Mazina'igan
A Chronicle of the Lake Superior Ojibwe
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Thin winter ice gives way to historic fishing

By Charlie Otto Rasmussen, Editor

In a slow-motion whiplash of the seasons, the ziigwan spearfishing opener continued its ongoing erratic path into 2024, dropping the earliest start date in modern history. While Gaa-bibooniked (the Cold Maker) made his presence felt in far northerly reaches of the Ceded Territory, much of the region watched the biboon months roll into ziigwan nearly devoid of precipitation on a gray and brown landscape that encircled freshwater lakes holding whisper thin ice cover.

"What a year. It's been a season of all kinds of firsts," said Jonathan Gilbert, GLIFWC biological services director. "It all started with the earliest Wisconsin opener ever."

While April 8 marks the average Ceded Territory open-water start date, spearfishers were landing walleyes (ogaawag) under the stars by March 10 this season. Yet soon after St Croix Band citizens began fishing, Gaa-bibooniked swept into the region, completely shutting down the harvest for 10 days through mid-March.

When the peepers ultimately came out around the first week of April, spearing accelerated considerably. As Lac Courte Oreilles elder George Morrow and his Ojibwe peers have long counseled, the walleye spearfishing season traditionally begins with the chorus of omakakiig or tiny one-inch frogs known as spring peepers.

(see Weather-extended, page 22)

Lac du Flambeau fisherman Nathan Jellen hoists a walleye from the Turtle-Flambeau Flowage April 20. Fishing with Alan and John Peterson, the tribal members motored along the edges of the reservoir's extensive collection of undeveloped islands, finding ogaawag in good numbers. (C. Rasmussen photo)

For the love of hemlocks

Tiny insects target mighty gaagaagimizhiin

By Steve Garske
GLIFWC Invasive Species Coordinator

Everyone loves gaagaagimizh, or eastern hemlock tree. White-tailed deer (waawaashkeshi) love gaagaagimizhiin (hemlock trees) for the food and cover they provide in winter. Gaagwag (porcupines) love the salty taste of their branches. Hermit thrushes, Acadian flycatchers and several species of warblers love them for their dense canopies that support a variety of insects and mites. Brook trout (maazhamegoonsag) and their invertebrate prey benefit from the cool streams shaded by gaagaagimizh. Beings ranging from blue jays (diindiisiwag) to deer mice (waawaabiganoojiinyag) and southern red-backed voles enjoy the nutritious seeds that hemlocks produce every summer. The moist, sheltered environment created by stands of gaagaagimizh provides important habitat for more than 120 birds and mammals and over 300 species of insects and other arthropods. In the northeastern United States, at least eight bird and 10 mammal species are strongly associated with hemlock forests.

Humans enjoy the graceful form and attractive deep-green foliage of gaagaagimizh and its relatives. So much so, that they've even imported hemlocks (*Tsuga spp.*) and other conifers from overseas. This has enabled two more hemlock-loving beings to arrive in North America. Both are insects related to aphids or "plant lice," and live on the stored nutrients of hemlock trees.

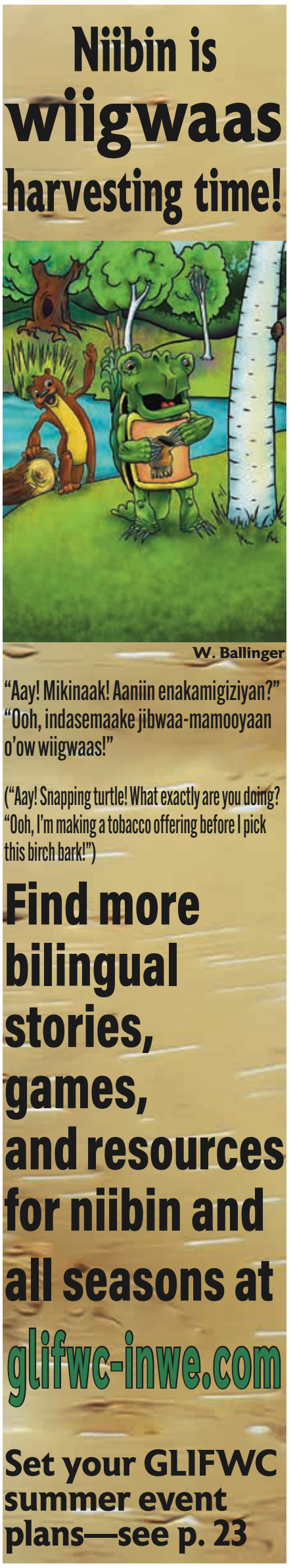
The elongate brown cases on the undersides of these hemlock leaves hide female EHS. The cases are about 1.5 mm (1/16 inch) long. The males make smaller, whitish cases. (K. Abell, Univ. of Massachusetts, Bugwood.org)

Troublesome imports

An insect called the elongate hemlock scale (*Fiorinia externa*) or EHS, arrived in New York from Japan around 1908. It prefers hemlock but also feeds on other conifers, including balsam fir (aninaandag), black spruce (zesegaandag) and white spruce (gaawaandag).

Juvenile EHS attach themselves to the undersides of the needles of these trees, where the females cover themselves in a hard, brown, waxy coating. They feed on nutrients from the needles, causing them to turn yellow and drop off. Heavy EHS feeding makes the host trees more susceptible to drought and diseases, and can eventually kill them.

(see Tiny insects, page 21)



Ogaa for Elders (with a side of omashkooz)

Senior appreciation program returns to LCO

By Charlie Otto Rasmussen, Editor

Reserve, Wis—The ziigwan favorite Ogaa for Elders is back. Lac Courte Oreilles Band walleye harvesters donated hundreds of fish to the tribe's elder services program during the spring season. Program nutrition specialists parlayed the harvest of fresh local fish into the feast for more than 100 at the LCO Elder Nutrition Center, while dozens more welcomed hand-delivered meals at home on April 25. Many community members contributed to the celebratory effort, starting with local fishermen.

"It's all about helping the elders," said Jim Tate, Lac Courte Oreilles member and an Ogaa for Elders founder. "I just wanted to be able to contribute to them, to see that they had walleyes to eat."

Like many services, the grassroots community venture got derailed during the Covid-19 pandemic. Ogaa for Elders launched in 2017 when Tate, fishing partner Chuck Lynk, and GLIFWC Warden Mike Popovich hatched a plan to provide walleyes for band elders, military veterans, and disabled residents. Tate said the idea was to assist men and women who long-served as community providers but now lacked the mobility to get out and harvest.

That first season GLIFWC wardens situated donation bins near fish monitoring stations on boat landings where Ojibwe fisherman had their harvest documented by creel teams. With a boost from LCO spearfisher contributions, Tate and Lynk cleaned and distributed 166 ogaawag that year. Through the 20-teens, Tate hand delivered frozen walleye fillets to homes across the LCO reservation; his pick-up truck idling in the driveway, a welcome sign of spring.

LCO's Jim Tate (l) preps a salad at the Ogaa for Elders feast. With his fishing partner and a GLIFWC warden, Tate first imagined the volunteer fish donation program as a no-cost harvest-and-delivery service for LCO veterans and seniors.

INSET: Henry Bearheart serves as chief warden for the Lac Courte Oreilles Conservation Department. (CO Rasmussen photos)

Bringing it all together

In 2024 Ogaa for Elders volunteers dusted off the donation bins and reformed, transitioning to fewer home deliveries and a central feast, laying the ground where old friends could socialize and LCO program staff could share community updates about health and wellbeing. With the addition of tribal staff including LCO Conservation's Chief Warden Henry Bearheart and Warden Derek Taylor—plus the LCO Aging & Disability Services event team led by Allison Cuddy—the Ogaa for Elders feast came together April 25 at the LCO Elder Nutrition Center.

"Our elders are our wisdom keepers. We wouldn't be here without them," Cuddy said. "To give back to them, to be able to provide that meal for them, to see them smile and laugh, that's what it's all about."

Under the supervision of Chef Donny Gokey, LCO served up an outstanding walleye feast decked out with Anishinaabe foods at the elder center. With cuts from successful Ojibwe intertribal hunting the previous autumn, an omashkooz (elk) meatloaf supplemented the main course.

LCO elders George Morrow and Fred Tribble share in a walleye and elk feast at the Ogaa for Elders gathering April 25. (CO Rasmussen photo)

"Walleye is a medicine to us. It has the nutrients we need, that [native] bodies need," said Bearheart, who took the lead in donated ogaawag collections during the spearing season. "And it's not just the walleye. It's the other traditional foods: deer, elk, wild rice and corn."

Bearheart said that when it comes to elders, tribal members are generous with their harvests from Ojibwe treaty lands and water. Some fishermen donated half of their "catch" while others provided their entire harvest to the Ogaa for Elders program, he said. Bearheart also acknowledged Warden Taylor, who filleted more than 200 fish supplied to LCO seniors this past season.

Environmental advocate, ogichidaa Walt Bresette enters Wisconsin Conservation Hall of Fame

By Charlie Otto Rasmussen, Editor

Stevens Point, Wis.—In an outstanding move to recognize indigenous environmental leadership, the Wisconsin Conservation Hall of Fame inducted Walter Bresette into its ranks April 17. The late Red Cliff Band citizen and Loon Clan orator championed treaty resources across the state and beyond, notably promoting *nibi* (water) protection as mining corporations laid out plans for dubious development plans in the late 20th Century.

Professor Patty Loew is one of Bresette's formal nominators to the Hall. She shared her firsthand impressions of how Bresette, through wit, humor and intelligence, forged alliances between native people and the wider public to stand up for human rights and the environment in the face of pressure from extractive industries.

"Walt was able to talk to people and reach common ground and act in ways that showed our humanity and our integrity and the kind of people we wanted to be," said Loew, Bad River Ojibwe, during the virtual induction ceremony. "I couldn't be prouder that Walt Bresette is inducted into the Wisconsin Conservation Hall of Fame."

In 1984 Bresette became the editor of Great Lakes Indian Fish & Wildlife Commission's newspaper *Masinaigan* soon after its inaugural December 1983 publication. He served as public information director for the Commission as Ojibwe bands began off-reservation deer hunting following the *Lac Courte Oreilles v Voigt* ruling.

The skilled organizer would help found the Midwest Treaty Network and Great Lakes Indigenous Environmental Network according to Rick Whaley, who also co-nominated Bresette for the Hall.

Together, Whaley and Bresette authored and published *Walleye Warriors: An Effective Alliance Against Racism and for the Earth*, a book that documents the non-violent movement to resist the threats and social upheaval caused by anti-Indian protesters during the first years of modern off-reservation Ojibwe spearfishing.

Through the 1990s, the proposed Crandon Mine—sited at the intersection of Wolf River headwaters and Sokaogon Mole Lake and Potawatomi homelands—became a focal point for Bresette and other ogichidaa committed to fighting for clean water. The mine was never built and the strategies of combining public activism, culture, law, and indigenous sovereignty to achieve environmental protection is a template carried forward today. Walt Bresette walked on in February 1999. Bresette's induction ceremony, which include insightful comments shared by his daughter Katy Bresette, is available *tinyurl.com/bddmerjy*.

Ceded Territory news briefs

EPA final rule protects off-reservation water quality

On May 2 the U.S. Environmental Protection Agency (EPA) published a final rule that establishes a national framework requiring the EPA and states to consider tribal rights when setting or reviewing Water Quality Standards in areas where tribes have off-reservation and reserved rights.

Historically, the EPA considered tribal reserved rights on a case-by-case basis, leading to uncertainty and inconsistencies among states. This final rule requires that states consider tribal uses and values when setting water quality standards and establish criteria to protect both the resources themselves and the tribal members that exercise treaty rights. This rule provides clarity and consistency across the nation to ensure that water bodies and the beings that depend on them are taken into consideration when setting standards. The rule supports various water uses by tribes, including manoomin harvesting, fishing, and cultural practices. It reflects the government's commitment to honoring treaty obligations and its federal trust responsibility to tribes.

GLIFWC staff have been engaged with this rulemaking since its proposal and is working to better understand the rule to support its full implementation across the Ceded Territories. **—O. Gower**

State-licensed trappers exceed otter quota in Wisconsin

Despite Wisconsin Department of Natural Resources closing the otter season early in the Northern Zone, state trappers still overharvested the river mammals by 240 during the 2023-24 season. A relatively warm winter, stable water levels, and higher beaver prices made for increased interest and favorable trapping conditions across the Ceded Territory. These factors led to the highest rate of otter harvest Wisconsin has seen in the past six years.

Under a bag limit system, Wisconsin provides two otter tags per licensed trapper to regulate harvest, which includes a statewide otter cap of 2,500. The cap allows the DNR to close the season early should state harvest reach 2,500. For the past decade, state trappers have harvested fewer than 2,000 otters a year.

Missed opportunity: When rising otter registrations triggered the Wisconsin Furbearer Committee to meet March 13, representatives generally agreed to an early closure to prevent overharvest. The DNR predicted that otter harvest would hit 2,500 by mid-April. Using the same data, GLIFWC scientists advised that the 2,500 threshold would be reached much sooner.

Almost two weeks later, on March 26, the DNR announced the early closure of the otter trapping season in the Northern Zone effective April 1, 2024, at midnight. The closure did not affect the Southern Zone harvest which closed March 31, 2024. On the way to 2,740 otters, four of the highest daily reported harvests occurred after the closure was announced. **—A. Carl**

Gichigami water levels historically on the move

For those plying Gichigami waters this summer or playing along the shoreline, you may notice the docks are higher and the beaches are bigger compared to last summer. Water levels have dropped. Many factors including precipitation play into why the water level fluctuates. The Lake Superior master gauge—located at Marquette, Michigan since 1860—demonstrates that water level fluctuations are a natural phenomenon.

The winter of 2006-2007 was similar to this past winter—warm and dry, and some may remember back to the near-record low water levels in March of 2007. The difference though, going into this past winter water levels were a foot higher. Hopefully, with some rainy and warmer weather, historic low water levels will not return. In the meantime, step up and enjoy the extra sand and exposed rocks on the beaches!

For more information see *glerl.noaa.gov/data/wlevels*. **—B. Mattes**

GLIFWC executive administrator calls for media to consult with tribal fishing experts: the tribes

An article appearing in several northwest Wisconsin local newspapers in early April titled 'Tribal spear fishing harvest' extensively reviewed the Ojibwe spearfishing season, citing everything from the planning, motivations, and decision-making of spearfishers and off-reservation fishery managers. The 1,200-word article even went on to list the Ojibweg favored fishing locations in the Ceded Territory. But all of this was created without talking to anyone from the actual tribes.

'I am writing to invite a broader perspective," said GLIFWC Executive Administrator Jason Schlender in a letter to the editor of *Sawyer County Record* and *Spooner Advocate*. "When discussing treaty rights or tribal harvest, it is essential to include tribal experience and expertise. Excluding tribal input is a disservice to readers."

The feature article on Ojibwe fishing drew solely from comments by a Wisconsin Department of Natural Resources treaty data coordinator.

Ojibwe Country has a suite of indigenous experts on fisheries stewardship and harvesting species from ogaa to ginoozhe to maashkinoozhe. Learn firsthand about tribal natural resources priorities near your community online and through social media. Need a hand getting connected? Give us a call at GLIFWC 715-682-6619. **—CO Rasmussen**

Water quality protections enhanced at Keweenaw Bay via TAS

By Charlie Otto Rasmussen, Editor

Four years after granting Keweenaw Bay Indian Community (KBIC) with treatment-as-state (TAS) authority, the US Environmental Protection Agency has approved water quality standards developed by the Upper Michigan tribe. For KBIC, the federal endorsement is a milestone in a generations-long effort to conserve and enhance the waters in and around tribal homelands along the Gichigami south shore.

"We are proud of the work done to get our standards approved and create protection for our great natural resource, Lake Superior," said KBIC President Doreen Blaker.

With the announcement by EPA officials on April 8, KBIC becomes the first Michigan tribe to attain regulatory authority for water quality. The Ojibwe band's standards for nibi (water) protection apply to all management decisions and activities that may impact on-reservation waters and wetlands.

Among the provisions KBIC authorities address in their water quality standards is to support—or keep from harm—manoomin beds on the reservation. With assistance from other Great Lakes tribes and GLIFWC, KBIC Natural Resources Department has invested decades into seeding and maintaining wild rice beds at Sand Point and other aquatic systems. As spelled out in KBIC's standards, protecting public health, maintaining biological integrity, and nurturing the sacred relationship that exists between the people and nibi are of the highest priority.

A TAS designation is an important tool for tribes to more effectively protect the environment and indigenous homelands; it empowers tribal governments to exercise authority under sections of the Clean Water Act in the same manner that Michigan, Wisconsin, and Minnesota do on state owned land. KBIC joins additional GLIFWC-member tribes with TAS-water authority including Bad River, Fond du Lac, Lac du Flambeau, Mille Lacs, and Mole Lake Bands.

The bulk of KBIC's reservation is located at and around L'Anse, Michigan on 59,000 acres. Find details on Keweenaw Bay Indian Community Tribal Surface Water Quality Regulations at: *tinyurl.com/4t2byvsw*.

Lake sturgeon conservancy, rehab work cited in ESA decision

Mike Plucinski, a GLIFWC Great Lakes fishery technician with a juvenile lake sturgeon at the mouth of the Bad River during the summer survey season. (CO Rasmussen photo)

Following a year-long review of lake sturgeon management, population status, and rehabilitation efforts, the US Fish & Wildlife Service announced that the ancient fish species does not require a listing under the Endangered Species Act.

The determination came April 22 after federal wildlife authorities examined the health of lake sturgeon—known in Ojibwemowin as name (nah-May)—in the upper Midwest, including the Great Lakes and Mississippi River basins.

Perhaps the most outstanding lake sturgeon stronghold on the Gichigami south shore is at Bad River. This self-sustaining population benefits from pristine habitat and centuries of stewardship by the Bad River Ojibwe community.

"We haven't really done anything special," said Erv Soulier, who headed up Mashkiiziiibii Natural Resources Department (MNRD) for 31 Years. "We've counted the population, we've tagged sturgeon, we survey the juveniles at the mouth [of the Bad River]. Our people aren't taking many sturgeon. We look after things."

(see Name rehabilitation, page 9)

Beneath the waves

What's happening to the Minocqua Chain ogaawag?

Douglass Keiser, master's student at Bemidji State University, fertilizes ogaa eggs to be distributed into test boxes and along ideal spawning habitat. (A. Shultz photo)

By Bay Paulsen, Staff Writer

Under the calm shallow waters of Lake Minocqua, an old ogaa is preparing to spawn. She found a suitable location, as she's done every year for nearly a decade. It's a gravel bed with flowing water and not too much disturbance. Eager to complete the spawning cycle, the males are there already, waiting for her to deposit on average 50,000 eggs.

She swims away as her now fertilized eggs rest between the gravel pieces. Many never hatch due to predation or other issues, but the ogaa strategy is quantity over quality; out of many, a few will hatch and grow to be healthy adult fish. But these will never make it that far.

This old walleye is one of the last to have ever been born and grown naturally in this lake. All the younger ogaawag have been stocked into the lake as fingerlings, and the people who stocked them are working hard to understand why natural recruitment has simply ceased.

Since the early 2000s, production of ogaa in the Minocqua chain has been heavily declining, and by the mid 2010s, it was clear that action would need to be taken. Groups including the Lac du Flambeau Tribe, GLIFWC, Walleyes for Tomorrow, the Wisconsin Department of Natural Resources, and others enacted on a three-pronged plan: eliminate harvest, and stock fingerlings (fish about 6-7 inches long), and add spawning habitat.

Until this year, ogaa fishing on the Minocqua chain has included no harvest by tribes and catch-and-release only for nearly a decade, yet no natural recruitment has been reestablished in Lakes Minocqua or Kawaguesaga, with very limited success in Lake Tomahawk.

In the spring of 2023, GLIFWC ran an assisted reproduction program on Lake Minocqua, bringing in ripe ogaa from the lake to spawn in sterile containers, then dispersing those fertilized eggs over ideal shoreline habitat, hopefully giving each egg a better chance at survival. In addition, Walleyes for Tomorrow released over three million fry into Minocqua Lake that they produced in their mobile hatchery. That fall, researchers returned to survey the abundance of young ogaa from this program, and only two were found, indicating almost no success from last spring's efforts.

Determining the fate of ogaa eggs and hatchlings

I sat in the front of the boat as GLIFWC's Climate Change Inland Fisheries Biologist, Aaron Shultz, motored us closer to Fishers Island, a state-owned piece of land nestled in the eastern section of Lake Minocqua. The cool air whipped around my face as we approached the site. Several red balloon-like buoys ambled lazily on the water, marking the location. Among them, one mesh box protruded from the surface, and upon closer approach, I could see six more boxes beneath the waves.

This was one of two experiment sites that would help us move towards better understanding spawning failures. The new study, starting in spring of 2024

(see Minocqua Chain, page 22)

Ogaa spawning box located in Lake Minocqua. This box is part of a study to determine the major factors influencing the decline in ogaa recruitment in the Minocqua Chain. This one has a mesh lid to exclude egg predators. (B. Paulsen photo)

MAZINA'IGAN STAFF:

(Pronounced Muh zin ah' ĭgun)

Charlie Otto Rasmussen ..... Editor
Lynn Plucinski ..... Assistant Editor
Jenny Van Sickle ..... Staff Writer
Bay Paulsen ..... Staff Writer

MAZINA'IGAN (Talking Paper) is a publication of the Great Lakes Indian Fish & Wildlife Commission, which represents eleven Ojibwe tribes in Michigan, Minnesota and Wisconsin.

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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 *glifwc.org, Facebook*, or *Instagram*.

On the cover

From later June into July, the outer bark of paper birch trees known as wiigwaas becomes ready to harvest. On a nice hot day, with gentle pressure from a sharp blade drawn vertically down the tree, wiigwaas releases from the tree with an audible "pop." Temperatures sizzled in the upper-90s when this piece of paper birch popped off a tree in the Brunsweiler River bottoms for a youth harvester. (M. Rasmussen photo)

GAAGIGE: back together, forever

Ojibwe elders appraise language, climate work

GLIFWC's GAAGIGE group (seated from the left, Rose Wilmer, Bad River; Judy St. Arnold, Michigan Ojibwe; Val Phernetton, St. Croix; Carolyn "Carrie" Connors, Bad River; Cleo White, White Earth; Dennis White, Lac Courte Oreilles; Joe Nayquonabe, Sr, Mille Lacs. Standing, Erv Soulier, Bad River; Jim St. Arnold, Keweenaw Bay Indian Community; Frannie Van Zile, Sokaogon/Mole Lake; and Joye LaPorte, Fond du Lac. (M. Rasmussen photo)

By Jenny Van Sickle, Staff Writer

Ashland, Wis.—The GLIFWC Advisory And Guidance Input Group of Elders (GAAGIGE) convened March 8 to review progress on GLIFWC's programs for the first time since the summer of 2022. Gaagige, in Ojibwemowin, means forever; GLIFWC initiated the advisory committee with elders from across Ojibwe Country to help preserve traditional ecological knowledge and language.

While the group did hold some virtual meetings during the Covid-19 pandemic, it just wasn't the same, said St. Croix elder Wanda McFaggen: "We really missed this part, spending time with each other." For the first 17 years, the group met twice annually guiding program initiatives forward through storytelling and recommendations on everything from traditional foods, to language, to tradtional ecological knowledge, and climate change adaption.

GLIFWC's Intermedia Web Designer, Melissa Rasmussen kicked off the Ashland GAAGIGE gathering with a presentation on the recently finished Administration for Native Americans (ANA) grant project, Maajii-Ojibwemowag (*They Begin to Speak Ojibwe*), aimed at Native language preservation and maintenance. Resources produced include a 12 book language and culture series and language website. Book sets were distributed to early childhood programs in each of GLIFWC's member communities. The glifwc-inwe.com website has two primary sections; the first is Maajii-Ojibwemowag (They Begin to Speak Ojibwe) is designed for teachers, caregivers, and learners 0-5 years of age. The activities are first divided by the four directions and then by stories of the flyers, four-legged, swimmers, and plants.

The second language and activities section, Nenda-Gikendamang Ningo-Biboonagak (*We Seek to Learn Throughout the Year*) is organized by the seasons and developed for K-8 language learners.

Both sections draw inspiration from the dual language book, *Dibaajimowinan: Anishinaabe Stories of Culture and Respect*. Published in 2013, the book's dedication reads, in part: "to the speakers who protected our language and continued to speak it even when they were punished for it," written by then-project director, Jim St. Arnold of the Keweenaw Bay Indian Community. St. Arnold now provides guidance and input to GLIFWC's language projects as a member of GAAGIGE with his wife, Judy.

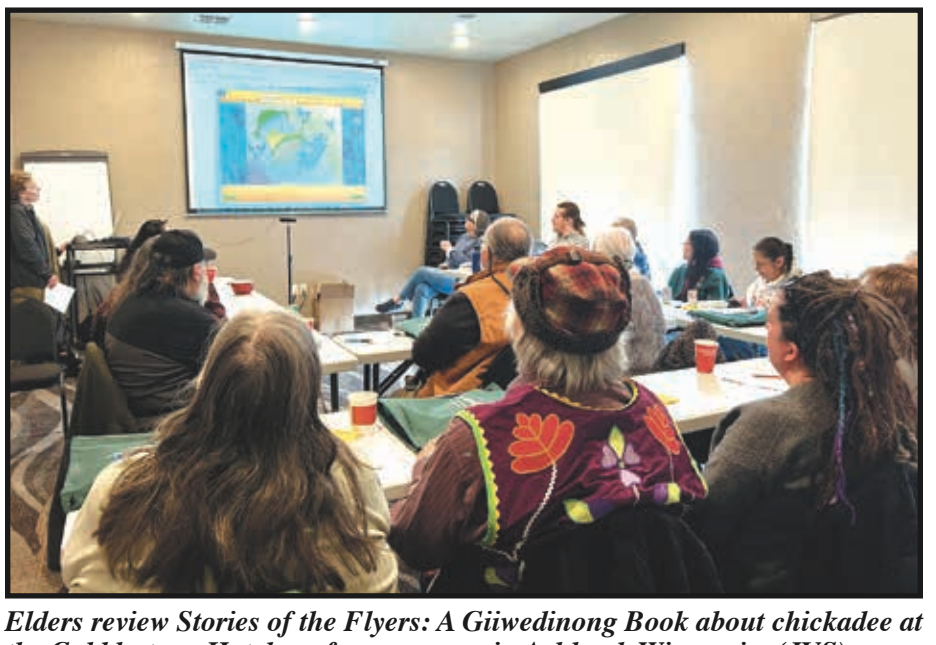
Elders also reviewed and gave advice to the GLIFWC Climate Team on how best to deliver upcoming climate change presentations to Ojibwe communities as well as what could be added to the traditional foods grant application.

"It's important for us to present to the elders first. They are ones who can tell if the listening session approach we are planning to use, to gather concerns and priorities for the Ceded Territory Climate Adaptation Plan, will work in their communities," said Rob Croll, GLIFWC's Climate Change Coordinator. GAAGIGE elders encouraged Croll's team to focus on education in their presentations rather than spending too much time with scientific jargon.

For Illeana Alexander, who joined GLIFWC in the role of Tribal Climate Adaption Specialist in 2023, this was their first GAAGIGE meeting. "The elders asked us to keep them up to date as we roll out our listening sessions, so we plan on continuing to attend the GAAGIGE meetings to share how things are going and get feedback," said Alexander.

While the tribal elders enjoyed the presentations and cherished their time together, the pandemic had a direct impact on the group. "It's nice that there are new members. It's exciting," said elder Joe Nayquonabe, Sr., of the Mille Lacs Band." I notice too, some of our group has walked-on now."

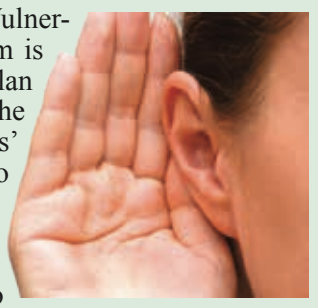
Nayquonabe said he likes putting in the work, values the laughter that comes from gatherings, and considers language preservation GAAGIGE's most pressing business. The quality time together as a group is an important element in being able to pass on the stories and knowledge, he said.



Elders review Stories of the Flyers: A Giiwedinong Book about chickadee at the Cobblestone Hotel conference room in Ashland, Wisconsin. (JVS)

Keep an ear out for a visit from GLIFWC

Climate listening sessions on tour



With the second version of GLIFWC's Vulnerability Assessment complete, the Climate Team is now setting its sights on a Climate Adaptation Plan for the Ojibwe Ceded Territories. To kick off the project, the team will visit all 11 member tribes' communities conducting listening sessions to inform tribal members of current and projected climate impacts and gather feedback on what concerns people the most.

Before rolling out the listening sessions to member tribe communities, the team first started with a hearing for GLIFWC staff. The listening sessions opened with a short educational presentation about climate change impacts in the Great Lakes region and some background and education on climate adaptation. After the presentation, GLIFWC hosted a big potluck lunch with time built-in to mingle and catch up. As the meal wound down, the Climate Team kindled a discussion on what people's most pressing climate concerns are and what GLIFWC can do to help create a resilient future landscape.

In addition to asking GLIFWC staff for their experience with climate change and how it impacts their work and personal life, the Climate Team compiled input on the format, timing, and logistics of the listening session. Everyone gave great feedback, and the team is excited to hit the road to learn from native people across the Ceded Territory.

Keep an eye out on Facebook and community news on your reservation—the Climate Team is coming to all 11 member tribes' communities! Find the latest Vulnerability Assessment (2023), Aanji-bimaadiziimagak o'owaki, at *tinyurl.com/mz3ayhdh*.

—I. Alexander

Copperwood receives financial boost from Michigan to develop metallic mine along Gichigami shoreline

By James Rasmussen
GLIFWC Policy Analyst

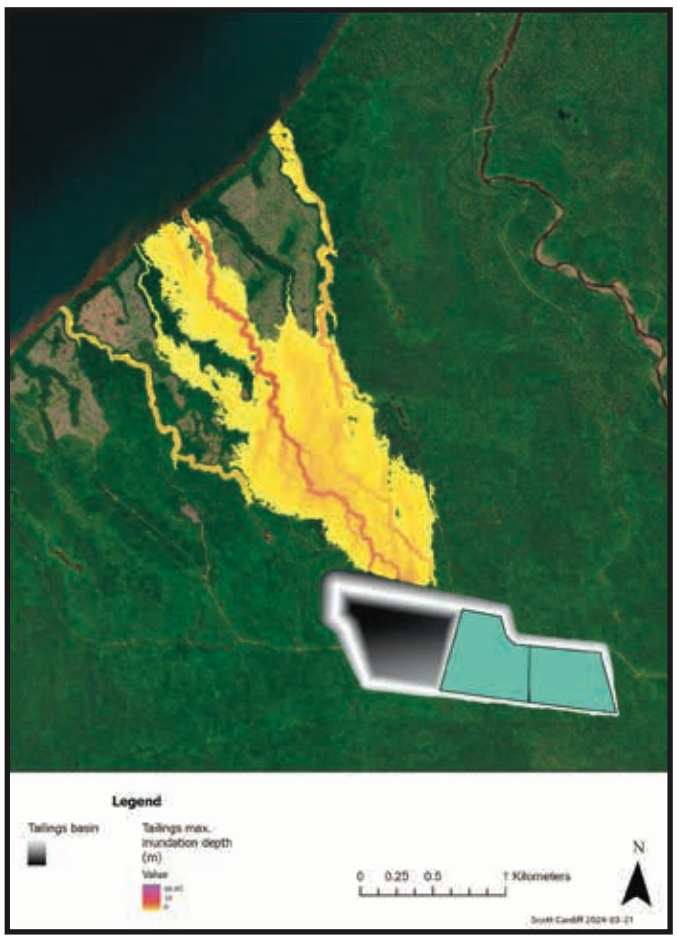
Wakefield, Mich.—Sited just feet from the Lake Superior shoreline and directly adjacent to the Porcupine Mountains Wilderness Area, the proposed Copperwood Mine presents a substantial risk to water quality and treaty resources.

The Copperwood Mine is a metallic mine in development by Highland Copper, a foreign mining corporation located in Vancouver, Canada. Highland seeks to establish mine workings just feet from the lakeshore and a tailing basin that poses a significant risk to local waterways and Lake Superior as determined by GLIFWC staff.

Trees have been cleared and the rerouting of streams is underway to make way for the tailings basin. Full scale construction has stalled because copper prices below $4.00lb meant the site would not be profitable. However, a new 50-million-dollar state subsidy and a recent spike in copper prices allow the owners to move forward with site development.

The tailings disposal basin

The mining waste from the proposal would be stored on site in what is known as a tailings disposal basin. The material stored in the 320-acre holding pit would consist of a toxic semi-liquid tailings slurry, along with the industrial byproducts of metallic milling operations. The slurry would be held back by an immense dam, constructed with some of the tailing waste from the mine.



Recent modeling of tailings flow by GLIFWC Staff for one scenario of tailings basin failure. A detailed tailings basin design is needed to refine these modeling results. (S. Cardiff illustration)

These dams have a troubled history of leaks, groundwater contamination, and catastrophic failure. They represent a permanent environmental threat and safety hazard, requiring expensive monitoring and maintenance forever. Storing mining waste near the shore of Lake Superior poses considerable water quality risk.

If the proposed tailings basin should breach, within just 30 minutes, contaminated slurry flow would reach Lake Superior. The remote location of the proposed site, adjacent to the Porcupine Mountains Wilderness Area, limits a timely emergency response to address such a breach.

A final design of the tailings basin at the proposed site has not been submitted, making it impossible to completely evaluate the risks, threats, and cost a tailings basin at this site may present. A breach of the tailing basin could cause tailings and mine process water to quickly enter Lake Superior.

Unknown impact from historic mine exploration

GLIFWC staff have also identified that conduits for mine flood water to escape into Lake Superior may have been created through the unregulated historic exploration of copper.

At one time, the Upper Peninsula of what is now Michigan had some of the world's largest deposits of high quality copper ore. That led to a copper rush that brought in workers and exploration from all around the world. Since the mining boom of the mid-19th Century, much of the highest **(see Proposed Cooperwood Mine, page 14)**

Healthy fishery hinges on stamp sand removal

Indigenous knowledge, science drives Buffalo Reef rescue

By Bill Mattes, GLIFWC Great Lakes Section Leader

Houghton, Mich.—It was an early spring morning in '95 when I grabbed my gear and headed to Traverse Bay on the Keweenaw Peninsula with GLIFWC Great Lakes Technician Mike Plucinski. We were off to measure, weigh, and collect fish samples from Ojibwe commercial fisherman Cecil Peterson. We didn't want to be late. Grumpy, as Cecil was affectionately called, did not wait for slackers.

Together aboard Peterson's tug, we plied the waters of Gichigami (Lake Superior) towards a string of gill nets that we knew would be chock full of adikameg (lake whitefish) with a few chinamekos (lake trout) hanging as well. We chewed the fat along the way to pass the time.

Cecil told me how the Gay Peninsula was made up of mining tailings (stamp sands), and that Old Man Weta had said his grandfather used to fish reef herring (kewis, cisco) near the shore by Gay, Michigan before the shoreline reef was covered by tailings.

I heard how the power of Gichigami's waves and the increased number of windy days were moving the tailings faster and further year-by-year; I heard that the tailings were starting to appear where Cecil fished for adikameg and chinamekos near Buffalo Reef—an important spawning area for the fish. Cecil told me: "when the fish disappear because the reef is gone, I'll be the first to get blamed because we harvest them. But if there's no reef, there's no fish."

Science runs with indigenous knowledge

I thought back to advice I'd received from an experienced biologist, who'd said to listen to the fishermen and design a study to verify what they said, then present the findings to the scientists and resource managers to spur actions that benefit the fishery. Good advice. In response to my onboard conversation with Cecil, GLIFWC's Great Lakes Section increased fall lake trout and whitefish sampling in the area and started sampling nearshore areas for juvenile whitefish

Mike Plucinski removes juvenile fish, pictured in bag, from a beach seine near the mouth of the Traverse River. (staff photo)

the following year in 1996. Through a successful grant application in 2004, the first GLIFWC study was implemented to assess where stamp sands were in relationship to the reef.

Over the ensuing 20 years, multiple studies have been conducted and more are ongoing. In an area under multiple jurisdictions, affecting change in management requires inputs by knowledge holders to be proven through western scientific methods. Studies thus far have shown negative impacts to fish and aquatic invertebrates due to stamp sands covering the natural substrate (sand and rocks). More recent studies are defining the scope of that effect.

The stamp sands now cover up to 40% of the reef and are piled up high at the Traverse River breakwater. Discoloration of the natural yellow sand due to **(see Buffalo Reef, page 16)**

Warm winter brings early ogaa assessments

GLIFWC biologists and Walleyes for Tomorrow volunteers collected ogaa from fyke nets in Lakes Minocqua and Kawaguesaga and are collecting length, age, and sex data before clipping a fin for mark-recapture population assessments. (B. Paulsen photo)

With last winter's warm temperatures and the early onset of spring, ice-out occurred much earlier than usual across the Ceded Territory. With that, GLIFWC crews hit the ground running in March to begin adult ogaa (walleye) assessments.

GLIFWC performs assessments for ogaa each spring during the spawning season. These population estimates are shared collaboratively between GLIFWC, Ojibwe tribes, and states to determine safe harvest limits and monitor lakes in which ogaa populations are a concern, such as Lake Lac Vieux Desert on the Wisconsin/Michigan border.

Population estimates are obtained using the mark-recapture method. It is labor intensive, but it produces more accurate data than other methods. During the survey, ogaawag are collected using either fyke nets or electrofishing gear and are "marked" with a fin clip. Later on the recapture run, the ratio of marked to unmarked ogaawag is used to calculate the approximate population.

In addition to early ice-out in 2024, temperatures on the lakes warmed very gradually, extending spawning season for ogaawag and causing these surveys to take longer than they usually do. Crews from Mole Lake Tribe, St. Croix Tribe, Walleyes for Tomorrow, Wisconsin Department of Natural Resources, and the U.S. Fish & Wildlife Service collaborated in obtaining the estimates.

—B. Paulsen

Dane LaGrew, GLIFWC fisheries aide, with a healthy female captured and released during a spring electrofishing survey. GLIFWC inland fisheries crews conducted adult ogaawag assessments on 19 Ceded Territory lakes. (E. White photo)

Fall feasting ahead with historic cisco surge on Gichigami

Cisco (lake herring), abundance has rebounded in a big way on Gichigami (Lake Superior). The largest number of ciscoes in 46 years of surveys was recorded in 2023. Coming up later this year, these fish should start showing up in the fall commercial fishery. Large year-classes (those hatched in the same year) of cisco have sustained commercial fisheries years into the future as the silvery fish live over 20 years. The future looks good if you like pickled herring!

Researchers are already documenting one-year-old cisco in chinamekos (lake trout) stomachs. Cisco are considered a prey fish, or a fish that is eaten by other animals, and lake trout are their primary predator—an animal that eats other animals.

In addition to lake trout, chinook and coho salmon also feed on cisco. With the large year-class of lake herring, these predators will have ample food to grow fast and large, so expect to see some big fish!

Atlantic sea lamprey also prey on cisco. Sea lamprey leave tributary rivers in the fall for Lake Superior when cisco are near shore to spawn. After leaving the rivers, sea lamprey begin feeding on fish as a parasite that attaches and drains the host's body fluids. With plenty of cisco nearshore to spawn in the fall, sea lamprey will have good eating so don't be surprised to see an uptick in the numbers of sea lamprey!

For more detailed information on cisco assessments visit *tinyurl.com/h7dxpreb*.

—B. Mattes

Essential Ojibwemowin

odoonibiins—lake herring

Gilbert receives the Wisconsin Award

GLIFWC Biological Services Director Jonathan Gilbert recently received the Wisconsin Award from the Wisconsin Chapter of the Wildlife Society. As the Society's highest honor, this award recognizes a person or group who demonstrates a high level of achievement or service to the wildlife profession. The award nominees are evaluated on the basis of their overall achievement or service to the wildlife profession in the fields of: management, research, teaching, public relations, or legislative direction. Pictured, from left: Scott Hygnstrom, director, Wisconsin Wildlife Institute, UW-Stevens Point; Jonathan Gilbert, Darren Ladwig, Wisconsin Department of Natural Resources and Wisconsin Chapter of the Wildlife Society president), and John Olson, retired DNR furbearer ecologist.

Manoomin gii-nitaawigiyaan
Makak, sensor for manoomin

By Bay Paulsen, Staff Writer

If manoomin (wild rice) plays a role in your life, whether you're harvesting it to feed your family, hunting waterfowl in the fall, or simply observing its life cycle as it grows each year on a nearby lake or stream, you likely know how sensitive this being is to disturbances like greatly fluctuating water levels, excess wave action, warming water temperatures, and increased frequency of historic floods.

These factors and more have contributed heavily to the decline of healthy manoomin beds in the last several decades, and our continued stewardship requires us to keep very close observations on the plant itself, its lifecycle, and the water it grows in.

It's for this reason that Eric Greenlee, Computer Science PhD Student at Georgia Tech, is collaborating with GLIFWC, the Lac du Flambeau Tribe, and the 1854 Treaty Authority to use modern technology to help bolster our understanding of manoomin waters.

It comes in the form of sensor-containing buoys, bobbing on the edge of manoomin beds. They continuously collect data for water level, wave action, humidity, water and air temperature, and water and air pressure, all of which can be remotely viewed by the biologists in real time.

Water quality and environmental stability are very important to the rice. These plants live out their entire lives in shallow, gently moving waters in inland lakes and along the edges of rivers, growing in several distinct stages.

Seeds begin their lives embedded in soft sediment after falling from their mother plant in late fall. They will lay dormant throughout the winter, and most will germinate the following spring, entering the submerged stage in which a root system and up to four small leaves will begin to form. These long leaves will gradually grow through the water column to reach the surface, and by early summer, they will lay flat on top of the water. This is known as the "floating leaf" stage and is where the plant is most vulnerable.

Installing sensors along manoomin beds. From left: Blaine Rothrock, Northwestern University; Kathleen Smith, GLIFWC; Yaman Sangar, Georgia Tech; Brandon Byrne, GLIFWC; Eric Greenlee, Georgia Tech. Inset: This buoy contains several sensors to monitor the air and water around manoomin beds. (AISES (aises.org) photos)

Maajiigin manoomin (the rice is starting to grow). (B. Paulsen photo)

Its buoyant leaves and underdeveloped root system allows it to be easily uprooted when the water is excessively disturbed, such as with high winds, flooding, or large boat wakes, all of which has become more common with climate change and human recreation.

By mid-summer, aerial shoots can be seen protruding from the water's surface, beginning the emergent stage. By now, the roots have taken a stronger hold in the sediment, and the plant is less vulnerable to mild and moderate disturbances.

Over the next few months, these stalks will grow two to five feet above the water and will develop flowers, then seeds, and in early to mid-fall, harvesting will begin. This harvest is the gift given to us by the manoomin plant and the water it grows in. This is why the protection of the plant and the water is so important, and these specialized buoys offer a new way to collect crucial observations.

This data will bring more understanding about the connections between human activities and manoomin, and it will help inform which acts of stewardship we need to prioritize, whether that's educating about the effects of climate change or implementing more regulation such as no-wake zones.

If you are out and about in Ceded Territory waters and come across any of these buoys yourself, you will find contact information and a QR code. Visit *www.manoom.in* to learn more about the project.

Control season for problem plants starts in June

Odanah, Wis.—GLIFWC is continuing efforts to work with populations of potentially harmful non-native species in 2024. These efforts include a focus on priority species of non-local beings such as Dalmatian toadflax, European marsh thistle, leafy and cypress spurge, purple loosestrife, wild parsnip, garlic mustard, teasel, yellow flag iris, and non-native phragmites.

Work will take place from June through September, primarily within the road rights-of-way of Ashland, Bayfield, Douglas, and Iron counties. Efforts may include manual removal (hand-pulling, digging, removing flower heads, etc.), spot applications of herbicide, as well as biological control for spurge and loosestrife.

Hundreds of non-native (or "non-local") species have been introduced to the western Great Lakes region, primarily as a result of human activities. Many of these introduced species are relatively harmless. However, some non-local plant species have aggressively moved into native ecosystems where they have been documented to cause environmental and economic harm, and even harm to human health. These species typically lack the natural predators and other natural forms of control that typically help maintain a balance in their native ranges (often parts of Europe and Asia).

Introduced species can negatively impact plants, wildlife, livestock, and humans. For example, garlic mustard can outcompete many native plant species, such as spring ephemerals in wooded floodplains. Purple loosestrife and non-native phragmites threaten wetlands and coastal estuaries by displacing native plants, reducing diversity, and degrading habitat for native wildlife. The sap of leafy and cypress spurge contains a compound that can be toxic to deer and cattle and spurge plants can displace native plants and forage crops. Yellow flag iris is also considered poisonous, and populations can expand quickly, forming dense monotypic stands that replace and crowd out native aquatic plants. Exposure to the sap of wild parsnip can lead to a condition called phytophotodermatitis, caused by chemicals in the sap that make the exposed skin of humans and animals hyper-sensitive to sunlight. This can result in mild to severe rashes, blistering, and skin discoloration that may last several months.

GLIFWC's control efforts are conducted with a goal of learning from and respecting these introduced non-local beings, as we do our part to protect native ecosystems, treaty-protected resources, and biodiversity in the Ceded Territory.

For more information, please contact Travis Bartnick at (715) 682-6619 ext. 2166 or email at *tbartnick@glifwc.org*.

← ***Thriving in grasslands and roadside habitats, leafy spurge can be toxic to domestic and wild four-legged animals. GLIFWC employs a combination of biological controls, manual removal, and herbicides to help keep a lid on non-native species, helping maintain biodiversity in the Ceded Territory.***
(S. Garske photos)

From water to food, PFAS finds its way into communities

New safety measures in place

By Caren Ackley, GLIFWC Environmental Biologist

PFAS, or per- and poly-fluoroalkyl substances, are a class of thousands of chemicals that have been manufactured across the globe since the 1940s. PFAS have been used in many industrial and consumer products for their desirable properties that make them resistant to heat, water, oil, and chemicals. However, these same properties make these chemicals resistant to degradation and are therefore extremely persistent in the environment, earning them the moniker "forever chemicals."

Furthermore, PFAS chemicals have been shown to be highly toxic and bioaccumulate in the body. The most common routes of exposure to the public are through consumption of contaminated drinking water and foods, including some fish.

Environmental PFAS contamination has been found near and downstream from a source point. Common sources of PFAS contamination include PFAS manufacturing plants, army bases and firefighting training facilities where PFAS-containing aqueous film-forming foam (AFFF) has been used to extinguish fires, landfills, and agricultural fields where biosolids have been spread as fertilizer. These chemicals can be easily transported by water, such as rain and snowmelt runoff and groundwater movement, and therefore can spread quickly across the environment contaminating surface waters and drinking water sources.

Federal standards emerging

In April 2024, the U.S. Environmental Protection Agency (EPA) set six Maximum Contaminant Levels (MCLs) for PFAS chemicals in drinking water. These new federal standards place legally enforceable limits on the amount of these chemicals allowed in drinking water: 4.0 parts per trillion (ppt) for PFOA, 4.0 ppt for PFOS, 10 ppt for each of PFHxS, PFNA, and GenX chemicals.

These standards also provide a Hazard Index MCL of 1 (unitless) for any mixture in drinking water of at least two of the chemicals PFHxS, PFNA, GenX, and PFBS that assesses the potential risk of the combined levels of these chemicals. All public water systems must conduct initial testing by 2027 and routine monitoring thereafter and are required to share the test results with the public. Where MCLs are exceeded, solutions must be implemented by 2029 to bring the water supply into compliance.

(see PFAS, page 16)

Name rehabilitation

(continued from page 3)

Now Chairman of the GLIFWC Lakes Committee, Soulier said the threat of poaching following the sturgeon crash in eastern Europe in the 1990s was a concern for the Ojibwe band.

"That loss of caviar, the world markets, we wondered if our sturgeon would become a target. But it never really happened here," Soulier said. Sturgeon eggs, or caviar, is considered a food delicacy across the northern hemisphere.

In historic waters where populations disappeared, stocking has returned sturgeon especially where overfishing and dam construction cut off mature fish from their spawning grounds. Fish passages, dam removal, and habitat improvements have helped accelerate the recovery.

Collaborations between state, federal, and tribal agencies on Upper Michigan's Ontonagon River and other Great Lakes tributaries are crucial to continued lake sturgeon recovery. (COR photo)

"On both sides of the International border, indigenous nations, the states/province, federal governments, and their partners have been effective at coordinating lake sturgeon management on Gichigami for a long time," added Bill Mattes, GLIFWC Great Lakes section leader. Joining MNRD, US Fish & Wildlife Service and GLIFWC have supported sturgeon research and monitoring on the Bad River system for 40 years.

—CO Rasmussen

Rainbow smelt PFAS study

Keweenaw Bay Ojibwa Community College students (from left) Jordis Numinen, Daniel Lauritsen, Jenna Maki, and Jean Duschaine measure and weigh rainbow smelt samples from Lake Superior last April. The college is working with Michigan Technical University to analyze smelt for PFAS through a cooperative agreement. Smelt are a significant part of tribal member's diets at Keweenaw Bay Indian Community, especially during the spring spawning runs on Gichigami shorelines when residents from across the region catch the bite-sized fish by the thousands from hand-drawn nets. (G. Mensch photo)

MW CASC & GLIFWC explore ways to help name adapt to changing climate

Name in a Changing Climate

Research partnership supports Tribal stewardship of name

In response to concerns from Tribal leadership in the Midwest region, a Midwest Climate Adaptation Science Center (MW CASC) and Great Lakes Indian Fish and Wildlife Commission (GLIFWC) team explored how climate change may affect name. This project investigated potential impacts and what can be done to help name adapt to a changing climate.

Language Guide

Name (*nuh-may;* Ojibwe)
Nmè (Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians)
Nama'o (Menominee)
Lake Sturgeon (English)

Research Path

Foundation - Relationships and Cultural Context

The project team's approach to relationship building:

1. Building a core internal team to develop processes and ensure success
2. Recognizing and supporting data and knowledge sovereignty
3. Communicating the research process and how information will be used with participants, including offering multiple checkpoints for feedback
4. Building time and flexibility into the process to meet participant capacity

Many Tribes have strong subsistence, cultural, and spiritual relationships with name. Understanding that there is much sensitive and cultural knowledge that folks are not able to share, the team focused this research project on the ecological aspects and rehabilitation of name.

Identifying Needs

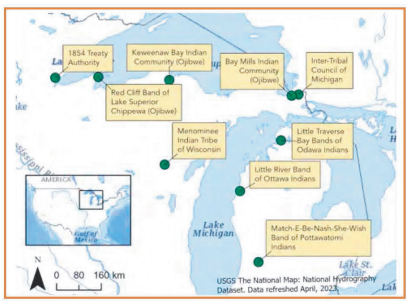
Informed by conversations with representatives from Tribal Nations and organizations, the research team identified three key outcomes for this research project:

1. A synthesis of current and projected climate impacts for name
2. Potential climate adaptation options for name
3. Future research priorities and areas of collaboration between the MW CASC and Tribal partners

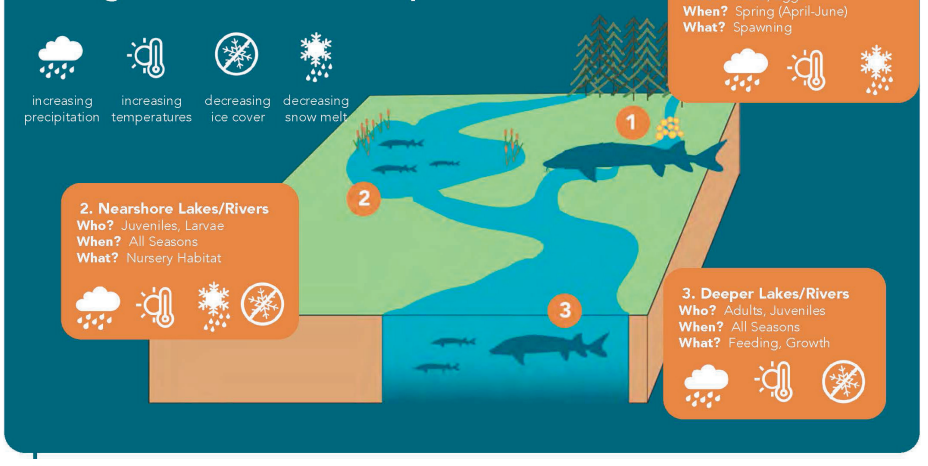
Performing Research

To determine how name is impacted by climate change, researchers:

1. Held conversations with biologists, natural resource directors, historic preservation officers, and managers from Tribal nations and organizations across the region
2. Performed a literature synthesis of climate drivers and model projections



Sharing Results - What Will Impact Name?



Sharing Results - How Could We Help Name Adapt?

- Nearshore, spawning, wetland habitat restoration
- Reconnecting floodplain habitat
- Reducing non-climate stressors
- Reducing or modifying dams
- Targeted water flow management

Next Steps

- Climate adaptation strategies could be incorporated into name stewardship plans and activities
- This project's partnership-driven research process could be expanded to other beings and initiatives

Indigenous people, stories, and local community-led fisheries management

Seattle, Wash.—Indigenous people and local communities have lived with and developed relationships with other species/beings (e.g. water, fishes), in some cases, for thousands of years. During this time, lessons were learned, stories were told, songs were sung, norms developed that shaped how these people used, respected, and cared for these other beings.

GLIFWC Inland Fisheries Research Biologist Aaron Schultz and The Nature Conservancy's Sui Phang led a session at the recent World Fisheries Congress March 3-7 on contributions of Indigenous people and local communities (IPLCs) in global fisheries as users, managers and leaders in defining and driving conservation and sustainable fisheries management.

Indigenous people and local communities comprise most fishers globally by numbers, often participating in mixed activities for nutrition and livelihood. In doing so, they also act as resource managers and stewards through formal and informal rules. Integrating the vision and existing governance of these fishery actors, through community-based and co-management approaches, is challenging yet necessary.

(see World Fisheries Congress, page 16)

GLIFWC staff is well represented on the World Fisheries Congress Steering Committee along with agency and NGO professionals from across the globe. (Submitted photo)

Data Sovereignty

The MW CASC observes principles for responsible and ethical research in every stage of research. We acknowledge that Indigenous knowledges are grounded in holistic worldviews and deeply rooted in local cultures and places and, as a result, there are inherent risks when sharing these knowledges publicly.

MW CASC consortium members (College of Menominee Nation, Great Lakes Indian Fish and Wildlife Commission) respect the spirit of data sovereignty. Data collected on reservations and ceded territories will be considered "Tribal data," subject to the laws and codes of the Tribal government. The Tribe maintains sole ownership and control of all Tribal data. Such data shall not be shared with third parties without the express written permission of the Tribe.

We recognize the importance of clear, transparent communication related to knowledge sharing by and with Tribes. When information is collected by federal staff it may be subject to the Freedom of Information Act. When requested by participants, we will take additional measures to safeguard the information from data requests.

Throughout this project, the research team emphasized how they intended to use participants' information, including to generate apeer-reviewed summary of these findings in collaboration with all interested participants. Every participant was invited to act as a co-author on the work and provide feedback as the summary was developed.

About the Midwest CASC

The Midwest Climate Adaptation Science Center (MW CASC) is a consortium of research-focused academic, Tribal, andnon-profit partners working collaboratively with the United States Geological Survey (USGS). We team scientists with natural and cultural resource managers to deliver science to help fish, wildlife, water, land, andpeople adapt to a changing climate. mwcasc.umn.edu

Tribal Climate Resilience Liaisons

The MW CASC has two Tribal Climate Resilience Liaisons who work to facilitate stronger relationships between Tribes, climate researchers, state and federal organizations, academic institutions, and the MW CASC. In addition, they work with Tribes to build capacity and provide support by assisting with climate resilience efforts.

Get in Touch

Holly Embke, MW CASC Research Fish Biologist: hembke@usgs.gov

Sara Smith, Midwest Tribal Climate Resilience Liaison: ssmith@menominee.edu

Acknowledgements

We express the sincerest gratitude to the many representatives from Tribal Nations and organizations whose collaboration made this work possible, including those at the 1854 Treaty Authority, Bay Mills Indian Community, Inter-Tribal Council of Michigan Inc., Keweenaw Bay Indian Community, Little River Band of Ottawa Indians, Little Traverse Bay Bands of Odawa Indians, Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians, Menominee Indian Tribe of Wisconsin, and Red Cliff Band of Lake Superior Chippewa.

Great Lakes Indian Fish & Wildlife Commission

MIDWEST Climate Adaptation Science Center

USGS science for a changing world

Biodiversity in Bay Mills

By Jenny Van Sickle, Staff Writer

Brimley, Mich.—In the Eastern most reaches of Michigan's UP is the community of Gnoozhekaaning (Place of the Pike). The Bay Mills Indian Community is bordered by the St. Mary's River, Lake Superior, Sugar Island, and the Hiawatha National Forest.

Wildlife Biologist Mallory Verch is relatively new to the Bay Mills Biology Department; however, her wildlife cameras have been in the field for a little more than four years and have captured moose, bear, and a mountain lion on the reservation.

On the short walk to a camera, Verch and her crew pass beach pea and dark grey basalt rocks where agates like to hide.

The high-water mark of the lake is dramatic. Pine tree root systems are exposed where the crashing waters have eroded its foundation of soil and rocks over the years. The erosion is in part due to the 10,000 ships that pass through the Soo Locks annually from March through December.

Wildlife Biologist Malory Verlich checks one of 33 game cameras across Bay Mills' 3,501 acres of reservation. (JVS photo)

The roots of this pine tree are exposed due to Gichigami waves. (JVS)

One initiative Verch is looking forward to is learning more about the local bapakwaanaajiinh (bat) population. "We need to try and gauge a baseline population and preserve areas where they are roosting." Because bats overwinter in such close quarters, they are especially susceptible to diseases and are naturally slow reproducers. The northern long-eared bat is listed as endangered due to white nose syndrome, a fungal infection that is fatal to bats.

Despite the often dark lore around them, bats provide a lot of benefits to their communities. Verch explained that the pesticide (herbicides, insecticides) industry has grown over the last five years and is worth more than 18 billion dollars in the United States. Increasing the use of pesticides is highly problematic because those chemicals easily travel through air and water systems, impacting the health of natural communities.

Bats not only eat bugs and mosquitoes, they're important pollinators and their guana is nitrate rich which helps grow healthy plants."Bats do it all for free and don't add any additional pollutants to our environment," said Verch.

Industry predictions estimate the demand for pesticides will continue to grow through 2028.

Surrounding the Bay Mills community is an important south shore ecosystem where the St. Mary's River meets Lake Superior, called an estuary. The National Centers for Coastal Ocean Science (a division of NOAA) reported that "increasing water temperature was the most significant factor affecting pesticide toxicity in estuarine organisms." Meaning, warming waters are likely to increase the potency of pesticides and how those toxins can harm aquatic life.

The Gumshoes or North Pond area is rich with high-quality coastal wetlands that remained almost entirely free from non-local beings or "invasive species."

Brian Wesolek oversees beach & water quality work with Bay Mill's biology team and has been carefully cataloguing wetlands since 2019.

"Look at this place, we've got everything here," said Wesolek. The North Pond wetland is alive with diverse and healthy plant life. A small boardwalk path is lined with Labrador tea, the handy work of beavers, the carnivorous pitcher plant, birch, and cedar trees until you reach the edge of a massive floating vegetative bog, where cranberries and dragonflies are flourishing.

The Bay Mills forestry department recently reported that the abundance of dams being constructed by beavers are contributing to water levels that support the vibrancy of the wildlife found in their wetlands.

"I've worked in natural resources for more than 10 years here." said Wesolek. "This never gets old," he added.

Brian Wesolek, Bay Mills water quality program, presents a pitcher plant, one of two carnivorous plant species that can be found at North Pond. (JVS photo)

Bay Mills has 1800 acres of undeveloped forested wetlands. In 2022, the Executive Council designated 126 acres of the Gumshoes Recreational Area with 'Preserve' status. The designation recognizes the wetland's rich biodiversity, overall health, function, and ecologic importance and largely protects the area from commercial development.

Environmental Biologist, Aubrey Maccoux-LeDuc, originally from Wisconsin, has made the small lakeside community of Bay Mills home. Over the last few years, Maccoux-LeDuc's day to day work has been project management focused on protecting area waters and the Straits of Mackinac.

Aubrey Maccoux-LeDuc, Bay Mills environmental biologist shows where work will begin to reunite ishkode (fire) with their landscape. BMIC is working through the planning stages to produce a video to help tell the story of good fire. (JVS photo)

Bay Mills' biology department has been at the forefront of Bay Mills' research on understanding more about the potential environmental impacts of Line 5. "When we look at oil spill response capacity, one thing we study is response time and how that's effected by wave height; it's critically important to know exactly what is or isn't possible, if the worst were to happen," explained Maccoux-LeDuc.

For more information about Bay Mills Indian Community's Biological Services please visit: *baymills.org/biological-services*.

Bat studies extend to KBIC

Two hundred miles west of the Bay Mills reservation, Keweenaw Bay Indian Community (KBIC) is almost 10 years into their bat data collection on the L'Anse reservation. KBIC tribal member and Wildlife Coordinator Kyle Seppanen, has earned the nickname, "batman."

In 2006, White Nose Syndrome (WNS) hit bat populations hard in the New York area, packing a mortality rate in bat colonies upwards of 85%.

Seppenen started working with the wildlife program in 2013, just one year before Michigan's Upper Peninsula had its first confirmed cases of WNS. Funding from Bureau of Indian Affairs Endangered Species program got KBIC's acoustic monitoring program underway while support from the US Fish & Wildlife Service has helped keep the work going.

"Bats can't stay asleep once they get it," explained Seppenen. WNS causes bats to experience irritation in their wings and nose, inability to eat or hibernate and they often die of dehydration.

The U.P. has a vast network of caves and mine shafts, which are ideal for bat habitat. A key component in combatting WNS is temperature. Because WNS is fungal, it needs warmer temperatures to survive.

Over the last decade, methods to keep caves cooler, treat bats directly with a vaccine-like medicine, or even scanning caves with UV lights are being deployed to kill WNS spores.

"The problem is, we can scan the entire hibernacula (hibernation space), but the second an exposed bat shows up untreated, the entire colony is right back at square one" for risk of exposure, explained Seppenen.

KBIC is also concerned by the potential excess use of pesticides, in the absence of bats. "There's just not much good that can come from increasing how often we're using those chemicals," said Seppenen.

The Northern Long Earned bat was officially added to the Endangered Species list in 2015. The Keweenaw Bay wildlife program strongly encourages community members, especially in the UP, to learn more about how and where to hang bat houses and stress that there is no need to be afraid of bats or to be any more cautious than with any other wild animal.

For more information on the history of White Nose Syndrome and resources please visit: *tinyurl.com/2cmybmcr* and *tinyurl.com/sw34ka3z*

In memory, story, action: Ojibwe achievements live on

East meets west in ceremonial treaty rights run/walk

By Jenny Van Sickle, Staff Writer

Odanah, Wis.—In 1999 the following passage appeared in the Mazina'igan spring supplement after the 1,000-mile Waabanong Run concluded in November of 1998: *"The [Treaty] Staff, now back in Lac du Flambeau, awaits another journey to be carried, perhaps, with new hands, new feet, but with an enduring vision and prayer…"*

The Waabanong Run from Lac du Flambeau to Washington DC was organized as part of the Mille Lacs 1837 Treaty rights case. The court's 5-4 ruling ultimately upheld reserved off-reservation harvest rights for Ojibwe treaty tribes in the eyes of the United States Supreme Court.

Some 25 years later, community members completed the Ningaabii'anong Run March 21, 2024, spanning the distance between the Bad River reservation in Wisconsin to the Mille Lacs reservation in Minnesota in a single day to commemorate the Waabanong Run. This time around,while the Treaty Staff stayed back, instead of heading to the steps of the Supreme Court in D.C., runners laced up their shoes to head west.

GLIFWC's Executive Administrator Jason Schlender helped plan the day's events in coordination with the Mille Lacs Band. He explained the naming of the runs in a talking circle: "Waabanong means 'to the east" whereas Ningaabii'anong means 'west' in Ojibwemowin."

There were in fact 'new hands and feet' who completed the 200-mile trek to Mille Lacs. Dan Williams, Executive Director of Red Cross Minnesota & Dakotas Region volunteered with a team of eight to host refreshments and first aid stops along the way. When Williams saw a flyer promoting the run, he was compelled to reach out.

"We work closely with Monte Fronk of the Mille Lacs Band. He's one of our best volunteers," said Williams, who got to work organizing volunteers and identifying good stopping points along the way. "We knew this was a really important anniversary to show up for, to roll up our sleeves and help out."

The Red Cross volunteers even got to log a few official miles before the day was over.

Running alongside newer faces were more familiar ones, too. Members from the original Waabanong core team reminisced about the 17-day run they completed together a quarter century before. Both Kemo (Gary Kmiecik) and Neil Kmiecik, GLIFWC's former Biological Services Director, participated in the 1998 run and this year's event.

Mille Lacs Commissioner of Natural Resources, Kelly Applegate leads the final stretch of the Ningabii'anong Run/Walk March 21, 2024 (JVS)

"Each new day we would pick a justice and their family to pray for," recalled Neil Kmiecik during a talking circle just before the run.

The printed passage from the 1999 Masinaigan continues:

"No one knows exactly when the prayer began; it seems an ongoing prayer emanating from the hearts of Native People, a prayer that has been carried westward in tragic voyages such as the Trail of Broken Treaties, and carried eastward as did Chief Buffalo in his arduous journey to Washington, D.C., taking the prayer and a plea that his people would not be removed from their homeland. The Treaty Staff and the runners reached Washington, D.C. and the U.S. Supreme Court building, their immediate destination, but the prayer continues, its course endless."

Read the entire spring supplement at *tinyurl.c45hrej5s*.

Neil Kmiecik. (JVS photo)

Gary Kmiecik. (JVS photo)

Miles, Brook, and Michael Kmiecik joined the core group for the last stretch of the run around Mille Lacs Lake. (B. Paulsen photo)

Red Cross volunteers Pam Snetsinger, Dave Snetsinger, and Ken Vertin encourage runners in McGregor, Minn. The volunteers organized four canteen stations along the route. (Red Cross Northern Minnesota Chapter photo)

Runners stop to enjoy a moment together just before completing the final mile, in front of Mille Lacs Lake at Shah-bush-kung Bay boat launch (JVS photo)

Mille Lacs Band's Little Otter Drum opened the 1837 Treaty anniversary celebration. INSET: Historian Bruce White (V. LaMoore photo)

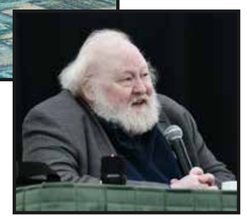
MLB hosts community celebration on 1837 Treaty anniversary

By Charlie Otto Rasmussen, Editor

Off-reservation hunting, fishing, and gathering rights in the 1837 Ojibwe Ceded Territory hung in the balance a quarter century ago. The State of Minnesota and a group of property owners challenged whether so-called treaty rights still existed in east-central Minnesota.

The US Supreme Court settled the scales in a March 24, 1999 decision in favor of Ojibwe signatories of the 1837 Treaty of St Peters, negotiated near present-day St.Paul. Off-reservation property rights were indeed valid. The Mille Lacs Band of Ojibwe has hosted community celebrations ever since. This year they went gichi.

The *Minnesota v Mille Lacs* decision 25th anniversary at the Grand Casino March 22 brought together key individuals in both the legal proceedings and implementation of off-reservation harvesting on the treaty lands and waters transferred to the United States.



The open venue allowed hundreds of Misizaaga'iganiing (Mille Lacs) area residents and visitors to circulate past Anishinaabe craft vendors and information tables plus take in presentations from invited guests in the main ballroom. Among them, historian and author Bruce White who served as an expert in the 1837 Treaty case, shared details from his scholarship of the treaty making era when Ojibwe negotiators insisted on maintaining privileges to fundamental resources like fish and sugarbushes.

"It all eventually boiled down to that very simple provision: it was in the treaty, so therefore it became the law of the land," White said. "And the Ojibwe people remembered this and passed on the oral tradition."

Additional insights emerged from a panel discussion with speakers including Don Wedll, former Mille Lacs Band (MLB) Commissioner of Natural Resources; longtime Indian Law attorney Howard Bichler; Red Cliff Band's George Newago and Jonathan Gilbert, GLIFWC biologist since 1984. Tadd Johnson, former MLB Solicitor General and MLB citizen Bradley Harrington, current director of tribal relations for Minnesota Department of Natural Resources, kept the engaging conversations moving in their roles as facilitators.

Looking back on the Lake Superior ogichidaa of the Gurnoe Decision

By Bay Paulsen, Staff Writer

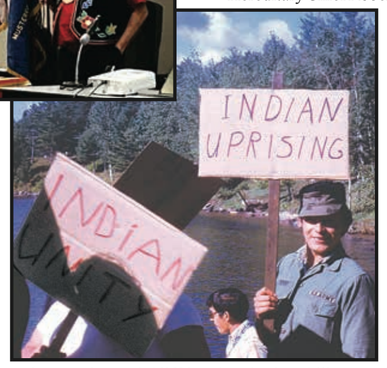
When the Lake Superior Ojibwe Bands negotiated land cession treaties with the United States government in the mid 1800s, tribes made sure that their rights to hunt, fish, and gather was kept for them and their descendants. However, when Michigan, Minnesota, and Wisconsin officially joined the union, they assumed their laws superseded the treaties. State game wardens began fining and arresting Ojibwe people who were harvesting food, medicine, and ceremony materials from the land and water.

While the state of Wisconsin argued that Ojibwe people had no rights to harvest resources off-reservation for more than 80 years, including from Lake Superior, South Shore tribes had their own understanding of treaty promises.

On September 16, 1969, six men from Red Cliff Band challenged the state. Louis Peterson, Richard Gurnoe, Phillip Gordon, Allan Bear, Roger Basina, and Ron DePerry set nets in Gichigami's Buffalo Bay, telling everyone from local newspapers to state game wardens about what they were planning. The next morning, a crowd of both tribal members and non-Indians gathered at the nearby campground in support as the men, in their small boats, pulled a large sucker from the cool water in clear view of the wardens. The men were arrested and taken to nearby Washburn where they were officially charged. Later that October, Tom O'Connor and Tom Deragon, both from Bad River, were also arrested while netting in Lake Superior. The court joined the Bad River and Red Cliff arrests as one treaty rights case.

The case, "State v. Gurnoe," went all the way to the Supreme Court of Wisconsin where the court heard arguments on whether the rights reserved by Ojibwe people still stood. On January 6, 1972, the court ruled that the treaties, signed by Ojibwe nations and the United States, superseded state regulation and that Ojibwe people had the right to self-govern their own harvests in the Ceded Territory. This became known as the Gurnoe Decision.

Red Cliff hereditary Chief Robert Buffalo speaks at the celebration honoring Ojibwe ogichidaa as emcee James Pete, Red Cliff, looks on. (B. Paulsen photo)



Treaty rights supporters gathered along the shoreline of Lake Superior at Red Cliff on September 17, 1969. (H. Paap photo)

Honoring the Ojibwe ogichidaa

On March 8, 2024, more than 50 years after the decision was made, the Red Cliff Band hosted over 125 people in the Legendary Waters Event Center to feast and to hear from Ron DePerry and the children of O'Connor and Deragon and the other surviving family members as they recounted stories from this time.

Hereditary Chief Robert Buffalo spoke on the name "Ogichidaa" (warrior) and how that term belongs not only to those who fight in combat but also to those who fight to uphold their way of life. Speaking to the surviving family members, Chief Buffalo said: "Your family members well deserves the title of Ogichidaa."

Tommy Joe Gordon expressed optimism for the future, adding that young people will continue to fight for their rights because they grew up seeing the precedent their elders have set.

When Ron DePerry stepped up to the microphone, he considered aloud whether this story truly had a beginning or an end. After recounting the Red Cliff arrest, he said: "When you look back at the hunting and fishing, there are so many stories that go on and on." The Red Cliff band and other Ojibwe nations have fought many battles, this just being one in a long line.

The celebration was a time of joyful remembrance. It was a chance for Red Cliff and Bad River members and others to gather with friends and remember the battles fought; a time to appreciate those who made sure Anishinaabe people would always be able to live the mino-bimaadiziwin.

At home on land and water

Mitigwaakiing dizi mishiikenzh (wood turtle)

Mitigwaakiing dizi mishiikenzh, wood turtle, is a small semi-aquatic reptile that lives near clear, moving water like streams and rivers. When not in the water, Mitigwaakiing dizi mishiikenyag can be found in meadows, fields, pastures, and sand banks.

In late spring and early summer Mitigwaakiing dizi mishiikenzh migrate from streams and nearby shores to sandy or gravelly substrate to lay their eggs. Turtles often cross roads, travel through agricultural fields, and may even find their way into your backyard to find the best place to nest.

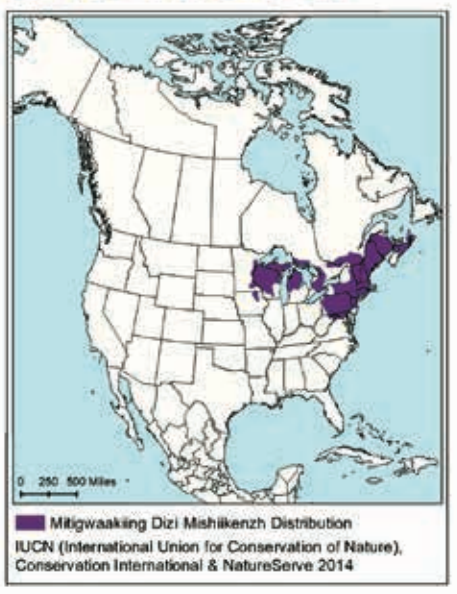
While mitigwaakiing dizi mishiikenyag are resilient to some climate change factors, they are very sensitive to human disturbances. Human developments and infrastructure, such as roads and new buildings, fragment and destroy habitat and critical animal crossing pathways.

Because mitigwaakiing dizi mishiikenzh live both on land and in the water, their habitat needs include both environments as well as a suitable place for nesting and egg laying. In addition to habitat loss and the danger of vehicle strikes when crossing roads, mitigwaakiing dizi mishiikenzh also faces pressure from the pet trade; the removal of adults from the ecosystem can cause a whole community to collapse because of the small size of the fragmented population.

Mitigwaakiing dizi mishiikenyag are threatened by human disturbances, but they do have protections! They are a Species of Greatest Conservation Need in all 17 states their habitat range covers. They are also currently being considered for listed under the Endangered Species Act.

The states of Minnesota and Wisconsin both list mitigwaakiing dizi mishiikenzh as a threatened species—meaning wood turtles are under careful observation and study—and they are a being of special concern in the state of Michigan.

Are you observing changes in the Ceded Territories? Share your observations at *climate@glifwc.org*. **—Climate Change Team**



Range map of mitigwaakiing dizi mishiikenzh.

Climate change vulnerability scores for mitigwaakiing dizi mishiikenzh on a scale of 0 (lowest vulnerability) to 32 (highest vulnerability). Dots indicate average score; lines indicate possible range of scores for each scenario.

General Description:

Mitigwaakiing dizi mishiikenzh, along with other turtles, is a part of the Ojibwe clan system and is believed to be descended from the Giigoonh (Fish) Clan. Members of this clan are known and respected for their wisdom, patience, and their abilities to teach and heal.

Mitigwaakiing dizi mishiikenzh lives near moving water, preferring clear, medium-sized, hard-bottomed (sand, gravel, or cobble substrate) streams and rivers. Mitigwaakiing dizi mishiikenzh also uses a variety of forested habitats near water, as well as meadows, fields, pastures, swamps, and bogs. Eggs are laid in areas with sandy or gravelly substrates such as sand banks, barrens, agricultural fields, gravel pits, yards, gardens, and roadsides. Over the winter, mitigwaakiing dizi mishiikenzh lives underwater in deep pools, under overhanging banks, roots, and logs, and in beaver lodges and muskrat burrows.

(see Climate threats to Mitigwaakiing dizi mishiikenyag, page 18)

Extremes in phenology

GLIFWC inland fishery biologists publish research with interagency team

"Lagging spawning and increasing phenological extremes jeopardize walleye (Sander vitreus) in north-temperate lakes"

Climate change is predicted to have varying and often unpredictable effects on ecosystems, communities, and populations. Given that many fish species rely on climatic cues to initiate seasonal behaviors such as spawning, changes in these cues have the potential to disrupt freshwater phenological processes.

Although many studies have tested whether long-term changes in climate affect freshwater ecosystems, few studies have examined the influence of increasing climate variability on freshwater species.

Our study provides some of the first evidence that increasing climate variability may disrupt tightly coupled ice-off and walleye *(Sander vitreus)* spawning phenology, potentially leading to a greater frequency of natural recruitment failures that could threaten a commercially, culturally, and recreationally important fishery. See link for more: *tinyurl.com/kb55pr6j*.

Proposed Cooperwood Mine

(continued from page 6)

quality ore has been extracted, but technological advances mean that mining today is more efficient, requiring less local labor.

Historical exploration boreholes left over from previous corporations remain unidentified and unplugged. These boreholes will serve as outlets for flooded mine water to escape into Lake Superior. GLIFWC staff have additionally identified that this threat has not been adequately addressed by Highland in their current proposal.

Michigan's construction subsidy to Highland Copper

On March 26th, Governor Gretchen Witmer joined the Michigan Economic Development Corporation (MEDC) chaired by Quenten Messer, Jr. to announce a $50,000,000 construction subsidy to Highland Copper.

The Copperwood Mine project is distinct from most initiatives funded by the Economic Development Fund because it is a pristine, or 'greenfield' site. A majority of the fund is directed to cleaning up existing industrial sites, or 'brownfield' sites, for development.

Following hesitancy by the MEDC Board that Highland Copper would be able to raise any capital and because of its greenfield status, conditions were added to its subsidy. Highland Copper has until December 31, 2025, to show the state that it has raised $150,000,000 in capital toward the project before the state will release its subsidy.

A press release from the MEDC purports that the development may generate 380 jobs and lead to as much as $425 million in investments to the project's region. However, the press release failed to address the impact on tribes or to treaty reserved resources guaranteed by the Federal Government to Tribes that include the right to fish in Lake Superior.

Furthermore, the economic analysis released by MEDC does not address negative impacts to tourism or natural resources from the proposed mine that are likely to be felt for many generations after the mine is closed; the current expected lifespan of the Copperwood Mine is just 11 years.

No fee camping at Ceded Territory federal properties

GLIFWC member tribes exercising their treaty rights may camp for no cost on most campgrounds in the Chequamegon-Nicolet, Ottawa, Hiawatha, and Huron-Manistee National Forests.

There is currently no camping agreement for Michigan State properties, Wisconsin State properties, Minnesota State properties or County properties. So, camping permits issued through the NAGFA system are **valid ONLY for the above four National Forest campgrounds**. It is your responsibility to know the ownership of the campground where you plan to stay.

To camp you must first obtain a National Forest Camping Permit through the NAGFA system. These can be obtained through your tribal registration station. If you already have a NAGFA account and have received a permit in the past, you can login online with your name and NAGFA ID# (located on a previous license) and issue yourself a camping permit. Detailed instructions can be found at: *data.glifwc.org/download/archive.bio/usfs.camping.envelope.instructions.pdf*

If you would like to reserve a site in advance of your visit:

1. Obtain GLIFWC Camping Permit
2. Visit *recreation.gov* and follow the attached instructions
3. Arrive at the campground on designated day, fill out the fee envelope and hang the envelope tag on campsite (instructions can be found at *data.glifwc.org/regulations/camping.php*)
4. If met with concessionaire questions the permit holder need only present their GLIFWC camping permit

If you have any questions, you may contact Alexandra Bohman at *abohman@glifwc.org* or 715-685-2125. **—A. Bohman**

Online option: ***to reserve a site on*** recreation.gov***, members must still obtain a GLIFWC camping permit through NAGFA. GLIFWC staff are working on establishing reservation access to Apostle Islands National Lakeshore properties on recreation.gov. For this camping season, members can reserve sites by calling APIS NL headquarters at 715-779-3398. (COR photo)***

Minnesota moose survey completed despite low snow

Following a 10-day delay to allow adequate snow cover in the conifer-dense forests of northeast Minnesota, interagency wildlife crews tallied moose from January 17 to February 2. Population estimates generated from aerial counts within sample plots revealed a stable moose herd numbering around 3,700 animals, according to research biologists.

While the last decade has produced consistent data documenting a population that's apparently found its footing, a dramatic drop in the northeast moose population between 2006-2013 generated widespread concern. State and Ojibwe wildlife authorities responded by canceling moose hunting seasons. Biologists from federal, tribal, and state agencies launched a series of research projects to identify the mortality drivers behind the moose decline; beyond wolf predation, climate-related factors including winter ticks and brain worm proved to be leading factors in waning moose abundance.

With a return to steady moose numbers in recent years, Fond du Lac Band and 1854 Treaty Authority have issued limited bull-only harvest tags to Ojibwe hunters, helping meet community nutrition and ceremonial needs. Over the 2023 off-reservation season, the 1854 Treaty Authority registered five bulls between Grand Portage and Bois Forte Bands and Fond du Lac Band hunters accounted for 19 bulls.

Very similar to English in spelling and pronunciation, the Ojibwemowin word for the big four-leggeds is ***mooz***. Prior to European settlement, the Ojibwe Ceded Territory hosted a widespread mooz herd. Now the animals are relegated to the northern half of the 1854 Ceded Territory and portions of Upper Michigan, with the core population centered in the eastern 1842 Ceded Territory. **—CO Rasmussen**

Great Lakes sea lampreys

Resilient species demand control but also newfound perspectives

By Bill Mattes, GLIFWC Great Lakes Section Leader

Bay City, Mich.—The Lake Superior Committee convened March 19 along with the other upper Great Lakes: Michigan and Huron. Rising sea lamprey populations in Lake Superior were of particular concern to the committee. This past year's adult sea lamprey index was 62,000, the second highest on record since the index started in 1986 and well above the target of 10,000 adult spawning sea lampreys.

In addition, the number of sea lamprey marks per 100 lake trout, an index used to determine damage to the fish population in the lake, increased to >7 per 100 lake trout, which is above the target of five. It was reported that several factors could be contributing to the increase in the adult sea lamprey index such as treatment deferrals due to COVID-19 related travel restrictions, low water conditions, untreated residual sea lamprey populations due to changes in distribution, newly discovered infestations, breeching sea lamprey barriers, and fully recruited larval populations within index streams.

Healthy populations of prey species for the lampreys are likely a contributing factor. As reported to the Lake Superior Committee, cisco (lake herring) abundance in Lake Superior was estimated to be higher than any other time since standard assessments started in the 1970s. In addition, both lake whitefish and lake trout populations were reported to be healthy in the face of the increased predation by sea lampreys.

The 2024 field season will see lamprey control crews, led by the USFWS-Sea Lamprey Control Program, returning to rivers where treatments were deferred due to low water. Crews will be treating newly discovered infestations, fixing barriers where escapement has occurred, as well as working on a full suite of tributaries scheduled for lampricide treatment where larval sea lamprey densities are the highest. Lampricide, is a highly effective chemical which targets larval sea lamprey and is the primary tool for control. The other highly effective control tool are barrier dams, which do not allow adult sea lamprey access to spawning grounds.

GLIFWC has assisted in adult sea lamprey assessment in the Bad and Middle rivers in Wisconsin since 1986. Recent abundance of spawning sea lampreys in the two tributaries was 37,360—the highest estimated since assessments began in 1986. Sea Lamprey Control in the Great Lakes Basin is coordinated by the Great Lakes Fishery Commission (GLFC) and carried out by the USFWS–Sea Lamprey Control program. GLIFWC's work in Wisconsin is done in coordination with the GLFC, USFWS, Mashkiiziibii Natural Resources Department, and the Wisconsin Department of Natural Resources.

Sea lampreys are a "misplaced" resident of the Great Lakes. Originally sea lampreys were confined to the Atlantic Ocean, where spawning tributaries are few as compared to plentiful ocean fish populations so the effect on the impacts are minimal. Ocean fish preyed on by lamprey are also larger, so they do not die when attacked by a sea lamprey. With the building of canals around Niagara Falls, sea lampreys gained access to the Great Lakes, where spawning tributaries are plentiful compared to the lake size, fish populations are limited in size due to low productivity, and fish are smaller so that they are more likely to die when preyed upon.

Sea lampreys are misunderstood. In the Great Lakes, sea lampreys are villainized as they are a detriment to fish populations used for food and for economic gain. But they are an incredibly resilient species of jawless fish, which in other parts of the world are renowned for their taste and contributions to the health of the ecosystems in which they live. As such we should acknowledge them and treat them with respect, as with any other being which is needed to sustain life.

While sea lamprey are skilled (suction mouth) climbers but only modest jumpers, barrier dams on northwest Wisconsin's Middle River and other Lake Superior tributaries are effective in preventing the exotic predators from reaching upstream spawning grounds. Lampreys living in Great Lakes ecosystems are native to the Atlantic Ocean where fish species—both large in size and population—have evolved together. In the Great Lakes, sea lampreys have on outsized impact on the health of native fisheries. GLIFWC and its federal, state, and tribal partners work cooperatively to control sea lamprey abundance. INSET: Adult sea lamprey in Lake Superior grow up to around 16-24" long. (CO Rasmussen photos)

Camp in the Penokee Hills built culture, cohesion & blueprint for safeguarding Aki

By Joe Cook, for Mazina'igan

Retracing recent cultural and environmental history in Wisconsin's north woods, specifically dealing with the mystically beautiful Penokee Range southeast of Ashland, the book, *Water Protectors: The H.E.L.P. Campaign to Save the Penokees*, by Nick Vander Puy, captures the reader's attention from start to finish.

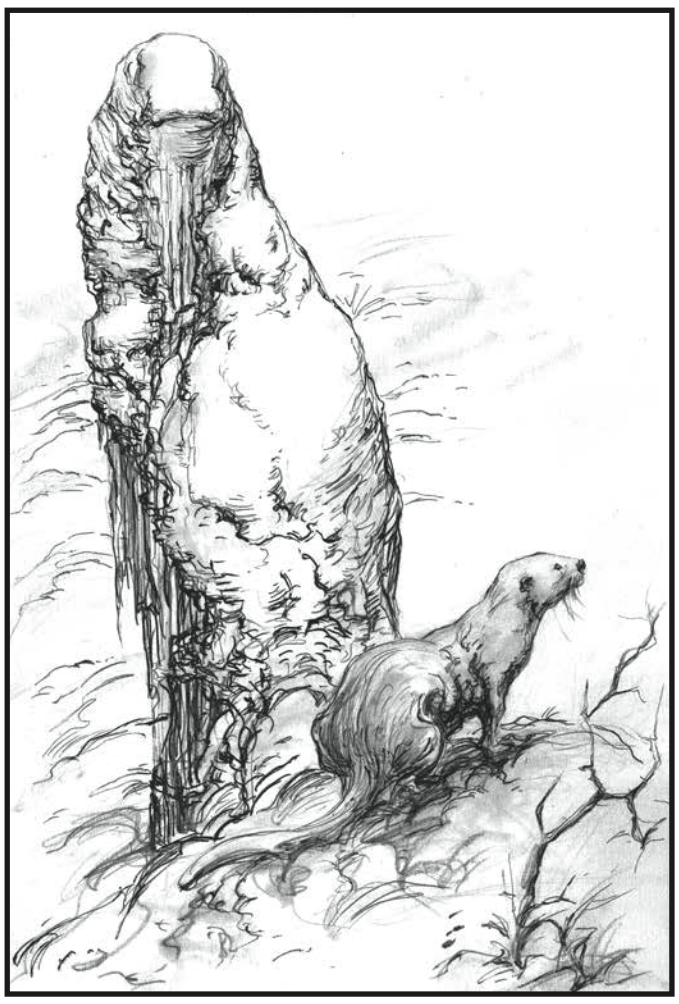
The author shares his experiences in living at a winter base camp dug into the foot of the miles-long Penokee Range. The challenges of meeting the spiritual and economic needs of the camp folk, as well as the nagging fear of the environmental threat to the Penokees were constants.

A mining conglomerate proposed to turn the ancient forested mountain into the world's largest open pit iron ore mine. Yet camp residents displayed unwavering selflessness and courage, cultural understanding, and a steadfast determination no matter the cost.

Vander Puy leaves the reader thirsting for more at each turn of the page as one jigsaws into place the events, native beliefs, timelines, and major players involved, including **H.E.L.P** (Harvest Education & Learning Project) originator Paul DeMain.

Throughout the book, Vander Puy allows one to view this struggle through the prism of one who was boots-on-the-ground and unafraid of standing up for this magical place called the Penokees. We see first-hand how a massive iron ore mine came close to becoming a reality.

So, it was for this reader a poignant moment when Vander Puy's story of the ice spike lady was unveiled mid-book. In this tale, he tells of wanting to walk alone with the Old Ones along the icy and snow-covered gorge that is Tyler Forks to pray silently for guidance—to be close to the nature he and other Ogichidaag were trying to defend and protect from the corporate interests of resource extraction. His haunting reveal of visualizing a woman mid-stream touches on the super-natural and makes one ponder if the "sign" he saw that winter afternoon was indeed divine intervention.



Ice Lady image from* Water Protectors: The H.E.L.P. Campaign to Save the Penokees *©Arthur Pittis.

Vander Puy has done an incredible job telling the story of what happened a decade ago in the woods that border the gravel-covered Moore Park Road. The banding together of so many different groups of folks, the proverbial *new people* of the age of the Seventh Fire, to help strike down the proposed mine connotes a belief in grassroots victory for the many environmental challenges that lie ahead.

The late Joe Rose, Sr., a frequent visitor and cultural guide to the H.E.L.P. Camp and a personal friend of mine, always said something like: "real wealth will be measured not by money and greed, but by pristine air and water and in wild places."

This reader never forgot those words, and this reader, indeed all of the Great Lakes region, can thank Nick Vander Puy for his wonderful book that documents that struggle, and the many Ogichidaag for their defense of the beautiful, wild forests and clean waterways of the Penokee Hills. Their stand is an inspiration for environmental stewards from all walks of life for a long time to come.

Come up to the Penokees. Walk the land. Let your burdens be washed away in the swirls of the Tyler Forks. Commune with the Old Ones. You'll find yourself saying what Vander Puy expressed in his book: "Es ist genug." German for, it is enough. *Water Protectors: The H.E.L.P. Campaign to Save the Penokees* is available online and from local booksellers.

—Joe Cook is a cultural educator and German language teacher for Sparta (Wisconsin) High School. In 2008, he formed the Sparta High Earth Club with students to engage in environmental protection efforts for natural treasures in Wisconsin. Since 2012, Cook and his students continue to make regular visits to Ashland County and the Penokee Hills, conducting fund raising for Bad River Band's environmental defense fund and elder nutrition services.

PFAS: Stay informed

(continued from page 9)

To find out if your water supply has been tested for PFAS, and what the results were if it was tested, contact your local water provider.

There are online resources and web-based maps where you can find PFAS testing information and results for drinking water, surface water and fish tissue including the U.S. EPA's PFAS Analytic Tool, the Wisconsin Department of Natural Resources PFAS Interactive Data Viewer, the Minnesota Department of Health's Interactive Dashboard for PFAS Testing in Drinking Water, and the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Michigan PFAS Action Response Team (MPART) PFAS Geographic Information System.

If your drinking water comes from a private well, it is your responsibility to have your water tested for contaminants, but you can contact your state health department or natural resources department to find out if financial assistance is available to help cover the lab costs.

If your drinking water has been found to contain unsafe levels of PFAS, there are home filtration systems available that can help remove or reduce PFAS. Some filter technologies shown to filter PFAS include charcoal (granular activated carbon, or GAC), reverse osmosis (RO) systems, and ion exchange resin, and the costs associated with these options vary widely. If you decide to purchase an at-home filter, be sure it is certified to remove PFAS.

Minnesota, Wisconsin and Michigan have issued waterbody- and species-specific fish consumption advisories for decades, and some of these advisories have been updated in recent year based on PFAS levels.

GLIFWC has begun testing fish from inland lakes across the ceded territories for PFAS levels, however, the current approach is to conduct broad surveys to detect hotspots that will inform future testing efforts and methods by both GLIFWC and the states.

Please be sure to familiarize yourself and your family with state fish consumption advisories and do your best to follow the advice.

Buffalo Reef

(continued from page 6)

stamp sand encroachment is evident southeast of the breakwater. Now that the public, scientists, and interagency managers are aware of the issue, a final plan has been made that can at least partially remedy the situation and ultimately save Buffalo Reef. Although these plans have wide support among tribal, scientific, and shoreline communities, there is a question as to whether the plans can fully come to fruition given the remoteness of the impacted area, and the limited political clout of those most interested. I've often thought, if these sands were piled near a wealthy, heavily populated area, they'd be gone. The U.P. of Michigan is often neglected by political influence, and mostly folks don't mind.

The stamp sands are leftovers from copper mining, copper that is still in the power lines used today to fuel our need for electricity. The stamp sands are toxic to aquatic life—they must remain on shore, away from the winds and waves of Lake Superior.

While the stamp sands may have beneficial applications, their use is not yet considered to be cost effective. Until then, they need to remain available if anyone is to use them and moving them upland, as planned, will do that. If left sitting on the shores of Lake Superior, they will continue to erode and dissipate throughout the lake and along the shore. If too much time passes without proper mitigation of the problem, the lake bottom and shoreline around Buffalo Reef could well be devoid of life in the future. As Grumpy said, "If there's no reef, there's no fish."

Editor's note: Cecil Peterson, Red Cliff Band, walked on 2018. His observations as a lifelong Gichigami fisherman continue to drive research in the region.

World Fisheries Congress

(continued from page 10)

A global range of presentations were invited to highlight the diverse roles and contributions of IPLCs in fisheries and explore pathways increasing their critical contribution to fish conservation and fisheries management. Topics that explore how indigenous knowledge can be incorporated into relationship/management plans to build social-ecological resilience and adaptation to a changing environment are highly encouraged.

Michael Waasegiizhig Price, GLIFWC traditional ecological knowledge specialist additionally provided Anishinaabe perspectives in a presentation while also serving as session moderator. GLIFWC Great Lakes Fisheries Biologist Bill Mattes also sat in at the Congress moderator table. **—GLIFWC Staff**

Share your "views" of the natural world

Phenology submissions

Seasonal observations are important to record from year to year, as they help determine trends in reliable changes—such as the average ice-on or ice-out dates on lakes, the date of the first snowfall, or when the first sandhill cranes return.

GLIFWC is trying to understand how environmental changes could be affecting treaty resources and having first-hand observations from across the Ceded Territory gives staff a better understanding of seasonal changes year to year.

Make a fun activity out of watching for the events that are listed, or by noting other phenological or seasonal events you observe throughout the year. This can be a fun activity for teachers, families, or anyone that enjoys spending time outdoors!

Help us study phenological and seasonal changes by writing down your observations on the form. Share your knowledge by mailing it back to GLIFWC by December 31, 2024. You can also submit observations online at *data.glifwc.org/phenology.calendar.* **—GLIFWC Climate Change Team**


M. Rasmussen

2024 phenology competition

Submit your observations to win prizes!

In 2024, the GLIFWC Climate Change Team is hosting a small competition! Submit your observations for the opportunity to win **prizes**! Prize options include a notebook, shirt, reusable canvas bag, sticker set, and seasonal foods such as manoomin, baashkiminasigan (jam), and anishinaabe-zhiiwaagamizigan (maple syrup).

The prize categories are:

- Most Observations from a **Youth** Observer (must submit for all four seasons)
- Most Observations from an **Adult** Observer (must submit for all four seasons)
- Most Interesting or Unique Observation (one winner per season)

The GLIFWC Climate Change Team will judge the entries and winners and their observations will be featured in a future *Mazina'igan* article!

Help us study phenological and seasonal changes by writing down your observations on the form. Share your knowledge by mailing it back to GLIFWC by December 31, 2024.

You can also submit observations online at *data.glifwc.org/phenology.calendar*

What are you observing in the Ceded Territories? Ozhibii'an ezhiwebak noopiming.

PLACE STAMP HERE

Tape and stamp this form and return to GLIFWC by December 31, 2024. Make sure to include the information below:

Name:_____

Address:_____

_____

Tribal affiliation (if any):_____

_____

Phone number or email:_____

Are you a:

☐ Youth observer

☐ Adult observer

To submit observations via our online submission form or for additional copies of this form, go to:

data.glifwc.org/phenology.calendar

Please print return address clearly:

GLIFWC—Climate Change
72682 Maple Street
PO Box 9
Odanah, WI 54861

Aaniin ezhiwebak Anishinaabe-akiing?

Please Help GLIFWC Observe Seasonal Events in the Ceded Territories

GLIFWC is trying to understand how environmental changes could be affecting treaty resources.

Help us study phenological and seasonal changes by writing down your observations on this form. Keep it on your bulletin board or refrigerator. Share your knowledge by mailing it back to GLIFWC by December 31, 2024.

Climate threats to mitigwaakiing dizi mishiikenyag

(continued from page 14)

The mitigwaakiing dizi mishiikenzh population is thought to have been in decline throughout the last century and is currently threatened by over-collection for the pet trade, habitat loss, and fragmentation. Currently, mitigwaakiing dizi mishiikenzh is found in many small, isolated populations across its range that generally range from 66 to 238 individuals. Mitigwaakiing dizi mishiikenzh range includes most of the Wisconsin and Michigan portions of the Ceded Territories, but only a few counties in Minnesota. Mitigwaakiing dizi mishiikenzh is listed as a threatened being by the states of Minnesota and Wisconsin, and a being of special concern by the state of Michigan.

Although turtles in general were mentioned frequently during interviews, mitigwaakiing dizi mishiikenzh was not. However, all beings are of equal importance to Ojibwe people based on the cultural belief in the original treaties with all of creation. What was consistently expressed during the interviews was a strong concern regarding their low population and vulnerability to many factors such as climate change. A fear of other turtle beings also eventually declining was expressed by an elder of Gete-gitigaaning (Lac Vieux Desert). She felt that the low population of mitigwaakiing dizi mishiikenzh might be a sign of decline in others yet to come.

Also of importance is that the Ojibwe name for this particular turtle being was difficult to obtain. Knowledge holders expressed that this is likely due to their low population over so many years and a shift in cultural knowledge as it relates to this being. The name of mitigwaakiing dizi mishiikenzh was suggested by a first language Ojibwe speaker in the Treaty 3 area of Ontario, Canada.

Summary of climate threats:

Mitigwaakiing dizi mishiikenzh was the most vulnerable crawler and in the 69th percentile relative to other beings in the vulnerability assessment. Mitigwaakiing dizi mishiikenzh is threatened by humans in several ways and is also highly vulnerable to the loss of individuals from a population, as their isolated populations are so small. On top of these threats, climate change poses added threats to mitigwaakiing dizi mishiikenzh, which will likely be affected by natural and anthropogenic barriers, limited dispersal, disturbances such as flooding, limited nesting habitat, and pathogens and predators.

Factors that increase the vulnerability of mitigwaakiing dizi mishiikenzh to climate change:

SI/I Natural barriers: Lake Superior is a barrier to the north of the Ceded Territories that would limit mitigwaakiing dizi mishiikenzh northward movement, particularly because mitigwaakiing dizi mishiikenzh is not currently found north of Lake Superior.

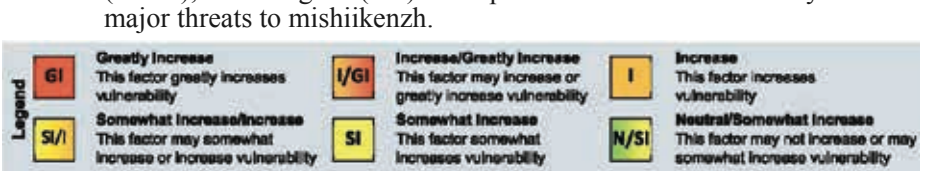
SI Anthropogenic barriers: Roads and railroads are the primary anthropogenic barriers to mitigwaakiing dizi mishiikenzh in the Ceded Territories. Others include agricultural fields, urban areas, and channelized streams.

N/SI Dispersal: Mitigwaakiing dizi mishiikenzh is capable of longer movements but has high site fidelity and rarely disperses. Individuals have been observed using the same hibernation and nesting location in successive years. Additionally, fragmentation of suitable habitat limits dispersal.

SI/I Disturbance regime: Extreme precipitation events and flooding can affect mitigwaakiing dizi mishiikenzh in several ways, including direct mortality from drowning, washing out or eroding nests, flooding nests that causes hatch failures, or even burying nests.

SI Uncommon landscape features: Nesting habitat for mitigwaakiing dizi mishiikenyag is largely found in non-natural sites such as road shoulders and gravel pits and is not extremely common across the assessment area.

SI Pathogens or natural enemies: Unknown and known fungal and bacterial pathogens could increase in warming climate and negatively affect mitigwaakiing dizi mishiikenzh. There are also a variety of predators that consume mitigwaakiing dizi mishiikenzh eggs that are expected to be favored by climate change, particularly esiban (raccoon), zhigaag (skunk), and waagosh (fox). Nest predation and adult mortality are both major threats to mishiikenzh.



What are you observing in the Ceded Territories? Ozhibii'an ezhiwebak noopiming.

Please record the date, location, and species (if applicable) for each observation. Return to GLIFWC by December 31, 2024. Miigwech!

Niibin / Summer — **Date/Location**

Dates/amounts of heavy rain events (>1" in 24 hrs) _____

First monarch butterfly _____

First firefly _____

Deer seen with summer coat _____

First birch bark harvested _____

Flowers on berry plants (species) _____

Berries ripe (species) _____

Loons nesting _____

Loon chicks _____

Wild rice in floating leaf stage _____

First wild rice ripe _____

First wild rice harvested _____

Other niibin observations:

_____

_____

_____

_____

_____

_____

Dagwaagin / Fall — **Date/Location**

First grouse harvested _____

First duck harvested _____

Last ducks on the lake/river _____

Last loons on lake _____

Bucks in rut _____

First polished deer antlers _____

Deer have winter (gray) coat _____

First deer harvested _____

First princess pine harvested _____

First apples harvested _____

First cranberries harvested _____

First leaves changing color (species) _____

Peak fall color _____

First leaves falling (specify tree species)

_____

Nighthawks migrating _____

First fire in the woodstove _____

Sandhill cranes flying south _____

First frost _____

First day temperature stays below freezing (32°F)

_____

First snowfall _____

First snow that sticks _____

Lake frozen solid (specify lake) _____

Other dagwaagin observations:

_____

Zaasijiwan
•It Ripples•

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

Anishinaabeg ojibwemowag. Ojibwewikwewag gemaa ojibwewikwag, gwiiwizensag idash ikwezensag, gidaa-ojibwemom/anishinaabemom! Aabawaa agwajing. Bimosedaa! Idash Ojibwemodaa! Bimoseyeg, ginanda-gikendaanan niiwin-Ojibwe-ikidowinan endaso-giizhig (midaaswaak biindig ningo-biboon). HOWAH! Miinikaa ina? Niwii-minwendaamin, niibing omaa Akiing. Ninga-biindigeshimomin. Mino-giizhigad. Wiin biindaakoojige gaye. Miigwech Giiwedinong, Waabanong, Zhaawanong, Ningaabii'anong, Ishpiming, idash Akiing. Mii'iw, gichi-miigwech.

(Native Ojibwe people, they speak Ojibwe. Ojibwe men or women, boys and girls, you all should speak Ojibwe/Anishinaabe language! It is warm outside. Let's all walk! And let's all talk Ojibwemowin! When you all walk, seek to learn them four-Ojibwe-words every day (1000+ in 1-year). WOW! Lots of blueberries? We will all be happy, as it is summer here on the Earth. We shall be dancing in the grand entry. It is a good day. S/he makes an offering also. Thanks to the North, to the East, to the South, to the West, in the Sky and to the Earth. That's all, great thanks.)

Bezhig—1

OJIBWEMOWIN (Ojibwe Language)

Double vowel system of writing Ojibwemowin.
—Long vowels: AA, E, II, OO
Waabooz—as in father
Miigwech—as in jay
Aaniin—as in seen
Mooz—as in moon

—Short Vowels: A, I, O
Dash—as in about
Bine—as in tin
Niizho—as in only

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

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

—English can lose its natural flow in language translations.

Bag(s)
Gashkibidaagan(ag)

Odoozhitawaan a'aw gashkibidaagan.
—S/he makes that bandolier bag.

(**Animate**-living, pipe/tobacco bag)

Nimiikawaadenimaa imaa.
—I think s/he is beautiful there.

Nindayaawaa gashkibidaagan.
—I have h/h, a pipe/tobacco bag.

Nindayaan mashkimod.—I have a purse.

Mashkimodaang, nindozhooniyaam.
—In the purse/bag, I have money.

Mazina'igani-mashkimodens niniimimiijime.
—In small paper bag, I take food.

babaamaadizii-makak(oon)—suitcase(s)

Niizh—2

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

A. Ninditibiwebishkige giiwedinong. Ninwaabandaan i'iw ziibii.

B. Giditibiwebishkige na? Gego gawiseken! Ningii-gawise.

C. Jiigi-ziibiing gii-waabamaa a'aw waawaashkeshii.

D. Aaniin ezhi-ayaayan? Niminwendam noongom. Miigwech.

E. Giwii-izhaa na zaaga'iganing? Giwii-pagiz ina imaa?

F. Giwii-chiime na noongoom?

G. Gaawiin ninjiimesii.

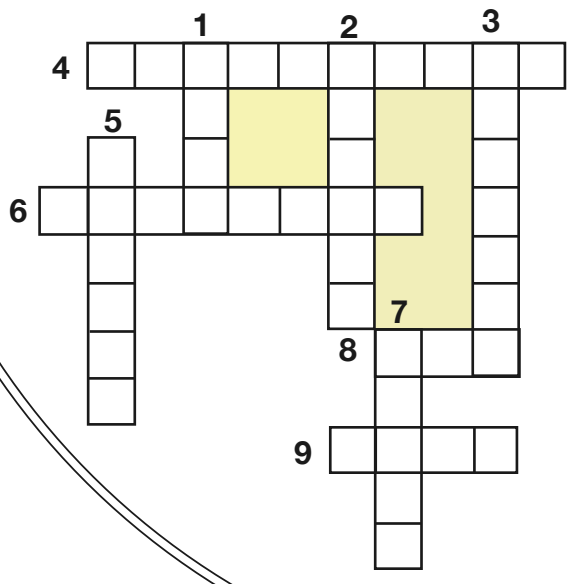
H. Gidayekoz ina?

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

ditibiwebishkigan(ag)—bike(s)
ditibiwebishkige—s/he peddles

Niswi—3

IKIDOWIN ODAMINOWIN (word play)



Down:
1. she, he
2. every
3. It is warm.
5. four
7. and

Across:
4. girls
6. lots of blueberries
8. yes/no question marker
9. also, too

Online Resources
ojibwe.lib.umn.edu
ojibwe.net
glifwc.org
glifwc-inwe.com

Niiwin—4

Eya!—Nanda-mikwendan!
Yes!—Try to remember it!

Wegonesh? Gaawiin mashi. Aaniin danaa?
—And what? Not yet. Why not?

Ojibwemodaa!—Let's all speak Ojibwe!
Anishinaabeg.—Persons. Native Ojibwe.
Anishinaabemo.—S/he speaks Ojibwe.
Anishinaabemo*wag*.—**They** speak ...
Ojibwemo.—S/he speaks Ojibwe.
Ojibwemowin.—The Language Words are pronounced in syllables.
A ni shi naa beg, O ji bwe mo win
Aaniin. Aa niin!—Greetings!
Aaniin ezhi-ayaayan?
—How are you?
Eya'!—Yes!
Nimino-ayaa.—
I am well.

Ojibwemowag
gwiiwizensag
Aaniin danaa
-wag
-mowin
omaa

1. Bakadewag noongom, ingiw _____.
2. _____ ina? Bizindandaa!
3. Gaawiin mashi. _____. Anishinaabemodaa!
4. Anishinaabemoyaan _____, nimbiindaakoojige.
5. Niibing, ditibiwebishkige_____, nisaye dash nishiime.
6. Inwewin: Ojibwa- Anishinaabe-_____.

Translations:

Niizh—2 **A.** I pedal him/her a bike to the north. I see that river. **B.** Do you ride bike? Don't fall over! I fell over. **C.** By a river, I did-see him/her that deer. **D.** How are you? I am well now. Thanks. **E.** Do you want to go to the lake? You want to swim there? **F.** You want to canoe now! **G.** No, I do not want to canoe. **H.** You are tired?

Niswi—3 **Down: 1.** wiin **2.** endaso **3.** aabawaa **5.** niiwin **7.** idash **Across: 4.** ikwezensag **6.** miinikaa **8.** ina **9.** gaye

Niiwin-4 **1.** They are hungry now, those **boys**. (gwiiwizensag) **2. They speak Ojibwe language?** Let's all go listen! (Ojibwemowag). **3.** Not yet. **Why not?** Let's all speak Oijbwe/Anishinaabe language! (Aaniin danaa) **4.** When I speak the Anishinaabe language **here**, I offer tobacco. (omaa) **5.** As it is summer, **they** pedal, my older brother and my younger sibling. (-wag) **6.** The language; a way of speaking: Ojibwe **language**/Anishinaabe **language**. (-mowin)

There are various Ojibwe dialects; check for correct usage in your area. The grammar patterns may help a beginner understand and voice inanimate and animate nouns and verbs correctly, as well as create questions and negate statements. This may be reproduced for classroom use only. All other uses by author's written permission. Some spellings and translations from The Concise Dictionary of Minnesota Ojibwe by John D. Nichols and Earl Nyholm. All inquiries can be made to **MAZINA'IGAN**, P.O. Box 9, Odanah, WI 54861 *pio@glifwc.org*.

Edited by Michael Waasegiizhig Price

What lives and grows in a wetland?

Ojibwe lands have always been very rich with nibi (water). There are many zaaga'iganan (lakes), ziibiwan (rivers), and of course, Gichigami (Lake Superior).

Because of these, there are lots of places where land and water overlap with each other called wetlands.

Some of these wetlands have lots of big trees and are called a waabashkikiig (swamp or marsh), and others have few trees and are called mashkiig (bogs or peatland).

Wetlands have a huge role in our environment because they are home to lots of plants, the Ojibwe people have used these plants for hundreds of years.

Color the plants

pitcher plant

Omakakiiwidaasan (pitcher plant) can only be found in acidic bogs. The leaves at the bottom curl up into tall bowls or "pitchers" where little manidoonsag (insects) get stuck and eaten by the plant, and it grows one red flower way up above the pitchers so the pollinating manidoonsag don't fall in. Ojibwe children used to use these plants as toys and called them "frog leggings."

cranberry

Aniibimin (cranberry) is a low evergreen vine. It has small pink flowers that look like tiny shooting stars and grows edible berries that stay on the vine through winter. Ojibwe people ate these berries raw or drank them in a tea. The plant could also be used to help with nausea.

hoary willow

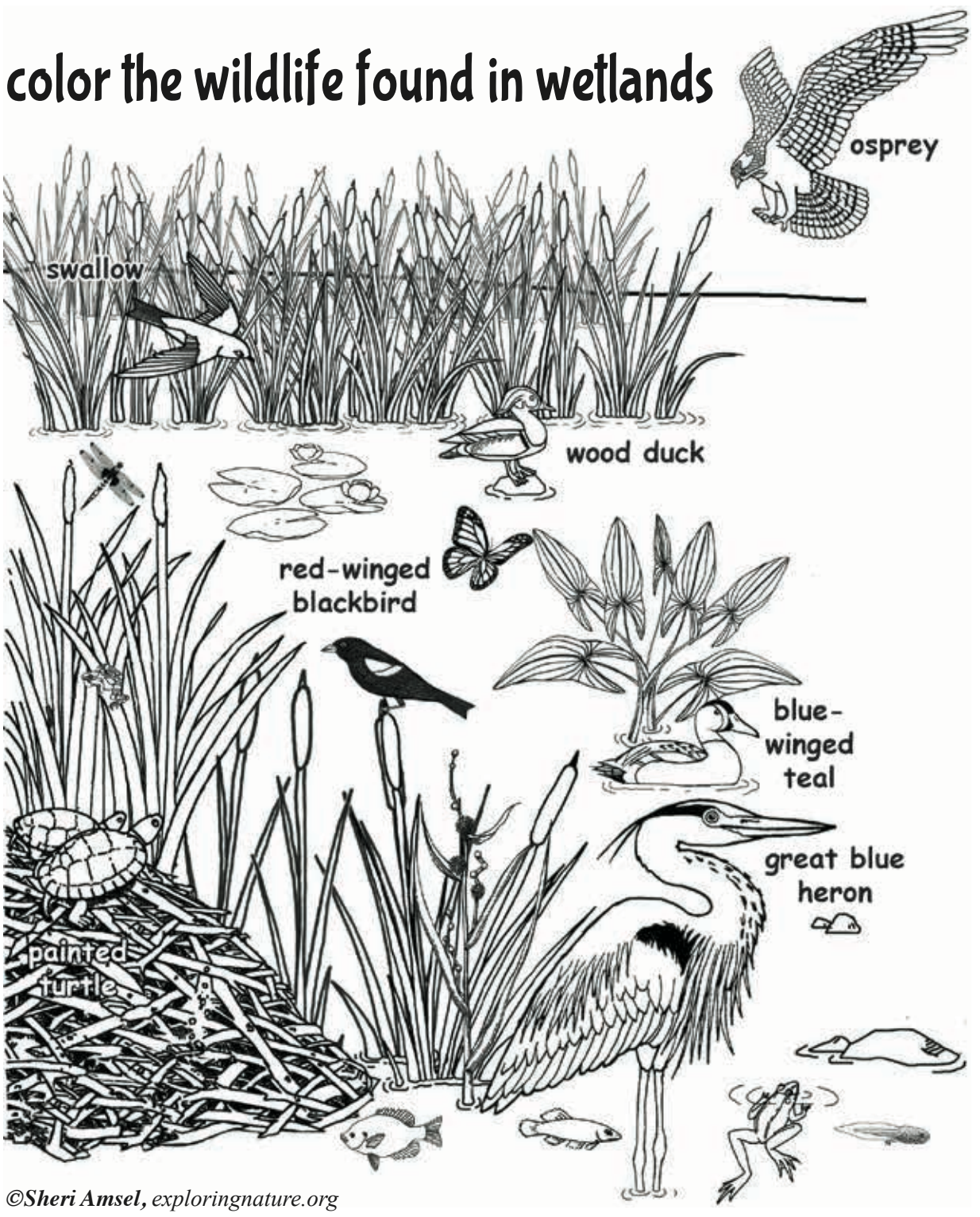
balsam willow

Balsam willow photos courtesy of © Arthur Haines, Native Plant Trust.

Several types of oziisigobiminzh (willow) can be found in the mashkiig, including the the hoary willow and the balsam willow. Newer branches on the hoary willow are yellow to brown with lots of little white hairs. The balsam willow's buds and leaves smell like balsam, hence the name! Like some other willow species, both oziisigobiminzhiig were used by Ojibwe people for stomach problems and fainting, and the branches could be woven into baskets.

Featured plants are from the book Plants Used by the Great Lakes Ojibwa **©1993, published by the GLIFWC. The book can be purchased at** *tinyurl.com/bdesvfxk*.

color the wildlife found in wetlands



©Sheri Amsel, exploringnature.org

Tiny insects target mighty gaagaagimizhiin

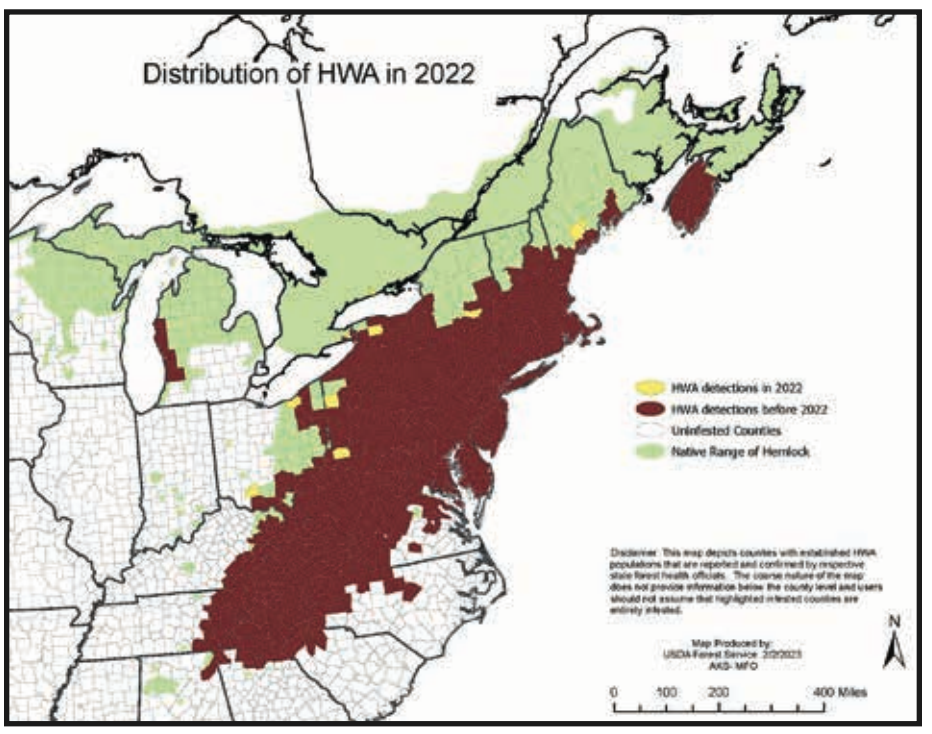
Hemlock woolly adelgid females cover their eggs in white waxy material. Appearing like tiny cotton balls, these ovisacs are often the most obvious indication of HWA infestation. (L. Graney, Bartlett Tree Experts, Bugwood.org)

(continued from page 1)

The second, much more destructive introduction is the hemlock woolly adelgid (*Adelges tsugae*), or HWA. This tiny insect is native to central and eastern China, South Korea, Taiwan, Japan, and the Pacific Northwest. At least eight genetically distinct "lineages" of HWA occupy different parts of this range, and vary in life cycle and host specialization. The eight species of hemlock trees (including mountain hemlock and western hemlock of western North America) that inhabit this range are naturally resistant to this insect. On top of that, various specialist insects and diseases keep the HWA in check. But this isn't the case in eastern North America, where the HWA is a recent arrival.

The HWA was first detected in eastern North America in Richmond, Virginia in 1951. From there it has spread throughout most of the range of eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. caroliniana*), from northern Alabama and Georgia north to New York and southern Maine, with an outlier population in western Lower Michigan.

Using genetic testing, researchers have found that this introduced HWA lineage came from southern Japan. Unfortunately these two eastern hemlock species have little resistance to the HWA, and natural HWA predators are absent from their range. As a result the HWA has caused extensive hemlock decline and mortality in eastern North America.



Distribution of the HWA as of 2022. Brown-shaded counties show HWA detections before 2022, and yellow counties show detections in 2022. Uninfested counties with eastern hemlock are shown in green. Since this map was made, the HWA has been found in two more Lower Michigan counties (Benzie and Antrim). (USDA Forest Service map.)

You can help!

If you think you've found the EHS or HWA, it's important to let people know. Take a handful of photos, note the location of the affected trees, and report it! You can contact your Tribal Natural Resource Department, or contact GLIFWC at *steveg@glifwc.org* or at 715-682-6619 ext. 2126.

You can also report your find to the state agencies. In Michigan, call the Michigan Department of Agriculture and Rural Development (MDARD) at 800-292-3939, or email them at *MDA-Info@Michigan.gov*. In Wisconsin, call DATCP at 866-440-7523, or email *Renee.Pinski@wi.gov*.

Eastern hemlock mortality caused by the HWA in North Carolina. (USFS-SRS, Bugwood.org)

Pushing back with biocontrols

Since the 1990s a major effort has been underway to introduce insect predators from Asia and western North America to control the HWA in eastern North America. The most successful so far have been two species of *Laricobius* beetles, one from the western US and the other from Japan. Both are now widely established across eastern North America, where they feed heavily on the winter nymphs of HWA. Unfortunately, the HWA reproduces at such high rates that these two beetles (along with another *Laricobius* that's native to eastern North America and typically feeds on a spruce adelgid) haven't reduced HWA numbers significantly. At least not yet.

Several species of flies that specialize on adelgids are currently being evaluated for host-specificity and effectiveness at controlling the HWA. These should work together well with the *Laricobius* beetles, because they emerge in spring and prey on both generations of HWA.

Because the Michigan infestations were initiated by infested hemlock trees shipped from out east, Michigan has implemented an HWA interior quarantine. The law regulates the movement of hemlock and tiger-tail spruce trees (*Picea torano*, the alternate host for the introduced lineage of HWA), along with forest products and nursery stock from the infested counties to other parts of the state. It has also implemented an exterior quarantine, regulating the movement of materials from other states with infestations.

Meanwhile the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) has placed an exterior quarantine on items that could carry EHS and HWA. These quarantines restricts the import of the EHS and HWA, along with hemlock trees, bark, and a variety of other conifers from infested eastern states including Michigan.

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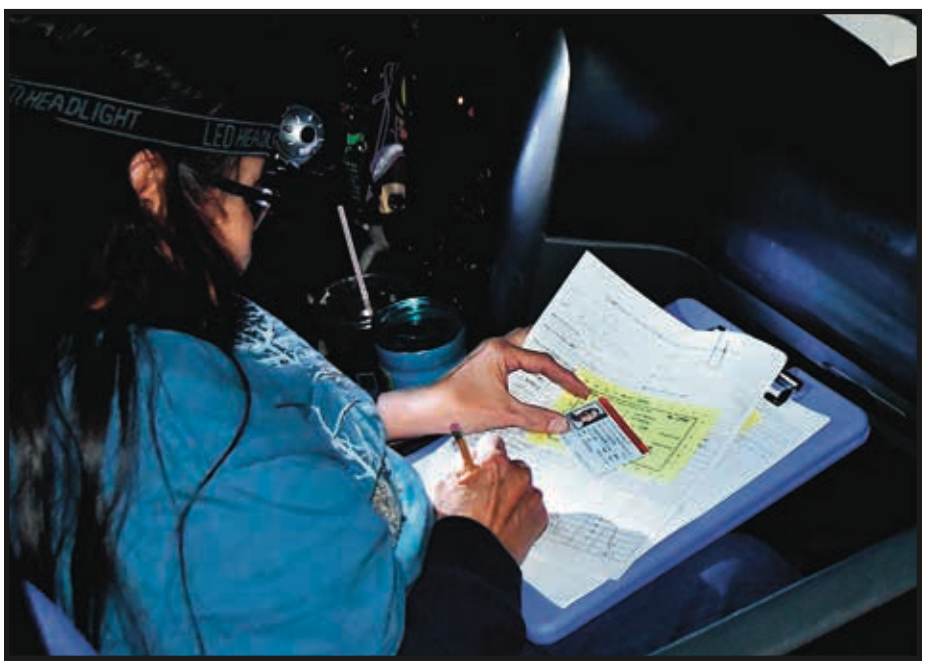
Weather-extended fishing season across CT

(continued from page 1)

By the third week of April spearfishing had found its groove, the season moving along quickly as harvesters fanned out across the region to lakes large and small. On the sprawling Turtle-Flambeau Flowage, Lac du Flambeau members fished on calm waters under a near-full moon the evening of April 20-21. With yellow permits tucked into back pockets, mixed groups of family and friends took turns at the bow of fishing boats scanning the shallows for ogaawag. GLIFWC Warden Riley Brooks motored in and out of the reservoirs' placid bays ringed by heavily forested shorelines. Wardens play a crucial role in harvester safety and enforcing conservation codes during the season.

Back at the Turtle-Flambeau boat landing, a creel team led by Terri Mitchell checked identification cards and issued permits to later arrivals. Before the end of the night, the Lac du Flambeau fishers and creel team would reconvene as each fish is accounted for on a catch report. It's an exacting monitoring system repeated all across the Ojibwe Ceded Territory during the spring spearfishing and netting harvest.

Walleye fishing in Wisconsin largely wrapped up over the first week of May leaving the maashkinoozhe hunters with their wide 5-tined spears to ride the shallows for muskies. At the tail-end of the season with a chance nightly muskie permit still being issued, the preliminary maashkinoozhe harvest totaled 249 fish in the Wisconsin Ceded Territory. The ogaawag harvest figured in at 38,880 through May 15.



Before Ojibwe harvesters launch their boats, GLIFWC creel clerks review walleye and muskie harvest quotas, tribal identification, and then issue fishing permits which are valid for just one evening. Photo: GLIFWC clerk Terri Mitchell from Lac du Flambeau prepares a harvest permit at a southern Iron County boat landing in northern Wisconsin. (C. Rasmussen photo)

First northern to last perch in Minnesota

At Mille Lacs, all the 1837 Treaty bands fished the big east-central Minnesota lake during the long-drawn-out season. One night after the Wisconsin opener, Ojibwe spearfishermen launched onto Lake Mille Lacs March 11. While the dark waters were open and ice-free, the fish weren't in the shallows yet, said GLIFWC Fishery Biologist Ben Michaels. Spearfishers harvested a few northern pike on the first few fishing runs, but it would be weeks before ogaawag appeared in the catch reports.

"The walleye catch started out as a trickle between the spearers and netters. Some of the male walleyes were out early, staging, getting ready to spawn in late March," Michaels said. "The tribal harvest peaked in mid-April. Then you'd see some females in the creel reports."

From an intertribal walleye quota of 65,950lbs, Ojibwe bands combined to bring in 53,675.7lbs of ogaawag through May 15. The last fish of the near two-month-long spring season were asaawe, or yellow perch, caught by Ojibwe netters, Michaels said. Mille Lacs Band and other tribes annually save a portion of their ogaawag quota for later in the year; oftentimes fresh fish is needed for ceremonies, funerals, and other special events in the fall.

Beyond Mille Lacs, 1837 Treaty fishermen trekked to a pair of small lakes in Chisago County north of the Twin Cities metro. Green Lake yielded 105 ogaawag at 255.9lbs and Goose Lake produced an 18 walleye bag weighing in at 50.7lbs.

Michaels called out a chimiigwech to GLIFWC monitoring crews for putting in the long hours, working boat landings wherever the Ojibwe harvest occurs. In addition, Wildlife Section staff from GLIFWC's central office traveled to Mille Lacs during the peak of the harvest to help count and measure fish when evening spearing and morning gillnet pulls kept monitoring crews engaged for extended shifts.

Successful ogaawag season Michigan

In the 1842 Ceded Territory of the western Upper Peninsula, Lac Vieux Desert Band and Keweenaw Bay Indian Community spearfishers encountered good walleye numbers in the region's off-reservation waters. At KBIC, Fisheries Biologist Gene Mensch reported ogaawag totals approaching 800 fish through April on inland lakes and the Gichigami connected waterway, Portage Lake. KB Natural Resources Department conducted mandatory harvest checks as well as fyke net assessments to collect data on walleye health and abundance.

For the Lac Vieux Desert Band, tribal citizens had a strong season on Lake Gogebic registering 4,046 walleyes from a harvest guideline of 4,080. Gogebic, the big 13,380-acre Upper Peninsula lake, has long provided the band with a reliable harvest. LVD spearfishers rounded out their season harvest of 4,976 ogaawag and eight muskies in the smaller lakes scattered around band's reservation near Watersmeet.

From rivers feeding Lake Michigan's Little Bay de Noc where tribal conservation officials issued 18 permits, Bay Mills Indian Community spearfishers harvested 79 ogaawag. The band added one lake sturgeon to its spring season with a 75-inch Black Lake fish harvested by Justin Carrick in the Lower Michigan 1836 Ceded Territory.

Harvest numbers for all three states are preliminary. Learn more about off-reservation Ojibwe fishing at *www.glifwc.org*.

Minocqua Chain

(continued from page 4)

in collaboration with Douglass Keiser, master's student at Bemidji State University, would help determine whether the recruitment problem on this chain of lakes is a habitat issue, a predation issue, or neither.

Each site contains three types of boxes, all with permeable sides for unobstructed water flow and a layer of clean, ideally sized gravel for ogaa spawning. The first type of box has an open top, mimicking a natural habitat that remains completely open to egg predators. The second type has a mesh lid which would exclude predation, and the third type is entirely enclosed in a fine mesh which ogaa hatchlings would not be able swim out of. This box will help us know whether the eggs are even surviving until they hatch.

There is also a fourth "type" which is no box at all, but rather continuing to distribute eggs across ideal shoreline habitat similar to the assisted reproduction program. This group will act as the control and offer a baseline number of successfully recruited ogaa.

Before fertilized eggs are placed in the boxes or along the shoreline, DNA samples are taken from the parent ogaawag so that later during the fall when fingerling ogaa are surveyed, it can be determined which boxes successfully produced these young fish. Should no young fingerlings be produced from any of these boxes, we will know that the recruitment issue goes beyond simple habitat or predation.

Development on the shores of inland lakes can degrade habitat when trees and other plant life are removed and no longer hold the soil together. Climate change tends to increase competition with fish better suited to warmer waters, such as largemouth bass. The increased traffic along shorelines with large boats and seasonal dock installations during spawning season may also play a large role in unsuccessful recruitment due to egg trampling or suffocation by sediment.

The ogaa know what they are supposed to do, and it is our responsibility to understand what is hindering them. The results of this study will help us do that and inform what kind of relationship we need to have with the ogaa in the Minocqua chain moving forward.

Upcoming events

The Healing Circle Run is a prayer for healing. It is an opportunity to pray for healing for ourselves, our families, our communities, our nation, Aki and all our relatives. This 7-day run connects 10 tribal nations throughout the Ojibwe Ceded Territory. Join us as we run through our homelands, or walk/run in prayer and unity from wherever you are. For more information contact *glifwc.org/hcr* ***or call 715.682.6619.***

Mikwendaagoziwag Memorial Ceremony July 24, 2024

Opening ceremony and canoe launch at 9:00 a.m. at the Savanna Portage State Park Boat landing on the east side of Sandy Lake. Ceremony and feast to follow at the Army Corps of Engineers Sandy Lake Recreational Area near McGregor, Minnesota. For more information call GLIFWC at 715.682.6619.

It's time to sign up for Camp Onji-Akiing August 12-14, 2024

Register to join us at Camp Nesbit in Michigan's UP. Youth ages 10-14 and Junior Counselors ages 14-18 are invited to experience the Ottawa National Forest through education, cultural connection, and environmental stewardship as a part of Camp Onji-Akiing (From the Earth), facilitated by GLIFWC's Enforcement Division and the US Forest Service. Campers will participate in a morning spirit run, learn canoe safety, team up for games and adventures before ending the day with a fireside story at the edge of Lake Nesbit. For more information contact Jill Miller @ 715-292-9638 or email *ConservationOutreach@glifwc.org*.

Comptroller settling into new position

As GLIFWC's Comptroller, Joe O'Donahue joins the Administration Division to help lead the accounting department.

"Essentially my role is to organize, record, and summarize the work of accounts receivable/payable and payroll, and to keep everything in finance moving forward, said O'Donahue.

O'Donahue earned his EMT credentials at Gogebic Community College in 2013.

While attending the University of Wisconsin-Superior (UWS), O'Donahue would commute to the Marengo/Cable area to work nights and weekends on the ambulance. O'Donahue graduated with honors, earning his B.S. in Accounting from UWS in 2019.

O'Donahue is happy to be settled back in his hometown, Ashland, Wis. with his wife, Brittany and two kids Frank, 3 and Bonnie, 1.

In his free time, he's rooting for the Michigan Wolverines and Green Bay Packers. When he can get outdoors, he enjoys hunting ruffed grouse, bow and rifle hunting deer or just hanging out with his dog, Mike, and cat, Leonard.

O'Donahue is grateful for the team of financial experts already in place, to help get his feet under him. "The complexity of our funding streams requires a high level of oversight," said O'Donahue. He added that he approaches accounting from a "*plan the work and work the plan*" perspective and is looking forward to learning more about history and local cultural practices to best serve GLIFWC's member tribes.

—JVS

Great Lakes Indian Fish & Wildlife Commission

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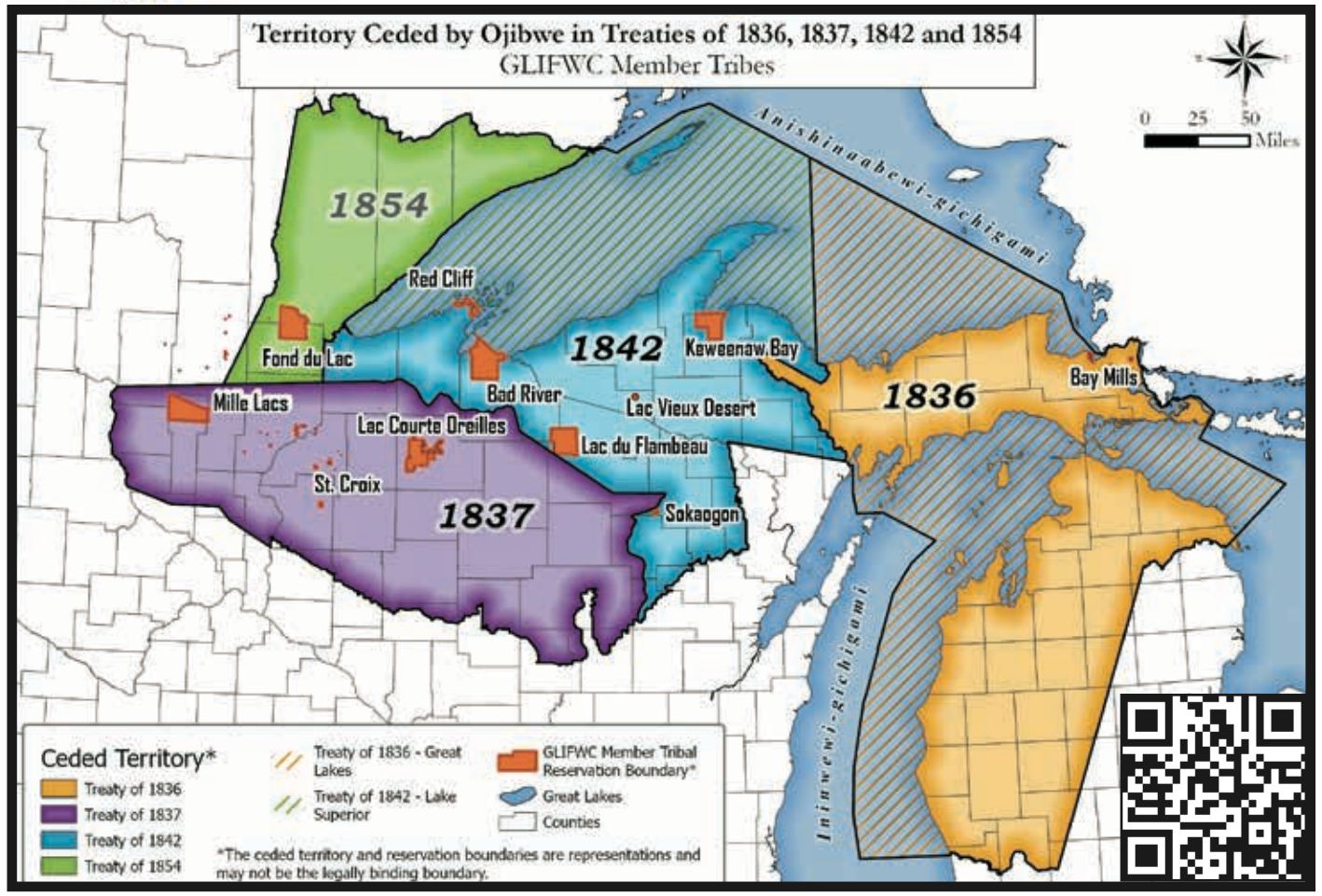

Motorists: give turtles a break this season

Miskwaadesi, mikinaak and their many relations are on the move. Around a dozen turtle species—including painted and snappers—participate in the breeding season from roughly Memorial Day to Independence Day in the Ojibwe Ceded Territory. During those high-traffic holidays and weeks in between, female turtles are also journeying to nesting grounds, oftentimes traversing roads that crisscross the landscape.

mikinaak (COR photo)

Help mikinaak and others arrive safely to lay their eggs by slowing down near wetlands, rivers, and lakes. If it's safe for you to do so, guide turtles across the road in the direction they are heading.

Wood turtles are of special concern in the Ojibwe Ceded Territories with formal state protections as a threatened species in Minnesota, Wisconsin, and Michigan. A target of the pet trade, they are illegally removed from the wild, hurting already struggling populations.

From the Re-creation Story to ceremonies, the turtle has a special place in Ojibwe culture. Look out for them this season.

—CO Rasmussen

Mazina'igan

A Chronicle of the Lake Superior Ojibwe