Mazina'igan
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SUMMER 2018

GLIFWC welcomes Isham into new leadership role as executive administrator

By Charlie Otto Rasmussen, Editor

Odanah, Wis.—GLIFWC announces longtime Lac Courte Oreilles tribal leader Michael J "Mic" Isham Jr. as its new executive administrator. Isham formally assumed the top spot at GLIFWC in mid-April.

"Natural resources and the work of GLIFWC is a passion for Mic," said Jim Williams Sr., GLIFWC Board of Commissioners chairman and president of the Lac Vieux Desert Band. "I look forward to good things under Mic's leadership. He's been a mentor to many of us over the years."

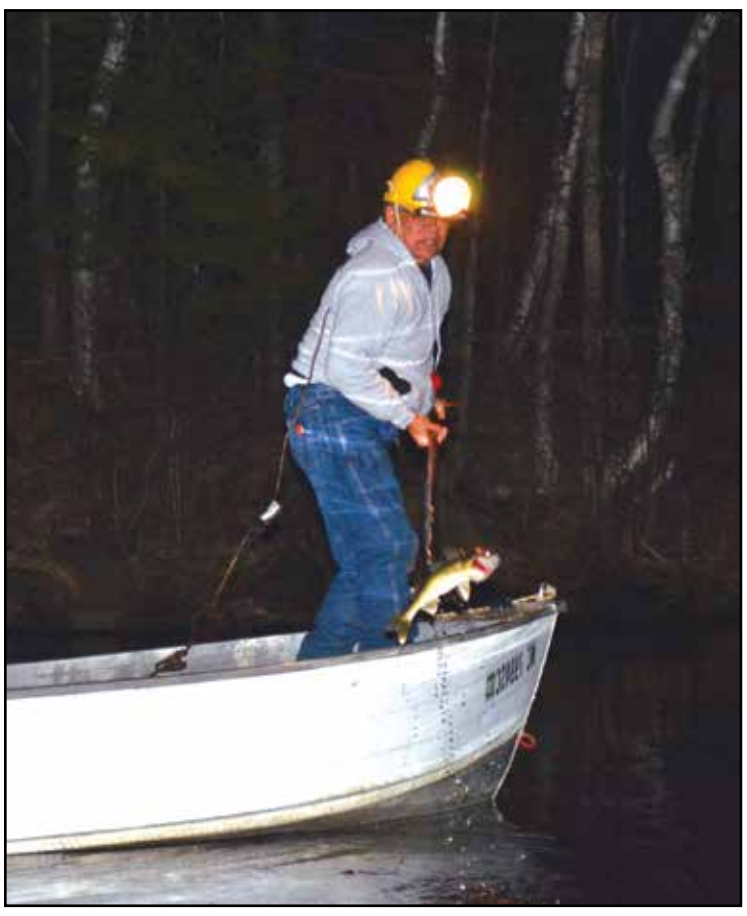
An award-winning natural resources manager, Isham brings more than 30 years of experience to the Commission. One of GLIFWC's original interns in the mid-1980s, the Northland College graduate went on to work with a diverse collection of federal, state, and tribal agencies in the Wisconsin Ceded Territory and beyond.

From 1995-2017 Isham served on the Lac Courte Oreilles Tribal Governing Board as councilman, secretary treasurer, vice-chairman, and chairman. Over that same period, he served as chairman on GLIFWC's Voigt Intertribal Task Force and Board of Commissioners. Isham succeeds James E Zorn, a

(see GLIFWC welcomes Isham, page 3)

Michael J "Mic" Isham Jr. (COR Photo)

Gaa-bibooniked (Old Man Winter) stays late, spring fishing season is short & quick



Despite a late ice-out, the 1842 Ceded Territory provided good ogaa harvest opportunities for many Ojibwe people. (CO Rasmussen photo)

By GLIFWC Staff

Across Ojibwe Country, winter weather drifted deep into ziigwaan setting the stage for one of the latest openers in the modern spearing era. The open-water season got underway near the southern edge of the Ceded Territory at Long Lake in Chippewa County, Wisconsin April 28. By early May, Ojibwe harvesters in Minnesota and Upper Michigan were launching their spearing boats as the ice finally receded from inland lakes.

Ogaa harvest on Mille Lacs Lake in Minnesota opened up on May 2 for on-reservation harvesters and May 4 for treaty harvesters. Shifting wind conditions and moving ice steered the first part of the season into a bit of a two-step, as the lake swayed back and forth between on and off reservation harvesting.

GLIFWC Warden Mike Burns says that the harvest seems to be inching above recent averages this year, probably due to a number of factors. The 2013-year class is maturing and spawning. In addition, winter weather and ice caused a delayed start, condensing the season.

"All the walleyes came in together, and stayed together, congregated within the shallows for quite some time," he says. The result is that spearers are pulling in plentiful harvests in shorter amounts of time.

Treaty harvesters from Fond du Lac, Lac Courte Oreilles, Lac du Flambeau, Red Cliff, and St. Croix all fished for walleye at Mille Lacs Lake this year. According to preliminary creel numbers, Fond du Lac harvested 6,060.8 lbs, Lac du Flambeau—3,188.4 lbs, Lac Courte Oreilles—3,220.2 lbs, St. Croix—3,400.9 lbs, and Red

(see 2018 spring, page 5)

Choose rainwater over tapwater this season

Add nibi to your summer "harvest" plans

Rain barrels capture water from your roof:

- gardens
- lawns
- indoor plants

see your local conservation office or tribal government for low cost rain barrel options

Omashkooz hunt taking shape for autumn

By Charlie Otto Rasmussen, Editor

Clam Lake, Wis.—Nearly a quarter century after wild elk were reintroduced to northern Wisconsin, Ojibwe tribes and state officials are planning an elk hunting season this fall. While Michigan 1836 treaty tribes have conducted elk hunts in the Lower Peninsula for more than a decade, it's the first modern elk (omashkooz) hunt in the Wisconsin Ceded Territory.

"We're on the road to elk restoration success," said Jonathan Gilbert, GLIFWC biological services director. "We're certainly not all the way there yet, but with some surplus animals in the Clam Lake area, the time is right for a limited harvest."

Erased from the landscape by unregulated hunting and habitat loss, wild elk were absent from Wisconsin for more than a century. In 1995 Lac Courte Oreilles' Negaunegabo Gene Begay presided over a ceremony in southern Ashland County welcoming the release of 25 Michigan elk.

Although challenged by everything from predators to drownings to vehicle collisions, that herd has pushed past the 200-animal threshold—a number that state and tribal wildlife officials pegged as a benchmark to consider bulls-only hunting.

"Elk are a harem species. One dominant bull will mate with many females," Gilbert said. "With the Clam Lake bull/cow sex ratio around 1:1, we have a number of expendable bulls—animals that are not breeding and not contributing to herd growth."

The Wisconsin Elk Advisory Committee—comprised of state, GLIFWC and tribal biologists—endorsed a 10-bull harvest cap. The state and Ojibwe treaty tribes are evenly splitting the quota. State officials announced plans to transfer one of its five tags to Rocky Mountain Elk Foundation for use at a conservation fundraising auction.

Representatives from the ten Ojibwe treaty tribes that make up the Voigt Intertribal Task Force are working with GLIFWC officials on the hunting season structure and harvest tag distribution. Rather than distribute tags to individuals through a lottery system, tribes are expressing interest in making each elk hunt a community event.

"A group of elders are figuring out the particulars of the hunt, how a shooter is selected," Gilbert said. "Ultimately there will be a lot community sharing with the meat. We might see the hides used in constructing drums."

Gilbert said the tribes and state are making plans to coordinate testing for chronic wasting disease and potentially other ailments. The earliest tribal elk hunt would occur in September after Labor Day. *Mazina'igan* will publish complete details of the hunt in the dawaagin issue due out in mid-August.

A bull-only elk hunt will take place in northern Wisconsin in 2018. (Rocky Mountain Elk Foundation photo)

On the cover

2108 Pow Wow for Hope Head Male Dancer, Endaso-Giizhik Robert DesJarlait, appears inside an inflatable tunnel that serves to educate the public about colon health and disease. DesJarlait, a Red Lake Ojibwe, is a colon cancer survivor and a vocal wellness advocate, encouraging American Indians to take part in regular cancer screenings. While cancer rates are on a long-term decline for most Americans, natives are experiencing an increasingly high rate of the disease. For more see pages 12-13. (CO Rasmussen photo)

Miigwech, baamaapii niijii

James E. Zorn came out of law school determined to uplift—and enact justice for—human rights abuse victims through the United Nations. It was a difficult undertaking, said classmate Henry Buffalo Jr. A return to Wisconsin to take on a central role in the *Lac Courte Oreilles*, or *Voigt*, treaty rights case introduced Zorn to a career supporting Ojibwe tribes. In 2006, the longtime GLIFWC lead attorney and policy analyst took the helm of a premiere tribal agency, championing natural resources harvest and management for 11 Ojibwe bands in the upper Great Lakes. On May 21 Zorn formally retired from GLIFWC after a distinguished 31-year career.

"I've been deeply and profoundly enriched here," Zorn said to friends and coworkers. "It's time for me to be there for my kids when they need me--to have that flexibility."

GLIFWC's first executive administrator, Henry Buffalo, joined hundreds of others in celebrating Zorn's career in Indian Country at an event in Red Cliff. Buffalo, a Red Cliff Band member, graduated with Zorn from University of Wisconsin Law School in 1981.

In addition to playing fundamental roles in the *LCO v Wisconsin* case for both the Lac Courte Oreilles Band and GLIFWC, Zorn helped defend Ojibwe treaty rights in the *Minnesota v Mille Lacs* case. Later as executive administrator, he oversaw the expansion of Ojibwemowin, healthy foods, and youth programs at the Commission.

"We've all had a hand in creating something that's pretty special," Zorn said. "I'll miss the joy of being in this work community, of finding people, of finding a calling." **—CO Rasmussen**

Buffalo (left) is pictured with Zorn and his wife Rebecca Campbell at an April 4 gathering in Red Cliff. (CO Rasmussen photo)

Ogichidaa Storytellers: Gathering the Pieces

Jerry Jondreau

As a new harvesting season looms, renewal and subsistence always seem to come to mind. However, gratitude is an oftentimes inexplicable emotion felt by many harvesters.

Gratitude for everything in creation, but also gratitude for the ogichidaag (warriors) that planted seeds of survival for Anishinaabeg. GLIFWC in collaboration with well-known film producer, Finn Ryan have been on a mission to document and share these stories to a broader audience.

Three videos have been officially released, the first titled "Crossing the Line: Tribble Brothers," and the second "Lifting Nets: Gurnoe Decision," was released shortly after.

In April of 2018, GLIFWC released the third video "Gathering the Pieces: The Jondreau Decision." The third video features KBIC tribal member Jerry Jondreau as he recounts his grandfather William Boyzie Jondreau and the struggle to retain treaty harvesting rights reserved in the treaty of 1854.

In June of 1965, 100 years or so after the signing of many treaties with the federal government, William Boyzie Jondreau checked his nets and found four lake trout that were bycatch from the day. He kept the fish and headed to the landing where he encountered a state game warden. Boyzie cited his treaty reserved harvesting rights upon interrogation by the warden. Boyzie's actions brought this delicate matter into the Supreme Court of Michigan, which eventually decided in favor of William Boyzie Jondreau in April of 1971.

As you harvest this spring and summer, take a moment to remember all of the ogichidaag that both preserved and fought for the Anishinaabe way of life. The co-management between the tribes, and the state that exists today is in place to protect the environment and resources that everyone subsists upon. These videos are available on the website *www.glifwc.org* and also on YouTube: *https://youtu.be/q5TmLyWyFM0* ***—D. Jennings***

Ceded Territory news briefs

Forest pests continue to challenge natural resources managers

The invasive gypsy moth continues to spread into western Wisconsin, Minnesota and points west. While its impact to forests has been much reduced due to control efforts and an effective fungal biocontrol, outbreaks still occur, defoliating trees and adding an additional burden to the forest (see *https://datcp.wi.gov/Pages/Programs_Services/GypsyMoth.aspx*).

Much more worrisome are other forest invasives—the hemlock woolly adelgid, an aphid ("plant lice") relative which kills hemlock trees, beech bark disease, thousand canker disease of walnut trees, and the Asian longhorned beetle, which, if it escapes its eradication areas in southern Ohio, central Massachusetts and the New York City region, will wreak havoc on eastern North America's maple forests. All of these forest beings arrived in North America because people brought them here. **—S. Garske**

GLIFWC survey: Two-thirds of tribal members rely on treaty rights to acquire traditional foods

Chi Miigwech to everyone that participated in GLIFWC's Traditional Food Interest Survey offered both online and through the mail this past winter. With responses from some 300 tribal members and programs, GLIFWC dietary specialists are establishing research priorities to address food contamination issues, including physical, chemical, and biological sources.

According to tribal respondents, 65% use their treaty rights to harvest traditional foods. The top four foods tribal members want access to: berries, wild rice, maple syrup, and venison.

All of us in GLIFWC's Administration for Native Americans SEDS program would also like to say congratulations to our survey winner, Cheryl Bernier of Bay Mills Indian Community! She received five pounds of wild rice purchased from tribal harvesters that participated in our previous "Manoomin~The Good Berry" project that ended in 2017. **—OH Maroney**

Tribal master degree program kickoff this fall at UMD

University of Minnesota Duluth, in its collaboration with tribal communities throughout the country, has developed a new, one-of a-kind master's degree program. UMD is now accepting applications for Master of Tribal Resource and Environmental Stewardship (MTRES) for Fall 2018.

UMD gained national attention with its Masters of Tribal Administration and Governance (MTAG) program that has pumped out many desired professionals throughout Indian Country. MTRES was designed by tribal communities over a 3-year period with tribal communities in mind. The University of Minnesota Board of Regents approved the program in February of 2018 as a collaborative program between UMD's College of Liberal Arts, College of Education and Human Services Professions, Swenson College of Science and Engineering.

Tribal communities continue to pave the way in the environmental protection realm. However, the need to build up knowledgeable leaders in program management, sovereignty, treaty rights, and even economics has always been eminent. Program participants will undergo intensive course work and seminar projects that embody the very topics that tribal communities will need for engaging the broader region in proper and culturally sensitive environmental management practices. For more information or to apply check out the website: *https://cla.d.umn.edu/departments/masters-programs/mtres*. **—D. Jennings**

Follow the burns to good miinan picking

Following the example set by American Indians, the US Forest Service continues to use prescribed burns in the Ceded Territory to improve habitat for both plants and wildlife. For blueberry pickers, ongoing fire management is creating good harvest opportunities on many National Forest lands. In preparation for miinan season this July and August contact your local Forest Service ranger station for area prescribed burn histories. **—CO Rasmussen**

Camp Onji-Akiing

Natural Resource Cultural Summer Camp
July 16-20, 2018
Lake Nesbit Environmental Center
Sidnaw, Michigan
See page 10 for camp application.
Registration deadline is June 8!

Martes international symposium coming to Ceded Territory


waabizheshi (marten)

Ashland, Wis.—The *Martes* Working Group is hosting its 7th international symposium during the week of July 30-August 2.

Comprised of approximately 150 wildlife professionals from around the world, the *Martes* Working Group conducts research on members of the fur-bearing *martes* complex including American marten, fisher, pine marten, stone marten, sable, yellow-throat marten, nilgri marten, tyra, and wolverine.

Martes species are highly skilled predators that are members of the mustelidae (weasel) family. They are circumpolar in distribution, meaning that they occur around the world in northern latitudes, most often in forested environments.

The *Martes* Working Group sponsors symposia every 4-5 years in which people gather to exchange information, present research results, and explore new collaborations. These symposia rotate around the world, the last being in Krakow, Poland in 2014. The symposium in far northern Wisconsin presents an opportunity for people to hear from the world's experts on these species that live right in our back yard. Dr. Jonathan Gilbert, GLIFWC director of Biological Services, is currently the president of the *Martes* Working Group and is leading the effort to plan the symposium.

GLIFWC has been involved in marten and fisher research for more than 25 years. During that time there have been at least five graduate projects undertaken in collaboration with various universities including Purdue, UW-Stevens Point and UW-Madison.

In addition to research supported directly by GLIFWC, collaborations have been undertaken with additional graduate research projects. This research has resulted in many publications in peer-reviewed journals, and dozens of presentations and posters at professional conferences. Although the research topics have been varied, ranging from estimating metabolic rates to examining genetic structure of the populations, most of the effort has gone into determining habitat selection patterns and preferences. **—GLIFWC Wildlife Section**

Hunter Safety

A hunter safety class is being offered for individuals 10 years of age and older. Children under 18 years of age will need a parental signature to participate in class. This class will be three days, with attendance required **ALL** three days. Space is limited, so reserve your seat. Registration ends July 18th, 2018.

When: **July 24–26**, 2018 • 10:00 am – 2:00 pm

Where: Ojibwa Resort Casino (Chippewa Room 2)
16449 Michigan Avenue, Baraga, Michigan 49908

Contact: GLIFWC Warden Steven Amsler at 715-562-0034
or email *samsler@glifwc.org* to register

GLIFWC welcomes Isham

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31-year GLIFWC veteran who spent the last dozen years as executive administrator. Zorn entered retirement on his birthday, May 21.

"I've been with GLIFWC in some way since 1986, and I consider the staff as family," Isham said. "Being executive administrator of GLIFWC enables me to continue to fulfill what I consider to be one of the most important missions of the great Ojibwe Nation—the protection and enhancement of our treaty reserved rights. My predecessors Jim Schlender Sr. and James Zorn have built GLIFWC into the top tribal natural resource agency in the United States, and I aim to keep it that way during my tenure as executive administrator."

Isham received national recognition in 2016, receiving the Chief Sealth Award from the Native American Fish & Wildlife Society (NAFWS). The highest honor bestowed by the 220-tribe NAFWS, the Chief Sealth Award acknowledges leaders who excel in natural resources stewardship.

An off-reservation natural resources management agency created in 1984, GLIFWC represents 11 Ojibwe bands in Michigan, Wisconsin and Minnesota. The executive administrator oversees GLIFWC's programs and serves in key leadership and liaison roles regarding the comanagement of Ceded Territory natural resources. Each GLIFWC member tribe reserved off-reservation harvest rights to wildlife, fish, and wild plants on property transferred to the United States through treaties negotiated in 1836, 1837, 1842 and 1854. Collectively, the lands and waters included in the treaties are known as the Ceded Territory.

Chronic wasting disease taking hold in Wisconsin Ceded Territory

Captive deer rules fail to halt spread

By Travis Bartnick, GLIFWC Wildlife Biologist

The contagious neurological ailment, chronic wasting disease (CWD), continues to spread in wild and captive populations of white-tailed deer in the western Great Lakes region. In early 2018 two wild deer tested positive within the Ceded Territory of Wisconsin along with a third just outside of the southern boundary in early April.

The first was a healthy-looking two-year-old buck in northeastern Lincoln County. The second, a one-year-old doe that was harvested in southern Oneida County, just north of where the Lincoln County CWD-positive deer had been harvested.

A private landowner harvested the second CWD-positive deer in March utilizing a disease surveillance permit issued by the Wisconsin Department of Natural Resources (WDNR). The tags were available to landowners within a 27-square mile focus area, about eight miles southwest of Rhinelander. The disease surveillance tags were issued to increase the number of samples available to estimate the prevalence and distribution of CWD in the area. Other ways that additional samples are collected outside of the regular hunting season include the collection of car-killed deer and deer harvested using agricultural damage permits, nuisance permits, and urban deer hunts.

Just south of the Ceded Territory boundary in Wisconsin, another wild deer in western Eau Claire County also tested positive for CWD in April. This is the first CWD-positive wild deer reported in the county. The two-year-old doe was reported as a sick deer by a landowner. This situation demonstrates the importance of reporting any deer that look sick to your local biologist or conservation warden. If the Eau Claire County landowner had not reported this deer, it is likely that it would have continued to spread CWD prions on the landscape, and to other deer. In 2015, a captive deer farm in eastern Eau Claire County was depopulated after CWD was discovered in the herd and several deer temporarily escaped from the farm and were later killed. The escaped deer included two CWD-positive bucks that roamed free for five months before being shot and tested.

The Wisconsin DNR is responding to the new CWD-positive deer by meeting with the public and local County Deer Advisory Councils. The DNR is establishing a 10-mile radius disease surveillance area around the CWD-positive location, conducting surveillance within the area, and encouraging area residents to report sick deer.

Sick deer in captivity

In Minnesota, the office of the legislative auditor recently published an evaluation report regarding the oversight of deer and elk farms by the Minnesota Board of Animal Health (BAH). One of the key findings within the report was that the BAH had failed to enforce various deer and elk regulations. More specifically, it was found that BAH staff did not always confirm whether deer and elk farmers were compliant in submitting samples for CWD testing for animals that were harvested from, or discovered dead, on their farms.

Additionally, the report found that the BAH and the Minnesota Department of Natural Resources (MN DNR) did not always share data in an effective manner in relation to CWD outbreaks. The report by the state auditor's office provided a number of recommendations to help address any inadequacies and to improve cooperation and communication between the BAH and the MN DNR. The results of the report suggest that similar audits could identify ways to improve coordination in other states, such as Wisconsin or Michigan, where multiple agencies share responsibility to stop the spread of CWD, yet have been ineffective.

The Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) placed two Wisconsin captive deer facilities under quarantine after an adult male deer at a Washington County deer farm tested positive for CWD on March 8, 2018. A Bayfield County deer facility was simultaneously quarantined when it was discovered that the owner of both deer farms had transported captive deer from the Washington County farm to his Bayfield County deer farm in December 2017. According to DATCP officials, the transport of the deer was legal according to state regulations. Since it is possible that the deer that were transported from the Washington County farm to the Bayfield County deer farm were exposed to CWD, the Bayfield County farm is scheduled to be depopulated and all deer will be tested for CWD.

A Wisconsin Department of Natural Resources wildlife technician removes lymph nodes from an ayaabe harvested last November in Eau Claire County, Wisconsin. Chronic wasting disease testing is centered on examining lymph nodes and brain tissue from dead whitetails. Health experts discourage people from eating deer that test positive for the always-fatal neurological disease. (CO Rasmussen photo)

In February 2018, a CWD-positive deer discovered on a captive deer facility in Waupaca County in 2017 was found to have been sourced from a captive deer facility in Pennsylvania. Another deer on the Pennsylvania farm also tested positive for CWD. This is likely the first confirmed case of the transportation of CWD-positive deer across state lines by the captive deer industry.

These two instances of legally transporting CWD-infected deer, or potentially CWD-infected deer, both within and between states illustrates the need for more effective regulations on the movement of captive deer, both at the state level and at the federal level. One way to address this problem would be for all state agencies that oversee captive deer farms (such as DATCP in Wisconsin) and the United States Department of Agriculture to impose a moratorium on the transport of captive deer and deer products like urine and other bodily fluids until a more effective live test or field test can be developed. CWD prions can be spread through feces, urine, blood, and through soil and plants where prions have been shed by living or dead and decomposing deer infected with CWD. Currently, the only approved CWD tests requires the animal to be killed.

Food for thought

Although there are no documented cases of CWD being transmitted directly to humans, the risk is not zero. The Centers for Disease Control and Prevention recommends that humans not consume any meat from animals that test positive for CWD. Health Canada's Health Products and Food Branch (HPFB) advocates that the most prudent approach is to consider that CWD has the potential to infect humans.

Despite the fact that the risk is not zero, hunters and their families continue to consume venison regardless of whether they have tested the deer for CWD. In 2017, only about 6% of deer harvested in Wisconsin were tested for CWD. According to a survey conducted by the WDNR, of the hunters who initially kept the deer they harvested that tested positive for CWD, 30% stated that they had consumed, or were planning to consume at least some of the venison. As CWD continues to spread, the number of CWD-infected deer that are consumed is likely to increase.

Deer hunting and consuming venison comprise a significant portion of the traditional lifeways that were reserved in treaties for future generations. Venison

(See Chronic Wasting Disease, page 18)

Chronic Wasting Disease: Stay informed

GLIFWC maintains a CWD website with an online map detailing CWD detections in Minnesota, Wisconsin, and Michigan. The website also includes frequently asked questions and information regarding safe handling and carcass disposal recommendations. GLIFWC's CWD website can be accessed here: *https://data.glifwc.org/cwd/*

Informational CWD brochures are also available at GLIFWC tribal registration stations. GLIFWC biologists recommend tribal hunters practice safe handling and proper disposal of deer carcasses, and getting deer tested for CWD.

Tribal hunters interested in getting their deer tested for CWD can drop off deer heads at their local tribal registration station or local state DNR CWD testing sites. Testing typically takes less than two weeks to get the results.

If bringing in a deer head for testing, be sure to leave about 4-6 inches of neck (about a hand width) attached to the head and double bag the head in heavy duty garbage bags.

2018 spring fishing season

(continued from page 1)

Cliff—85.6 lbs. Collectively, these same tribes also took 178.1 lbs of northern pike. Bad River and Mole Lake Bands have not fished on Mille Lacs Lake thus far during the 2018 spring season.

The home band of Mille Lacs harvested 8,579.9 lbs of ogaawag from the big lake, and 243.1 lbs of northern pike. As the spring season winds down in the latter half of May, Ojibwe treaty tribes reached a combined harvest of 24,535.8 lbs of ogaawag and 467.8 lbs of northern pike.

Elsewhere in the Minnesota territory, Ojibwe fishers wielded both spears and gill nets to fish waters beyond Mille Lacs Lake. In Kanabec County, 1,049-acre Knife Lake yielded a northern pike-dominated catch for tribal netters. Around 65 miles from the Twin Cities metropolitan area, Knife provided Mille Lacs Band members with 81.4 lbs of pike and 12.6 lbs of walleye.

North and east into the 1854 Ceded Territory, Fond du Lac Band (FdL) fishermen were presented a short window of opportunity when the late ice finally let go of Arrowhead lakes.

"All of the sudden, the lakes popped open all at once. It was a case where we had to prioritize lakes, figuring were tribal members were going to get the best fishing opportunities," said Brian Borkholder, FdL inland fisheries biologist. Over a two-night run, Cadotte and Birch Lakes provided a combined 70 walleyes along with eight northern pike (ginoozheg).

In Upper Michigan, tribal spearers from Keweenaw Bay Indian Community (KBIC) and Lac Vieux Desert made the best of conditions, turning a difficult season around to generate a solid harvest. At Portage lake, KBIC spearers bagged 350 ogaawag by the evening May 12, said KBIC Biologist Gene Mensch. Muddy water from the near-flood-stage Sturgeon River (which empties into Portage Lake) made visibility a challenge for spearers, Mensch said.

Lac Vieux Desert Band's most productive water, Lake Gogebic, offered up 2,898 walleyes through May 15. GLIFWC Officer Dan North reports that while one night of choppy water made for very poor spearing conditions, LVD spearers and GLIFWC monitoring crews were treated to a spectacular aurora borealis show.

A little over a week after a major snowstorm, spearing conditions for Wisconsin Ojibwe bands peaked on May 8 when tribal members achieved their single most successful night of the season. By the end of fishing May 15—and into the early hours of the 16th—ogawaag harvest totals for the Wisconsin Ceded Territory reached 28,887. Musky hunters added 189 fish to the preliminary total.

The Bad River and Red Cliff's Intertribal Youth Spearing Night took place on Lake Namekagon on May 11. Todd Stone carefully maneuvers his boat along the shallows as Melayna Smart scouts the water for the reflection of a walleye's eyes. (P. Maday photo)

Before the backdrop of colorful sunset, Daisy McGeshick helps Cruz Lemery into a flotation vest before an evening of spearing at Lake Gogebic. (CO Rasmussen photo)

Fishing with in tandem with his son, Lac Vieux Desert's Danko Hazen brings in a walleye May 12 from Lake Gogebic in western Upper Michigan. (CO Rasmussen photo)

A GLIFWC creel clerk measures a northern pike caught by Mille Lacs Band members on Knife Lake in the 1837 Ceded Territory. (M Burns photo)

Near Keweenaw Bay Indian Community, creel clerks Martin Beck and Heather Gauthier document and process walleyes speared from Portage Lake. A portion of the harvest is slated for mercury testing to determine potential health risks from consuming the fish. KBIC fisheries staff are also tagging and releasing walleye (left) as part of a biological assessment. (G Mensch photos)

Throughout the spring fishing season, Lac du Flambeau Band and GLIFWC dispatched aquatic invasive species technicians to spray-wash spearing boats after they returned to the landing each evening. At the Trout Lake landing in northeast Wisconsin, technicians cleaned boats to prevent invasive spiny water fleas—or their eggs—from hitching a ride to another waterbody. (A McGeshick photo)

Collaborative walleye rehabilitation efforts to begin on Lac Vieux Desert Lake

By Joe Dan Rose & Aaron D. Shultz
GLIFWC Inland Fisheries Biologists

Straddling the Michigan-Wisconsin border in Gogebic and Vilas counties—and lying within the 1842 Treaty-Ceded Territory—Lac Vieux Desert is a 4,300-acre lake that has been receiving a lot of attention lately (Image 1). The reason is that state and tribal fisheries managers have observed all-time low levels of walleye abundance stemming from declines in natural reproduction.

While this decline is not completely understood, a collaborative interagency walleye rehabilitation plan was recently drafted by GLIFWC, Wisconsin Department of Natural Resources (DNR), Michigan Department of Natural Resources, the Lac Vieux Desert Tribe, and Sokaogon (Mole Lake) Chippewa to address the issue.

The goal of the plan is to restore natural reproduction and increase the density of adult walleyes to at least 2.5 fish per acre (Image 2). The plan includes stocking, coordinated population assessments, harvest management, public education, and enforcement efforts.

Image 2. Mark Luehring, GLIFWC fisheries biologist, measures an adult walleye as part of a population study. (Dennis Soulier photos)

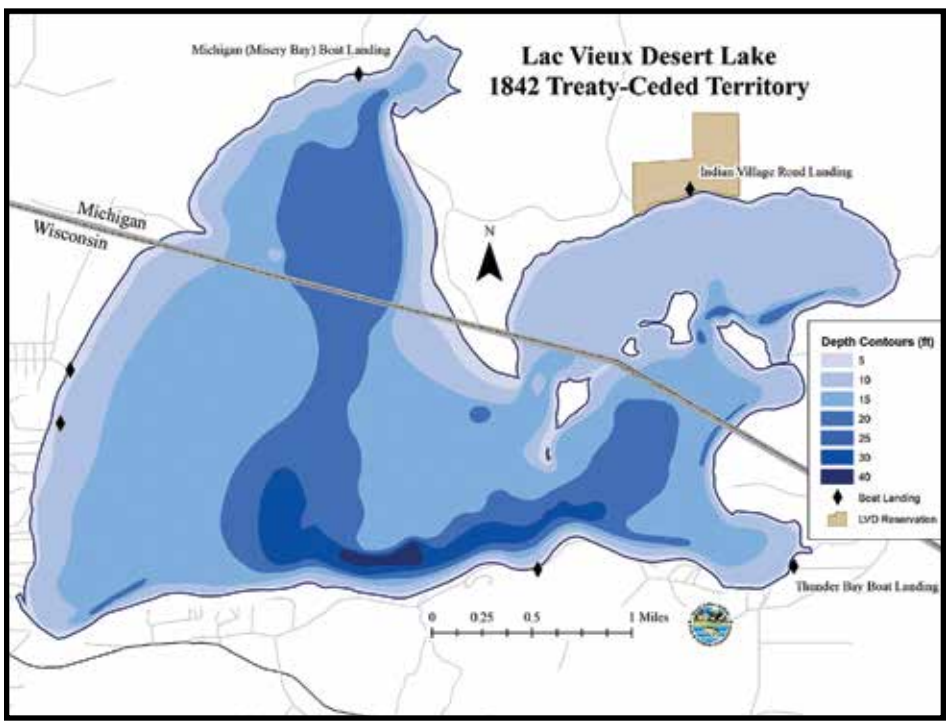


Image 1. Lac Vieux Desert Lake. Reservation boundaries are representations and may not be the legally binding boundary.

When the ice retreated on Lac Vieux Desert this spring, crews from the Michigan DNR set nets to estimate walleye abundance. This is accomplished by marking as many adult walleyes as possible with fin clips.

After the marked fish have some time to mix within the lake, crews then use electrofishing boats to sample the shoreline to determine the proportion of the population that was marked. Following that effort, the Wisconsin DNR will follow up with a netting survey targeted at muskellunge, which are most effectively sampled a little later in the year than walleye.

Finally, GLIFWC and Wisconsin DNR crews will jointly sample Lac Vieux Desert in the fall to determine if there was any natural reproduction by walleye in 2018. If natural reproduction is low or non-existent, Lac Vieux Desert will receive approximately 64,500 extended-growth fingerlings (6 to 8 inches) in October or November, courtesy of the Wisconsin DNR, as part of the Wisconsin Walleye Initiative.

Walleyes reared in collaboration between the Lac Vieux Desert Lake Association and Lac Vieux Desert Tribe will not be stocked in Lac Vieux Desert itself, but will be transferred to other lakes within the 1842 Treaty-Ceded Territory.

In addition to the netting and electrofishing surveys, the Michigan DNR will be conducting a creel survey throughout the angling season to estimate angler effort, catch, and harvest. The creel clerk will interview anglers from a boat and at access sites (Image 3). Angler compliance with the clerk is encouraged as it is essential to obtain the best possible information for fisheries management.

Anglers should be aware that the recreational fishing regulations for walleye on Lac Vieux Desert (in Michigan and Wisconsin waters) are new for this year and include an 18-inch minimum size limit and daily possession limit of 3 fish. The more restrictive regulations were put in place as part of the rehabilitation plan.

In addition, the Lac Vieux Desert Tribe and Sokaogon Chippewa have agreed to refrain from spearing or netting walleye on Lac Vieux Desert from 2018 through 2022.

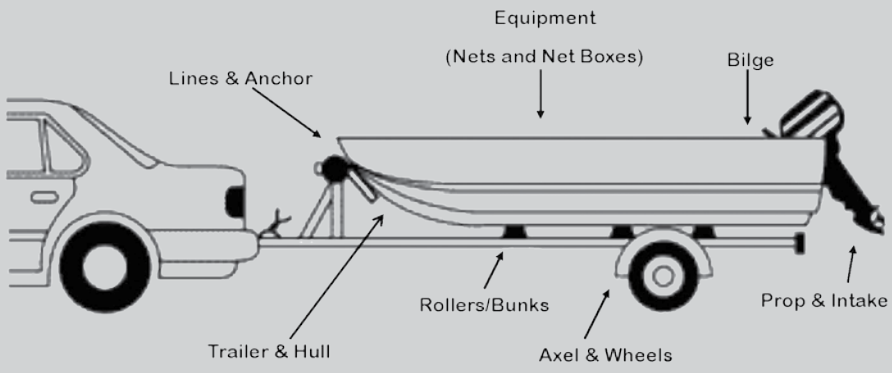
Image 3. Creel Clerk for the Michigan Department of Natural Resources (MIDNR) surveys an angler about his catch. (MIDNR photo)

Ganawendan Ginibiiminaan (Protect Our Waters)

Aquatic invasive species (AIS) can have negative impacts to treaty resources including spawning and fish habitats. Remember when out on the waters to take the precautions to prevent their spread. Watch for invasives hitching rides on plant fragments, mud or debris!

Stop Aquatic Invasives

- ✓ ***REMOVE*** any mud or debris, plants and animals from your boat, trailer and equipment
- ✓ ***DRAIN*** all water from boat, fishing boxes and equipment ensuring it does not drain back into the waterbody.
- ✓ ***CLEAN*** or ***DRY*** boat, trailer and all equipment that came into contact with water including nets, buoys, anchors, ropes and lines, etc.



Don't forget to check these spots for hitchhikers.

Walleye angler harvest, effort soars on Lake Gogebic

2016 state regulation change targets smaller fish

Lake Gogebic, a 13,000-plus-acre lake nestled in Michigan's heavily forested Upper Peninsula, has been a lake with stable walleye production (see Winter *Mazina'igan* 2017/2018).

In late 2015, after anglers expressed concern that they were catching too many undersized walleye, the Michigan Department of Natural Resources (MIDNR) changed the walleye regulation from the statewide 15 inch minimum size limit with a 5 bag limit to a 15 inch minimum size limit and five bag limit with two walleye allowed between 13 and 15 inches. This regulation change has contributed to increased angler effort and harvest on the lake in the last two years.

MIDNR estimates angler harvest and effort using creel surveys. During these surveys, creel clerks count boats, interview anglers, and measure fish at random times throughout the fishing season.

The samples collected when the creel clerk is present are intended to be representative of the time when the creel clerk is not present. These data are expanded to provide estimates of effort, catch, and harvest for the whole season.

Image 1. Walleye caught by an angler. (Watandash photo)

In 2015, MIDNR conducted an open water creel survey prior to the angling regulation change but did not survey during the ice-fishing season. The harvest estimated during this survey was just over 3,000 walleye (Table 1). The open water creel surveys conducted in 2016 and 2017 (again, no surveys were conducted during the ice-fishing season) after the regulation change showed an estimated angling harvest at over 21,000 walleyes each year.

Sustained harvest at the levels estimated in 2016 and 2017 will likely severely stress the walleye population.

Year	Angler Hours	Angler Open Water Releases	Angler Open Water Harvest	Tribal Harvest	Combined Harvest
2015	56,561	34,315	3,232	3,349	6,581
2016	87,767	18,142	21,794	4,211	26,005
2017	116,840	31,256	21,810	3,552	25,362

Table 1. Angler hours, number of walleye released, number of walleye harvested, tribal spearing harvest, and combined harvest (does not include ice fishing) for the 2015 (pre-regulation change), 2016 (post-regulation change), and 2017 (post change) seasons.

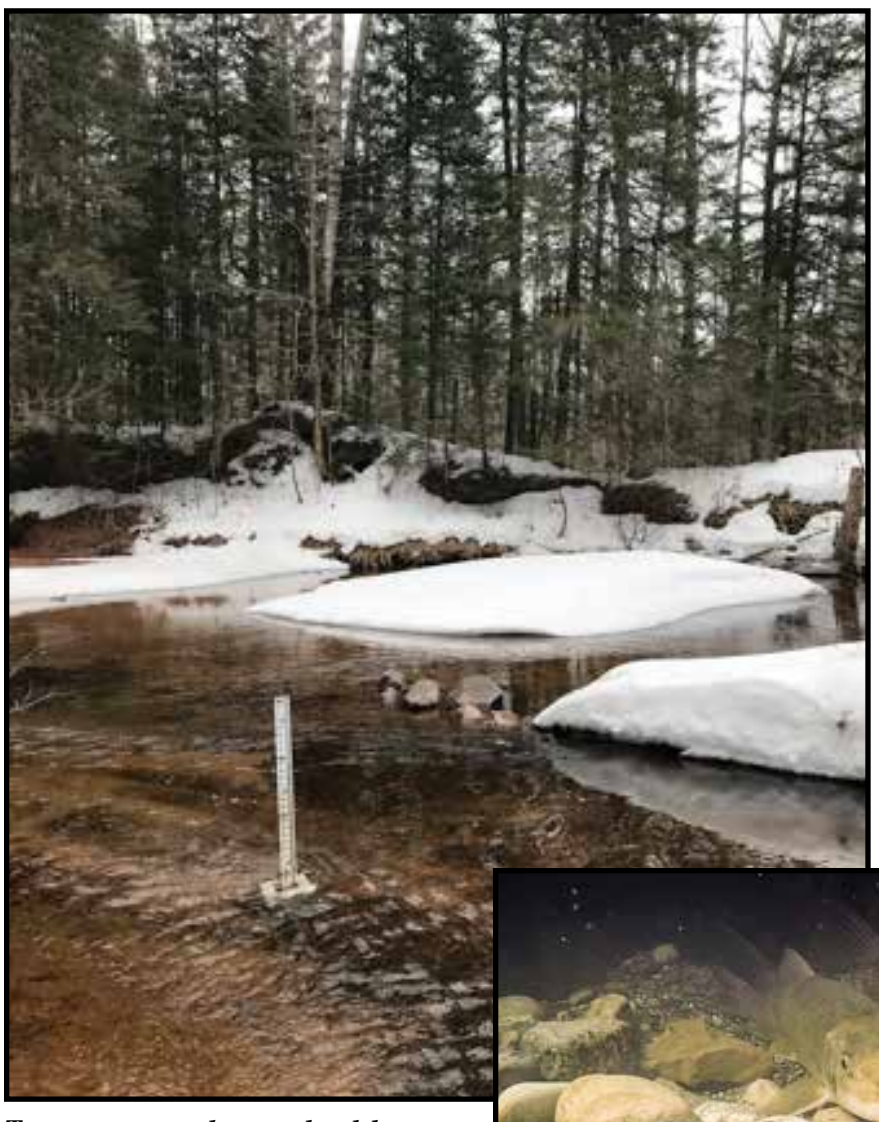
So what caused the harvest estimate to increase? Anglers were allowed to keep more of the walleye that they caught (Image 1). In 2015, under the old regulation, anglers kept about 9 percent of the walleye they caught.

During the first year of the new regulation, anglers kept 55 percent of the walleye they caught, and during the second year, they kept 41 percent of the walleye they caught. In addition, the number of hours spent fishing increased from about 57,000 hours in 2015 to about 88,000 hours in 2016 to almost 117,000 hours in 2017. Since the regulation change went into effect, angling effort has doubled on the lake, and walleye harvest has increased by more than four-fold.

What does the future hold for the lake? Currently, many lakes throughout the 1837 and 1842 Ceded Territories are experiencing decreased walleye abundance. Lake Gogebic has remained resilient to this trend, and is likely to remain a good environment for walleye in the future even if projections of increased temperatures hold true. However, sustained harvest at the levels estimated in 2016 and 2017 will likely severely stress the walleye population.

In spring of 2017, GLIFWC and MIDNR worked together to estimate the adult walleye population. The estimate was about 45,000 walleye. Given this estimate, the combined tribal and angler harvest in 2016 and 2017 has likely exceeded levels that MIDNR and GLIFWC biologists have generally considered to be sustainable in MI 1842 Ceded Territory waters.

(see Lake Gogebic, page 11)



Temperature and water level loggers deployed in Pike's Creek, Bayfield, Wisconsin during sucker migrations in the spring.

White suckers (right) migrating upstream to spawning site(s).

—Dr. Karen Murchie, Shedd Aquarium photos

Citizen science success in sucker monitoring

In the Summer 2017 issue of *Mazina'igan*, we told you about a citizen science study led by Shedd Aquarium research biologist Dr. Karen Murchie in collaboration with researchers at the University of Wisconsin-Madison and the Lake Superior National Estuarine Research Reserve.

The study aims to document the timing of sucker migrations across a latitudinal gradient over a long period of time to see if there are any shifts in these mighty migrations that may be caused by climate change.

Last year, a team of 24 citizen scientists documented over 26,000 suckers migrating into one of the 17 monitored locations spread across the western shore of Lake Michigan and southern shore of Lake Superior.

The Bad River Natural Resources Department and GLIFWC contributed important data on the Bad River to the 2017 study, and are set to participate again in 2018 as part of their spring sea lamprey surveys.

Leander Cloud, Bad River tribal member, noted that in 2017, the sucker run wasn't as large as it has been in the past years in the Bad River, but individual fish that were observed were large.

While more years of data are required to establish trends in timing and environmental cues that get the suckers moving, Dr. Murchie will also be seeking information from citizens with historic migration knowledge.

She looks forward to continuing to work with individuals in the Ceded Territory in subsequent years as the program develops further.

Look for more information on project findings at *www.sheddaquarium.org/Conservation--Research/*.

— Aaron Shultz, Ben Michaels, Mark Luehring, Adam Ray & Joe Dan Rose, GLIFWC Inland Fisheries Staff

Red Cliff spearheads non-native Phragmites removal

Three regional wastewater treatment facilities targeted

By Todd Norwood, Red Cliff Treaty Natural Resources Div. For Mazina'igan

Red Cliff, Wis.—The Red Cliff Band of Lake Superior Chippewa is leading a project in cooperation with Strand Associates, the City of Washburn and greater Bayfield area to eliminate three large seed sources of non-native *Phragmites australis* subsp. *australis* (common reed) in Bayfield County, Wis.

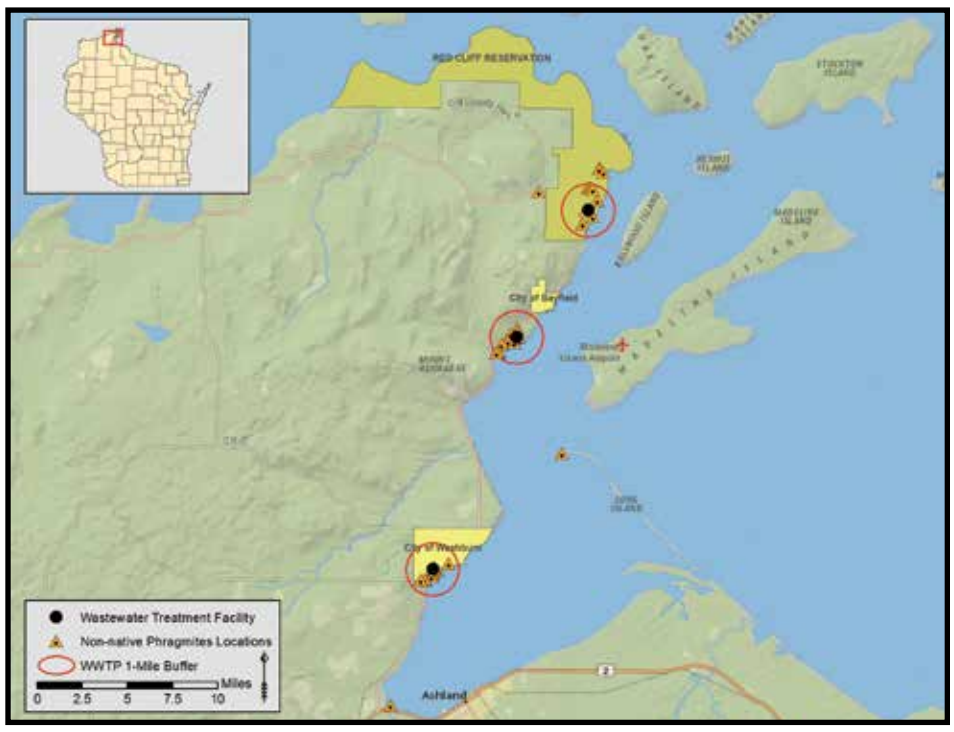
The project includes removal of Phragmites from constructed reed beds at wastewater treatment facilities (WWTF) where the reed is used to dewater biosolids along Bayfield Peninsula.

The less aggressive native subspecies (*Phragmites australis* subsp. *americanus*) will replace the non-native strain in the reed beds. The project, which runs from May through September 2018, affords protection to approximately 14,000 acres of coastal wetlands along with countless inland wetlands in the Chequamegon Bay region of Lake Superior.

The effort to eradicate non-native *Phragmites* began in earnest in 2013 when GLIFWC and Red Cliff Treaty Natural Resources staff discovered small populations of non-native *Phragmites* on the Bayfield Peninsula landscape.

Upon closer inspection, it became apparent that nearly all populations were located within one-mile of each WWTF located in Red Cliff, Bayfield, and Washburn. A 2016 genetic study led by Red Cliff confirmed the small external populations originated from seed and showed some genetic similarity to the reed bed *Phragmites*.

For more information on native vs. non-native phragmites, download the brochure: **Phragmites—Native or Not? *Distinguishing native phragmites from the invasive non-native subspecies in the Great Lakes region*** at *http://mnfi.anr.msu.edu/phragmites/phragmites-native-non-native.pdf*



The effort to eradicate non-native* Phragmites *began in 2013 on the Bayfield Peninsula.

When the original reed bed installations occurred during late 1990's and early 2000's, there was a wide spread notion that *Phragmites* dispersal was almost exclusively through vegetative means such as rhizomes or stolons rather than by seed. Since the concrete reed beds entirely contain the rhizomes, there was no way for the *Phragmites* to escape from the facility.

However, recent molecular studies, including our genetic study of the Chequamegon Bay populations, shows that non-native *Phragmites* uses seed as its predominant dispersal mechanism. As a result, we now know the three large reed bed populations currently located at the WWTFs will greatly contribute to the spread of non-native *Phragmites* in the Chequamegon Bay region.

Removing the current reed bed populations will eliminate the only known local seed source of non-native *Phragmites* and offer significant protection to regional ecosystems.

New aquatic invasive species discovery underscores ballast water issues

By Ben Michaels, GLIFWC Inland Fisheries Biologist

Duluth, Minn—Lake Superior, along with the other Great Lakes, is host to numerous aquatic invasive species such as the sea lamprey, round goby, zebra mussel, and Eurasian Ruffe. These species, among others that have invaded Lake Superior, continue to alter fish communities in Gichigami by competing with or feeding on native species.

Figure 1. Bloody Red Shrimp. (NOAA Great Lakes Environmental Research Lab photo)

In July 2017, U.S. Fish and Wildlife Service and Wisconsin Department of Natural Resources personnel, through the Great Lakes Early Detection and Monitoring Program, detected a new invasive species, bloody red shrimp (*Hemimysis anomala*) (Figure 1), in the Twin Ports Harbor—located in the western arm of Lake Superior.

This tiny animal was first detected in Lakes Michigan and Ontario in 2006 and is now present in all of the Great Lakes. Although only one individual bloody red shrimp was detected in the sampling gear, biologists remain unsure of how widespread this species has become or its potential for range expansion within Lake Superior.

The bloody red shrimp, a relative of the native opossum shrimp (*Mysis relicta*), is a small (0.25–0.5 inches) invertebrate native to eastern Europe that feeds on algae and zooplankton during the nighttime, making them difficult to visually detect. Biologists and fisheries managers are concerned that this species could disrupt the lower food web by competing for resources with native zooplankton and forage fish, possibly adversely affecting larger-sized fish, such as lake trout, that rely on small fish for food.

Despite current regulations that prohibit discharge of ballast seawater in the Great Lakes, it's possible that the bloody red shrimp was transported in ballast waters of saltwater shipping vessels that often frequent the Twin Ports area, which is one of the largest ports in the United States. Due to the extensive shipping traffic, it's not entirely surprising that a new aquatic invasive species has been detected in this area of Lake Superior. The bloody red shrimp finding comes as the U.S. Senate recently blocked an attempt by shipping officials to reduce ballast water regulations in the Great Lakes. Ships pump and discharge ballast water for stability, helping to compensate for changes in cargo load levels.

The movement of invasive species also highlights the importance of fishermen ensuring that their boats and equipment are free of debris and that water from live wells and bilges are always drained prior to leaving a waterbody.

For more information, please contact Ben Michaels at *smichaels@glifwc*.org

Become a citizen scientist on Mille Lacs Lake

Mille Lacs Lake, Minn.—Shortly after ice-out, the Mille Lacs Band of Ojibwe, in collaboration with GLIFWC, Fond du Lac Band of Lake Superior Chippewa, and US Fish & Wildlife Service (USFWS) launched a study to evaluate seasonal habitat use and the movement patterns of juvenile and adult walleye (see *Mazina'igan*, Biboon 2017/2018.6). The results of this project, funded by a USFWS Tribal Fish & Wildlife Grant, will be used to inform the walleye rehabilitation plan for Mille Lacs Lake.

Fisheries specialists are surgically implanting acoustic transmitters into the bellies of juvenile and adult walleye. Researchers also insert a green Floy tag with contact information just below the dorsal fin on adult fish (Image 1).

We need tribal members and recreational anglers to help us with this research project. If you capture a fish with a green Floy tag, please keep the fish in the water while recording the tag number and location (ideally GPS coordinates), then immediately release the walleye. The acoustic transmitter will continue to transmit data to our receivers throughout the lake (Image 2). In some cases, a captured walleye might not survive after release. These fish will exhibit signs of stress, which include floating upside down and limited respiration (i.e., water is not being pumped across the gills; Image 3). If your tagged fish does not look like it is "going to make it" (i.e., death is almost certain), then please return the whole fish to the Minnesota Department of Natural Resources or Mille Lacs Band.

Thank you for supporting this research. We will provide updates on this project throughout the year that will include data reported by tribal members and recreational anglers. For more information, or if a tagged fish is caught, please contact Mille Lacs Band Biologist Carl Klimah at 320-532-5690 or *Carl.Klimah@millelacsband.com*.

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

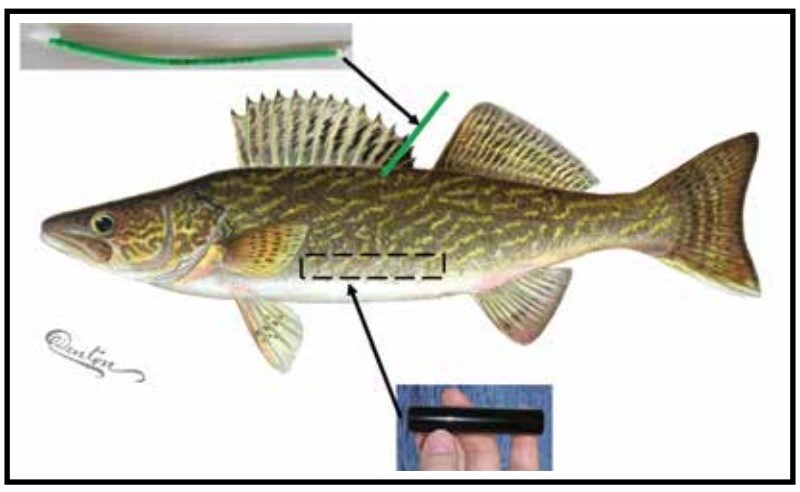


Image 1. Location of acoustic transmitter and external tag on adult walleye in Mille Lacs Lake. Please report tag number and capture location to **Carl.Klimah@millelacsband.com** *or 320-532-5690.*

Image 2. An acoustic receiver attached to a mooring. Receivers will be positioned throughout the lake. (Dr. Chris Vandergoot photo).

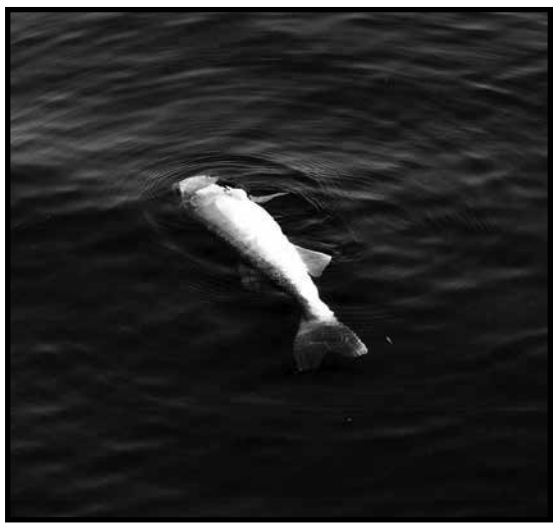


Image 3. Walleye floating at the surface. (Dave Orrick photo).

Lake sturgeon: an ageless wonder in the modern world

By Bill Mattes, GLIFWC Great Lakes Biologist & Melonee Montano, GLIFWC TEK Outreach Specialist

Namé (Lake Sturgeon) are ancient animals that swam in the earth's waters when dinosaurs roamed the land and the only mammals were small rodents. They are culturally significant to the Ojibwe people in many ways and, when plentiful, a part of the main diet.

There are only a few Ojibwe people remaining that utilize the skeleton of the namé to tell young ones traditional stories, with each piece of cartilage being a different part of the story.

The story of baaga'adowewin (lacrosse) makes reference to namé, as well as other stories. For generations, many groups of native people that have been sharing these types of stories, relay how amazing namé are, especially when referencing namé thunder.

For years, people have reported sounds and vibrations coming from bodies of water in which there is a high population of namé. In the last few years, Ron Bruch, biologist with Wisconsin Department of Natural Resources along with Chris Bocast, an acoustic ecologist with the UW Sea Grant Institute, have been utilizing underwater-microphone recordings that have confirmed sounds of the namé emitted mostly during times of spawning.

Today, many sturgeon populations have been decimated worldwide. In Gichigami (Lake Superior) they are recovering from years of abuse by humans during the 19th and 20th centuries. Overharvest, polluted water, and dams which block access to spawning grounds severely reduced their numbers in all of the Great Lakes. Although reduced from historic times, in Gichigami, namé numbers are stable today.

Namé was featured on GLIFWC's 2003 poster. (artwork by biskakone)

Juvenile namé have sharp bony plates, or scutes, which cover most of their body and protect them from predators. As they age, the sharpness wears away but the hard bony plates remain.

Namé look like one might imagine a fish from 100 million years ago to look. They can live to be over 100 years old. Because fish grow their entire life, old namé can be large—over seven feet long and over 150 pounds. Bony plates cover most of their body—from a shovel like nose to a primitive 'hetocercal' tail fin. Sharks also have this type of tail fin.

Namé have sensory barbels and large thick lips which they use to forage for food on the lake or river bottom. Namé feed mainly on bottom dwelling critters like mollusks, worms and aquatic insect larvae, although they will feed on small fish if the opportunity presents itself!

It takes many years for namé to mature and spawn for the first time. For males this is at about age 10 to 15 and for females age 15 to 20. The same fish do not spawn every year. For female fish it takes time to produce up to 40+ pounds of eggs. These eggs are part of the reason namé are sought around the world for caviar, many times to the detriment of the population because without eggs being laid there are no young fish.

For more on lake sturgeon acoustic recordings see: *www.seagrant.wisc.edu/Home/Topics/FishSpecies/Details.aspx?PostID=1594*.

Onji-Akiing (From the Earth)

Natural Resource Cultural Summer Camp

July 16-20, 2018

Lake Nesbit Environmental Center
Sidnaw, Michigan

GLIFWC is excited to announce our 2018 cultural summer camp program: Onji-Akiing (From the Earth) for students entering grades 5-8!

A collaborative effort between GLIFWC and the USDA-Forest Service, Onji-Akiing is a cultural outdoor adventure-based camp that focuses on natural resource career exploration and treaty rights. This camp is held at beautiful Camp Nesbit, nestled in the heart of the Ottawa National Forest in Sidnaw, Michigan, also home to the calling loons of Lake Nesbit.

Leadership and service learning activities are important aspects of this program. Activities also focus on group cooperation and communication, problem solving, self-confidence, leadership, physical exercise, spiritual growth, social skills, as well as respect and responsibility to self and community.

Hands-on experiential activities include a group obstacle course, high ropes course, birch bark etching, lacrosse, moccasin games, cultural quilting, native plant medicine gardens, drumming, fishing, archery, swimming, Canoomin safety, animal and plant wisdom, cultural exploration, and cooperative games.

Centered on the Medicine Wheel, this camp explores Native American traditional ways and traditional ecological knowledge, and campers also learn about forestry, biology, fisheries and botany. Youth will work with staff from GLIFWC and the USFS. This camp is free of cost. Deadline for accepting applications is June 8, 2018. This camp fills up fast so early applications are welcomed. Applications postmarked after the deadline will not be accepted.

Deadline for accepting applications is June 8, 2018

Onji-Akiing Registration Form

Participant Name _____

Address _____

City _____ State _____ Zip _____

Email _____ Phone #( )_____

Grade _____ Age _____

Tribe Affiliation _____(if none, leave blank)

Please attach another sheet of paper with a short essay (at least 100 words) on why you want to attend Camp Onji-Akiing. Please include any special achievements, and how this camp might help you in school, your community, and with any life goals.

Please attach one letter of recommendation from an adult, not related to you, about why they think you should attend the camp and how you will benefit from it.

5th–8th grade students are accepted on the basis of their essays, recommendations, and space availability. In the event you are accepted, you will be expected to sign a statement saying that you will participate fully in all activities. Parents/guardians will have to complete and sign health and permission forms for all camp activities.

For questions or concerns, please contact:

Heather Bliss
906-458-3778
hnaigus@glifwc.org

10th Anniversary

Mail application, essay and letter of recommendation to:
GLIFWC, Attn: Camp Registrations, PO Box 9, Odanah, WI 54861 or Heather Bliss at 253 Silver Creek Road, Marquette, MI 49855. You can also email application to *hnaigus@glifwc.org* or fax application to 715-682-4221. No late applications will be accepted!

Multi-agency project seeks answers to changing birch resource

By Paula Maday, Staff Writer

According to GLIFWC Forest Ecologist Alexandra Wrobel, tribal harvesters are noticing less and less birch on the Ceded Territory landscape. And some harvesters—especially canoe builders—are also noticing less quality birch.

Harvesters and traditional ecological knowledge (TEK) holders indicate that depending on their project, they look for bark with specific characteristics. Particularly for canoe builders, these bark qualities may include fewer "flaws" and fairly large diameter, which could mean fewer lenticels in the bark, fewer branch scars, and low trunk curvature. But these qualities have become more challenging to find within the Ceded Territory.

Causes behind the decline in the quantity and quality of birch are varied. The changing climate could be affecting birch habitat. Birch pole harvesting could be affecting young recruitment classes as well as changes in the severity and frequency of natural disturbances on the landscape in which birch generally thrive. Finally, with regard to management, birch has not been considered a monetarily valuable tree, and assisted regeneration can be time-consuming and expensive, so forest management plans tend to manage against, rather than for, paper birch.

Ojibwe birch bark harvesters look for specific characteristics on wiigwaas when considering construction projects from baskets to canoes. High quality wiigwaas is steadily becoming more difficult to find in the Ceded Territory. (CO Rasmussen photo)

Though not deemed monetarily valuable by some, birch is a cultural keystone species for the Ojibwe, and concern regarding its health recently prompted GLIFWC member tribes to direct efforts to look further into the birch resource.

Engaging its Memorandum of Understanding with the US Forest Service (USFS), GLIFWC partnered with the USFS Northern Research station to develop a base understanding of where birch still exists in the Ceded Territory. That partnership produced a paper about using TEK and Western-based science as well as various resource reports about the state of paper birch in the Ceded Territories.

But Wrobel says they're still not to a point of understanding what's happening to the specific birch that harvesters look for. "We really need a better understanding of where to target our efforts toward not only preserving the birch that we have, but also restoring locations where paper birch has been or could be," she says.

This question has spurred additional project partnerships, bringing in the Michigan Tech School of Forest Resources and Environmental Sciences, GLIFWC tribes, and other USFS folks. Together with GLIFWC and the Northern Research station, the group will plan and undertake a large, collaborative survey effort this summer. The survey will get people out to locations where birch exists or should exist to learn more about the locations where the species is and is not thriving. A set forest management protocol will guide surveyors through collecting data in locations within the Ceded Territories.

"We're trying to keep that protocol relatively basic this year," says Wrobel. "We'd like to have widespread data collection while keeping the human error low and the data standardized."

GLIFWC summer interns will be assisting with the survey, and the group is also hoping to recruit tribal college students and tribal natural resources staff to help with the project. If you are interested in assisting with the survey contact Alex Wrobel at (715) 682-6619 ex. 2125 or email *awrobel@glifwc.org*.

Data collected through the summer survey will be used to formulate more specific questions about birch and design research projects that would start in 2019. The research projects will help GLIFWC member tribes to learn more about the specific factors and conditions that are affecting birch, and develop cultural and harvest recommendations for preserving and restoring such an important cultural resource.

For more information see:
www.fs.usda.gov/treesearch/pubs/45701
www.fs.usda.gov/treesearch/pubs/48342
www.fs.usda.gov/treesearch/pubs/49374

Waabizheshi & ojiig in a changing climate

By Melonee Montano, GLIFWC TEK Outreach Specialist & Hannah Panci GLIFWC Climate Change Scientist

Waabizheshi (American marten) and ojiig (fisher), members of the mustelid family (a family of carnivorous mammals, including weasels) are impossibly cute yet tremendously fierce. Both are northern beings (species), that prey on small mammals, live in mature forests, and use hollow trees or rocks for dens.

So how will climate change affect these two beings differently? GLIFWC climate change staff have some ideas based on an ongoing climate change vulnerability assessment, which integrates Traditional Ecological Knowledge (TEK) with Scientific Ecological Knowledge (SEK).

Waabizheshi is one of the Ojibwe clan animals. Most often, those who belong to the waabizheshi clan are respected for their hunting skills (as is the waabizheshi). In many of the traditional teachings and legends, the role of the waabizheshi is that of a messenger. The fur pelt of the waabizheshi has been sought after more commonly than that of the ojiig. The pelt is sold, traded, and more importantly, used in certain Ojibwe ceremonies.

The ojiig is also highly respected to the Ojibwe people and known to be the only animal that can kill and eat a porcupine. It also is often on the go during both day and night. The ojiig holds a place in traditional teachings and legends as well. For example, the Ojibwe hold star knowledge in which the ojiig is a constellation in the night sky (the Big Dipper). Through the teachings of the ojiig constellation, one can learn about the origin of the seasons and the importance of certain values such as cooperation and self-sacrifice.

Both are likely to be negatively affected by climate change. Increasing temperatures, particularly in the winter, will decrease the snowpack depth and make the snow denser. Waabizheshi in particular prefers deep, fluffy snow for resting and denning sites, protection from predators, and foraging for prey; ojiig does not use the subnivean zone (under the snow) as much as waabizheshi, but is found exclusively in areas that have snowy winters and has been known to use snow dens.

The small mammals that waabizheshi and ojiig both rely on, such as waabooz (snowshoe hare) and the red-backed vole, may not fare particularly well in a changing climate. Predators, such as gidagaabizhiw (bobcat), and competitors, such as wiisagazi ma'iingan (coyote), and waagosh (fox), are expected to increase and will make survival more difficult for waabizheshi and ojiig.

Waabizheshi, however, is likely to be more vulnerable than ojiig. Natural barriers such as nonforested land and fragmentation, and anthropogenic barriers, such as agriculture and clearcuts, may limit waabizheshi dispersal to new habitats; waabizheshi also does not disperse very long distances. Waabizheshi has more predators and competitors likely to be favored by a warming climate than ojiig.

All in all, these two cute-but-fierce mammals may not exactly be favored by changing conditions, but don't expect them to give up without a fight.

Vulnerability of ogaa to climate change

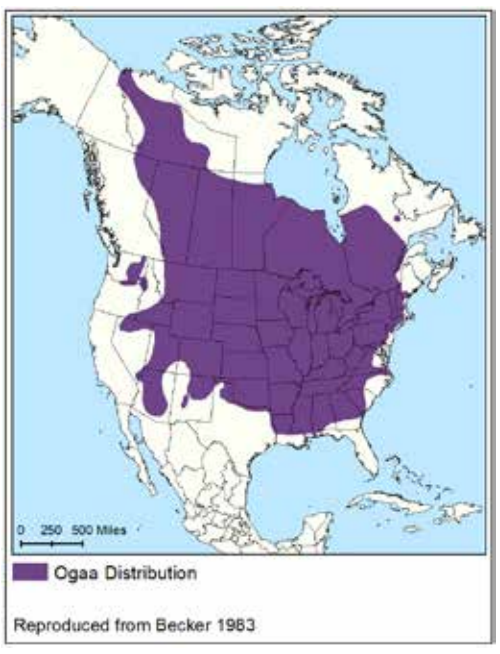


Figure 1. Range map of ogaa.

Ogaa (Walleye)

Sander vitreus

Moderately - Extremely Vulnerable
(Confidence level: High)

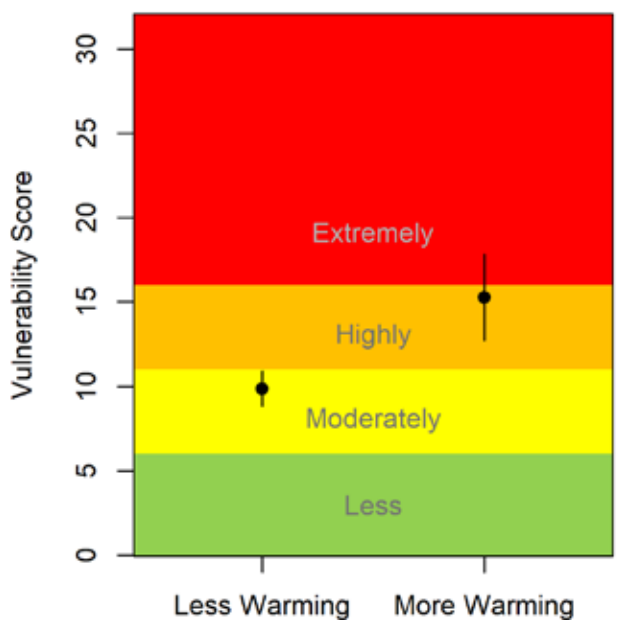


Figure 2. Climate change vulnerability scores for ogaa on a scale of 0 (lowest vulnerability) to 32 (highest vulnerability). Dots indicate average score; lines indicate possible range of scores for each warming scenario.

General Description:

Like many of the swimmers, ogaa is highly respected in Ojibwe culture. Ogaa features prominently in many traditional stories and personal memories illustrating how Ojibwe people have depended on fishing as a means of survival. In a historical interview from 1992, Mille Lacs tribal member Doug Sam emphasized how his people have relied on ogaa and other swimmers for their subsistence needs:

"We used to go out here [Mille Lacs] … used to have big barrels full of salted fish to last all winter... and early spring there you go put a little tepee out there and get a golden northern or a walleye. That was your meal. You didn't get a whole bunch. You just got what you needed for... it was a good life."

Traditional stories of ogaa depict its interconnectedness with other beings/species. A tribal member from Red Cliff remembered her mother from the Bad River Tribe describing how the frogs would make noise to indicate the start of the ogaa season.

Ogaa was a main focus of protests by non-Indians during the "Walleye Wars" of the late 1980s. Sports fishermen and others opposed to tribal members spearing ogaa led protests at boat landings on Ceded Territory lakes. These protests, which sometimes turned violent, came after the landmark court case of Lac Courte Oreilles v. Wisconsin, which recognized the Ojibwe people's treaty-reserved rights to hunt, fish, and gather off-reservation in Wisconsin's Ceded Territories.

(see Vulnerability, page 19)

GLIFWC Climate Change staff are conducting a climate change vulnerability assessment for the 1837 and 1842 Ceded Territories of over 60 species of importance to GLIFWC's member tribes.

The assessment uses the Climate Change Vulnerability Index (CCVI) tool as well as input from regional species experts.

Climate Change staff have been conducting interviews with tribal elders and harvesters from each of the GLIFWC member tribes.

A final report will integrate Traditional Ecological Knowledge (TEK) and Scientific Ecological Knowledge (SEK) to assess the vulnerability of these species to climate change.

To the left is an example of the results you can expect from this report; look for more results in future editions of *Mazina'igan*.

If you have any comments or questions about our assessment, please contact Aaron Shultz at *aaronshultz@glifwc.org*.

—Aaron Shultz, Hannah Panci & Melonee Montano, GLIFWC

Lake Gogebic

(continued from page 7)

very few of them are mature at 13 inches when the new regulation allows them to be harvested. Similarly, most of the males are typically mature at 15 inches, but a lower percentage are mature at 13 inches. Consistently high harvest of walleye before they reach maturity could result in a long-term reduction in natural reproduction.

Given the importance of the Lake Gogebic walleye population to the Lac Vieux Desert Tribe, GLIFWC biologists plan to continue monitoring natural reproduction of walleye on Lake Gogebic during annual fall electrofishing surveys.

Additionally, GLIFWC plans to work with MIDNR to conduct more frequent adult walleye population estimates and will be considering other methods to track adult abundance more frequently in the coming years.

For more information, please contact Mark Luehring at *mluehring@glifwc.org*.

—Mark Luehring, Aaron Shultz, Ben Michaels, Adam Ray & Joe Dan Rose, GLIFWC Inland Fisheries Section

Tribal sovereignty, ceremonial tobacco keys in pushing back cancer

By Charlie Otto Rasmussen, Editor

In most corners of the United States, cancer mortality rates are on the decline—a trend that's been underway for the last two decades. A closer look at the demographics, however, reveals that American Indians are not keeping pace. They are, in fact, falling behind.

"Native people are the only US population with increasing cancer rates," said Kristine Rhodes, American Indian Cancer Foundation (AICAF) chief executive officer. "That's a burden we have to eliminate."

Rhodes, a Bad River Band of Ojibwe, oversees an integrated strategy to help turn the tide against all preventable cancers in natives—especially the deadliest ones including lung and colorectal cancer. While AICAF promotes healthy lifestyles through advertising and social media platforms, the Minneapolis-based organization sees unique opportunities in Indian country.

"Tribal sovereignty is a public health tool," Rhodes said. "Tribal councils make economic and policy decisions that either promote or hurt the health of the people. Of course we want tribal leaders to think about health in all decisions"

Leaders at Lower Sioux Indian Community put that principle into action in 2016, authorizing a healthy foods initiative that impacts tribal buildings and the tribe's annual wacipi (powwow). Vendors that serve health-promoting, indigenous food at the wacipi recoup a 50% discount on application fees. As for food and beverage machines, merchants must stock at a 75% threshold of "Smart Snacks" established by US Department of Agriculture. It's a model that Rhodes and other native health advocates hope to see replicated in tribal council chambers across Indian Country.

While improving native diets is central to the work of AICAF, a longtime menace—one particularly rooted in the north-central United States—continues to represent a stubborn obstacle to sustained health: commercial tobacco. From the upper Great Lakes, west through the Dakotas, lung cancer is the leading cause of death for both men and women.

"The burden of lung cancer mortality is higher in the Northern Plains in large part due to smoking and low screening rates," said Melanie Plucinski, a Bad River member who serves as prevention and policy manager for AICAF. "People who develop lung cancer pass away from it at high rates because they are not going to a doctor regularly and the cancer is not detected in time to treat."

AICAF researchers recently rebooted a tribal tobacco use and prevalence study to pinpoint current smoking and tobacco use rates across tribal communities in Minnesota. Plucinski said results of the same survey conducted five years ago revealed that smoking rates alone for American Indians were a striking 59%, compared to 16% for the general population. Plucinski and study coordinator Amanda Dionne anticipate that outreach efforts will translate to a decline in commercial tobacco use among natives when the current survey is complete.

GLIFWC Mining Specialist Dawn White created her own smoking blend as asemaa stories were shared that included Wenaboozhoo, midewiwin perspectives, and daily life in Ojibwe Country. (COR photo)

"We're engaging with communities in all areas of prevention," Plucinski said. "And it's not one-size-fits-all. It's about tailoring solutions based on the needs and readiness of American Indian communities."

Part of AICAF's approach employs guidance from tribal elders to reach young people. Elders recognize that many American Indians who grew up in 20th Century boarding schools missed out on teachings about the manufacture and use of traditional tobacco. That knowledge gap oftentimes continues with their children and grandchildren. Native methods of learning like talking circles, elders advise, are an effective means to pass on knowledge. Both schools and community centers serve as venues to gather native youth and discuss how to make choices that are healthy for both the spirit and the body.

Native tobacco, community blends

AICAF and traditional educators draw a clear line between store-bought tobacco and Indian asemaa. While both are commonly used in cultural settings--including native ceremonies—only those venerated tobacco blends comprised of native plants win the endorsement of health professionals.

"Traditional tobacco is different depending on what tribal community you are from," Plucinski said. "There are vast differences regionally with what is called and considered traditional tobacco."

At GLIFWC offices last April, knowledge-holders from various communities shared a sampling of Ojibwe asemaa blends. At first glance, the mix of plant fragments looks something akin to household potpourri. A closer look reveals unique combinations of wild plants that can include hawthorn, bearberry, mullein, cedar, sage, sweet grass and the inner bark of red osier dogwood. Homegrown tobacco is often part of the mixture as well. In the western Great Lakes region there are a half-dozen native plants considered to be tobacco.

Once combined, these highly variable mixtures—widely known as kinnickinnic—are also called apaakozigan in Ojibwemowin. Highly attuned practitioners of traditional tobacco blending say that the unique smells of apaakoziagn pipe smoke can reveal where a person is from, or where they acquired their knowledge.

Spread over millions of acres, tribal lands can yield a range of apaakozigan ingredients at the local level. But no matter the composition, traditional tobacco honors spiritual teachings handed down through the generations.

For more on health initiatives and tobacco guidance in American Indian Communities see *www.americanindiancancer.org/resources-2/community-research*

Elder Stew

Original concept from Franny Van Zile and Fred Ackley, Jr., Mole Lake

Prep Time: 5 minutes • Cook Time: 3 hours 40 minutes
Total Time: 3 hours 45 minutes
Serving Size: 1 cup • Yield: 6

Ingredients

¾ pound	**venison** roast, fat removed
¼ teaspoon	**salt**
⅛ teaspoon	freshly ground black pepper
2 cups	**wild rice**, cooked
3 cups	water

Directions

1. Season venison with salt and freshly ground black pepper.
2. Heat medium heavy-bottomed saucepan over medium-high heat and place roast in hot pan to sear. Flip roast to sear on all sides.
3. Pour in 1 cup of water and using a wooden spoon, scrape up any bits of venison off the bottom of the pan.
4. Pour the remaining water into the pot and bring to a boil, then reduce heat to a low simmer. Cook until venison is very soft and falling apart, about 3 hours.
5. Add wild rice and cook for an additional 30-40 minutes or until all ingredients are very soft.
6. Cool slightly and serve hot.

Bold=Indigenous foods

Our Ways… This recipe was originally designed to be a soft, nourishing meal for persons who have trouble chewing, swallowing or digesting whole foods. Such as persons who are very sick. To bring it back to the original recipe omit the salt and pepper.

Ceded Territory foods, a natural resource during recovery

By Owen Maroney, GLIFWC Community Dietician

Undergoing treatment for cancer is difficult for the patient and the caregiver. A cancer diagnosis is a challenging life event that is all too common these days. Once a diagnosis is made, questions of how to increase long-term survival and quality of life often arise. Many people focus on diet and lifestyle changes. While there are hundreds of studies on diet or lifestyle impacts on cancer, there are also many factors that impact outcomes.

Traditional foods from the Ojibwe Ceded Territory offer a wide range of nourishing options to help during periods of healing and recovery. Utilizing deer meat and manoomin, Elder Stew (left) is one proven dish that has aided patients on the road to recovery.

"It's hard for people to swallow [ordinary food]," said Fred Ackley, Sokaogon Mole Lake elder. "They get more nourishment when you eat that soup and broth and meat, and the [wild] rice."

The following diet and lifestyle information is adapted from the American Cancer Society's website—a good resource for patients, caregivers, and families impacted by cancer.

- Protein is important for tissue development, repair, and maintenance. People undergoing surgery chemotherapy, or radiation treatment need more protein to help heal and fight off infection. Here are some examples of foods that can be hunted or gathered that are a good source of protein: **duck, whitefish, venison and rabbit**.
- Carbohydrates are the major energy source for the body and are necessary to help the body and organs function. When possible chose sources of carbohydrates that a nutrient dense. Some examples of foods that can be hunted or gathered that are a good source of nutrient dense carbohydrate are: **berries, wild rice, and acorns**.
- Fats help transport some vitamins through the blood, insulate the body, and provide a lot of energy. When choosing opt for mono and polyunsaturated more than saturated. Some examples of foods that can be hunted or gathered that are a good source of nutrient dense fats are: **black walnuts, sunflower seeds, and fatty fish such as lake herring**.
- Antioxidants from fruits and vegetables may lower risk for some types of cancer. People diagnosed with one type of cancer are at a greater risk for a second cancer. Interestingly, antioxidants from supplements do not appear to have an impact on cancer risk, so antioxidants will need to come from food sources. Consider making **fresh fruits and vegetable smoothies**, making soup from whole vegetables, or simply eat them fresh. When fresh foods are not available, opt for frozen without added sauces when possible.
- Intake should be discussed with your physician and oncologist to help make a decision that is best for you.
- For cancer prevention, there is strong evidence that eating large amounts of red meat and processed meats can increase risk of certain cancers. Additionally, cooking meat at very high temperatures (i.e. grilling, frying, or broiling) may increase the rise of certain types of cancers. Consider other cooking styles such as baking, stewing or other low and slow cooking methods. The Elder Stew recipe is a good example.

One thing to keep in mind with preparing foods for cancer patients, whether recently diagnosed or undergoing treatment, is their immune system has been weakened. This makes food safety a paramount concern.

Food safety

- Always wash hands and preparation surfaces well, before handling foods.
- Keep hot foods hot (above 140°F) and cold foods cold (below 40°F). When refrigerating large batches of soups or casseroles, slpit them into smaller, shallower containers to help each dish cool to 40°F within 2 hours.
- In addition to basic food safety, the American Cancer Society recommends choosing pasteurized honey, milk, and fruit juices instead of raw. When eating at a restaurant choose foods that are thoroughly cooked, avoiding salad bars, sushi, raw or under cooked meats and eggs.

There is a lot more to know about caring for loved ones who are going through cancer treatment. We recommend visiting the American Indian Cancer Foundation at *americanindiancancer.org* and the American Cancer Society at *cancer.org*. There is a lot that science doesn't fully understand about the interaction according to the American Cancer Society, no single study is the last word on any subject.

American Indian Cancer Foundation®
POWWOW FOR HOPE

At the largest cancer awareness pow wow in the United States, families, friends, and complete strangers came together in solidarity, May 5. Despite the weighty realities that accompany the broad collection of diseases called cancer, participants of the 7th Pow Wow for Hope shared an infectious wave of strength, optimism, and harmony with everyone that entered the historic Base Camp facility at Fort Snelling, located in the center of the Twin Cities metropolitan area.

"Powwow for Hope engages American Indian and Alaska Native people to fundraise and celebrate cancer warriors (survivors & caregivers) in our lives. The funds raised help AICAF do more for survivor support," said Kristine Rhodes. Fundraising teams, sponsors, and an online auction generated over $62,000 for AICAF programs.

Chef Austin Bartold's Gatherings Café crew prepared a refreshing, healthy salad for participants at the Pow Wow for Hope. Many of the ingredients can be sourced from your garden this summer including mixed greens, cucumbers, and strawberries. A honey balsam vinaigrette, sliced grapes, and orange segments bring together a well-balanced flavor. (COR photos)

Ceded Territory SCIENCE

Expert panel reviews fish monitoring practices on Mille Lacs Lake

Key Points

- Gill net survey—Placement, mesh size, and length of the gill nets set in the fall to assess relative abundance of adult walleye is on par with other large walleye lakes in the region.
- Creel survey—More effort per hectare was put into creel surveys on Mille Lacs Lake than Lake Erie.
- Angling effort—Walleye fishing effort in Mille Lacs Lake was high relative to most other lakes in Minnesota. Similarly, walleye fishing effort in Mille Lacs Lake was approximately 10 times the effort in Lake Erie.
- Changes in the ecosystem—An increase in water temperature, an increase in light penetration, introduction of invasive species (spiny waterflea, zebra mussels), reduction in total phosphorus, and a loss of small prey items (zooplankton) has occurred over the last 30 years and has been associated with the decline of adult walleye in the ecosystem. The ability of walleye to adapt to these new conditions and for stocks to recover remains unknown.
- Abundance of adult walleye—The abundance of adult walleye across age groups over the last 4 years was below average or average relative to the previous 20+ years.

Technical Report

In 2017, Minnesota Department of Natural Resources (MNDNR) contacted Dr. Chris Vandergoot, Research Biologist with United States Geological Survey, to assemble a review panel for the purpose of evaluating the MNDNR's sampling design for various fisheries surveys conducted on Mille Lacs Lake.

Dr. Vandergoot's review panel consisted of Dr. James Jackson (Cornell University), Dr. Doug Watkinson (Department of Fisheries and Oceans Canada), and Dr. Troy Zorn (Michigan Department of Natural Resources). These fisheries scientists work on large lakes (e.g., Lake Michigan, Lake Erie, Lake Winnipeg, and Oneida Lake) and their disciplines include stock assessment and management of fish populations, fisheries ecology and ecosystem assessment, effects of aquatic invasive species, and population dynamics. Together, this team reviewed the 30+ year history of data and sampling protocols for Mille Lacs Lake and had follow up discussions with the MNDNR.

After soliciting input from stakeholders (Mille Lacs Fishery Advisory Committee, MNDNR, Fond du Lac Band, Mille Lacs Band, and the Great Lakes Indian Fish and Wildlife Commission), Dr. Vandergoot and the review panel were specifically tasked with evaluating five areas of interest:

1) Gill net survey

The review panel found that the assessment techniques used for adult walleye were similar to other large lake systems. Mesh sizes (1.5" to 4", except for 3.5") used in the fall gill net survey of adult walleye were similar to some of the other large lakes (e.g., Devil's Lake, ND), however, larger mesh sizes (4.5" to 7") were not used on Mille Lacs Lake but have been routinely used on Lake Erie.

The fixed placement of gill nets in Mille Lacs Lake allow researchers to sample nearshore and offshore areas (i.e., is a representative sample of walleye across different habitats) and compare catch data over time.

Again, this is a common approach to estimating relative abundance of adult walleye in large lake systems. Lastly, the amount of net set in Mille Lacs Lake was 0.25 ft /hectare, the 3rd highest amount of net relative to other large lakes in the region (Figure 1). Collectively, the review panel's comparative analysis of the fall adult walleye gill net survey on Mille Lacs Lake indicates that it is on par with other surveys conducted in large lake systems in this region.

2) Creel survey & angling effort

The panel indicated that the sampling design for the creel survey was robust relative to Lake Erie, and angling effort was high relative to other lakes. Specifically, Mille lacs Lake, approximately 48 times smaller in surface area than Lake Erie, has nearly the same total number of creel clerks (3 on Mille Lacs, 3.75 on Lake Erie), and the creel survey was conducted seven days/week on Mille Lacs Lake compared to five days/week on Lake Erie.

Information collected during the creel surveys (1983-2016) indicates that angler effort directed toward walleye on Mille Lacs Lake was the second highest in Minnesota at an average of 57 hours/ha, with only Red Lake (2015-2016) having a higher amount of fishing effort in one year (80 hours/ha).

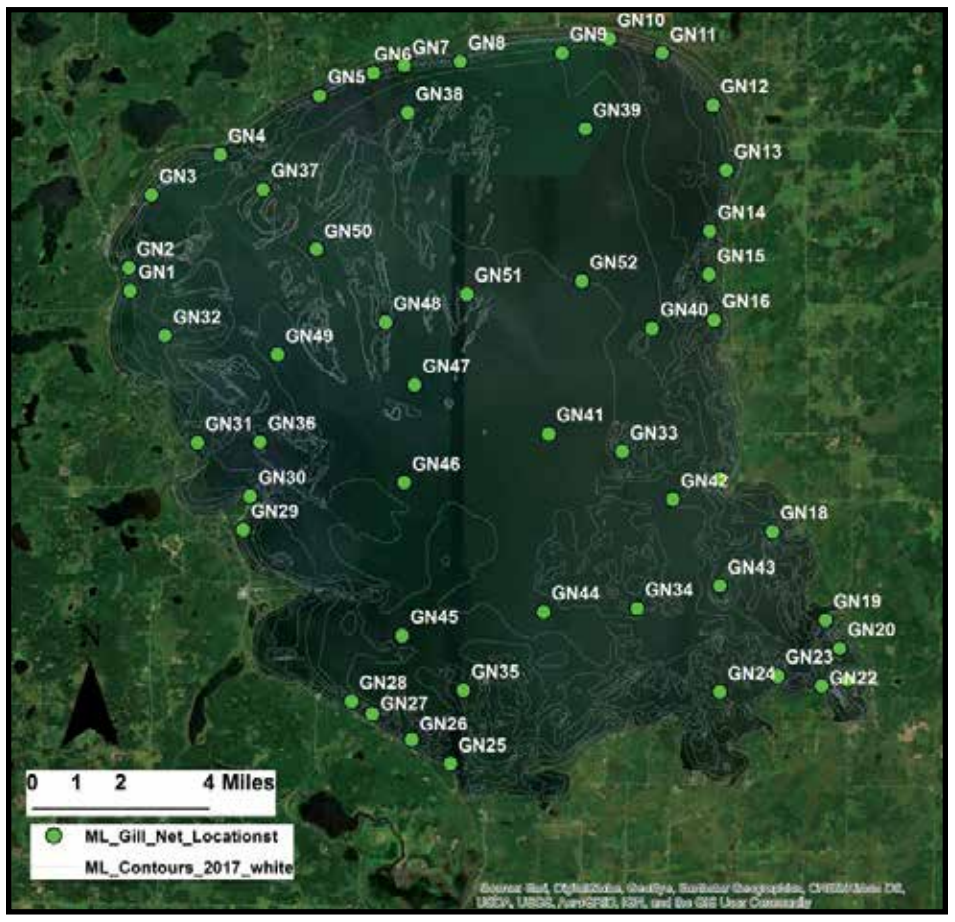


Figure 1. Location of gill nets set in the fall to assess the relative abundance of adult walleye in Mille Lacs Lake.

From 1983-2016, fishing effort on Mille Lacs Lake was approximately ten times the observed effort on Lake Erie (Figure 2). The review panel pointed out that the high amount of effort put into the creel surveys was likely needed to capture the relatively high amount of angling effort on Mille Lacs Lake.

3) Changes in the ecosystem

From a biological perspective, the review panel explained how changes in the Mille Lacs Lake ecosystem might be affecting walleye stocks by describing similar disturbances in other large lakes. Changes in the Mille Lacs Lake ecosystem include the introduction of the spiny water flea and zebra mussel, lower zooplankton abundance, an increase in temperature, an increase in light penetration, and a decline in total phosphorus (see *Mazina'igan* Summer 2017 for details).

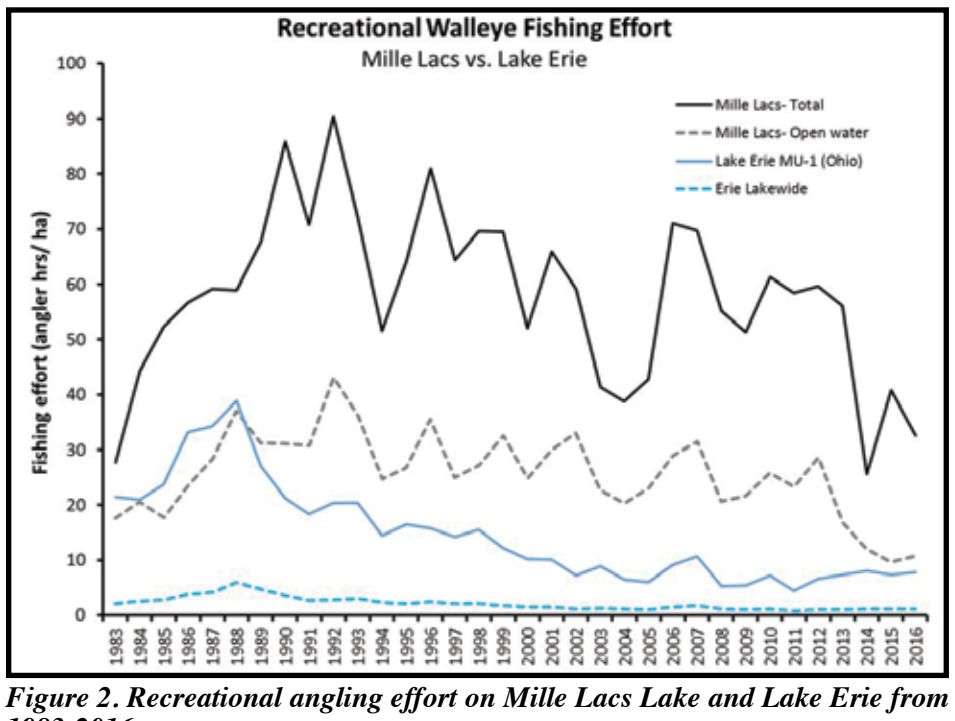


Figure 2. Recreational angling effort on Mille Lacs Lake and Lake Erie from 1983-2016.

(see Mille Lacs Lake fish monitoring, page 23)

Grouse on the go: Biologists collaborate to restore native populations

By Charlie Otto Rasmussen, Editor

An interagency team of wildlife specialists is wrapping up a three-year project to boost a struggling Wisconsin sharp-tailed grouse population with birds from far northern Minnesota. From late April into early May, biologists trapped the birds—known as aagaskoog in the Ojibwe language—from a mix of private and public land in Kittson County north of Karlstad.

"Some private landowners were very nice in allowing access to the birds," said Adam Oja, GLIFWC wildlife technician. "It's helping us restore the sharptail population in the Moquah Barrens."

Centered in the Bayfield Peninsula, Moquah Barrens is an unique pine barrens ecosystem. The US Forest Service has invested nearly a decade of habitat work in the rolling sand hills, replacing Civilian Conservation Corps era pine plantations with native plants and trees through logging and prescribed burns. The management program is returning the landscape to a more open habitat composition favored by sharptails.

In Minnesota, Oja said aagask trapping crews rolled out of bed at 3:30 each morning to reach the dancing grounds—called leks—where the birds congregate during the spring breeding season. While sharp-tailed grouse dancing grounds are often situated on an elevated flat of ground, Oja said the Kittson County birds set up shop on a small, half-acre circle of land in a remarkably featureless hay field.

Female grouse hung out near the edges of the lek, while near the center, high-energy males performed an elaborate dance with wings spread and legs pumping like pistons. All that activity made the males considerably easier to catch in the oval traps installed on the lek, Oja said. But with some selective winnowing, biologists ultimately trap-and-transferred 31 females and 33 males from Minnesota to Wisconsin. These 64 birds from 2018 brought the 3-year project total to 160 Minnesota sharptails joining the remnant Moquah Barrens population of only a few birds.

Aagask (sharp-tailed grouse). (COR photo)

Led by US Forest Service Biologist Brian Heeringa, the project brought together specialists from GLIFWC, Red Cliff & Bad River Tribes, Wisconsin & Minnesota Departments of Natural Resources, and a handful of landowners—all committed to restoring the native sharp-tailed grouse to portions of its historic range.

Wildlife officials shelved a second Ceded Territory sharptail project until spring 2019 after late winter cold and snow interrupted trap-and-transfer plans in Upper Michigan. Citing concerns about low survival and poor nesting conditions, Michigan Department of Natural Resources said it would look to move around 20 birds from the eastern Upper Peninsula to Ontonagon County next year.

Ruffed grouse to head south

The Missouri Department of Conservation is in discussions with Wisconsin Department of Natural Resources to trap-and-transfer up to 300 ruffed grouse over three years. After completing a pair of projects to create early-successional forests—habitat preferred by ruffed grouse —Missouri resource officials proposed moving Wisconsin birds south in exchange for $60,000 dedicated to grouse management.

The project may begin as early as fall 2018. The potential relocation harkens back to a seminal agreement some 40 years ago when Wisconsin exchanged ruffed grouse for Missouri wild turkeys. Once isolated to southwest Wisconsin, wild turkeys now thrive across much of the state as well as neighboring Michigan and Minnesota.

The Ojibwe Ceded Territory is home to three species of native grouse: ruffed, sharptails, and spruce grouse. Each has their own unique habitat requirements.

Sea lampreys pose challenges to healthy Gichigami fishery

Sea lampreys (*Petromyzon marinus*) are parasitic fish native to the Atlantic Ocean. Sea lampreys, which parasitize other fish by sucking their blood and other body fluids, have remained largely unchanged for more than 340 million years and have survived through at least four major extinction events. While sea lampreys resemble eels, they are not related and are set apart by their unique mouth: a large oral sucking disk filled with sharp, horn-shaped teeth surrounding a razor-sharp rasping tongue.

GLIFWC biological staff Kia Hmielewski and Adam Oja remove parasitic lamprey from a trap at the Bad River Falls May 16 during adult population assessments. (B. Mattes photo)

How do sea lampreys kill fish?

Sea lampreys attach to fish with their suction cup mouth then dig their teeth into flesh for grip. Once securely attached, sea lampreys rasp through the fish's scales and skin with their sharp tongue. Sea lampreys feed on the fish's body fluids by secreting an enzyme that prevents blood from clotting, similar to how a leech feeds off its host.

In their native Atlantic Ocean, thanks to co-evolution with fish there, sea lampreys are parasites that typically do not kill their host. In the Great Lakes, where no such co-evolutionary link exists, sea lampreys act as predators, with each individual capable of killing up to 40 pounds (more than 20 kilograms) of fish over their 12-18 month feeding period.

Host fish in the Great Lakes are often unable to survive sea lamprey parasitism, either dying directly from an attack or from infections in the wound after an attack. Host fish that survive an attack often suffer from weight loss and a decline in health and condition.

Sea lampreys prey on most species of large Great Lakes fish such as lake trout, brown trout, lake sturgeon, lake whitefish, ciscoes, burbot, walleye, catfish, and Pacific salmonids including Chinook and coho salmon and rainbow trout/steelhead.

Where are sea lampreys found?

The first recorded observation of a sea lamprey in the Great Lakes was in 1835 in Lake Ontario. Niagara Falls served as a natural barrier, confining sea lampreys to Lake Ontario and preventing them from entering the remaining four Great Lakes. However, in the late 1800s and early 1900s, improvements to the Welland Canal, which bypasses Niagara Falls and provides a shipping connection between Lakes Ontario and Erie, allowed sea lampreys access to the rest of the Great Lakes.

Within just a short time, sea lampreys spread throughout the system: into Lake Erie by 1921, Lakes Michigan and Huron by 1936 and 1937, and Lake Superior by 1938.

Sea lampreys were able to thrive once they invaded the Great Lakes because of the availability of excellent spawning and larval habitat, an abundance of host fish, a lack of predators, and their high reproductive potential—a single female can produce as many as 100,000 eggs!

For information on sea lamprey control in the Great Lakes see: *www.glfc.org/control.php*.

—Great Lakes Fishery Commission

Zaasijiwan
•It Ripples•

Ojibwemotaadiwag Anishinaabewakiing.
They speak Ojibwe to each other in Indian Country.

Zaaga'iganing, ingiw ikwewag ojibwemotaadiwag. Apane wiindamaadiwag gegoo mii dash geget baapiwaad. Gii-niibing, gii-mawadishiwewag gii-mawinzowaad. Ingii-tebitawaag ingiw ikwewag. "Mino-giizhigad noongom, baapiwaad. Ikwewag ozegi'aawaan iniw makwan. Wii-animinizhimowag," gii-ikido, nimaamaa. Mii dash gii-kichi-baapiyaang gaye. Gichi-niibowa ningii-mawinzomin. Ani-niibing, niwii-mawinz. Mawinzodaa! Mawadishiwedaa! Baapidaa! Niibin.

(At the lake, those women talk Ojibwe to each other. All the time they tell each other something and then certainly they laugh. When it was summer, they visited when they picked berries. I heard those women from a distance. "It is a good day now, when they laugh. The women are scaring the bears. They will run away scared," said my mother. And then we had a big laugh too. We picked a whole lot of berries. As summer begins, I want to pick berries. Let's all pick berries! Let's all visit! Let's all laugh! It is summer.)

Bezhig—1

OJIBWEMOWIN (Ojibwe Language)

Double vowel system of writing Ojibwemowin.
—Long vowels: AA, E, II, OO
W<u>aa</u>booz—as in f<u>a</u>ther
Miigw<u>e</u>ch—as in j<u>ay</u>
Aan<u>ii</u>n—as in s<u>ee</u>n
M<u>oo</u>z—as in m<u>oo</u>n

—Short Vowels: A, I, O
D<u>a</u>sh—as in <u>a</u>bout
<u>I</u>ngiw—as in t<u>i</u>n
Niizh<u>o</u>—as in <u>o</u>nly

—A glottal stop is a voiceless nasal sound as in A'aw.

—Respectfully enlist an elder for help in pronunciation and dialect differences.

VAI—S/he feeling action. Use any VAI: Verbs, Animate, Intransitive

Root: Niimi.—S/he dances.
Niniim.—I dance.
Giniim.—You dance.
Niniimi**min**.—We dance.
Giniimi**min**.—We all dance.
Giniimi**m**.—You all dance.
Niimi**wag**.—They dance.
Niimi**n**!—Dance! (to one) Daga—Please
Niimi**g**!—You (plural) dance! Gaawiin—No
Niimi**daa**!—Let's all dance! Eya'—Yes
Gaawiin niimi**sii**.—No, s/he is not dancing.
Gaawiin niimi**siiwag**.—No, they are not dancing.

Niizh—2

Circle the 10 underlined Ojibwe words in the letter maze. (Translations below)

A. Daga, wewebanaabiidaa! <u>Niwii-naadin</u> i'iw <u>jiimaan</u>.

B. Noongom gaawiin noodinzinoon. <u>Wii-kimiwan</u> ina?

C. Niwii-waabamaag <u>ogaawag</u>. Indayaan miijimikanijigan

D. <u>Aandi</u> waa-wewebanaabiyaang? <u>Izhaadaa</u> <u>akeyaa</u> giiwedinong!

E. Nizaagitoon zaaga'igan. Niwii-kanawendaan apanee.

F. Niwewebanaabii. <u>Nimiijin</u>. <u>Nibaa</u>.

G. Akawe, daga bagidin <u>asemaa</u>.

H. Mino-giizhigad, izhaayaan imaa zaaga'iganing.

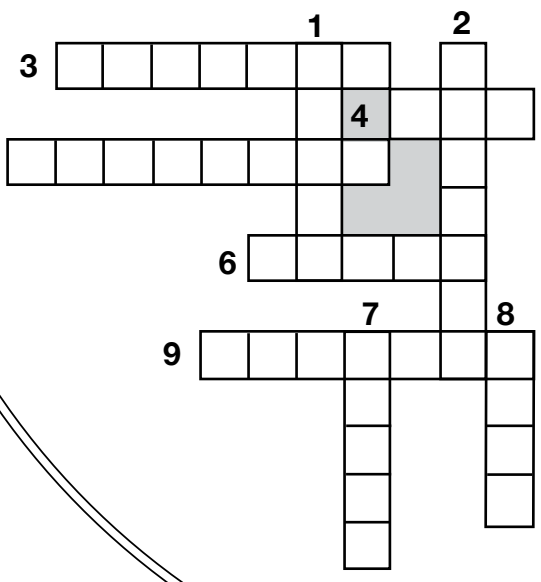
J	W	N	E	A							
I	I	O	O	K	O						
I	I	O	J	E	M	G					
M	K	D	I	Y	W	O	A				
A	I	Z	H	A	A	D	A	A			
A	M	T	N	A	Y	E	D	K	W		
N	I	M	I	I	J	I	N	W	A	A	
P	W	E	O	W	B	E	N	G	A	N	G
A	A	S	E	M	A	A	Z	A	N	S	E
G	N	I	W	I	I	N	A	A	D	I	N
J	I	M	S	H	T	O	D	K	I	O	M

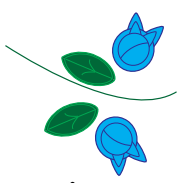
Niswi—3

IKIDOWIN ODAMINOWIN (word play

Down:
1. always
2. a lot
7. where
8. also

Across:
3. women
4. thustly, then
5. let's all laugh
6. something
9. walleyes





minaan (blueberries)

Online Resources
ojibwe.lib.umn.edu
ojibwe.net
glifwc.org

Niiwin—4

VAI B-form—When, if or While...
Use suffixes. Also in W-type questions!

Nagamo.—S/he sings. Nagamowin—Song
Nagamo<u>yaan</u>.—**When/if I** sing. —yan
Nagamo<u>yan</u>.—When/if you sing. —yaan
Nagamo<u>d</u>.—When/if s/he sing. —d
Nagamo<u>yang</u>.—When/if we sing.
Nagamo<u>yeg</u>.—When/if you all sing. —yeg
Nagamo<u>waad</u>.—When/if they sing.
Nagamod, nimbizindawaa.— —waad
If s/he sings, I listen to him/her.
Aandi negamowaad?—
Where are they singing?
Niimi'idiwin!—
Dance (powwow)
Mii'iw.—That's all.

1. Giminwendam na nagamo_____? (when I)

2. Aaniin apii waa-nagamo_____ iwidi waabang? (S/he).

3. Zaaga'inganing bagizo_____ giminawaanigozig. (if you all)

4. Aandi waa-wiisini_____? Nimbakade.

5. Megwaayaak mawinzo_____, indizhaa. (if they)

Translations:

<u>Niizh—2</u> **A.** Please, let's all go fishing with a line! I will get that boat. **B.** Today is it not windy. Will it rain? **C.** I want to see walleyes. I have bait. **D.** Where will we line fish? Let's go north. **E.** I love the lake. I want to always take care of it. **F.** I line fish. I eat it. I sleep. **G.** First, please put down tobacco. **H.** It is a good day when I go there to the lake.

<u>Niswi—3</u> ***Down:*** **1.** apane **2.** niibowa **7.** aandi **8.** gaye ***Across:*** **3.** ikwewag **4.** mii **5.** baapidaa **6.** gegoo **9.** ogaawag

<u>Niiwin-4</u> **1.** Are you happy **when I** sing? (yaan) **2. When** will **she** sing over there tomorrow? (-d) **3. When you** all swim in the lake, you all are happy. (-yan) **4.** Where **will you** eat? I am hungry. (-yeg) **5. When they** pick berries in the woods, I go. (-yeg

There are various Ojibwe dialects; check for correct usage in your area. The grammar patterns may help a beginner voice inanimate and animate nouns and verbs correctly, as well as create questions and negate statements. Note that the English translation will lose its natural flow as in any world language translation. This may be reproduced for classroom use only. All other uses by author's written permission. Some spellings and translations from <u>The Concise Dictionary of Minnesota Ojibwe</u> by John D. Nichols and Earl Nyholm. All inquiries can be made to **MAZINA'IGAN**, P.O. Box 9, Odanah, WI 54861 or email *lynn@glifwc.org*.

Edited by Jennifer Ballinger, Saagajiwe-Gaabawiik

Agwajiing dazhitaadaa!

Let's get outside this niibin (summer)! Summer is right around the corner, the days are getting longer and the temperature is warming.

Do your mind and body a favor and get off your smartphones, video games and computers. Unplug. Get up. Get outside. Exercise is good for you!

There's a lot to see and do outside, even in our own backyard. Take a nature walk, go fishing, camping, or swimming, grab your friends and play a game of baaga'adowewin (lacrosse) or bakitejii'igewin (baseball).

Mazina'igan has put together a nature scavenger hunt for you to do this summer. But don't forget to ask your parent or guardian's permission before you start!

Under each picture is the Ojibwe and the English word. Put a check in the box after you have found what is pictured.

When you are done with the scavenger hunt, use the underlined letters to fill in the blanks below to see what the title of this page is in English. Have fun!

☐ **maang (loon)**
1

☐ **mizise (turkey)**
2 3

☐ **miskwaadesi (painted turtle)**
4 5 6

☐ **memengwaa (butterfly)**
7 8

☐ **odatagaagominagaawanzh (blackberry bush)**
9 10

☐ **obiigomakakii (toad)**
11

☐ **misajidamoo (grey squirrel)**
12

☐ **obaawitig (rapids)**
13

☐ **ode'imin (strawberry)**
14 15

Translate the Ojibwe word Agwajiing dazhitaadaa!

’

__ __ __ __ __ __ __ __ __

1 2 3 4 5 6 7 8

__ __ __ __ __ __ __ !

9 10 11 12 13 14 15

Reflections on Ode'imini-giizis (Strawberry Moon)

By Alex Wrobel, GLIFWC Forest Ecologist

Ode'imini-giizis, "strawberry moon" of the Ojibwe annual calendar (otherwise known as "June" in the commonly used Gregorian calendar) is an exciting time of year for new plant growth, nesting birds, the returning fireflies, the summer solstice, and for marking the beginning of berry season here in the Ceded Territories.

Ode'iminan (strawberries, or literally translated as "heart-berries") are one of the first berries to arrive and ripen each growing season and are a favorite among both tribal gatherers and non-tribal gatherers alike. As a source of nourishment, ode'iminan are eaten raw, dried and sometimes ground into a powder.

According to an interview from a tribal member at Lac Courte Oreilles in 2016 "leaves and stems are good for the heart also." The grandma of the same tribal member used to make a tea from both the leaves and the berries. Various traditional knowledge-holders agree that the ode'imin is a good medicine for the heart, a claim that is often supported by "Western" scientific literature.

Beyond use as a food source, heart-berries are prominent figures in woodland teachings for their importance in ceremony, their healing properties as medicine, and for their influence on Ojibwe art.

I had the opportunity to speak with Sarah Agaton Howes, an Anishinaabe artist, teacher and member of the Fond du Lac Band of Lake Superior Chippewa about the significance of ode'iminan to her and her family:

> I have beaded ode'iminan for years. Everyone from little girls on the playground to older women at ceremonies love ode'iminan. One time my Auntie Roxanne Delille said to me 'do you know why I love them so much?' and then she told me about how 'we, as Anishinaabe, are the people of the Heart Way. She said I should work from my heart, lead from my heart, and think from my heart.' This teaching really hit the 'heart' of who I know us to be and the work I do—whether that's in the world of running, in art, design, or in teaching makizinikewin. We are always trying to heal our hearts, connect our hearts, and it is so hard to keep our hearts out front. I was taught our designs were meant to teach about medicines and food, so I always use ode'iminan in my work to remind myself and to remind others of this teaching.

Strawberry plant. (Arthur Haines photo)

Inset: Ode'iminan with its heart-shaped berries. (Glen Mittelhauser, Maine Natural History Observatory photo)

According to the Thirteen Grandmother Moon Teaching by Arlene Barry, from her series of compiled teachings "Kinoomaadiewinan Anishinaabe Bimaadinzinwin" and published on *www.kanawayhitowin.ca* "Kanawayhitowin: Taking Care of Each Other's Spirit": "The medicine of the strawberry is reconciliation. It was during this moon cycle that communities usually held their annual feasts, welcoming everyone home, regardless of their difference over the past year, letting go of judgement and/or self-righteousness."

It is important to note that teachings and stories can vary from tribe to tribe, from family to family and even from person to person. That a variation in teachings do not infer that someone is right or that someone is wrong, but quite the opposite. These differences in teachings serve as indicators to how revered the seemingly simple berry can be. Particularly to anishinaabekwe.

Nikki Crowe, Fond du Lac enrollee, elaborated on the teaching that the ode'iminan and other berries are used during ceremonies when a family member is on her moon time.

> I was taught that a woman's medicine is strong during this time and we ask for her prayers by giving her berries and a blanket to keep her comfortable, and this is her contribution to the ceremony. During the Sandy Lake Memorial last summer, my niece did not go on the water due to her moon time. The other women brought her some berries and other feast foods. I talked to her about her moon time and the importance of taking care of herself and others with prayers. I asked her to pray for the people who died at Sandy Lake and the ones who tried to go home. I asked her to pray for those on the water that day to make it safely across. These were the kind of teachings that were passed on to me, so when asked, this is what I share with others. It is important to honor a young female's transition into a woman, and what better way to do that than to treat them to a whole bunch of berries and give them a sense of responsibility to their community by praying for others. I know there is more to these teachings not explained here but I will leave that for others who know more than I do. Miigwech.

These accounts reinforce the significance of ode'iminan as a source of physical and spiritual healing for Ojibwe families and for individuals. So while planning your ode'imini-giizis feast be sure to share some heart-berries with relatives and give thanks for the upcoming growing season.

A black ash strawberry basket created by Kathy Kae. (COR photo)

Sarah Agaton Howes designed this wool blanket in collaboration with Eighth Generation's Inspired Natives Project. The beautiful design, characteristic of the woodlands floral tradition, tells the story of physical and spiritual renewal. It honors the land through representations of the wild plum flower, the water through our beloved wild rice, and healing through the dogwood flower, which is used to create traditional tobacco. (submitted photo)

Ode'imin

Anishinaabekwe: An Ojibwe woman
Ode'iminan: "Heart Berries" or "Strawberries"
Ode'imin: "A Strawberry"
Minopogwadoon ode'iminan: "Strawberries taste good"
Ode'imini-giizis: "Strawberry Moon" or "June"
Ode'iminike: "She picks strawberries, processes strawberries
Ode'imini-baashkiminasigan: "Strawberry sauce or jam"

CWD in the Ceded Territories

(continued from page 4)

is often an important source of lean, healthy meat for tribal members. The spread of CWD is putting the future of those lifeways and traditions at a greater risk with each new report of CWD in the Ceded Territories.

The future of deer, deer hunting, and treaty rights in the Ceded Territory is at risk and the state and federal agencies, as co-managers with the tribes, have a responsibility to protect wild deer and elk populations by consulting with tribal governments and adopting common-sense rules and tribal recommendations for regulating the captive cervid industry.

Vulnerability of ogaa

(continued from page 11)

Ogaa is found in many lakes and rivers throughout the Ceded Territories and is commonly harvested by tribal members and recreational anglers (Figure 1). Ogaa gains a competitive advantage over other species in turbid or stained, low-light waterbodies with limited plant growth. It typically spawns at night in early spring, shortly after ice-out over shallow (<6 feet) gravel and/or cobble bars. Young ogaawag commonly move offshore into the pelagic zone after gaining the ability to swim. Juvenile and adult ogaawag tend to use deeper, darker water during the day and move into the nearshore environment (littoral zone) at night to feed.

The ogaa population has declined in many waterbodies throughout the Ceded Territories in recent years. For example, ogaa in Lac Vieux Desert Lake has declined from a high of ~3 adult fish/acre in 1998 to approximately 0.5 fish/acre in 2016, an amount quite low relative to other Ceded Territory lakes (average 2.5 fish/acre). Similarly, ogaa in Mille Lacs Lake declined by approximately 90,000 pounds per year between 1998 (biomass ~2.5 million pounds) and 2016 (biomass ~0.89 million pounds). Ogaa stocks are predicted to decline in many other lakes throughout the Ceded Territories.

In interviews with tribal members, ogaa was frequently mentioned. Tribal members are seeing a decrease in the population in a majority of the lakes where ogaa are present. Current contamination and the potential for future contamination have been consistently mentioned as a concern. One tribal member from Mille Lacs voiced concern about the change in color of some ogaa, noting that some are darker grey and, during processing, the meat won't separate from the skin and tends to shrink to one-third of the size. Another consistent observation and concern noted during interviews is that cooler ogaa-dominated lakes are getting warmer.

Summary of climate threats:

Ogaa was in the 78th percentile relative to other fish in the assessment. Relative to other beings/species, ogaa was in the 90th percentile. Factors that increased ogaa's vulnerability to climate change include: natural and anthropogenic barriers (e.g., connectivity of inland lakes, dams), thermal niche (loss of coolwater habitat), hydrological niche (e.g., droughts), disturbance regime (more intense floods), dietary versatility (availability of specific prey items), sensitivity to competition (ogaa competes with bass species), sensitivity to pathogens (i.e., more susceptible to infections and parasites) and documented (e.g., decline in abundance) and predicted response (e.g., range contraction) to climate change (Figure 2).

Factors that increase ogaa's vulnerability to climate change:

SI — Natural barriers: Limited connectivity of inland lakes will reduce the ability of ogaa to move to suitable habitat as the climate changes. Moreover, migration routes such as shallow waterways have the potential to warm faster than lakes, creating a barrier for this coolwater species. Conversely, an increase in frequency and intensity of extreme weather and precipitation events has the potential to create new migration routes between waterbodies. Natural barriers are likely to impede ogaa dispersal as the climate changes, but some dispersal will still occur through river systems.

N/SI — Anthropogenic barriers: Barriers such as dams and road crossings can impede movements of ogaa in rivers and are likely to impede ogaa dispersal to a limited extent as the climate changes. Ogaa in lakes are less affected by this factor as few anthropogenic barriers exist in lakes.

SI — Physiological thermal niche: Thermal niche for ogaa, a coolwater species, depends on the life stage. For eggs, the optimum temperature is 48-59°F, with high mortality occurring when temperatures remain below 42°F or above 66°F for extended periods. Optimal temperature for growth of fry (young fish capable of feeding themselves) is 59°F, and no growth occurs at temperatures below 50°F or above 68°F (upper lethal temperature is 70°F; lower lethal temperature is 42°F). Optimal temperature for growth of juvenile ogaa (young fish that have developed scales and working fins) is approximately 70-77°F, with no growth occurring at temperatures below 54°F or above 84°F. For adult fish (capable of reproducing), optimum temperature is approximately 64-72°F with performance decreasing at 79°F and lethal temperatures at 84-93°F (lower lethal limit is not defined). Water temperature is predicted to increase as the climate changes, potentially reducing thermal habitat for ogaa by 10-40% and resulting in negative consequences for growth and survival of this species.

SI — Historical hydrological niche: The area ogaa occupies has experienced slightly lower than average variation in precipitation in the past 50 years.

N/SI — Disturbance regime: An increase in the intensity and frequency of extreme precipitation events might decrease ogaa recruitment in some lakes and rivers.

N/SI — Dietary versatility: Ogaa diet is flexible across life stages, but due to its small mouth (i.e., gape limitation), newly hatched ogaa typically consume zooplankton. It is possible that this prey item might not be available as the climate changes, thereby limiting food for this life stage.

SI — Sensitivity to competition: Ogaa's sensitivity to competition depends on the fish community in the individual waterbody. Ogaa is likely to experience more competition in lakes and rivers containing largemouth bass and smallmouth bass, a situation likely to be exacerbated as the climate changes because these species perform better at elevated temperatures.

SI — Documented response to climate change: Distribution and abundance of ogaa has been declining in recent decades and has been correlated with environmental conditions associated with climate change (e.g., growing degree days, water clarity).

I — Modeled change in range or population size (2050): The number of lakes that support naturally reproducing stocks of ogaa is predicted to decrease by 65% in Wisconsin. A similar decline will likely occur in lakes throughout the Ceded Territories.

SI — Overlap of modeled future (2050) range with current range: It is predicted that only 35% of the lakes that currently support naturally reproducing stocks of ogaa will do so by 2050.

I — Occurrence of protected areas in modeled future (2050) distribution: Less than 5% of ogaa habitat in the Ceded Territories is predicted to be in a protected area by 2050.

Legend

- GI — **Greatly Increase**: This factor greatly increases vulnerability
- I/GI — **Increase/Greatly Increase**: This factor may increase or greatly increase vulnerability
- I — **Increase**: This factor increases vulnerability
- SI/I — **Somewhat Increase/Increase**: This factor may somewhat increase or increase vulnerability
- SI — **Somewhat Increase**: This factor somewhat increases vulnerability
- N/SI — **Neutral/Somewhat Increase**: This factor may not increase or may somewhat increase vulnerability

2018 sugar bush

Ceded Territory sugar bushers experienced a fairly long, uneven season in 2018 that wrapped up in late April. Even as winter weather extended well into spring, intermittent warming spells over the two-month season repeatedly shut down the flow of maple sap for syrup producers. Maple sap runs when nighttime temperatures dip below freezing and then bounce back to around 40 (degrees) or so during the day. (CO Rasmussen photo)

Wellness Summit teaches harvesting tips and tricks

Food sovereignty was a huge theme at the 2018 Bad River Mino-Bimaadiziwin Wellness Summit on April 28-29. Invited presenters and workshop demonstrators spent the weekend talking about harvesting and the underlying theme of "culture is prevention."

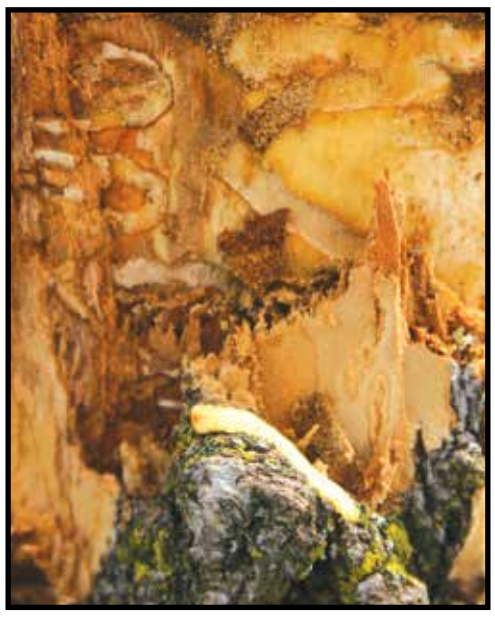
GLIFWC Climate Change Fisheries Technician and Bad River Tribal member Ron Parisien Jr. demonstrated net tying, proper care and techniques for netting. (D. Jennings photo)

Big changes to emerald ash borer regulation take hold in 2018

Aagimaakwag & baapaagimaakwag (ash trees) in the crosshairs

By Steve Garske
GLIFWC Invasive Species Coordinator

The US Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) and most states have maintained a quarantine system for emerald ash borer (EAB) since its discovery in Detroit in 2002. Along with an extensive media campaign and other measures to inform the public of the threat posed by this invasive beetle, this county-by-county quarantine system appears to have been successful in slowing the EAB's spread into northern Wisconsin and the western Upper Michigan. The quarantines may also have helped slow the spread of other forest invasives like gypsy moth and oak wilt.



Emerald ash borer larvae eat their way through the tree's food-conducting tissue, starving the tree. (S. Garske photo)

In a major policy shift, however, APHIS revealed that it is preparing to end federal regulation nationwide in a December 2017 letter to tribes around the country. In early spring of this year, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) responded by placing the entire state (except for tribal lands) under quarantine, effective March 30.

The DATCP order frees up movement of untreated hardwood logs, firewood logs, and other regulated materials anywhere within Wisconsin's borders. Firewood restrictions remain on state and federal lands in all three states. For the most recent monthly EAB quarantine map, see *http://emeraldashborer.info/documents/MultiState_EABpos.pdf*.

The state's decision was driven by several factors, including the unfortunate fact that EAB populations probably occur undetected in unquarantined areas. Pressure by the timber industry was also a factor.

With no reported EAB infestations in the western United States, the APHIS proposal to end regulation nationwide came as a surprise to many. The move is being driven by funding cuts to the $7 million dollar per year program, which includes regulation, enforcement, surveying for EAB, releasing biocontrol insects, and education and outreach. APHIS wants to refocus its remaining resources on raising and releasing biological control insects (tiny, stingless wasps) in EAB-infested areas across the US. Federal deregulation will not go into effect for several months at least, according to USDA-APHIS State Plant Health Director JoAnn Cruse.

At its December 2017 meeting, the Voigt Intertribal Task Force passed a resolution opposing a Wisconsin statewide quarantine. Soon after GLIFWC sent letters to both APHIS and the Wisconsin DATCP, informing them that the tribes opposed ending the quarantine system at this time, and reminding them of their duty to consult with the tribes before proceeding with their plans.

Moving forward, tribes take the lead

Although APHIS will no longer survey for EAB in the Ojibwe Ceded Territories, they may be able to help tribes or other groups survey uninfested areas. Surveys could target high-risk areas such as campgrounds, powwow grounds, areas where logs are stored, and areas where tribal members gather firewood.

GLIFWC and its member tribes have been working to develop and implement a variety of regulatory, management, and research actions to deal with the impending arrival of the EAB. The following are steps tribes can implement to address this issue. GLIFWC staff are available to provide technical assistance with many of these actions.

Most of northern Wisconsin and Upper Michigan are still EAB-free. Tribes can establish and implement firewood quarantines for their members inside the Ceded Territories, based on criteria of their choosing. Movement of firewood and other regulated materials onto tribal lands by anyone (not just tribal members) could also be regulated.

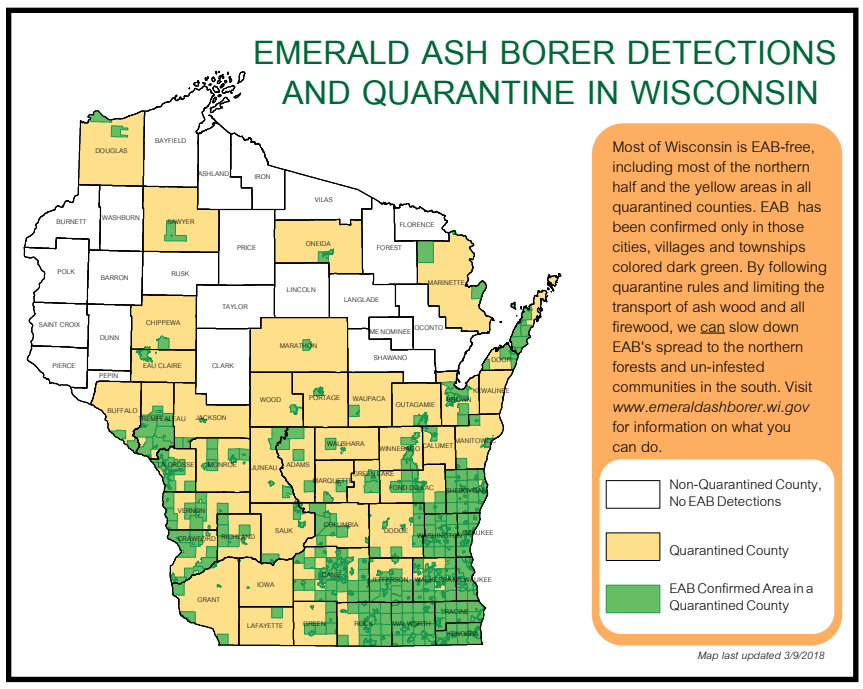
Ash seed collection is valuable in preserving local or regional genotypes (genetic strains) of ash for resistance breeding programs and eventual reintroduction into the wild. Seeds can be collected for several years after the EAB arrives in an area. Waiting until the EAB arrives to collect seed has the advantage of providing seed for storage that is as young and fresh as reasonably possible. It is important to not wait until the trees are dying back though.

Ash is sometimes pre-emptively harvested in logging operations. Disease-resistant ash can show up anywhere though, so ash seedlings and saplings should be allowed to mature.

Systemic pesticides (pesticides that spread throughout the plant) can be used to protect individual ash trees. For more on this see "Insecticide options for protecting ash trees from emerald ash borer," at *www.emeraldashborer.info/documents/Multistate_EAB_Insecticide_Fact_Sheet.pdf*.

The Slow Ash Mortality (SLAM) project has integrated multiple methods to suppress EAB populations. See *https://continentalforestdialogue.files.wordpress.com/2016/07/deb-slam-contin-dial-nov-2016.pdf* for a slide presentation on the SLAM project.

Finally, tribal natural resource agencies could work with APHIS to release biological control wasps in EAB-infested areas. For more information see "Biological control release and recovery guidelines" at *www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/downloads/EAB-FieldRelease-Guidelines.pdf*.



This shows where the EAB has actually been found in Wisconsin. Except for southern Wisconsin, the EAB is still rare in the state. Keep in mind that except for tribal lands, the entire state is now quarantined, meaning untreated hardwood can now be moved anywhere within the state with a few restrictions. An interactive version of this map is at* http://datcpservices.wisconsin.gov/eab/article.jsp?topicid=25*. (WI DATCP image)

What can tribal harvesters do?

For tribal harvesters making black ash baskets and teaching others basketmaking traditions and skills represents a significant part their livelihood. These caretakers of this ancient tradition will be directly impacted by the loss of ash.

Josh Homminga and Sarah Bedell gather sweet grass, which they weave into the rims of their baskets. (Bucko Teeple photo)

Sault Ste. Marie Tribal member Josh Homminga resides with his partner Sarah Bedell on Bay Mills Indian Reservation in the eastern Upper Peninsula. Josh lays out what's at stake: "As Anishinabe we have made different items from the land. We believe that when we make things that our ancestors did we have a spiritual connection to our ancestors. My family has made baskets for many years. The emerald ash borer may mean the loss of all of our ash trees and that connection to our ancestors. We also worry that the practice of making baskets will be lost forever if the emerald ash borer kills all of the ash trees. That would be a sad day for our people." You can see Josh and Sarah's delightful 2015 presentation on black ash basketmaking at *www.glifwc.org/Forest_Pests/.../Trad_baskets_EAB_SB&JH_2015March.pdf*.

While perhaps not ideal, there are steps tribal harvesters can take to minimize the EAB's impact on their craft. Underwater storage of black ash logs is a traditional practice that maintains log quality for up to a year after harvest. It can be effective in eradicating EAB—one study found that no EAB survived in logs submerged in a river for 14 weeks in spring or 18 weeks in winter. The logs can then be transported out of infested areas without the risk of spreading the

(see Emerald ash borer, page 22)

Youth underwater photography program explores connections between Ojibwe culture & aquatic resources

We all have our favorite spots on or near the water whether it's a fishing-hole, beach, lake or stream. Many people spend their happiest times near the water recreating, fishing, harvesting, playing, praying or just relaxing. Imagine your favorite place. Have you ever wondered what it looks like under the surface?

A group of adventurous high school students from around the Bayfield peninsula of northern Wisconsin are using photography to reveal the hidden world beneath the water's surface. They are the Zaaga'igan Ma'iinganag, the Lakewolves, and soon you will be seeing some of their work around the Bayfield Peninsula and beyond.

Bazile Panek gets ready to photograph rice beds near Pacwawong on the Namekagon River, fall of 2017. (T. Lafrançois photo)

Zaaga'igan Ma'iinganag

The central mission of Zaaga'igan Ma'iinganag is to safely explore the coastal waters of Lake Superior and other inland waters of ecological and cultural importance. The team aims to explore under the surface and share their photographs and stories with the public. Photography offers a vivid storytelling tool that gives power to youth voices and shares their ideas in a way all of us can relate to.

Founding member Bazile Panek says: "The first time I took a picture underwater I felt that I had started a journey that will move people and create change. It was a way for me to have another voice, through my photos." For Yrsa Peterson, underwater photography is "empowering. It is a window to a world that gets too few visitors and too little appreciation." The team admits it's also just plain fun to be in the water and delve under the surface.

A spider from below taken by Yrsa Peterson in the lagoon of Mooningwanekaaning where the Lakewolves shared the underwater photography experience on a camping trip with Bayfield Middle School Alt. Ed., 2017. (Y. Peterson photo)

The idea for the program was born when research diver and aquatic biologist Toben Lafrançois saw the premier of Dazhindandaa I'iw Nibi (Let's Talk About the Water) in 2016 at the Red Cliff Watershed Symposium. At that time, he and Wisconsin Sea Grant were interested in whether a unique underwater photography program, first designed by Ben Thwaits, Lafrancois, and Ian Karl for therapeutic, science education, and conservation outreach purposes within the institutional setting of Northwest Passage, Ltd (NWP), could be successful in a mainstream setting.

A discussion of the elders and youth at Red Cliff in 2016 made it clear that adapting the program to mainstream high school students was not only possible, but that youth leaders like Panek were inimitably ready to connect underwater photography to strong cultural values and projects already expressed in many forms but made explicit in Dazhindandaa I'iw Nibi. Photography offered another powerful tool that Lafrancois thought could amplify what these kids were already sharing about long standing cultural values. With the help of Bayfield High School teacher Rick Erickson, Lafrancois and Panek created the region's first organized underwater photography club.

In 2016 the group began learning about underwater photography and exploring Lake Superior, the Bois Brule and the Namekagon River. Panek came up with the name Zaaga'igan Ma'iinganag on the first outing (and Lafrancois saw a wolf on the way there, so it seemed fitting).

Vennessa Gordon clarified the power of the name, saying "I feel like a wolf when I'm in the water hunting for the perfect prey/photo." Yrsa Peterson soon joined up, adding her rich experience with Lake Superior to the group and designing the logo. The pack was formed.

Bazile Panek, Yrsa Peterson and Vennessa Gordon having fun in the Namekagon, summer of 2017. (T. Lafrancois photo)

Underwater photography

A typical outing involves suiting up in 7mm wetsuits with fins, mask and snorkel. Wetsuits provide protection from the cold but also create positive buoyancy, enhancing safety and comfort. Most Zaaga'igan Ma'iinganag are either trained lifeguards themselves or have wilderness first responder training, and Lafrançois is a trained rescue diver keeping a close eye on safety. The team operates as if this was a professional SCUBA dive even though they are snorkeling. After suiting up, the team then explores an area and decides just which rules of photography to break in order to get amazing shots. Nature is a major partner in the outcome, as the team responds to conditions and explores what the water holds under the surface. After shooting, the team meets again to go over photos and talk about editing. The kids quickly mastered the equipment, water skills, and photo editing technology needed to create their remarkable images.

A second type of Lakewolf outing involves the core Pack sharing this experience with larger groups in a peer to peer teaching style. In 2017, for example, Gordon and Peterson helped lead a Bayfield Middle School Alternative Education camping trip where photography and water exploration techniques were shared with the students in Jeff Theune's class. Each participant had a chance to play around in the water, use the equipment, and try out photography as part of a science and culture-based overnight field trip to Mooningwanekaaning (Madeline Island).

This fall the team will be working with Bayfield High School teacher Rick Erickson's classes in a similar way. Peer to peer and larger group outings can work well because the cameras do not require you to be fully immersed. Some students may not want to swim, and in many cases, it is impractical to suit up large groups. Excellent photographs can be taken, however, in just a few inches of water and still produce beautiful and scientifically interesting photos. This means that anyone can take a peek under the surface and engage more deeply with aquatic resources, allowing larger groups to share the exploration across a wide range of ability and comfort levels.

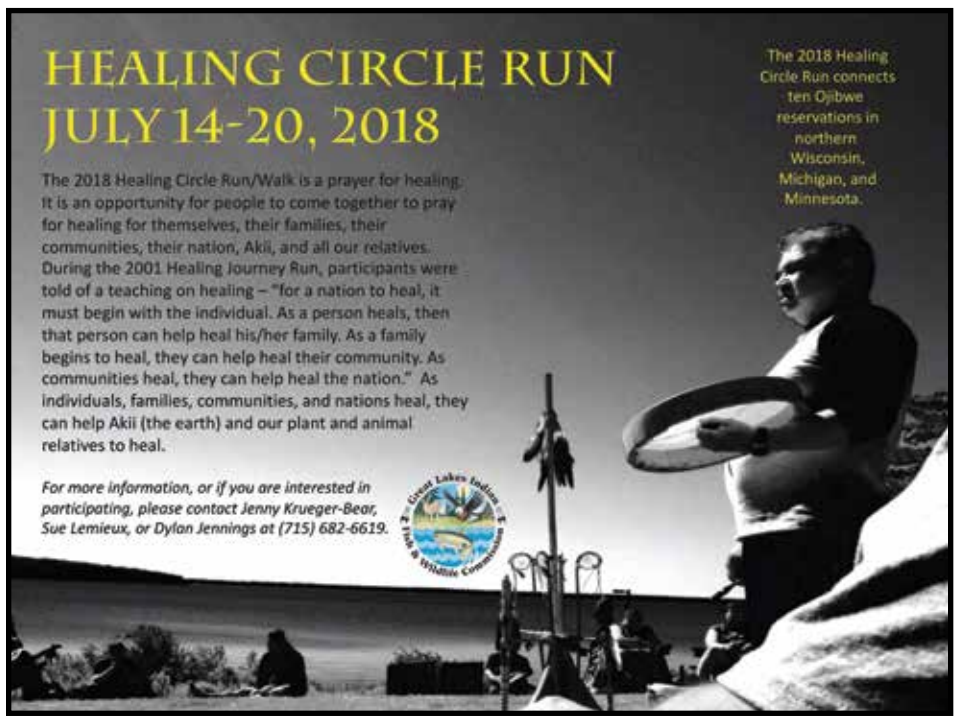
Connecting to water is connecting to culture

A central element of the Zaaga'igan Ma'iinganag program emerged directly from the youth leaders themselves. The approach of Lafrançois was to create safe opportunities for adventure, art, and science. The photographic content and stories are entirely up to the pack members, as are some of the locations visited (with weather and other constraints being limiting factors). Early on it became clear that connecting people in and around the team to the water through direct experiences rested firmly on a respect for Ojibwemowin place names and consequently on Ojibwe history and values. The group is open to all interested kids no matter their background, but the team members advocate respect for Ojibwe culture as part and parcel of respect for the water. The credit for this direction rests on the water itself and on the leadership of the pack members.

Their own words, of course, best describe how a science based photography program became inseparable from cultural expression, respect, and for Tribal members-identity. This core aspect of the mission of Zaaga'igan Ma'iinganag stems directly from the interwoven words of the elders and youth shared in Dazhindandaa I'iw Nibi.

For Peterson, underwater photography with the Zaaga'igan Ma'iinganag creates a sense of "respect for everything around us. People, lake, language. Also the drive to [share with] others the same respect." According to Panek, "Ojibwe is the language of the lake at least where we are. The lake can't listen very well if you are not speaking its language. With Ojibwe you can have a much deeper connection to the Lake and what we do [as photographers]." These high school students are sharing not just the biology or scenery under the waters, but have created a model for cross-cultural understanding and self-respect that adults should take note of.

(see Zaaga'igan Ma'iinganag, page 22)



Mikwendaagoziwag ceremonies at Sandy Lake July 25

All are welcome to join GLIFWC for annual ceremonies, paddle and feast\ in commemoration of the 1850 Sandy Lake Tragedy. It is a time to remember the sacrifices made by the many tribal members who arrived at Sandy Lake, Minnesota to receive annuity payments, but found only inadequate and spoiled rations, delayed payments and, for many, death.

It is a good time to remember those people, the struggles and determination, and to say chi miigwech!

Agenda: A morning ceremony at the East Boat Landing is followed by a paddle in canoes or kayaks across Sandy Lake where ceremonies are held at the Mikwendaagoziwag Monument located at the Sandy Lake Recreation Site on Highway 65 north of McGregor, Minnesota. A noon feast follows. For more information contact GLIFWC at 715.682.6619.

Check GLIFWC's Facebook page for map, directions and other details.

Essential Ojibwemowin

Mikwendaagoziwag—They are Remembered

Zaaga'igan Ma'iinganag

(continued from page 21)

Gordon put it best saying "Some of us are native and cultural, but some are not and I want to know more." Being in the water formed part of the foundation for a rebirth of cultural interest. Her photographs share a strong sense of professionalism and a keen eye for the biologically interesting, but it's this rediscovered connection that makes this group so special. The Zaaga'igan Ma'iinganag invite all people to share in that journey as we come together to appreciate the true riches of our waters.

Next steps

As the Zaaga'igan Ma'iinganag are showing, the future of freshwater health depends on all of us paying attention to what is under the surface. The results of this work have been publicly shared in several venues and the team hopes this continues to ripple outwards. Some examples of getting their work into the public eye include collaborating with the Bayfield Recreational Center to photograph the polar plunge and Point to Pointe swim race.

Panek introduced a Ojibwe culture to a worldwide ocean conservation audience through underwater photography at the Blue Mind 7 conference (Stevens Point Wis., April 2017), notably the first Blue Mind conference held near freshwater rather than saltwater. Locally, Panek and Gordon shared their work at the Red Cliff Watershed Symposium in fall of 2017 to an audience of regional water scientists and community members.

In the near future, collections of Zaaga'igan Ma'iinganag photographs will be organized into galleries. Some will travel the Great Lakes region with the help of Wisconsin Sea Grant, a gallery presentation at the Great Lakes Aquarium (scheduled for fall 2018) will include their photographs, and they hope to contribute to Mazina'igan. 2018 also brings collaboration with the National Park Service on several projects, and they will be conducting outings with Bayfield High School classes in May as well as next fall. Keep your eyes peeled for their amazing work!

If you have any questions, comments, or run a group that would like to join the Zaaga'igan Ma'iinganag or share their photographs, contact *toben@lakewolves.org* or *tlafrancois@northland.edu* or check out their website *http://lakewolves.org/*.

The Zaaga'igan Ma'iinganag would like to thank GLIFWC for their interest in the program, Wisconsin Sea Grant for partial financial support, Northwest Passage, Ltd 'Under the Surface' program for lending equipment and technical support, the Red Cliff Environment Department, Apostle Islands National Lakeshore, and all the teachers, parents, and students who have helped out.

The Lakewolves explore the waves of Little Sand Bay. (V. Gordon photo)

Emerald ash borer: hope for the future

(continued from page 20)

EAB. Flowing water is best, as the logs tend to rot in standing water. If logs are soaked in a container (like a canoe), the water should be changed periodically to prevent them from decaying.

Another option is to pound out and process the strips for storage. According to Bad River basketmaker April Stone, the strips will last for many years in dry, well-ventilated conditions. April has stored strips for up to 10 years and believes they could be stored even longer, though they would eventually start to become brittle and deteriorate. Storing strips is one of the best ways for harvesters to insure black ash materials for the future. How far into the future is an open question though. April worries about the loss of knowledge such as "the qualities to look for in a basket tree and what goes into processing the raw materials." She also worries about the loss of the opportunity for a mother to pass this knowledge down to her daughters.

This traditional lidded storage basket, made by April Stone, was woven from baapaagimaak (black ash) strips. (April Stone photo)

Hope for the future

The EAB has decimated ash across southern Lower Michigan and northern Ohio, where it has been established the longest. However, a small percentage (up to 1%) have survived and around 0.1% appear to be healthy. These "lingering ash" will be critical to long-term ash survival on the landscape. Research by the U.S. Forest Service has found that selective breeding of ash cuttings taken from lingering ash trees can yield resistant ash within as little as two generations. Learn more at *www.nrs.fs.fed.us/disturbance/invasive_species/eab/control_management/lingering_ash/*

APHIS continues to release three species of tiny, stingless parasitoid wasps in EAB-infested areas of the Great Lakes region. (Parasitoid insects lay their eggs on other insects. The larva then feed on their host, slowly killing it.) Along with a native parasitoid wasp, these wasps appear to be suppressing EAB populations in areas where it has been established the longest. APHIS plans to eventually release these biocontrol insects in every county in the US. The hope is that after the big ash trees are killed and EAB populations crash, these insects will be able keep the EAB in check, allowing young ash to live long enough to mature and reproduce. While some have expressed concern that they might begin to attack native relatives of the EAB, there is no evidence of this so far, according to Wisconsin DNR Forest Health Specialist Paul Cigan.

"We must be grateful for what we have in the natural world." April Stone points out. "We need to be aware of the forest beings and respect them, or they will be gone."

Adam McGeshick new Chief Warden at GLIFWC

Adam McGeshick, of the Mole Lake Band of Sokaogon Chippewa, was appointed as Chief Warden of the GLIFWC Conservation Enforcement Division on April 30, 2018. McGeshick has served the Commission and its member tribes as a conservation warden since January 2007, working in the Lac Vieux Desert, Lac du Flambeau, and Mole Lake communities.

McGeshick served as a military police officer in the United States Army National Guard from 2005-2013. His Basic Training and Advanced Individual Training was completed in Fort Leonard Wood, Missouri, and he deployed to Iraq in support of Operation Iraqi Freedom with the 32nd Infantry Brigade Combat Team in 2009. His educational background includes studies within the criminal justice program at Nicolet Technical College and law enforcement administration at Ashford University.

McGeshick and his wife Nicole are licensed foster parents who have been providing foster care for five years. They have two long-term foster children living with them and a five-year-old adopted son, Leonard. McGeshick is an avid hunter and fisherman, and enjoys the outdoors with his family and four dogs. "Children are our future. That's why I take them out duck hunting, deer hunting, bow hunting, and fishing at a young age. We all enjoy it."

McGeshick's interest in connecting youth to the outdoors extends to his work in conservation enforcement. He is eager to coordinate with other divisions and tribes on youth outreach, infuse culture into safety classes, and build positive relationships between conservation officers and youth. "I am also very excited to meet with our tribal leaders and work on identifying and addressing the needs of our tribes on an individual level," he says. **—P. Maday**

GLIFWC welcomes new Environmental Biologist

North Dakota native Candace Kraft joined the GLIFWC staff in April as an Environmental Biologist with the Planning and Development Division. Kraft will be working under an Administration for Native Americans (ANA) grant that aims to develop a traditional food regulatory program. She will assist in cultivating quality control plans for traditional Anishinaabe foods, and drafting model food codes that help tribes to incorporate traditional foods into larger-scale feeding operations such as Head Start and elder feeding programs.

Kraft will also be doing work under an EPA Great Lakes Restoration Initiative (GLRI) grant. Specifically, she will be helping with outreach for GLIFWC's mercury testing program."I know that the work we are doing is really important," she says. "I am really excited to do research and make practical discoveries that will keep people healthy, happy, and productive."

A member of the Sanish (Arikara) tribe, Kraft earned her Bachelor's Degree in Fisheries and Wildlife Science from Valley City State University in 2012. Her Master's in Environmental Science and Policy came from UW-Green Bay in 2017. For her Master's thesis, Kraft focused on the Wisconsin state deer donation program, evaluating the decline in hunter/processor participation and developing recommendations for the DNR and participating non-profits. Kraft also has work experience with the US Fish and Wildlife Service and US Geological Survey.

In her free time, Kraft is an avid birdwatcher that enjoys classic buildings and classic books. Her favorite read is The Alchemist by Paulo Coelho. **—P. Maday**

Ante takes on new role in GLIFWC Enforcement Division

Stephen Ante was appointed Contract Compliance Officer for the GLIFWC Conservation Enforcement Division on May 1. The change comes five years after Ante began working for GLIFWC as a Records Management Specialist.

Under his new position, Ante will be managing grant awards received by Enforcement. Currently, the division receives funding from a number of sources, including the BIA Youth Initiative Program—which supports Camp Onji-Akiing summer camp for 5th-8th graders, First Nations Development Institute—which supports a new high-school aged summer youth program that will debut this year, and the Department of Justice—which provides support through a Community Oriented Policing Services (COPS) grant.

As the new key point of contact for the GLIFWC Enforcement Division, Ante will be reaching out to tribal leaders and agency administrators to provide continued support for established partnerships and cooperative efforts. You can reach Stephen by calling (715) 682-6619 ex. 2111 or by emailing *stephen.ante@glifwc.org*. **—P. Maday**

***Find a ghost net? Report it at* http://glifwc.org/ghostnet.html.**

Mille Lacs Lake fish monitoring

(continued from page 14)

Similar changes in other large lakes (e.g., Lake Erie and Lake Michigan) are correlated with a decrease in the relative abundance of walleye. Fisheries managers adjusted regulations to accommodate the decline in adult walleye in these other large lake ecosystems. For Mille Lacs Lake, there has been a decrease in the relative abundance of adult walleye, which has been correlated with changes in the ecosystem; however the magnitude of the effect these changes may have on the Mille Lacs walleye population remains unclear.

5) Abundance of adult walleye

Lastly, the review panel assessed the possibility that the management goal of building up the adult walleye biomass might have inadvertently caused a decline in walleye abundance (i.e., the notion that too many big walleye in the lake results in high rates of cannibalism). The data indicates that the abundance of walleye that are 5+, 10+, and 15+ years old in Mille Lacs Lake over the past 4 years was average or below average compared to the abundance of these age groups in the previous 20+ years (Figure 3). This result suggests an increase in cannibalism through the buildup of adult biomass was likely not the reason for the decline in walleye abundance.

Peer-review is the cornerstone of the scientific process. By inviting this panel to review assessment techniques and data, fisheries biologists have learned what they are doing well and how they can improve their monitoring efforts. The full report will be available on the USGS website in the near future. Please contact *aaronshultz@glifwc.org* if you have questions about this article.

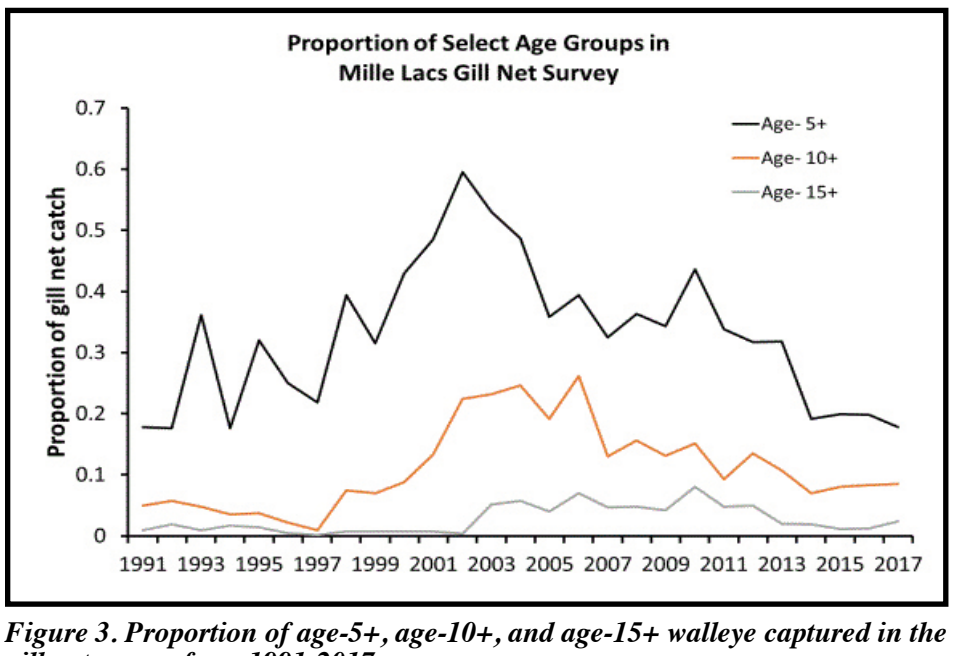


Figure 3. Proportion of age-5+, age-10+, and age-15+ walleye captured in the gill net survey from 1991-2017.

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To recieve the e-edition contact *lynn@glifwc.org* and provide your email address.

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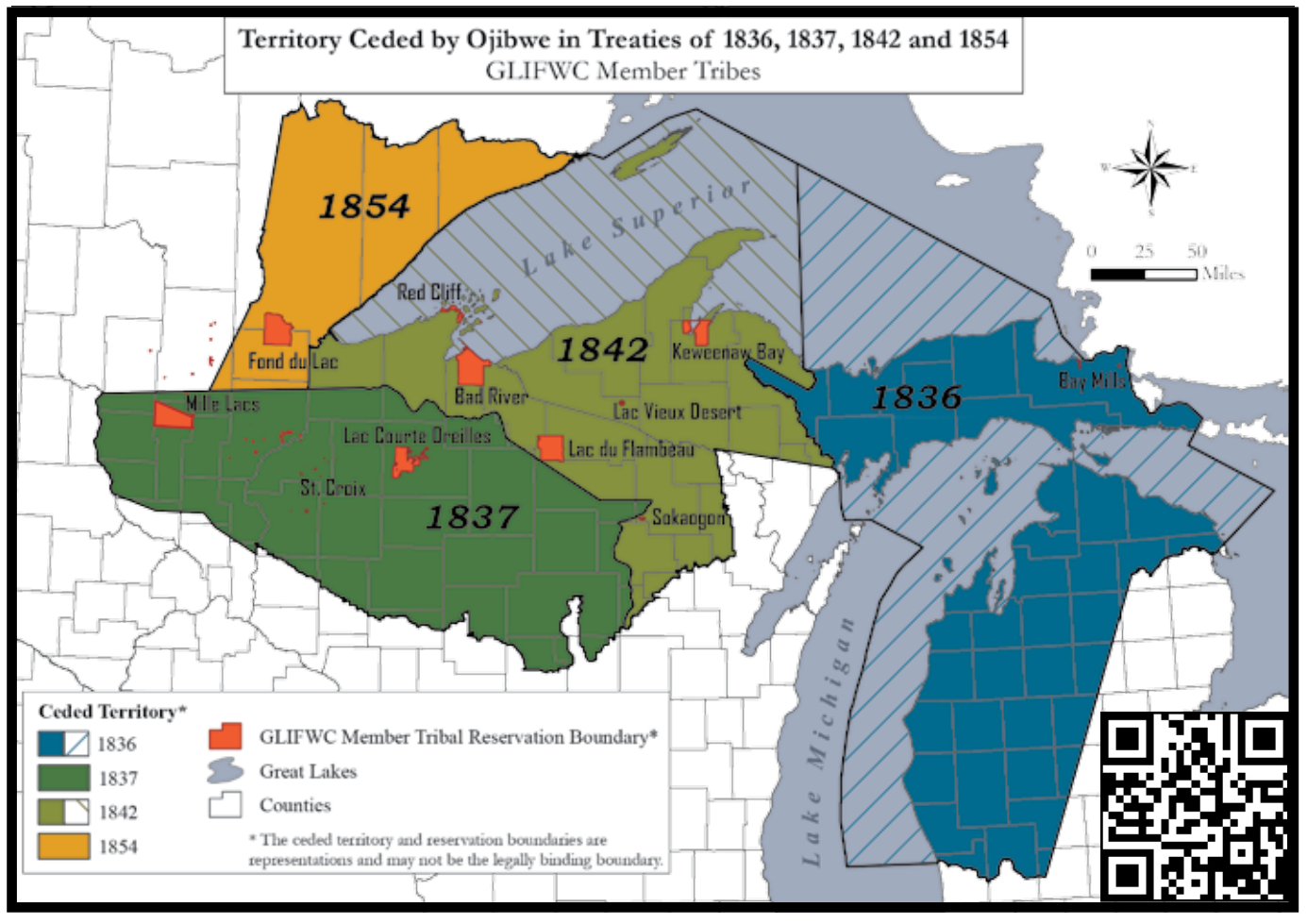
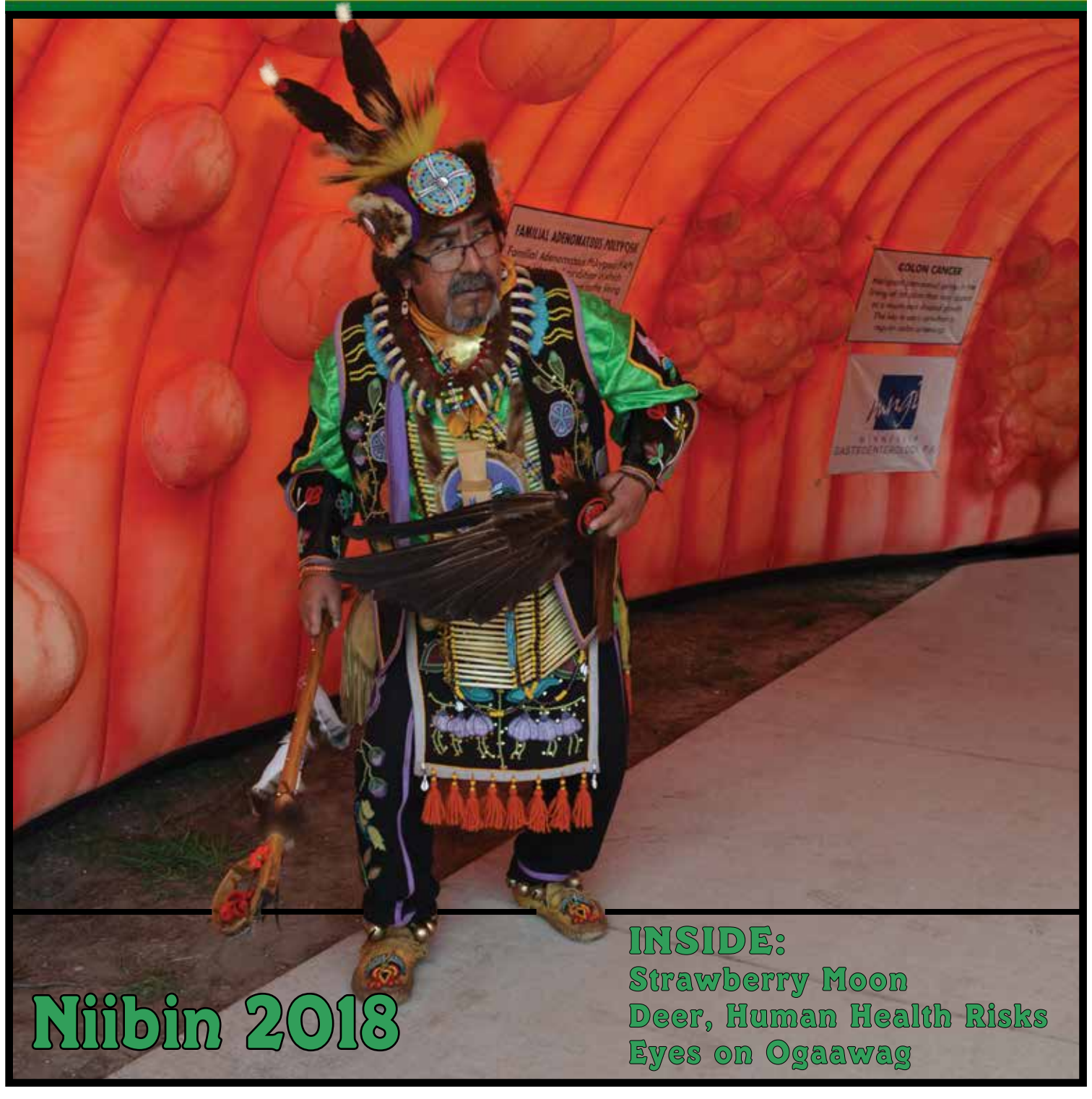
Although **MAZINA'IGAN** enjoys hearing from its readership, there is no "Letters to the Editor" section in the paper, and opinions to be published in the paper are not solicited. Queries as to potential articles relating to off-reservation treaty rights and/or resource management or Ojibwe cultural information can be directed to the editor at the address given above. For more information see GLIFWC's website: **www.glifwc.org** and our Facebook page.



Mazina'igan

A Chronicle of the Lake Superior Ojibwe



Niibin 2018

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