indicate average score; lines indicate possible range of scores for each warming scenario.

General Description:

Waabooz utilizes primarily coniferous and mixed forest, as well as bogs, swamps, lowland shrub, and forest edges. Early successional forests often have a higher waabooz abundance. Waabooz also requires a dense understory for cover. Areas with greater than 60% forest cover and dense understories have the highest probability of having waabooz.

As forest was cleared for agriculture in the late 1800s, the waabooz range contracted northward. Currently, waabooz is at the southern end of its range in the Ceded Territories, and its range continues to shift northward (Figure 9). From 1980 to 2014, waabooz's range has shifted 18.4 miles north in Wisconsin, and 28 miles north over the last 20 years in Michigan. Waabooz populations undergo cyclical patterns in abundance, though at the southern end of its range these cycles are not as dramatic as in other regions.

Nearly all TEK interviewees have expressed concern about a decline in the waabooz population. The days of noticing tracks in the snow, seeing it in the backyard, and setting numerous snares to trap it are now mostly gone. When TEK interviewees were asked how long they had been noticing the population decline, the average response was 15 years. Most interviewees also noted a decrease in snowfall during that time frame, which some feel is contributing to the waabooz decline. There are concerns about the loss of traditional teachings and stories regarding the waabooz and waabooz trapping. Tribal members fear the traditional knowledge and stories about it will soon only be memories and younger generations will have never seen a waabooz in their backyard.

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Waabizheshi

(continued from page 14)

Changing snow in Wisconsin may be making it harder for martens to avoid fishers except for areas with deeper snow, according to Gilbert. The Penokee Range is an example of this valuable habitat to Waabizheshi.

Thirty years of waabizheshi research by GLIFWC has resulted in education opportunities for both Scott, currently in her Master's research, and Aldred, who also researched the marten in her graduate schooling.

Scott, Aldred, and Gilbert recommend getting involved in internships, volunteer work, and class projects to set oneself apart when applying to research opportunities.

