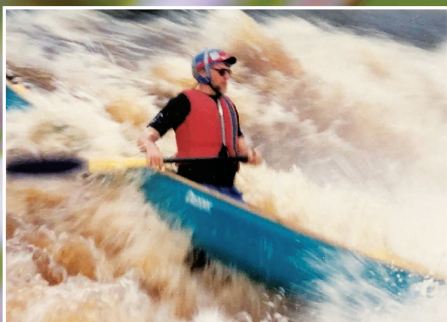


WISCONSIN NATURAL RESOURCES

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SUMMER 2021 \$3.50

GOOD BUZZ FOR A SPECIAL BEE



INSIDE

RIVER ACE SHARES THE LOVE
HITTING THE TRAIL TO HONOR HANK AARON
A MILESTONE FOR FISHERIES RESEARCH
SPECIAL REPORT: WISCONSIN'S GREAT LAKES

OPENING NOTES

A good sailor knows how to make the wind work to their advantage. No matter which way it's blowing, they can tack and jibe in such a way to get where they need to go.

Biking and hiking trails, too, can take us places. Meandering at times, maybe, but ultimately leading us from here to there — or nowhere in particular, if that's what we prefer. The same for rivers and other waterways.

Even more rustic natural areas can guide us. Often without designated paths or obvious routes, they encourage us to find our own way. Or sometimes better yet, to keep eyes peeled for the unexpected.

Outdoor experiences featured in this magazine include all the pursuits mentioned above and more, each activity taking someone somewhere — and bringing readers along with them.

These stories show just how it is with the outdoors: No matter where we start or what our initial expectations may be, if we're open to the outdoors and embrace the adventure, somehow they can steer us exactly where we need to be.



Sailboat races on Sturgeon Bay

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Volume 45, Number 2

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*SNA Program safeguards
state heritage lands*

PRESERVE, PROTECT, APPRECIATE

Lisa Gaumnitz

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Special Report

WISCONSIN'S GREAT LAKES



Stories by:

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Allison Voglesong Zejnati
John Gurda
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Madeline Magee
Dara Fillmore
Amanda Smith
Peter Jurich

Blue River Sand Barrens
State Natural Area

NATE FAYRAM

FROM THE SECRETARY

Preston D. Cole

Wisconsin is home to 84,000 miles of rivers and streams, 15,000 lakes, 800 miles of Great Lakes shoreline and 190 miles of Mississippi River shoreline. We truly have something special here.

And there's nothing quite like summer in Wisconsin. Whether hiking, biking, kayaking, camping and more, there are so many ways to find your adventure.

While you're out, take a moment to visit and really just appreciate Wisconsin's forests. At the DNR, we're responsible for managing 1.5 million acres of forested lands, including state forests, state parks, wildlife areas and other properties.



To help protect the planet and the people of Wisconsin, this past Earth Day 2021, Gov. Tony Evers signed an Executive Order pledging to protect and restore Wisconsin's forestland by conserving 125,000 acres and planting 75 million trees by 2030 as part of the U.S. chapter of the global Trillion Trees Initiative.

To kick things off, together, we planted trees alongside volunteers at Havenwoods State Forest in Milwaukee — the state's only urban forest.

When fully realized, the state pledge will result in 28.8 million metric tons of carbon dioxide stored over the next 50 years. That is equivalent to the amount of carbon dioxide produced by 6 million cars in a year.

Forests are woven into the culture of Wisconsin — where 17 million acres of forestland cover nearly half the state — and are vital to our social, ecological and economic well-being. Both the wide variety of forest-based recreational activities enjoyed by the



On Earth Day in April, Wisconsin Gov. Tony Evers, left, and DNR Secretary Preston D. Cole planted trees at Milwaukee's Havenwoods State Forest, part of a pledge to add 75 million trees in the state by 2030.



public and the products made from our forests are crucial to the state and local economies.

In addition to safeguarding water resources, providing wildlife habitat and supporting rural economies, maintaining healthy forests is also essential to mitigating climate change.

To help retain forest cover, the state plans to use the Knowles-Nelson Stewardship Fund to continue acquiring forestland for state and non-governmental entities. Additionally, the stewardship fund and other funding sources will be used to obtain conservation easements, preventing the conversion of forestland to other land uses.

Millions of trees will be planted each year on public and private lands in rural

and urban settings with support from state programs. In most U.S. cities, the distribution of urban tree canopy disproportionately benefits high-income neighborhoods.

A tree planting program targeting low-income urban communities would help to address inequity. Urban tree planting combined with enhanced tree maintenance can substantially increase urban forest carbon storage and deliver additional carbon mitigation benefits through energy savings.

Additionally, our state reforestation program will provide landowners hundreds of thousands of trees. Since 1911, the DNR has supplied Wisconsin landowners with more than 1.6 billion high-quality, native seedlings for reforestation. We also provide free tree seedlings for Wisconsin fourth-grade students to plant in honor of Arbor Day each year.

Dive into our Summer issue, as there is no shortage of interesting stories from across the state that might even provide inspiration for your travels. Whether highlighting the hard work DNR staff are doing to protect our amazing natural resources or sharing the personal stories of people enjoying them, I wish you happy reading!

JOSHUA MORRIS PHOTOS

DATELINE DNR



DNR FILES

JUNE 20

Kick off the summertime fun and enjoy every drop of daylight on the summer solstice.

JUNE 20

It's Father's Day, too, on this first day of summer, perfect for spending quality time outside with dad. And check out the Your Outdoors column in this issue for one reader's reminiscences of special times with his own father.



STOCK



FILE PHOTO

JULY 4

Just another relaxing summer Sunday ... made more special with a national holiday celebrating 245 years of history.

STATE PARKS MEAN HAPPY CAMPERS

Summertime is camping time, and the Wisconsin State Park System boasts excellent camping opportunities statewide.

While some first-come, first-served rustic campsites are available at select northern properties, reservations are required everywhere else. A vehicle admission sticker is needed for entry.

For details on camping and admission, safety updates and links to find a park and reserve campsites, check dnr.wi.gov/topic/parks/camping.



Newport Beach State Park

DNR FILES

YEARS OF VOLUNTEER EFFORTS YIELD BETTER DAYS FOR BLUEBIRDS

Bluebirds are back in Wisconsin, thanks to dedicated work by the DNR and citizen science volunteers at the Bluebird Restoration Association of Wisconsin. BRAW is celebrating its 35th anniversary this year.

Populations of eastern bluebirds have rebounded after plummeting by 90% in the 1980s, when only 600 nesting pairs were observed in the state. Now, thanks to BRAW's nest box monitoring program, about 20,000 bluebirds have been recorded annually.

More than 750 volunteers monitor nearly 7,000 nest boxes, with the design and management of the boxes improved over the years through BRAW member observations and research sponsored by the Cornell Lab for Ornithology and the North American Bluebird Society.


To read more on this successful conservation story and learn about BRAW and how to get involved in supporting bluebirds, visit braw.org.



DNR FILES

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Governor Tony Evers

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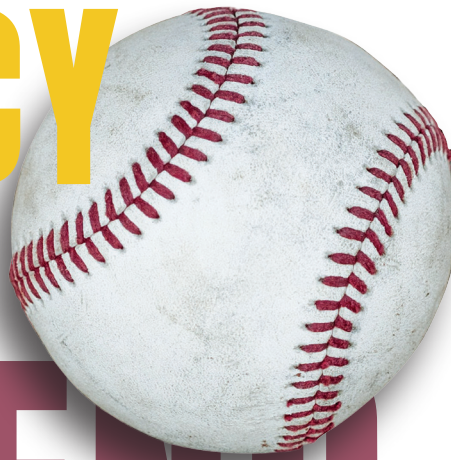
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LEGACY OF A LEGEND



ZELLE DUDA/UNSPLASH



DAVE SCHLABOWSKI

Hank Aaron State Trail remains fitting honor for baseball icon who died in January

ANDREA ZANI

It's not easy to honor someone with a legacy as important as that of Hank Aaron, but the Wisconsin pedestrian and bicycle trail named for the baseball legend is meant to do just that.

The Hank Aaron State Trail connects the Milwaukee lakefront with the city's Major League Baseball ballpark — a fitting tribute to the man who played professionally in Milwaukee for 14 seasons.

Aaron, who died on Jan. 22 at age 86, began his career with the Milwaukee Braves in 1954 and finished it with the Milwaukee Brewers in 1976, spending time in Atlanta in between when the Braves moved south. The Brewers, who already have a statue of Aaron outside their ballpark, are wearing Hammerin' Hank's No. 44 on their jersey sleeves this season.

In addition to setting standards for baseball categories such as home runs, runs batted in, extra-base hits and total bases (with all but his home run record still standing), Aaron also set a standard as a person, modeling

decency, commitment and community involvement even as he broke racial barriers in baseball and beyond.

That's why, for Aaron, the honor of having the state trail named for him was about more than baseball. Aaron understood the importance of the trail's urban location, and having his name associated with it prompted Aaron to be involved in more than name only.

The trail opened with a small segment in 2000, and Aaron was on hand in 2006 when a larger section was completed. He returned to Milwaukee from his home in Atlanta for numerous other trail-related events through the years.

"Hank Aaron was authentically humble and was truly honored to have the trail named after him," said Melissa Cook, who was manager of the trail during her time at the DNR before retiring.

Cook's comments were shared by the Friends of Hank Aaron State Trail in noting Aaron's death. FOHAST offers promotion, fund-raising, community programs and many other types of support for the trail. The DNR handles maintenance.

"At the dedication of the trail, he gave a speech and mentioned how honored he was, but then talked about how he hoped the trail would show people of future generations how much it meant to 'a young ballplayer so many, many years ago' to be welcomed by the people of Milwaukee," Cook recalled.



PA NGUYEN

Hank Aaron took a genuine interest in the state trail named in his honor including attending the groundbreaking for adjacent Three Bridges Park and a trail extension in 2012, with then trail manager Melissa Cook, left.

“At one point, when we were briefing him on the progress of the trail, he was so pleased that it would serve so many diverse neighborhoods and particularly children.”

STILL WORKING TO CONNECT

To that end of serving area youth, the work continues.

The nonprofit FOHAST has partnered with supporters and the Wisconsin Bike Federation to bring bicycle programming to young people in the Milwaukee area. Since 2008, the Bike Adventure Camps for Kids program has welcomed more than 1,200 area kids.

Turns out, the 14-mile paved trail winding through dozens of neighborhoods and past multiple city landmarks is the perfect place to introduce young children and teens to bicycling and the outdoors.

Check the FOHAST website at hankaaronstatetrail.org to learn more about these camps.

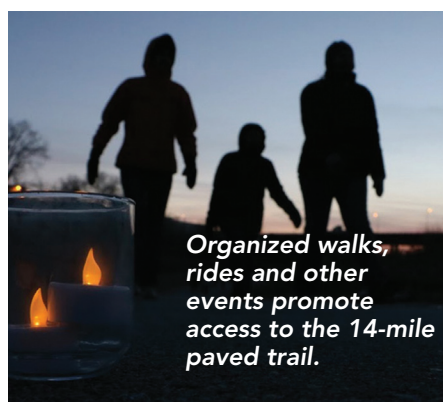
Other programming from FOHAST and the Bike Fed has reached hundreds more in the Milwaukee area utilizing the Hank Aaron State Trail. Events sponsored by the groups separately or together have included organized walks, runs and rides; family bike workshops teaching safety and basic maintenance; and signage efforts and other work to make the trail more easily accessible.

Recently, the Bike Fed honored Aaron and celebrated the trail with an online “visual story” featuring area children and families learning to enjoy



ROBERT QUEEN

Hank Aaron, who played much of his career in Milwaukee, was on hand for the unveiling of the original trail sign in 2006.



DNR FILES

the trail. The words and photos also show how programming from the Bike Fed and FOHAST was adjusted for COVID-19.

“Together, we continue our work to honor Hank Aaron’s legacy with special focus on achieving Aaron’s mission to improve access to his namesake trail for Black and Latinx Milwaukeeans,” the Bike Fed noted. “We adapted our programming to build new models of engagement.”

The words and photos on the following pages are excerpts from the Bike Fed’s online tribute to Aaron. For more on “Hammerin’ Hank’s Bicycle Legacy” and the full visual story, go to wisconsinbikefed.org and search “Hank Aaron.”



Andrea Zani is managing editor of Wisconsin Natural Resources magazine.

IN HONOR OF AARON

Following Hank Aaron’s death in January, Wisconsin Gov. Tony Evers proclaimed Hank Aaron Day on Feb. 5, which would have been the baseball legend’s 87th birthday. A framed copy of the proclamation is being prepared as a gift to Aaron’s widow, Billye, and will be accompanied by commemorative letters and photographs from Hank Aaron State Trail partners.

The effort is being coordinated by the DNR and Friends of Hank Aaron State Trail. A celebration of Aaron also is planned for this year’s Run/Walk the Hank event, tentatively set for Aug. 14, with details pending COVID-19 restrictions.

For more on the trail, including trail maps, go to hankaaronstatetrail.org and dnr.wi.gov/topic/parks/hankaaron.



MICHAEL ANDERSON

The urban location of Milwaukee’s Hank Aaron State Trail, winding from Lake Michigan to the Brewers’ ballpark, makes it ideal for introducing local youth to the joys of getting outdoors.

TEXT AND PHOTOS BY MICHAEL ANDERSON,
WISCONSIN BIKE FEDERATION

HANK AARON STATE TRAIL

RESTORING ECOLOGY CONNECTING NEIGHBORHOODS

The Hank Aaron State Trail has been a boon to the restoration of native ecology in the Menomonee River Valley. It also connects people to some of Milwaukee's landmark destinations. You can get all the way from Lake Michigan to Brookfield using this trail, truly connecting multiple communities. You can even connect to Milwaukee County's Oak Leaf Trail, then the New Berlin Recreation Trail to Waukesha, then hop on the Glacial Drumlin State Trail and ride all the way to Madison!



WORK PERSISTS TO IMPROVE ACCESS

Still, there is much work to be done connecting Milwaukee's communities to the trail. The Wisconsin Bike Federation and Friends of the Hank Aaron State Trail are dedicated to promoting equity and inclusion along the trail. The biggest obstacle for many people who live near the trail is simply accessing it.

A PLACE OF UNITY

Milwaukee's legacy of segregation is acutely felt along the Hank Aaron State Trail, with the Menomonee River Valley being a historic point of separation. Additionally, the location of I-94 on the north side of the trail exacerbates issues of segregation and access. Much of the work done in honor of Hank Aaron is to address inequities and promote the trail as a place of unity.





TOOLS AND SKILLS TO SUCCEED

We work to continue building Milwaukee's bicycle culture so families have the tools and skills they need to access this amazing resource. We aim to build not only a place to escape cars and pollution, but also to serve as a place where we can gather and feel connected to the history of this place.

HISTORY AND EXPLORATION

In response to COVID-19, FOHAST and the Bike Fed piloted a Youth Trail Ambassador Program. Young people representing different communities along the trail met every Saturday in October. Through exploration by bike with Bike Fed instructors, we learned about the history of the Menomonee River Valley and how cars have impacted development and public health in Milwaukee. We rode not only on the trail, but also explored connections to the trail for places important to our young cyclists.



HEADED TO THE TRAIL

Among Bike Fed initiatives, students from a summer camp learned how to safely navigate streets en route to the Hank Aaron State Trail.



HANK AARON STATE TRAIL

PROMOTING A SENSE OF COMMUNITY



By using the trail and zipping through neighborhoods, youth ambassadors developed a stronger sense of the community's history and their place in moving Milwaukee forward. The ambassadors determined how much time it would take to walk to the trail from each location we stopped.



SIGNS POINT TO PROMISING FUTURE

FOHAST and the Bike Fed, with the support of Quad Graphics and Milwaukee's Near West Side Partners Inc., plan to print and install wayfinding signs. They will lead from Tiefenthaler Park, where the nonprofit Kellogg PEAK Initiative is building a new community center, to the 32nd Street access point of the trail. We are excited to professionally render and install these signs! They will be durable enough to last two years and will help leverage support for more permanent investments.



A LITTLE CARE GOES A LONG WAY

On an outing with Safe Routes Instructor Barb Blick, riders stopped by Marquette and discussed how students can get onto the trail. This is a location where a little extra care and signage could transform how people interact with and use the trail system.



OUTREACH IS KEY TO FAMILY INVOLVEMENT

FOHAST and the Bike Fed collaborated on a new model of Family Bicycle Workshops. We created experiences uniquely tailored to family needs to get them out on the trail, with families coming from both the North Side and South Side of Milwaukee. One key was identifying trail access points on a map, so families have the skills and knowledge to make the Hank Aaron State Trail a treasured family pastime.



READY TO HIT THE TRAIL

Bicycle maintenance was another major component of the Family Bicycle Workshops. Safe Routes Instructor Eric Crouthamel was among those who helped families get trail ready.



AARON'S LEGACY LIVES ON

The spirit of Hank Aaron lives in this place, and the fact it is so accessible to the community is a beautiful thing. His legacy lives on in the journey and experiences of the young people who get to learn about their community and build lifelong connections thanks to the Hank Aaron State Trail.

Guided by a passion for paddling

**Veteran river lover
carves path to
help others enjoy
state waterways**

Longtime paddler Rick Kark has experienced his share of rough waters over the years, including on the Wolf River.

**STORY BY MOLLY MEISTER
AND PHOTOS COURTESY
OF RICK KARK**

Retired physician Rick Kark has what he best describes as “a love affair with rivers.”

A longtime paddling enthusiast, Kark has canoed in 42 states, Canada and even the Arctic Ocean. In Wisconsin, his paddling resume includes more than 300 rivers and streams.

“Rivers are fascinating,” Kark said. “I love the challenge of paddling — reading the river, finding the right routes, being able to control the canoe and being able to maneuver it through fallen trees and rocks and rapids and how to get back upstream.”

“The scene is always changing as you come around the next bend.”

Originally from Iowa, Kark moved to Wisconsin to attend medical school, and brought his love of water with him.

“I paddled my first Wisconsin stream in 1969,” he said. Along the Wisconsin-Minnesota border, “I spent three days and two nights canoe-

camping on the St. Croix River with my college sweetheart.”

Kark remembers the song “Sweet Caroline” blaring from the couple’s transistor radio as they floated downstream from Interstate State Park to Houlton.

“Little did I know I would eventually explore more than 300 other Wisconsin rivers,” he added.

WATERWAYS OPEN TO ALL

Kark is now retired to Asheville, North Carolina, but still returns to his adopted state of Wisconsin when he can. He’s one example of the tens of thousands of outdoor recreationists who hit Wisconsin’s navigable waterways each year.

Thanks to the state’s Public Trust Doctrine in the State Constitution, Wisconsin’s waters belong to everyone and are declared “common highways and forever free.”

That means everyone in the state has the right to boat, fish, hunt, ice skate, swim and, of course, paddle on navigable waters.

For Kark, despite his many travels, the state remains one of his favorite places to pursue his passion.

“Wisconsin is certainly the most vast and the most brilliant in many ways,” he said, “the most important part of my river family.”

What sets this neck of the woods apart? Kark cited the state’s huge variety of navigable streams, each

Two tips from Rick Kark for a better paddling trip to places such as the Bois Brule: Learn what you’re doing and take a companion.

featuring its own unique beauty. From challenging whitewater streams to foreboding rocky shorelines to the postcard-worthy geography of the Driftless Area, Kark has yet to meet a waterway he didn't enjoy.

"With so many beautiful places, I often found myself in circumstances where the lighting would be just right. It would be such a combination of water and rock and trees and different natural features that would just create shocking beauty," he said.

ADVICE FOR OTHERS

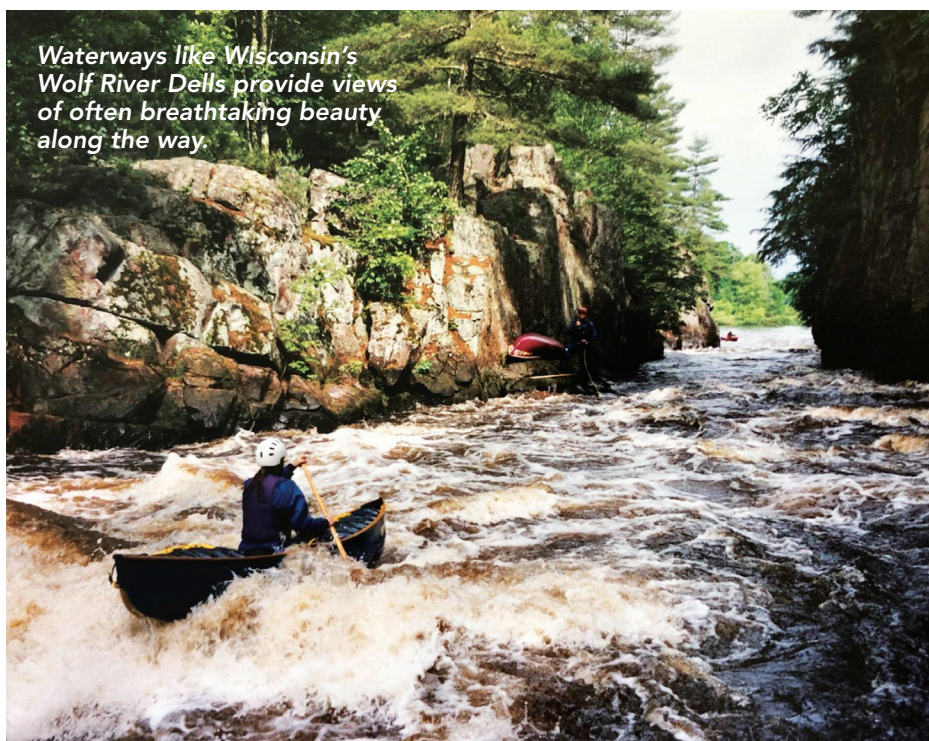
These days, paddlers of all experience levels can benefit from Kark's knowledge of the state's waterways through his guidebook available in partnership with the River Alliance of Wisconsin.

By 1982, after Kark had paddled around 100 rivers, he decided to start documenting his adventures. In 2015, he published a full collection of his notes, "Canoeing and Kayaking Guide to 309 Wisconsin Rivers and Streams."

The River Alliance eventually put the guidebook's contents online, organized by region, and used the material to create an interactive trip-planning tool for paddlers.

In addition to creating these helpful tools, Kark offers important advice for novice paddlers: Find someone to help you learn what you're doing.

"People think it's easy just to sit in the canoe and take off and paddle," he said. "But you don't want to start off by yourself.



Waterways like Wisconsin's Wolf River Dells provide views of often breathtaking beauty along the way.

"The first thing I suggest you do is find a companion or a group of paddlers to teach you the proper strokes and other invaluable skills. My way of starting was through the Sierra Club."

MAKING MEMORIES

Time on the water is not always calm. Kark said he has fallen out of his canoe several times when encountering difficult rapids.

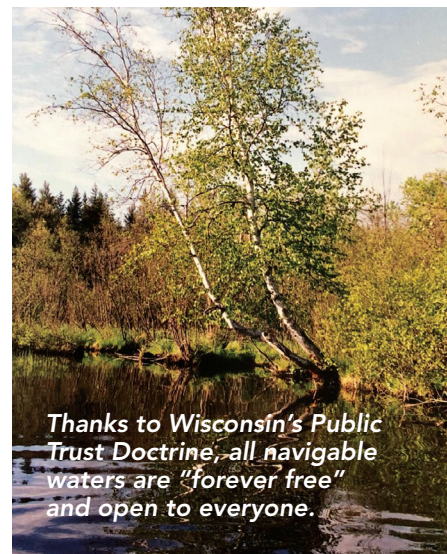
One time on the Wolf River, he had to switch into doctor mode to help a fellow paddler with a shoulder dislocation. Another time, Kark had a close encounter with a real-life badger.

"I got closer and closer and he just stood his ground in front of the den and was going to defend his territory," Kark said. "But I got a really close-up look of his face."

Even though Kark has thousands of hours of experience under his belt, he still gets lost from time to time, including once in the middle of a swamp full of trees. It's all part of the adventure, he said.

The doctor noted the benefits his paddling has had on his physical and mental health over the decades. Not only does he enjoy the physicality of paddling and portaging his canoe, he also enjoys the meditative aspects of being outdoors.

Since his retirement, Kark has been busy maintaining a fleet of seven canoes and exploring new waterways near his home and nationwide. He



Thanks to Wisconsin's Public Trust Doctrine, all navigable waters are "forever free" and open to everyone.

already has paddled more than 60 streams in North Carolina, with a goal of paddling in all 50 states.

As of now, he has just eight states to go.



Molly Meister is a public information officer in the DNR's Office of Communications.

PADDLE GUIDES ONLINE

To access Rick Kark's Canoeing and Kayak Guide to more than 300 Wisconsin rivers and streams, check the River Alliance of Wisconsin website, wisconsinrivers.org/kark-paddle-guide. For the interactive paddle guide tool, see wisconsinrivers.org/paddlew.

75 years of catch and research

Fisheries management benefits from decades of data collection on Vilas County lakes

RYAN BOWER

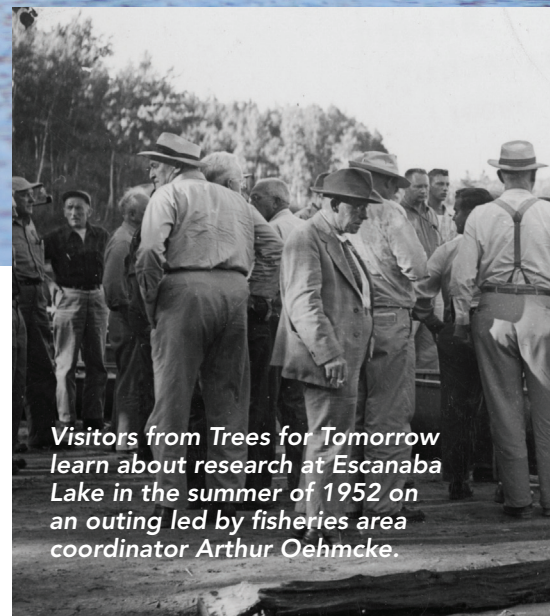
At five beautiful lakes in Vilas County, there is an opportunity for fishing to be about more than just casting a line. Here, at the Northern Highland Fishery Research Area, angling and science go hand in hand — and they have for 75 years.

On June 20, the DNR will mark the 75th anniversary of the NHFRA, the agency's longest-running fisheries research project. It has been a rich resource for researchers since it began and is well known by fisheries professionals and the research community, though lesser so by the public.

Originally called the Five Lakes Research Project, the NHFRA is named after the lakes that comprise it: Nebish, Palette, Mystery, Spruce and Escanaba, where the headquarters are located about 10 miles south of Boulder Junction.

The research area was established by the Wisconsin Conservation Department in 1946 in response to requests by anglers that a group of lakes be set aside for long-term sport fishing research. This specific area was chosen because of its location and diversity of lake types.

The NHFRA is an umbrella project including multiple research initiatives that have contributed much over the years to the understanding of how fish communities respond to fishing regulations, environmental changes and angler practices. Many of the DNR's fishing regulations were first

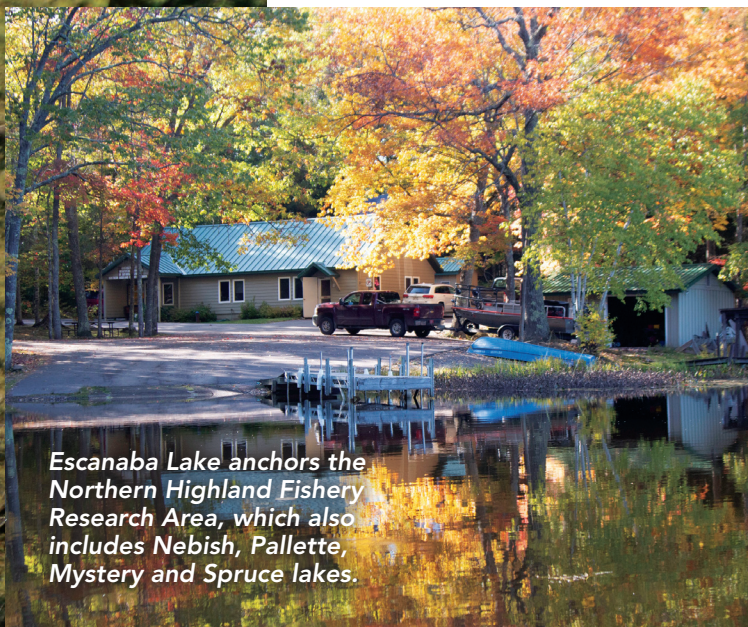


Visitors from Trees for Tomorrow learn about research at Escanaba Lake in the summer of 1952 on an outing led by fisheries area coordinator Arthur Oehmcke.

tested on lakes in the NHFRA.

One of the NHFRA's most notable and unique contributions is its angler survey data set, one of the longest continuous fish harvest data sets in the world. The data set stems from a mandatory fishing survey first imposed on all five lakes when the NHFRA was initially established.

Anglers on the lakes are required to stop by the Escanaba Lake creel station



Escanaba Lake anchors the Northern Highland Fishery Research Area, which also includes Nebish, Pallette, Mystery and Spruce lakes.

RYAN BOWER PHOTOS



RUSS NEUGEBAUER

twice when fishing — once before heading out and once after. A free permit is issued, and a survey is completed.

Staff will ask anglers questions such as what was used for bait, if they used a boat or kayak, what they were fishing for and if a fishing guide was employed. If fish are harvested, staff record the length, weight, sex and a rough age for each catch. More

recently, staff have started collecting catch-and-release information as well.

The answers help the DNR determine catch rates and trends in equipment use over time. That data provides a measure of targeted effort for each species and guide popularity.

And that's it. Just a few short questions, and anglers will have contributed to one of the longest-running, complete angler surveys in the world! The collective data creates a complete record of every angler who has fished the lakes and every fish that has been legally harvested there since 1946.

PERFECT SPOT FOR SCIENCE

Having such a complete data set is extremely rare in the world of natural resources, and the resulting knowledge gained from monitoring and evaluating fisheries regulations over the last 75 years is immense.

The NHFRA is the perfect place for such fisheries science to take place. The lake shorelines are undeveloped, often having fallen trees and other cozy hiding spots where young fish can grow up.

The lakes also are tucked deep enough into the Northern Highlands-American Legion State Forest that there is a calm and natural beauty to the lakes, making the angling experience that much richer and more authentic.

The DNR Trout Lake Forestry Station and the UW-Madison Trout Lake Station, other important research facilities in the state forest, are only a few miles away, adding to

the importance of this location from a research perspective.

Since the lakes in this area comprise very different lake types, choosing this area meant researchers could see how experimental regulations might impact the different lakes found in Wisconsin.

Mystery and Spruce lakes, for example, are sphagnum bog lakes, having darker water and simple fish communities similar to many of the other bog lakes in the state.

On the other hand, Escanaba Lake is a drainage lake and has a large diversity of fish species. Notably, it is one of the most studied walleye lakes in the world.

Nebish and Pallette lakes are classic kettle and water-table lakes, so their water level is dominated by precipitation.

From studying these five lakes and their fish communities, researchers can test and evaluate new fisheries regulations that could then be adopted in other comparable lakes across the state.

GETTING IT STARTED

Immediately after the NHFRA was established, the first research work began. It was a blanket regulation for all five lakes imposing no bag limit, no size limit and no closed season for all species unless specifically stated — during an experiment, for example.

The regulation aimed to better understand how the fish communities would react to unrestricted harvest, explained Greg Sass, DNR fisheries research team lead and current head of the NHFRA.



STABER W. REESE

A sign on Escanaba Lake in 1946 designates the newly established fisheries research area.

“Anglers were worried about stunting in fish populations,” Sass said. “The initial purpose of the NHFRA lakes was to better understand the role of angler harvest in increasing the size structure and individual growth rates of fishes.”

At the same time, the compulsory angler survey was implemented across the research area. The data from angler permits began creating the now massive data set used for research purposes and establishing annual catch and harvest rates for each species within the NHFRA.

RESEARCH AND TREATY RIGHTS

The most notable use of the data set happened in the mid-1980s. That’s when the Ojibwe began to harvest walleye and muskellunge through traditional spearfishing on off-reservation waterbodies in northern Wisconsin’s Ceded Territory.

This was done as part of their off-reservation hunting, fishing and gathering rights secured in the treaties of 1837 and 1842 and affirmed in federal court in the 1980s.

Harvested fish are measured and weighed, with sex and rough age also recorded, as part of the research area’s ongoing creel survey.



RYAN BOWER PHOTOS



The DNR’s Greg Sass oversees the fisheries research area and savors his own time spent on the water. “Most of the anglers who are here frequently enjoy the solitude and beauty of the lakes.”

Since this additional harvest could impact total exploitation rates — and a new federal mandate declared walleye were not to be overharvested in the Ceded Territory — the DNR and tribal collaborators started building a walleye and muskellunge joint fisheries management plan to ensure the sustainability of these resources.

Data from the angler survey played a critical role in the landmark plan, known as the Ceded Territory of Wisconsin Walleye Management Plan.

“We would have been in a much different place, trying to figure out (harvest quotas), if we didn’t have 40 years of data from Escanaba Lake,” Sass said, noting there was no standardized walleye monitoring program to collect data aside from the NHFRA until years later.

“Escanaba Lake might not be the best scenario to represent every walleye lake in northern Wisconsin, but it was the best information and science available at the time — and they used it.”

VALUABLE TRAINING GROUND

In addition to aiding science and fisheries management decisions in Wisconsin, the NHFRA also has served as a training ground for many career fisheries professionals.

After time spent at the NHFRA in their early years, these professionals have gone on to be bureau chiefs, district supervisors, team supervisors, hatchery managers, fisheries biologists and fisheries technicians for the DNR and other conservation organizations.

Working at the creel station or on one of the NHFRA’s projects offers valuable experience with technical skills and research.

“One thing we offer that other programs can’t is independent study,” Sass said. “That is something students interested in graduate school have sought from us. It gives them an extra year or two of experience before they go to graduate school.”

Many young professionals have leveraged the NHFRA’s 75-year data set and developed their own research from working at the site. More than 30 graduate students nationally have used the data set as a basis for master’s thesis work and doctoral dissertations.

SAME LAKE, DIFFERENT LOOK

As the NHFRA’s lakes and their fish communities have changed over the years, jobs and fishing opportunities

have come and gone, particularly on Escanaba Lake.

Fish community shifts, new regulations and the growth of non-fishing recreational activities are just a few of the ways Escanaba Lake has transformed since the start of the NHFRA. Data from the angler survey tells much about the lake’s long history.

The fish community in Escanaba Lake in the 1940s looked very different than it does now. Largemouth bass, smallmouth bass, bluegill, pumpkinseed, black crappie and yellow perch were the dominant fish species in the lake until the 1950s, according to angler survey data.

In the mid-’50s, walleye were established due to previous stocking efforts in the lake, and a self-sustaining population was soon created.

Within 10 years, many of the once-dominant species were in decline, and largemouth bass, smallmouth bass, black crappie and bluegill were almost entirely absent from the creel data set.

several decades before an experimental regulation would shake things up.

NEW RULE BRINGS CHANGE

In 2003, researchers set the first walleye regulation on Escanaba Lake since the NHFRA began. This regulation was a 28-inch minimum length limit and a bag limit of one for walleye.

Before the regulation went into effect, NHFRA data reflected 57 years of unrestricted harvest on Escanaba Lake, and it was experiencing an exploitation rate of nearly 35%. Researchers wanted to learn how the walleye population would respond to a shift from heavy harvest to essentially none.

Sass said they were most interested in how this change in harvest would impact adult abundance, juvenile recruitment, age and size structure and individual growth rates. The new regulation also was enacted to test whether more walleye would exceed 28 inches in length over time.

Researchers also changed Escanaba Lake’s regulation because it served



Fishing on Escanaba Lake has evolved over time, but the lake’s scenic vistas remain.

RYAN BOWER

The introduction of walleye did more than just alter the fish community. It created new angling opportunities and even added a few jobs to the area.

“Escanaba Lake was known as Boulder Junction’s ‘fry pan’ because of its renowned fishing,” Sass said. “It was a viable career to guide anglers, and Escanaba Lake was frequented by guides because of its plentiful walleye.”

With no bag limits, Sass added, “Anglers could take as many as they caught.”

Walleye were heavily harvested for

as a good comparison to another regulation change happening at a nearby lake, Sherman Lake, where a new rule increased harvest to 50%. Escanaba Lake would serve as an unexploited reference lake for Sherman.

Escanaba Lake’s regulation was so successful at stopping exploitation that no walleye have been legally harvested from the lake since the rule went into effect. The change was not popular, though.

“My predecessor took a whole bunch of heat when the regulations



Recreational opportunities extend beyond the water, with hiking trails offering yet another way to enjoy the NHFRA in addition to fishing.



RYAN BOWER PHOTOS

were changed. Even to this day, I have retired guides turn around and ask me in church when we are going to open up Escanaba Lake again,” Sass said.

“It has been hard for people to let go of that on Escanaba Lake.”

PLAN FOR THE NEXT MOVE

Such interactions show just how much the lake means to the anglers and guides who have been fishing the lakes for decades. But Escanaba Lake is a research lake. It and the other lakes in the NHFRA were set aside for exactly this purpose — to test new regulations.

The current walleye regulation on Escanaba Lake was scheduled to last for 20 years and will end in 2022, at which point a new regulation will be put into place.

Just as the current regulation was a test of transitioning from intense harvest to no harvest, the next proposed regulation is aimed to address a more recent harvest-related concern — declining walleye natural

recruitment and productivity in the Ceded Territory.

The proposed plan is to establish a yearly harvest quota to remove all annual production as well as an additional 25% of surplus production to test for overharvest, which has been identified on other Ceded Territory lakes.

ACTIVITIES SHIFT

An unintended consequence of the 2003 walleye regulation was a shift in how people enjoy the lake. Sass described a big surge in the number of people who wanted to enjoy the natural beauty of the lakes and surrounding area.

Hiking trails and cross-country ski trails became more popular, and the number of paddlers increased as well, according to the NHFRA data set. Sass said people have been taking advantage of the campsites around the lakes more, too.

“Most of the anglers who are here frequently enjoy the solitude and

beauty of the lakes,” he said. “The lakes are not developed, and you’ve got lots of recreational opportunities, great wildlife and good fishing.

“We still see plenty of anglers who want to harvest fish, but our records show less harvest than in the past. That seems to be a common theme across all the research lakes.”

According to the data, voluntary catch-and-release has grown in popularity since the mid-1980s, despite no closed season or minimum length limits for most species. Such angling does have benefits for the lake, including lessened harvest pressure.

“Escanaba Lake has become a place where guides come to practice. It’s a place where guides bring their clients who have reached their bag limit already but want to continue angling,” Sass said.


PAST, PRESENT AND FUTURE

Despite not always being popular, the Escanaba Lake walleye regulation will provide lessons for managing Wisconsin’s other lakes and solidify the importance of experiments like this to the greater angling community.

And the NHFRA will continue to lead research in emerging fisheries issues and their potential solutions.

“It is important to remember our past and our core mission, but at the same time, we need to adapt and be poised to meet the newest emerging research needs,” Sass said. “I want to take a more holistic, ecosystem approach to what influences our fish populations.

“For a lot of our history, (our approach) was solely based on harvest. The system is much more than that.”

To be part of the long-running work now being done by Sass and his colleagues, consider a trip to the Northern Highland Fishery Research Area. Enjoy the beauty of these magnificent lakes and contribute to years of science by doing something every angler loves — fishing. 

Ryan Bower is a communications specialist working in the DNR’s Division of Fish, Wildlife and Parks.

ABOUT THE NHFRA

For more on the DNR’s fisheries research efforts including the Northern Highland Fishery Research Area, check dnr.wi.gov/topic/research.

Snapshot Wisconsin seeks volunteers to build on wildlife monitoring momentum

RYAN BOWER

Fifty million photos. That colossal milestone has now been reached by the Snapshot Wisconsin wildlife monitoring program, thanks to its nearly 2,000 trail camera volunteers.

But the program, one of the DNR's largest citizen science efforts, is not stopping there. Using this momentum, Snapshot Wisconsin is recruiting additional volunteers across Wisconsin to host trail cameras and contribute to wildlife monitoring in their area.

Snapshot Wisconsin, launched in 2016, includes a community of volunteers who host trail cameras that capture images of passing wildlife. More than 2,100 trail cameras (some volunteers have multiple cameras) are part of the program reaching all 72 Wisconsin counties.

Photos are uploaded to the crowdsourcing platform Zooniverse — zooniverse.org/projects/zooniverse/snapshot-wisconsin — where thousands of other volunteers then classify the species shown. The program receives about 45,000 photos each day.

Data from the project helps the DNR understand the distribution of wildlife populations around the state and make important wildlife management decisions.

To celebrate collecting its 50 millionth photo, Snapshot Wisconsin released an interactive map in November showing the project team's favorite photos from across the state. The map highlights each photo and tells a story about the image or the species shown.

NEW WAY TO EXPLORE DATA

Rare species sightings, unusual animal behaviors and even a few multi-species encounters can all be seen in the interactive map. Find a link in the Snapshot Wisconsin December 2020 newsletter: dnr.wi.gov/topic/research/SnapshotWINewsletter.

Also in 2020, Snapshot Wisconsin released the first version of its Data

Dashboard, an interactive tool that offers volunteers and the public a new way to explore Wisconsin wildlife species.

Anyone can discover how species are spread across the state, when they are most active and how many sightings Snapshot has observed in each county. The data for 18 wildlife species is available to explore, and more species

will be added over time.

Check out the Data Dashboard at widnr-snapshotwisconsin.shinyapps.io/DataDashboard.

While Snapshot Wisconsin was able to get closer to its goals last year, the program needs more volunteers to reach its next level of development. The program seeks volunteers for both aspects — hosting trail cameras and classifying wildlife.

For camera hosts, requirements include access to at least 10 contiguous acres of public or private land along with access to high-speed internet and basic computer skills. Volunteers must be able to check the camera at least once every three months for a minimum of one year.

Once accepted as a camera host, volunteers receive all equipment and training needed, and staff are available to troubleshoot any issues.

If you want to see what species live in your area or contribute to wildlife monitoring statewide, try volunteering with Snapshot Wisconsin.

Ryan Bower is a communications specialist working in the DNR's Division of Fish, Wildlife and Parks.

ABOUT SNAPSHOT WISCONSIN

To learn more about the Snapshot Wisconsin wildlife monitoring program or apply to be a trail camera volunteer, visit dnr.wi.gov and search "Snapshot."



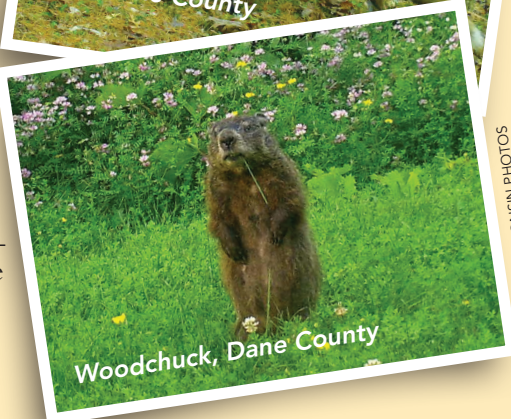
Snapshot Wisconsin volunteer Corri Hamilton checks program information as she sets up her new trail camera.



Black bears, Marinette County



Red fox pair, Marquette County



Woodchuck, Dane County

SNAPSHOT WISCONSIN PHOTOS

A photograph of a forest floor with a large, moss-covered log. A small hole is visible in the log, and a rusty patched bumblebee is flying near it. The background is filled with fallen leaves and branches.

SMALL NEST CREATES BIG

BUZZ

The sound of a single rusty patched bumble bee in Milwaukee County last summer led to the exciting discovery of a nest in this small hole.

Discovery generates excitement and optimism for rare rusty patched bumble bee

EVA LEWANDOWSKI

It's easy to overlook a hole an inch and a half wide in the middle of the woods, and just as easy to overlook insects a half-inch in size flying through those same woods.

So perhaps it should come as no surprise that when Halley Minser, a Milwaukee County Parks employee doing restoration work, first discovered a nest of the federally endangered rusty patched bumble bee, it wasn't because she saw the hole or

the unobtrusive bees, but because she heard the loud, iconic buzz of the queen bumble bees emerging from the nest.

By following that sound, Minser found the small hole that became the target of a burst of activity for biologists and conservation professionals from across the state.

The rusty patched was once abundant and widespread in the eastern United States, but by 2017 the species had declined by almost 90% and was listed by the U.S. Fish and Wildlife Service as federally endangered.

Wisconsin is home to some of the last populations of the rusty patched. In fact, the bumble bee has been documented in 37 counties in the state from 2017 to 2020.

While that number seems impressive on the surface, the majority of the observations have been of only a single



Federally endangered and a species of special concern in Wisconsin, the rusty patched bumble bee is a rare sight in the state.

JAY WATSON

individual, as opposed to the dozens or even hundreds of individuals of other bumble bee species that sometimes are reported.

As biologists and skilled volunteers scour the landscape for the rusty patched, they are finding it in frighteningly small quantities, and nests are all but unheard of. In fact, the nest Minser found was the only one reported in the first three years of a new statewide bumble bee monitoring project, the Wisconsin Bumble Bee Brigade.

RARE OPPORTUNITY

Rusty patched bumble bees (*Bombus affinis*) live in colonies with an annual life cycle. Only new bumble bee queens, called gynes, survive into the winter months.

The queens are inactive throughout the winter and spend it burrowed into the soil or woody debris. Early in the spring, they emerge and begin

collecting nectar and pollen and searching for a place to nest, usually underground.

The queen deposits a mixture of nectar and pollen into the nest and lays eggs on it. These eggs eventually develop into female worker bees that take over foraging for nectar and pollen while the queen remains in the nest and continues to lay eggs.

In mid- to late summer, queens produce males and new queens, which mate. Because of the annual nature of their life cycle, all but the newly mated queens die in the fall, with only these few survivors left to overwinter and begin the cycle anew in the spring.

The vast majority of rusty patched observations are made when the bees leave the nest and forage. Because they can fly long distances (more than a mile) for food, the location of foraging bees doesn't necessarily reveal information about nesting habitat.

As a result, much remains unknown



As with similar species, finding proper habitat remains one of the biggest challenges for the rusty patched bumble bee.

about what is required for a nesting site and what contributes to nest success or failure, information that is critical for conservation of the species. The Milwaukee County nest provided an extremely rare opportunity to study the habitat surrounding a nest, as well as the day-to-day activity of the bees at the nest entrance.

SHOCK AND DISBELIEF

While Minser wasn't surveying for bumble bees when she found the nest in mid-August 2020, she regularly monitors bumble bees on Milwaukee County Parks properties, so she immediately knew the importance of her find.

"I would've been thrilled to find a nest of any bumble bee species. I was in momentary disbelief when it turned out to be an *affinis* nest," she said. "I was shocked and then giddy with excitement once it sunk in."

She then stopped all work on the site and created a buffer zone around the area before reporting the observation.

"Holy grail! Please let me know what I can do to contribute information/data," she wrote when she submitted the observation to the DNR that evening.

DNR staff were equally excited to receive her report, exchanging a flurry of emails early the following morning and quickly verifying the observation based on Minser's photographs. Jay Watson, the DNR's terrestrial insect ecologist, immediately reached out for access to the nest to collect much-needed information on the endangered bee.

Watson, whose responsibilities have him crisscrossing the state surveying for rare insects, was committed to critical work elsewhere the following day. However, he knew the lateness of the season — coupled with the fact Minser had observed new reproductive females usually produced at the end of a colony's life cycle — limited the time to gather additional observations.

Recognizing that urgency, he reached out to another Wisconsin bumble bee expert, Amy Wolf, a professor at UW-Green Bay. Wolf made the drive to Milwaukee the next day, where she and Minser began marking individual bumble bees with small dabs of paint as they left the nest to estimate the number of bees living there.

The U.S. Fish and Wildlife Service also was contacted, and they provided guidance on survey techniques and what type of habitat and demographic

JAY WATSON



data would be most useful to their work with the rusty patched. They connected Watson with a researcher leading on-the-ground work at two nests found in Minnesota, allowing the two teams to share information and collaborate.

IMPORTANT OBSERVATIONS

Over the next three weeks, Minser made frequent trips to the site to monitor the nest, often accompanied by Watson. Wolf supplied a trail camera to record wildlife activity around the nest, and marking of individual bees continued — with as many as 10 bees caught and marked during a single three-hour observation period.

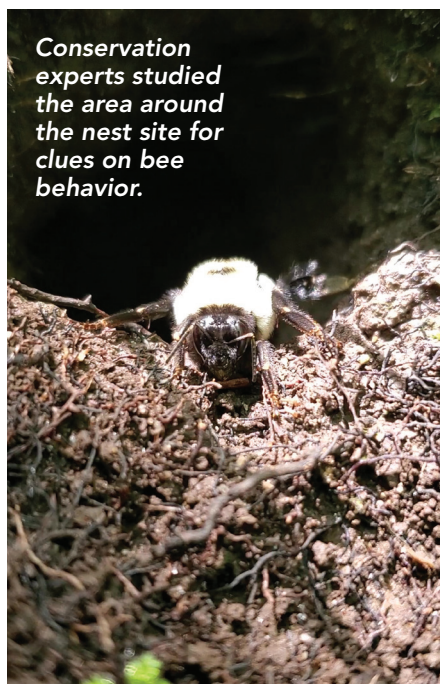
The number of individual bees sighted certainly exceeded the typical number normally found while surveying in a foraging habitat, but it was still relatively small. This could have been impacted by the lateness of the season, as the number of bees in the nest likely peaked in mid-summer.

Of particular note to the scientists was the observation that the newly produced reproductive females, or gynes, entered and left the nest multiple times. Simple models of the bumble bee life cycle often have gynes leaving the nest to mate and never returning, but that was clearly not the case here.

The fact these reproductive individuals returned to the colony multiple times made it clear a nest is even more important in the survival of individual bees and the species.

In addition to the nest, Watson and Minser surveyed the area surrounding the nest extensively, identifying the locations and plants on which the rusty patched bumble bees were feeding.

Conservation experts studied the area around the nest site for clues on bee behavior.



HALLEY MINSER PHOTOS

These surveys revealed the presence of several males in the area, good news for the newly produced queens that needed to mate quickly before finding a safe place to overwinter and then start new colonies in the spring.

DOG DETECTIVES GO TO WORK

By the first week in September, rusty patched activity at the nest had come to a halt, and Minser spent hours observing the nest to ensure that no additional bees were still inside. With high confidence that no bees were left to be disturbed, the next phase of activity began.

At the suggestion of the U.S. Fish and Wildlife Service, a group called Conservation Dogs Collective (formerly known as Midwest

Conservation Dogs) was contacted. This Milwaukee-based organization trains dogs to identify and locate biological scents useful to conservation work.

The organization has had success identifying salamanders, turtles and invasive species and recently began training dogs to sniff out bumble bee nests.

Laura Holder, executive director of Conservation Dogs, brought two dogs to the site to expose them to the smell of the rusty patched nest. The dogs, named Ernie and Betty White, are trained to detect but not disturb bumble bee nests.

Both exhibited heightened interest in the area, and Ernie paid special attention to the nest hole and the 4 to 6 feet of ground surrounding it. Exposure to the scent of a wild bumble bee nest, especially that of the rusty patched, was an excellent opportunity for the dogs.

“(It was) a critical step in honing their detection skills for the endangered rusty patched bumble bee nests,” Holder said of the experience. “This ensures the dogs are learning how to find the nests in the natural environment and also helps us understand how our dogs work in field-based scenarios, which can vary greatly with this species.”

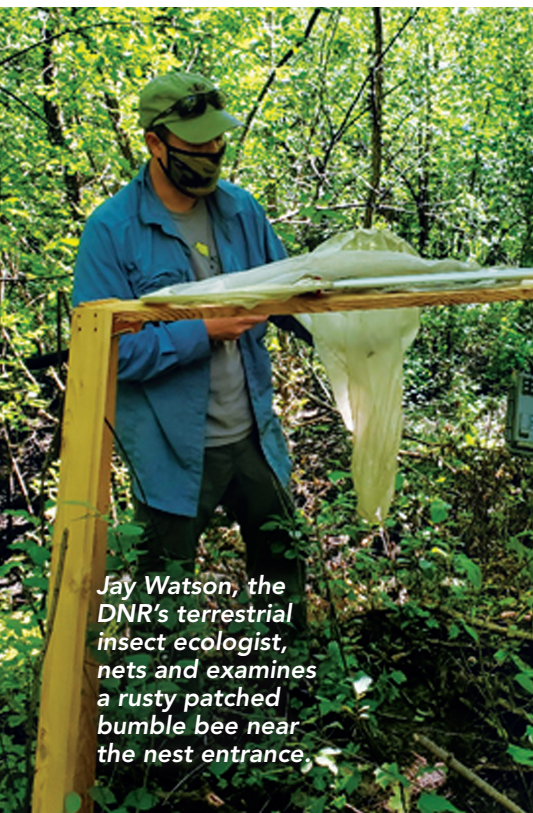
Later that week, the bumble bee experts from the DNR and UW-Green Bay again met with Minser at the nest, this time with an endoscope — a lighted camera on a flexible cable. They were not able to maneuver the device far enough into the hole to see the nest itself, but it provided a better view of the hole opening, which



JAY WATSON INSET PHOTOS

A rusty patched bumble bee forages near the newly discovered nest site, right. The bee has made only sporadic appearances elsewhere in the state, above photos, making last summer's Milwaukee County nest find an excellent research opportunity.

HALLEY MINSER



Jay Watson, the DNR's terrestrial insect ecologist, nets and examines a rusty patched bumble bee near the nest entrance.

HALLEY MINSER



A dab of pink paint is used to mark a rusty patched bumble bee after it is identified entering and leaving the newly discovered nest.

JAY WATSON

appeared to be part of an abandoned rodent burrow, possibly that of a chipmunk.

Excavating the nest was discussed but ultimately decided against, in order to be completely sure no bees would be hurt if one was unexpectedly still using the nest.

PARTNERSHIPS HELP TO BUILD ON CONSERVATION EFFORTS

Just over three weeks after the nest was found, the on-the-ground research and observations ended, but the partnerships in place to study and conserve rusty patched bumble bees certainly did not.

"We have strong partnerships in Wisconsin to support bumble bee conservation," Watson said in reflecting on the joint efforts of federal, state and county governments, along with university and nonprofit organizations. "That's what made it possible to learn so much about this rusty patched nest."

"It was such an exciting opportunity to expand our knowledge, and we plan to continue building partnerships that help support important bumble bee conservation work into the future."


The location of the nest illustrates another key point in rusty patched conservation: They have been repeatedly found in urban areas. The quality of wildlife habitat in urban areas varies greatly, but it is often more abundant than we think.

The Milwaukee County Parks Natural Areas Program manages more than 9,000 acres throughout the county, including high-quality habitats and some in need of restoration. Minser and other employees work in partnership with volunteers to monitor wildlife, and they use the resultant monitoring data in conservation planning and management.

Park staff were removing buckthorn and other invasives as part of a multi-year restoration project when the rusty patched nest was found. In the fall, they spread a native seed mixture throughout the area that was cleared of invasives.

The mix contained a number of flowers used by pollinators, including those that provide food to the rusty patched, like culver's root and jewelweed. Minser hopes the restoration efforts will improve the area for the bumble bee, and she and

other Milwaukee County staff will be regularly monitoring the site for rusty patched in the future.

The presence of rusty patched bumble bees in less than pristine conditions doesn't mean they prefer to live in such habitats, but it demonstrates their tenacity and ability to persist in unexpected places. In many cases in Wisconsin, those places include local parks, gardens and back yards — areas where the public can play a key role in conservation and monitoring. 

Eva Lewandowski, Ph.D., is a DNR conservation biologist in the Natural Heritage Conservation Program. She coordinates the Wisconsin Citizen-based Monitoring Network and leads the statewide Bumble Bee Brigade.



RORI PALOSKI

BEE A FRIEND

You can help the rusty patched bumble bee and other species in several ways.

- Plant a variety of natives that flower April-October, so food is available throughout the season.
- Minimize pesticide use, as insecticides can harm or kill bees and herbicides can kill the plants they need for food.
- Leave some or all of your yard natural or unmanicured; brush and leaf piles, woody debris, bare earth and old rodent tunnels all provide important habitat for bumble bees.
- Photograph and report bumble bees to the DNR's Wisconsin Bumble Bee Brigade, a statewide monitoring project — wiatri.net/inventory/bbb.

Also check these websites to learn more about rusty patched and other bumble bee conservation efforts and how you can get involved.

- Milwaukee County Parks Natural Areas Program: county.milwaukee.gov, search "conservation."
- U.S. Fish and Wildlife Service: fws.gov/midwest/endangered/insects/rpbb.
- Conservation Dogs Collective: conservationdogscollective.org.
- Department of Natural Resources: dnr.wi.gov, search "rusty patched."

WOODLAND DUNES PROPERTY HOLDS PROMISE FOR RARE BUMBLE BEE



JAY WATSON

NANCY NABAK

Where can a person find bee harmony? One place that's certain is the nearly 100 acres of bequeathed property now part of Woodland Dunes Nature Center and Preserve in Two Rivers.

"The former owner had a true love for the nature that surrounded her in the fields, forest and wetlands," said Jim Knickelbine, executive director of Woodland Dunes. "And she wished the community of wildlife to continue."

Over the years, farming subsided here and open fields reverted back to grasses and wildflowers. These habitat conditions became home for meadowlarks, grasshopper sparrows and other grassland birds. Thousands of milkweed plants also grew, adding additional support for pollinators.

"When I first started working at Woodland Dunes, we had just taken ownership of this beautiful habitat," said Jen Klein, land management coordinator. "One of the first things we did was enroll it into several U.S. Department of Agriculture programs to enhance the prairies for native birds and pollinators."

One pollinator in particular that's a focus at Woodland Dunes is the rusty patched bumble bee. The U.S. Fish and Wildlife Service designates Woodland Dunes a high potential zone for the presence of this federally endangered bee.

In July 2020, DNR conservation

biologist Jay Watson conducted a pollinator survey on the Woodland Dunes Preserve and found the rusty patched, a species of special concern in Wisconsin. It was the second time in two years the bee had been found by DNR biologists at Woodland Dunes.

QUICK ACTION WILL HELP TO PROTECT HABITAT

Unfortunately, the type of habitat that best supports the rusty patched bumble bee has been encroached upon by honeysuckle, threatening the woodland edges and shading out areas for spring flowers.

Taking quick action, Woodland Dunes wrote a grant proposal to the James E. Dutton Foundation. Based in Merrill, the nonprofit foundation supports projects that benefit wildlife,



WOODLAND DUNES PHOTOS

Presence of the rusty patched bumble bee has been confirmed in consecutive years at Woodland Dunes Nature Center and Preserve.

the environment and outdoors education.

The grant request was approved, allowing Woodland Dunes to hire two summer interns to create and maintain potential rusty patched nesting areas, floral resources and overwintering habitat. The project will begin sometime in June — after the bee queens have awakened from hibernation.

The honeysuckle will be removed by hand to minimize bee disturbance and allow foraging and nectaring activities over the summer. The work will end in August or early September to avoid disrupting the bees' overwintering hibernation needs.

"We have the perfect situation on this property for the rusty patched to thrive," Klein said. "They need that combination of wildflowers and forest edge to complete their life cycle."

"If we make a conscious effort to keep invasive shrubs from encroaching, the bees will do well here."



Nancy Nabak is communication coordinator for Woodland Dunes Nature Center and Preserve.



Grant money will help Woodland Dunes clean up invasive honeysuckle such as this and protect potential rusty patched habitat.

LEARN MORE ABOUT WOODLAND DUNES

Woodland Dunes Nature Center and Preserve, located between Two Rivers and Manitowoc, features more than 1,500 acres of forests, wetlands and prairies, with 7 miles of hiking trails. For details, see woodlanddunes.org.

SPECIAL REPORT

WISCONSIN'S GREAT LAKES

Vital assets to cherish and champion





MARC PONTO

Ours to protect and restore

Bradford Beach, Milwaukee

DNR and partners work together to support the Great Lakes, a treasured resource for Wisconsin

• KENDRA AXNESS

Lake Superior and Lake Michigan shape Wisconsin's culture and economy in important ways.

They provide vital water supply for drinking and manufacturing, support a \$3 billion tourism industry in lakeshore counties, and connect the state to maritime transportation networks that generate 8,800 jobs and \$2.4 billion in economic activity.

Wisconsinites also relish recreational opportunities the lakes offer. We love them for their beauty and for their vastness — for the opportunity to rest our eyes on a boundless watery horizon.

But despite this love, we have not always treated them well. The Great Lakes in Wisconsin and throughout the region face many problems stemming from a history of unchecked industrial, urban and agricultural land uses. Toxic pollutants, algae blooms and invasive species are harming the lakes' ecosystems and in turn impairing our ability to use and enjoy them.

There is hope for a bright future, however. Through a combination of regulatory programs, Great Lakes Water Quality

Agreement programs and the federal Great Lakes Restoration Initiative, Wisconsin is doing its part to protect and restore the lakes.

The Great Lakes Restoration Initiative — gri.us — is a federal program that provides funding to accelerate restoration efforts on the five Great Lakes. It's guided by an action plan with goals and accountability standards in five focus areas; read more at gri.us/documents#actionplan.

More than \$405 million of GLRI funding has been invested in Wisconsin since 2010, leading to environmental improvements and boosting the state's economy.

The following pages highlight the many ways the Department of Natural Resources and partners are working together to ensure healthy lakes for future generations.

Kendra Axness is a policy coordinator for the DNR's Office of Great Waters, focusing on Areas of Concern and Lakewide Action and Management Plan issues.



LEARN MORE

AREAS OF CONCERN: AOCs are sites along the Great Lakes with the most severe environmental damage stemming from pollutants. Forty-three AOCs were designated under the 1987 Great Lakes Water Quality Agreement, including five in Wisconsin; dnr.wi.gov/topic/GreatLakes/aoc.html.

GREAT LAKES WATER QUALITY AGREEMENT: This agreement between the U.S. and Canada commits each country to restoring the Great Lakes. Originally signed in 1972, it was updated in 1978, 1987 and 2012, with the 1987 agreement creating AOCs; ijc.org/en/what/glwqa-ijc.

BENEFICIAL USE IMPAIRMENT: The International Joint Commission, an agency created by a U.S. and Canadian treaty to resolve disputes over waters along the shared border, provided a list of 14 possible environmental problems, called beneficial use impairments, to designate AOCs. Once restoration goals are met for an AOC's designated impairments, it can be removed from the AOC list; epa.gov/great-lakes-aocs.

SHEBOYGAN RIVER AREA OF CONCERN

Signs of healing: From 'black eye' to vision of hope

Bird surveys are part of the citizen science work conducted along the revitalized Sheboygan River.

• SUSAN TESARIK

The Sheboygan River Area of Concern is healing after a decade of concerted efforts by local, state and federal partners to clean up historical pollution.

The lower 14 miles of the Sheboygan River and harbor were listed as a Great Lakes Area of Concern due to past industrial contamination and habitat degradation. Contaminants included polychlorinated biphenyls and polycyclic aromatic hydrocarbons — PCBs and PAHs.

Several projects removed these polluted sediments and restored fish and wildlife habitats, providing a better economy and quality of life for this community.

"The AOC projects have been an economic driver for the city of Sheboygan," said Chad Pelishek, director of planning and development for the city. "Developments along the Sheboygan River since dredging was completed in 2013 have led to approximately \$90 million in new investment along a river that once was the black eye of the community."

After the dredging project happened, Pelishek said, numerous developers "wanted to be near the water and have had a renewed interest in the Sheboygan River."

Along with economic success stories, people also are embracing the water. Sheboygan County's planning and conservation department director, Aaron Brault, noted renewed interest in recreational activities as environmental problems are resolved.

"There are a lot more kayakers, (paddle boarders) and canoers using the river than in the past," Brault said. "Volunteer groups also continue to complete monitoring activities to hopefully show the health of the

river keeps improving.

"The river is starting to be celebrated rather than having backs turned on it."

VOLUNTEERS PLAY A BIG ROLE

On the volunteer front, Sarah DeZwarte has been recruiting and training people for the past 10 years to collect data to assess the health of the Sheboygan River AOC. Her work as education director for Camp Y-Koda Outdoor Skills and Education is a collaborative effort with the DNR and municipalities.

"Our citizen scientists look for the presence of frogs, toads, mussels, bats, birds and invasive species in and around the Sheboygan River," she said.

These species can indicate how the environment is responding to pollution cleanup and restoration actions.

While community members have helped gather needed data, their understanding of the science behind the AOC project also has deepened, DeZwarte said.

"I think the most important outcome is that we see our citizen scientists actively engaged in local, real-life, hands-on science," she said. "Through evaluation surveys, we learned that citizen scientists felt they gained a deeper understanding of river ecosystems. They also commented that they began to feel comfortable asking science-related questions, which led them to further science exploration."

"They observed species of wildlife they hadn't before, and they have become overall stewards of our local environment."

Volunteers have even started to form their own groups for stewardship activities, DeZwarte noted, including beach



STACY HIRON

Dredging of the Sheboygan River was completed in 2013, spurring renewed interest in riverfront development projects.



CHAD PELISHEK

cleanup outings and invasive species removal. "It has been a truly amazing experience to watch these volunteers blossom."

With community members so actively engaged, the Sheboygan River and harbor is sure to remain in good hands well beyond the AOC program.

Susan Tesarik is communications and outreach coordinator for the DNR's Office of Great Waters.

SHEBOYGAN RIVER AOC

Three of the nine environmental problems listed for the Sheboygan River Area of Concern have been addressed: restrictions on dredging activities, undesirable algae and degraded bottom-dwelling organisms. The remaining impairments are being evaluated as the environment continues to heal. To learn more, visit dnr.wi.gov/topic/GreatLakes/Sheboygan.html.

For details about Camp Y-Koda Outdoor Skills and Education programs and to get involved, visit sheboygancountyyymca.org/camp-y-koda. To learn more about city of Sheboygan cleanup initiatives, check sheboyganwi.gov under the "History & Info" tab.

And for a case study assessing the economic impact of the Great Lakes Restoration Initiative in Sheboygan, go to the Great Lakes Commission website, glc.org, and search "Sheboygan."

LOWER MENOMINEE RIVER AREA OF CONCERN

Removing polluted sediments from Menekaunee Harbor has allowed for restoration of fish and wildlife habitat.

Success story: Removed from AOC list, Lower Menominee shines as source of pride

• ALLISON VOGLESONG ZEJNATI

Just before it spills out into northwestern Lake Michigan's Green Bay, the Lower Menominee River defines the boundary between the Wisconsin port city of Marinette and its Michigan neighbor, the city of Menominee.

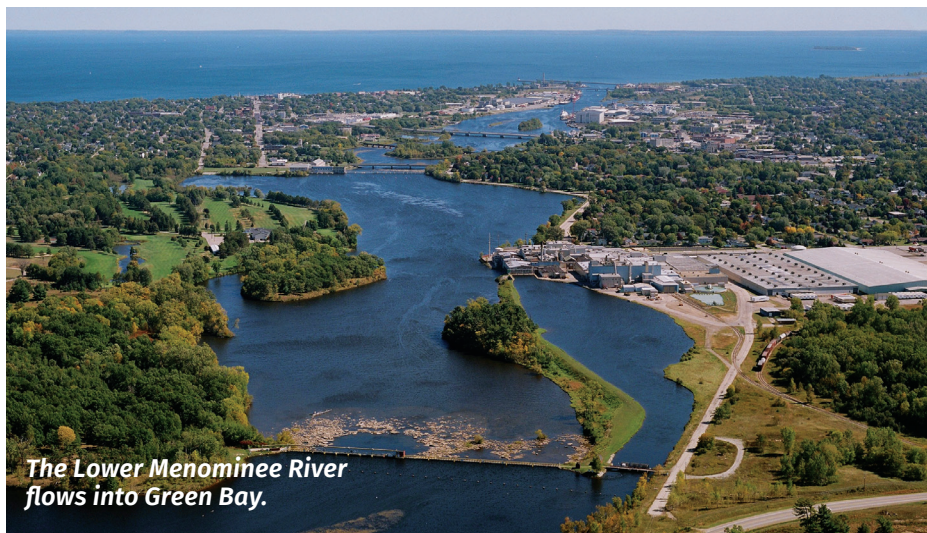
What used to be a heavily polluted river is now a cleaner waterway that binds the two cities as a shared point of pride.

As of August 2020, and after more than 30 years of effort, the Lower Menominee River is no longer on a binational list of pollution hotspots around the Great Lakes.

"It's something we can be really proud of, that we've made the river part of the community again," said Keith West, co-chair of the Lower Menominee River Area of Concern Citizens Advisory Committee and associate professor of geoscience at UW-Green Bay's Marinette campus.

The International Joint Commission, the agency created by a U.S. and Canadian treaty to resolve disputes over waters along the shared border, included the Lower Menominee River on its list of 43 pollution hotspots, or Areas of Concern, in the Great Lakes basin in 1987.

For decades, industrial development



The Lower Menominee River flows into Green Bay.

at the slow-flowing river mouth meant contaminants dumped in the waters — such as arsenic, coal tar and paint sludge — settled nearby, coating the river bottom.

"I used to take my students out to Menekaunee Harbor on the river because it provided a great example of how to ruin an aquatic ecosystem," West said.

When the AOC was first listed, the Wisconsin and Michigan departments of natural resources began to cooperate with a Citizens Advisory Committee. The committee assists state and federal

agencies with different aspects of Remedial Action Plans for AOCs.

Trygve Rhude, a resident of the Menominee region, serves alongside West as committee co-chair.

"I got involved from day one," Rhude said. "I've worked on this for more than half of my life."

CHECKING OFF THE LIST

To remove an Area of Concern from the list of hotspots, state agencies — along with federal and local partners — first identify the causes of specific ecological problems.

CHERYL BOUGIE

BRIAN HOLBROOK

Then they take actions to address the impairments, and finally use monitoring and data to demonstrate the ecosystem is no longer impaired so people and wildlife can once again enjoy the benefits of clean water.

Of 14 possible problems, the Remedial Action Plan for the Lower Menominee River listed six beneficial use impairments. As of 2019, all have been addressed. Here's the original list and the year each was removed:

- Beach closings or restrictions on recreational contact with the water — 2011
- Restrictions on dredging activities for navigation or commerce — 2017
- Communities of bottom dwelling organisms are degraded — 2017
- Restrictions on eating fish and wildlife — 2018
- Loss of fish and wildlife habitat — 2019
- Degraded fish and wildlife populations — 2019

"The main focus of the AOC was eliminating the arsenic, and just accomplishing that one feat is a huge success story," Rhude said.

"But we also had issues like loss of habitat and degraded fish populations on our list, and because of that we were able to do more than just scoop out the polluted sediment in the river."

Although the action plan for the Lower Menominee identified several remediation goals, for many years there was slow progress due to a lack of funding, while waiting on legal processes to unfold.

Launched in 2010, the Great Lakes Restoration Initiative began to provide an infusion of federal funding to help put plans into action.

"Being an AOC was a blessing in disguise in that we were able to leverage that money to restore habitat and do really visible projects that benefit our community and the environment, like the Menekaunee Harbor," Rhude said. "That would have never happened if we weren't an AOC."

FIRST FOR WISCONSIN

Benefits to sturgeon were particularly noticeable once restoration progressed, said Stephanie Swart, Michigan Department of Environment, Great Lakes and Energy AOC coordinator for the Lower Menominee River.

"The amount of sturgeon habitat we were able to restore in the Lower Menominee River is truly remarkable," she said.

For Brie Kupsky, the Wisconsin DNR's Office of Great Waters AOC coordinator for the river, the most important success story is how much was accomplished from 2014 to 2019 because of

A sturgeon is carefully examined after passing through a fish elevator installed at the Menominee Dam to help the species reach historic spawning and rearing habitats.



ROB ELLIOT



Successful efforts to restore the Lower Menominee River Area of Concern included dredging in Menekaunee Harbor. See a YouTube video at: youtu.be/S2anlYak2q4.

DNR FILES

funding from the Great Lakes Restoration Initiative.

Since 1985, \$71.1 million in public funding has gone to clean up the AOC, with \$41.1 million from the GLRI. Once the GLRI funding came, work could get started right away because the area was "shovel ready" with complete remedial action plans agreed upon.

Out of 43 AOCs around the Great Lakes, the Lower Menominee River is the eighth to delist. It is the fifth in the U.S., the third in Michigan and the first in Wisconsin.

Although it is delisted, the need remains for community members to be involved with protecting the river.

"If you can get people to value the water, they'll protect it," West said. "And I think the cleanup of the river through the AOC succeeded in that."

Allison Voglesong Zejnati is a public affairs specialist (contractor) with the International Joint Commission, Great Lakes Regional Office.

LOWER MENOMINEE RIVER AOC

To learn more about the Lower Menominee River Area of Concern and efforts that led to its delisting, visit dnr.wi.gov/topic/GreatLakes/Menominee.html. To get involved in stewardship opportunities, follow the Lower Menominee River AOC Citizens Advisory Committee on Facebook: facebook.com/menomineeriveraoc.

This story first appeared in the International Joint Commission's Great Lakes Connection December 2020 newsletter and was adapted with permission from the author. To see the original article and other newsletters and information from the IJC, go to ijc.org and search under Library. For more about the IJC's work on the Great Lakes visit ijc.org/en/what/glwq.

LOWER GREEN BAY AND FOX RIVER AREA OF CONCERN

Cleanup completed: Momentum continues to restore habitats, water quality

A revitalized river and bay boosts the local economy and enjoyment of area waters through outdoor recreation and events in recent years like a concert on the city dock in downtown Green Bay.

CHRISTOPHER RAND

• KENDRA AXNESS

The global pandemic made 2020 a difficult year, but for the residents of northeast Wisconsin there was a big reason to feel hopeful that better days are ahead: the completion of the Lower Fox River PCB cleanup project.

With these toxic pollutants now fully remediated, habitat and watershed restoration initiatives can gain the full attention of the many dedicated partners working to restore the Green Bay ecosystem.

DNR Office of Great Waters Director Steve Galarneau has seen the cleanup of these polychlorinated biphenyls unfold over the course of his 27-year career with the DNR.

"It took a lot of persistence and hard work to get here, and we celebrate this huge achievement with all of the partners who contributed to this success," he said. "At the same time, we know we have more to do to restore this AOC, and we're excited to keep the momentum going."

The Lower Green Bay and Fox River Area of Concern spans 7 miles of the Lower Fox River — downstream from the De Pere Dam to the mouth — and approximately 22 square miles of southern Green Bay.

These waters were designated an AOC in the late 1980s due to the presence of PCBs, habitat loss and degradation,

and excessive algae.

These problems limit the ability of residents and visitors to consume fish and waterfowl and to enjoy recreational activities. They also harm fish and wildlife populations. The presence of toxic pollutants in river and bay sediments also led to restrictions on dredging activities, causing problems for shipping and recreational boating.

MAJOR ACCOMPLISHMENT

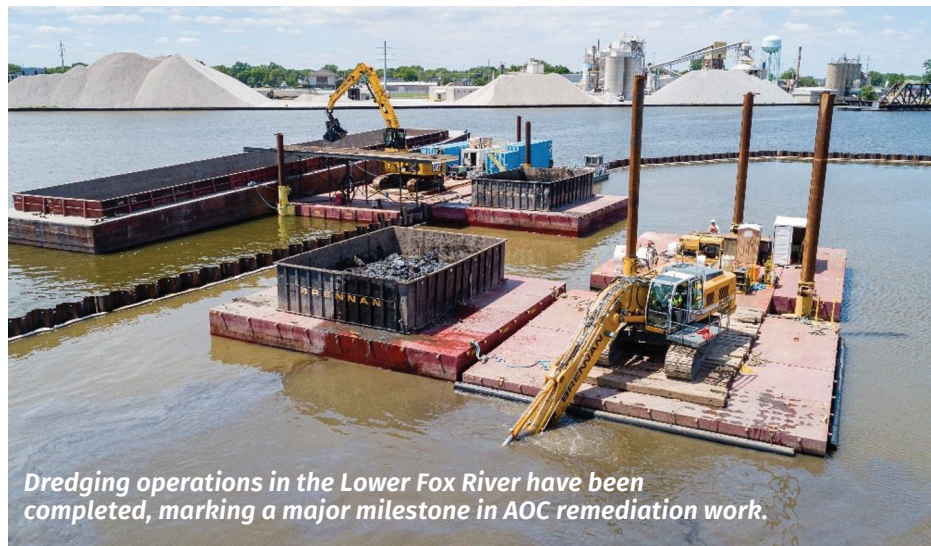
Completing the Lower Fox River PCB cleanup was a necessary step to address these problems. PCBs are toxic chemicals that were produced during

the production and recycling of carbonless copy paper in the 1950s through 1970s.

One of the largest known PCB cleanups of its kind in the world, the 17-year effort in northeast Wisconsin followed decades of scientific investigation and included dredging, capping and sand covering.

The project was designed to reduce risk to human health and the environment due to the presence of PCBs in river sediment from Little Lake Butte des Morts to the river mouth at Green Bay and beyond.

The cleaner, deeper river and bay ensure the continued vitality of the



Dredging operations in the Lower Fox River have been completed, marking a major milestone in AOC remediation work.

J.F. BRENNAN

Port of Green Bay. According to the most recent Port of Green Bay Economic Impact Study, the port contributes \$147 million to the economy while supporting 1,289 jobs.

That represents a \$64 million increase since the previous economic study in 2010. A healthy port will continue to sustain and grow jobs, income and business.

HABITAT WORK POISED TO TAKE OFF

For Brie Kupsky, the DNR's Lower Green Bay and Fox River AOC coordinator, finishing the PCB cleanup is a game-changer.

"While we were able to start some important projects like the Cat Island Chain restoration, there's a lot of AOC habitat work that had to wait until the cleanup was done," Kupsky said. "I'm thrilled that we are now able to begin moving more of our AOC habitat restoration projects into the limelight."

Kupsky has worked with partners from UW-Green Bay, the U.S. Fish and Wildlife Service, The Nature Conservancy and many others to develop a list of 18 AOC habitat projects that, once implemented, will result in achieving the desired goals for fish and wildlife habitat and populations.

Projects will enhance habitat for shorebirds, waterfowl, fish, turtles and other animals. Most of the funding for the projects is anticipated to come from the Great Lakes Restoration Initiative — GLRI — and the Natural Resource Damage Assessment.

The NRDA is the avenue for the public to be compensated for the environmental damage caused by the PCBs. It funds projects to restore habitat and provide recreational access.

"The collaboration with the NRDA Trustees is a unique opportunity in this AOC," Kupsky said. "We can leverage

those funds with GLRI funds and find efficiencies for achieving the goals of multiple partners and programs."

SUSTAINED EFFORT REQUIRED

The sediment and habitat problems, while challenging, are in some ways easier for the AOC program because they are localized issues that can be addressed by working directly within or adjacent to the Lower Green Bay and Lower Fox River. Addressing poor water quality within AOC waters is a different story.

During rainstorm and snowmelt events, excess fertilizer and sediment is carried from the land to local waterways in runoff water. In the 6,400-square-mile Fox-Wolf watershed, this runoff eventually flows into Green Bay.

That means activities on land far away from the AOC boundaries are contributing to issues in the AOC, such as algae blooms in Green Bay. The scale of this problem means the AOC program can do some, but not all, the work needed to address this issue.

Kupsky and many local partners are exploring ways for the AOC program to help address these larger water quality problems as part of the Lower Fox River Water Quality Management Plan.

This planning effort brings together partners including the DNR's watershed managers, Fox Wolf Watershed Alliance, county governments, UW-Green Bay, Alliance for the Great Lakes, area legislators and others to describe the nutrient and sediment reducing actions needed in the Lower Fox Watershed, develop strategies to meet those needs and identify potential funding sources.

Kupsky is optimistic the AOC waters will continue to get better with time.

"There is such passion for these waters in northeastern Wisconsin," she said. "So

many amazing people have dedicated their careers to solving the problems that we've had in the river and bay.

"Thanks to them, we've come a long way — and the success of the PCB cleanup is proof that it's possible to do big things."

Kendra Axness is a policy coordinator for the DNR's Office of Great Waters, focusing on Areas of Concern and Lakewide Action and Management Plan issues.

CLEANUP CALCULATIONS

Here are some of the notable numbers from the Lower Fox River PCB cleanup.

- Dredged sediment total: 6.5 million cubic yards
- Area of river bottom capped: 275 acres
- Area of river bottom sand covered: 780 acres
- Processed sediment sent to landfill: 4 million tons
- Treated water returned to river: 10 billion gallons
- PCB reductions since 2006: 90% in river water; 80-90% in sediment
- Average PCBs in walleye: 65% lower since 2006

LOWER GREEN BAY AND FOX RIVER AOC

To learn more about the Lower Green Bay and Fox River AOC, visit dnr.wi.gov/topic/greatlakes/greenbay.html.

For more on the Lower Fox River PCB cleanup project, see dnr.wi.gov/topic/foxriver.

Find details on the most recent Port of Green Bay Economic Impact Study at portofgreenbay.com/economic-impact-study. And watch two DNR videos on habitat restoration work on YouTube:

- "Cat Island – Rebirth of an Environment" — youtu.be/BZnMQ9cQ_J4
- "Plovers Are Back in Green Bay" — youtu.be/luSqprUWo84



Volunteers help to record data along the Lower Fox River at a monitoring event for the Area of Concern.

BRIE KUPSKY

Environmental reckoning: Milwaukee addresses past mistakes to create more promising future

McKinley Marina, on Lake Michigan in Milwaukee

• JOHN GURDA

Milwaukee's rivers have played multiple roles over the centuries — as canoe routes for Native Americans, channels of commerce for early urbanites, sources of ice for local beer barons and corridors of recreation for tired factory workers.

All of those incarnations have evaporated with time, but a darker legacy of the past is still very much present: a thick layer of polluted sediment deposited during Milwaukee's industrial heyday.

That toxic legacy is a threat to human health, a killer of aquatic life and an aesthetic disaster, but its days may be numbered.

Milwaukee is poised to launch the biggest cleanup project in the history of the Great Lakes. The effort would cost somewhere north of \$350 million, 65% coming in federal funds and the rest from local sources.

That would make it one of the largest public works projects in Milwaukee's recent history. For comparison, \$350 million would fund the city's entire library system for almost 20 years.

The work is decidedly unglamorous but entirely necessary. The tall figures of Milwaukee's past may have been hard workers and visionary thinkers, but from an environmental standpoint, the results of their work have been a disaster.



SIGMA GROUP

The trio of rivers flowing into Lake Michigan in Milwaukee — the Menomonee, Kinnickinnic and Milwaukee — are included in the Area of Concern because of the historical pollution that contaminated them.

Lacking both the technology and the understanding to protect local rivers, the city turned them into open sewers.

By 1878, when Milwaukee's population had surged past the 100,000 mark, the community had nearly 75 miles of sewer pipe under its streets. The system's sole function was to carry human, animal and industrial waste, mixed with stormwater, to the nearest river.

There it sat until the next heavy rain pushed it out into Lake Michigan — the source of the city's drinking water.

An 1881 visitor described the Milwaukee River as "a currentless and yellowish murky stream, with water like oil, and an odor combined of the effluvia of a hundred sewers."

GROWING INDUSTRIES, DYING WATERS

Household sewage and horse manure were the worst of it in the short term. They consumed nearly all the available oxygen in the rivers, making them uninhabitable for native aquatic life.

In the long run, however, the greater menace was the steady stream of contaminants from local industries. For generations, Milwaukee's machine shops, tanneries, packing houses, breweries and manufactured gas plants simply dumped their waste products — oil and grease, coal tar, hide scrapings, heavy metals and compounds such as PCBs and PAHs — into the nearest stream.

Human and animal waste dissipated over time, but industrial pollutants became the gift that kept on giving. In 1987, the Milwaukee estuary — the inner harbor and the rivers that feed it — was designated an official Area of Concern, one of 43 hot spots on the Great Lakes.

The AOCs are a club no one wants to join. But membership need not be permanent.

Since the establishment of the Environmental Protection Agency in 1970 and passage of the Clean Water Act two years later, the federal government has played a leading role in America's cleanup efforts, including several in Milwaukee.

Federally supported remediation projects have been going on for decades in the Milwaukee River, the Little Menomonee, the Kinnickinnic, the

SUCK THE MUCK

Although the details are still being worked out, the general outline of the proposed AOC cleanup is clear. Giant vacuum hoses would suck up the contaminated muck from approximately 7 miles on the Milwaukee River, 3 miles on the Menomonee and 2 miles on the Kinnickinnic, including the inner harbor where all three streams meet.

The most toxic material would be trucked to out-of-state landfills, but the greater part would be piped to a new containment facility on the east side of Jones Island, adjoining an older fill site north of the Lake Express ferry dock.

Most of Jones Island is already "made land" deposited over the last century. The disposal facility, engineered to keep 1.9 million cubic yards of waste where it belongs, would create another 42 acres, giving the Port of Milwaukee new docking space or the public a new park.

Nowhere on the Great Lakes has such a massive cleanup been attempted under a single agreement involving so many players with such an aggressive timeline. Excitement is building as the project moves forward.

"I've been calling our region the Fresh Coast for years," Milwaukee Mayor Tom Barrett said. "And to live up to that name, we need to maximize recreation and wildlife along our waterways. Cleaning up the AOC would give us a history-making fresh start."

TURNING AROUND A TOXIC PAST

It might be more accurate to say the project would unmake history, although there is no ironclad guarantee Milwaukee will get the chance. The AOC project has generated significant momentum, but turning such ambi-

tious plans into freshwater realities presents a historic challenge.

What will it take to keep the momentum building? A continued spirit of collaboration. Stable funding for the EPA's Great Lakes Restoration Initiative. And steadfast, demonstrated public support from throughout the region.

Past actions in Milwaukee have left a toxic legacy for the current generation. Today's residents can be the first in the region's history to leave their waterways in better shape than they found them — for all the generations still to come.

Writer and historian John Gurda is an eight-time winner of the Wisconsin Historical Society's Award of Merit. His book "The Making of Milwaukee" was turned into an Emmy Award-winning documentary series on Milwaukee PBS.

MILWAUKEE ESTUARY AOC

To learn more about the Milwaukee Estuary Area of Concern, visit dnr.wi.gov/topic/GreatLakes/Milwaukee.html. The following entities and organizations have committed money, time and energy to ensure the success of Milwaukee's current planned cleanup project:

- U.S. Environmental Protection Agency
- Wisconsin Department of Natural Resources
- Milwaukee Metropolitan Sewerage District
- City of Milwaukee/Port Milwaukee
- Milwaukee County
- Ozaukee County
- We Energies
- Wisconsin Department of Transportation
- U.S. Army Corps of Engineers
- Milwaukee Metropolitan Association of Commerce
- Suburban municipalities
- Harbor District
- 16th Street Community Health Centers
- Milwaukee Riverkeeper
- Fund for Lake Michigan
- Menomonee Valley Partners
- Milwaukee Water Commons



Milwaukee's Pierhead Lighthouse

KRISTINE HINRICH

Menomonee Valley, Cedar Creek and Lincoln Creek.

The next step is the big one. Milwaukee has a generational opportunity to solve one of its longest-standing problems, not piecemeal but all at once.

The EPA has declared the Milwaukee estuary a priority AOC, one of 10 on the Great Lakes, making it a prime candidate for funding to remove all the toxic sediment. Milwaukee, in turn, has assembled a united front of agencies — city, county, state and nonprofit — to coordinate the cleanup.

Money is already flowing through the pipeline. The EPA has agreed to fund 65% of the preliminary work, which is projected to cost \$29.3 million, and efforts are underway to raise the local match.



DNR FILES

At a news conference in January 2020, partners including DNR Secretary Preston D. Cole, at podium, and Milwaukee Mayor Tom Barrett announce the signing of the Great Lakes Legacy Act Project Agreement. The agreement provides funding and a shared path forward to accelerate contaminated sediment cleanup in the Milwaukee Estuary AOC.

ST. LOUIS RIVER AREA OF CONCERN

The city of Superior's Wisconsin Point Project protects sensitive dune habitats and historical sites while also improving public beach access with boardwalks. Parking areas are enhanced with pervious pavement to infiltrate stormwater and other measures to prevent erosion. See a YouTube video of the project at: youtu.be/5XZJPMOLqFk.

Partnerships spur progress: Efforts pass halfway point to restore river, revitalize community

• MATT STEIGER

The St. Louis River is a place where Northwoods beauty meets the industrial landscape of the largest freshwater port in the world, the Duluth-Superior harbor.

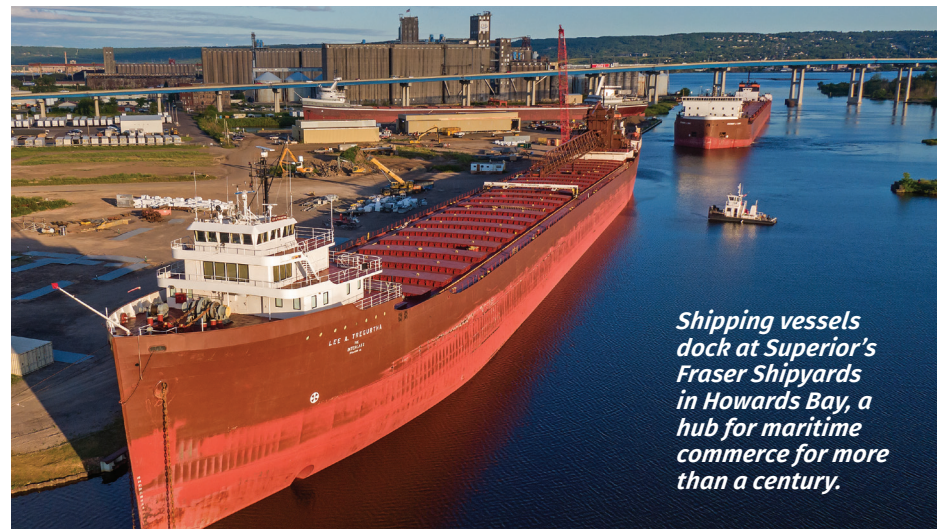
This border water is home to coastal wetlands, nursery habitat for Lake Superior fish species and the thriving waterfront communities of Superior, in Wisconsin, and neighboring Duluth, in Minnesota.

The St. Louis River is the second largest tributary to Lake Superior, flowing 179 miles through northeastern Minnesota and into the 12,000-acre freshwater estuary below the Fond du Lac Dam.

Past urban and industrial practices have permanently altered the river and its ability to meet the needs of wildlife and people. Many who grew up along the St. Louis River can remember fish kills, industrial dumping directly into the river and the lack of places to use the water for recreation.

But the health of the river is improving thanks to the efforts of many partners, including the states of Wisconsin and Minnesota, the Fond du Lac Band of Lake Superior Chippewa, local and federal governments, citizens groups and universities.

Aided by Great Lakes Restoration Initiative funding, these partners have successfully completed more than half of the necessary actions to restore the St. Louis AOC, including fish and wildlife habitat restoration projects, contami-



Shipping vessels dock at Superior's Fraser Shipyards in Howards Bay, a hub for maritime commerce for more than a century.

nated sediment cleanups and wild rice seeding activities.

The remaining projects are underway, with the goal to complete on-the-ground projects identified in the AOC plan by 2025.

RECOVERY INDICATORS

To determine what would be needed to reach AOC goals for fish and wildlife populations, scientists and natural resource managers selected key species as indicators of recovery including walleye, lake sturgeon, muskellunge, common tern, piping plover, great blue heron and bald eagle.

Based on the status of these indicator species, AOC partners identified actions to bolster populations that

were still languishing. Two such actions were habitat projects for common tern and piping plover, both Wisconsin state endangered species.

In 2019, 14 acres of piping plover habitat were created on Wisconsin Point. In 2020, a similar project was undertaken on Interstate Island, one of the few common tern nesting sites left in western Lake Superior.

Both sites relied on shipping channel dredge material to build up the ideal habitat for these bird species. The dredge material was provided by the U.S. Army Corps of Engineers, an important partner in these and other restoration projects requiring sandy material to build habitat.

Projects like these yield triple ben-

JENNIFER HAGEN

DAVID SCHAUER

efits of an improved shipping canal, cost-effective placement of clean dredge material and vital habitat for rare species.

MAJOR CLEANUP UNDERWAY

The Howards Bay sediment cleanup in Superior Harbor is a \$19 million remediation project taking place on the site of an active shipyard that began by building unique whaleback ships in 1890. Due to historical industrial uses including shipbuilding, saw milling and grain transport, the sediment in the bay is polluted with mercury, tributyltin, PAHs (polycyclic aromatic hydrocarbons) and lead.

Following many years of planning and design, dredging began in 2020 and is expected to be completed in 2021. After cleanup, the bay will be dredged to the proper depth for vessels traveling to the shipyard, which also will provide habitat for musky and northern pike, plus space for migrating waterfowl.

Approximately 81,000 cubic yards of sediment will be dredged by completion of the project. Along with the environmental benefits, the project will create a new recreation area in the city and support local business.

Partners on this project include the DNR, U.S. Environmental Protection Agency, Fraser Shipyards, city of Superior and the Army Corps of Engineers. Great Lakes Legacy Act funds are covering a significant portion of the project cost.

Other slips in the harbor are being assessed to determine if they require remediation, and the goal is to clean up these sites by the end of 2024.

MANOOMIN'S RETURN

Manoomin, or wild rice, is a key wetland species important for AOC recovery. In the 1400s the Ojibwe nation migrated to the region because of manoomin's abundance. Poor water quality, physical habitat loss and landscape changes have reduced the abundance to only a few remnant stands.

The AOC partnership is restoring up to 275 acres in the estuary. The Fond du Lac Band of Lake Superior Chippewa is using their manoomin knowledge and expertise to guide the effort.

Tom Howes, the Natural Resources Program Manager for Fond du Lac who leads the seeding work said, "Since 2015, we've seeded around 53,000 pounds of manoomin in the estuary."

Bringing manoomin back to the wetlands in the estuary is as important to the people who live here as it is to the ecosystem.

"You'll hear Ojibwe people even say that if this goes away, so do we. We



Staff of the Fond du Lac Band of Lake Superior Chippewa Natural Resources Department seed freshly picked manoomin, or wild rice, into the St. Louis River. Learn more about restoring wild rice in the St. Louis River Estuary on YouTube: youtu.be/qjgW7SVNrxg.

DNR FILES

cease to exist as a unique cultural group because this is that central to our identity," Howes said of manoomin.

The St. Louis River Alliance also is part of this partnership and restoration effort, seeding over 3,500 pounds of rice in the past five years. The alliance holds a yearly volunteer event to seed 10 acres of wetlands near Clough Island.

TRULY A COLLABORATION

Strong partnerships with local, state, tribal and federal entities are key to the success of AOC projects. The city of Superior has implemented multiple projects on city property and contributes in-kind services and funds to AOC projects.

For example, the city led projects to restore a swimming beach at Barker's Island, restore dune habitat and enhance public access on Wisconsin Point. The city also is contributing to the remediation of Howards Bay and the design for a habitat restoration project on the 9-acre Pickle Pond property.

City staff are enthusiastic about the benefits of these projects to the community.

"It has been exciting to witness how, through strong partnerships, the AOC projects and GLRI funding, that Superior has been given a fresh and safe way to reconnect to the waterfront," said Linda Cadotte, Superior's director of parks, recreation and forestry.

Such energy has helped to maintain momentum toward achieving AOC goals and is valued by AOC program managers.

"We simply could not be successful in the AOC without our partners," DNR's Lake Superior supervisor, Cherie Hagen, said. "It has been such an honor to work alongside many partners who share a common vision to restore the river and

estuary, and we genuinely appreciate all partner efforts."

To date, three impairments have been removed in the St. Louis River AOC: degraded aesthetics, fish tumors and deformities, and excessive loading of sediments and nutrients into Lake Superior.

The degraded fish and wildlife populations impairment is likely next, as related projects will be completed in 2021. The remaining five impairments are expected to be evaluated for removal beginning in 2025.

The St. Louis River has come a long way since the days of fish kills and industrial dumping, and with local partners committed to staying the course, it has even better days ahead.

Matt Steiger is the St. Louis River Area of Concern coordinator for the DNR. Dara Fillmore, the Lake Superior water resources specialist in the DNR's Office of Great Waters, also contributed to this report.

ST. LOUIS RIVER AOC

To learn more about the St. Louis River Area of Concern, visit dnr.wi.gov/topic/GreatLakes/StLouis.html.

And watch DNR YouTube videos on restoration work in the AOC:

- Restoring wild rice: youtu.be/qjgW7SVNrxg
- Barker's Island beach restoration: youtu.be/LifDDV9ylqg
- Wisconsin Point dunes and piping plover habitat restoration: youtu.be/5XZJPMOLqFk



High water levels on Lake Michigan in 2020 made beach areas smaller and covered this dock in Sister Bay.

JENNIFER HAGEN

Lakes for the long run: Working together to build resiliency

• MADELINE MAGEE

The Great Lakes ecosystem is regularly subject to short-term natural disturbances such as floods and droughts, historically returning to normal conditions. But new stressors such as habitat loss, pollution, invasive species and global climate change are reducing the ecosystem's ability to return to optimal conditions after these events.

Improving resiliency in the system ensures high-quality waters and ecosystem services remain in the face of these disturbances.

"Building resilience in the Great Lakes is important because it means the things we need from communities and nature will still be there despite stressors and disturbances," said Stacy Hron, the DNR's Lake Michigan program coordinator.

Climate change will be the largest factor in Great Lakes resilience in years to come. According to the Wisconsin Initiative on Climate Change Impacts, we can expect to see an air temperature increase of 3 to 9 degrees in Wisconsin over the next 40 years.

Warming temperatures will decrease ice cover, cause warmer water temperatures and impact where plants and animals can live — in water and on land. WICCI also projects an increase in extreme storm events and winter and

spring precipitation.

Record-setting storms already have occurred in the Lake Superior basin in 2012, 2016 and 2018, causing millions of dollars in damage, including the destruction of Saxon Harbor in Iron County. These storms cause more than property damage, said Gina LaLiberte, the DNR's statewide blue-green algae coordinator.

"Since 2012, we've seen previously undocumented harmful algal blooms on Lake Superior linked to record storm events flushing nutrients and sediments into an increasingly warmer Lake Superior," she said.

This illustrates one of the most significant impacts of climate change: It worsens the impact of other major stressors.

WATER LEVEL WOES

Climate change also is to blame for extreme fluctuations in water levels in recent years. Water levels were at historic lows in 2012 and 2013 and swung significantly to record-high levels in 2019 and 2020.

Adam Bechle, coastal engineering specialist at Wisconsin Sea Grant, said these high water levels can have major impacts to the coast.

"High water levels allow erosive waves to reach higher elevations on the shore where they batter shoreline infrastructure and eat away at the base of bluffs and dunes," Bechle said.

But don't forget about impacts from low water levels as well, Bechle cautioned.

"The latest science indicates that rather than a clear trend in lake levels up or down, we might see both higher highs and lower lows with more rapid fluctuations than we've seen in the past," he said.

These low water levels can have major impacts to the coastal ecosystem, preventing fish from accessing spawning areas and leaving wetlands high and dry, unable to provide nutrient and flood protection.

"If we want to have a resilient coast," Bechle said, "we need to plan for both the highs and the lows."

This type of resiliency planning will require a team approach from partners throughout the basin, Hron noted.

"The scale of impact of climate change and other stressors is so large that no one entity or project can fix this on their own," Hron said. "I'm optimistic that through partnership, we can put projects on the ground that will help maintain resiliency in the Great Lakes."

Madeline Magee, Ph.D., is the DNR's Great Lakes and Mississippi River monitoring coordinator and manages the BEACH monitoring program. Dara Fillmore, the Lake Superior water resources specialist in the DNR's Office of Great Waters, also contributed to this report.

Here are four examples highlighting how resiliency is incorporated in Great Lakes projects

The city of Racine improved beach health and restored native habitats in the 11-acre Samuel Myers Park along the Lake Michigan shoreline.

JULIE KINZELMAN

SAMUEL MYERS PARK, RACINE

Samuel Myers Park along the Lake Michigan shoreline once had poor water quality due to stormwater runoff pollution, but the city of Racine completed projects to improve beach health and native habitats in the 11-acre park.

“In order to be resilient and have the capacity to recover, we needed to look at a wide range of options,” said project leader Julie Kinzelman, Ph.D., retired laboratory division director at the city of Racine Public Health Department.

That included “engineered structures, green infrastructure, restoring or preserving natural capital and then planning and education,” she said.

Green infrastructure additions capture and infiltrate stormwater runoff before it reaches Lake Michigan to improve water quality and hold flood waters during storm events.

The city also raised the height of a breakwater to protect the shore from storm damage and created flood storage areas to retain storm surges. These areas double as attractive public open spaces during times of low water.

Pollinator gardens, prairies and sand dunes host numerous native plants, making the park a vital stopover for migrating birds and butterflies.

“We wanted to maintain a balance between ecosystem function and utility, and install resiliency features that provide multiple co-benefits,” Kinzelman said.

GREEN SCHOOLYARDS, MILWAUKEE

Green Schoolyard redevelopment projects are a collaboration between Milwaukee Public Schools and several partners, including the Milwaukee Metropolitan Sewerage District, the city of Milwaukee and Reflo, a nonprofit group — reflo20.com/greenhealthyschools.

These projects create green space in school playgrounds by replacing asphalt with permeable surfaces, massive underground cisterns, native plants and bioswales to divert rainwater from local sewers and filter it before it goes into Lake Michigan.

The work reflects priorities from the city of Milwaukee’s green infrastructure plan, calling for significant reductions in impervious surfaces to create a greener city and reduce impacts of climate change. Projects also include outdoor educational space, which research has shown can improve academic outcomes.

Six completed projects have removed over 85,000 square feet of asphalt and managed over 184,500 gallons of stormwater per rain event. Fifteen additional projects are in development.

• MADELINE MAGEE

MARENGO RIVER WATERSHED, ASHLAND COUNTY

Many streams flood easily in northern Wisconsin’s Marengo River Watershed, damaging infrastructure and polluting the Bad River and Lake Superior during extreme rain events. The effects of large-scale flooding in 2016 and 2018 are still being felt in Ashland County.

“Climate adaptation strategies enable us to plan ahead, reduce risks and implement conservation practices that account for current and future extreme weather conditions,” said Ashland County conservationist MaryJo Gingras.

Ashland County is one of the first in Wisconsin to incorporate climate change recommendations directly into implementation goals.

“We hope Ashland County’s climate adaptation work inspires other communities,” said Kyle Magyera of the Wisconsin Wetlands Association.

Actions upstream are key to slowing the flow of water during severe storms — reconnecting streams to floodplains and preventing wetlands high in the watershed from draining downstream, for example.

Bluff erosion stabilization, technical assistance and cost-sharing for runoff reduction, restoring wetland hydrologic functionality and diversifying forest age classes are among other actions identified in the plan.

LAKE SUPERIOR BASIN

More than 95 million black ash trees have been killed by the invasive emerald ash borer in the Lake Superior Basin since the destructive beetle appeared in Wisconsin in 2008.

Stands of black ash are found in lowlands and swamps where few other trees can thrive, providing benefits such as slowing flood waters and shading cold water brook trout streams. But loss of black ash is profoundly changing these forests, while climate change limits the ability of other trees to replace black ash.

Colleen Matula, DNR forest ecologist and silviculturist, lamented this double threat: “EAB is causing widespread ash mortality, and climate change is altering these wetland forested habitats by reducing diversity.”

A project funded by the Great Lakes Restoration Initiative is studying how forests in the Lake Superior Basin will look in a warming climate absent of black ash trees. The DNR, U.S. Forest Service, county foresters, universities, Native American tribes, federal and nonprofit groups are evaluating adaptation strategies.

“This project helps further understanding of diverse black ash ecosystems and assists foresters in choosing a replacement species to maintain forest cover and hydrologic function,” Matula said.

Tree species being used to replace black ash include pine, maple, spruce, tamarack, birch, oak, elm and cedar. More than 30,000 seedling trees have been planted on project sites so far.

• DARA FILLMORE

AQUATIC INVASIVE SPECIES

On guard against invasives: DNR and partners collaborate to control harmful non-native species

Adult round goby

PAUL SKAWINSKI

• AMANDA SMITH

Aquatic invasive species have a long history in the Great Lakes region and continue to play a significant role in shaping the environment, culture and economy we know today.

The Wisconsin Aquatic Invasive Species Management Plan, updated in 2019 — dnr.wi.gov/lakes/invasives — outlines Wisconsin's approach to preventing and managing the undesirable impacts of aquatic invasive species.

The goals are to **prevent** new introductions of non-native nuisance species into Wisconsin, **contain** the spread of existing invasive species and **control** existing populations of invasive species to minimize harmful impacts.

Strong partnerships are key to the success of Wisconsin's AIS Program. The program is implemented by the Wisconsin AIS Partnership representing people from federal, state and local governments, tribes, universities, citizens groups and regional collaboratives that all work on AIS issues.

Led by University of Wisconsin-Extension Lakes and the DNR, the partnership implements AIS outreach and monitoring programs statewide such as Clean Boats Clean Waters and the Citizen Lake Monitoring Network, among others.

In 2010, the launch of new federal funding through the Great Lakes Restoration Initiative allowed Wisconsin to significantly expand its AIS program and direct resources to the state's Great Lakes Basins. This infusion of funding has allowed the DNR to:

- Expand its network of watercraft inspections on the Great Lakes and connected waters;
- Identify and respond to pioneer AIS populations;



SARA FOX

The Clean Boats Clean Waters program includes boat inspections to help boaters understand the vital role they play in preventing invasive species.

- Implement a monitoring program to quantify the rate at which AIS are spreading across the state; and
- Expand outreach efforts on other invasion pathways beyond recreational boating.

The Great Lakes experience the impact of numerous invasion pathways, but maritime commerce is of significant concern, particularly ballast water. It's how iconic invasive species like the round goby arrived.

Lake Superior and Lake Michigan also connect to many of Wisconsin's inland waters via river systems in their basins, which can function as invasion pathways themselves because of locks and dams that create an artificial connection to upstream habitat.

A key example is the Lake Winnebago System, Wisconsin's largest inland lake and the largest recreational fishery for the culturally important lake sturgeon. This system connects to Lake Michigan's Green Bay via the Lower Fox River, where the round goby and other invasive species are knocking at the door.

Amanda Smith is an aquatic invasive species specialist for the DNR.

STOP THE SPREAD

Non-native plants and animals that invade ecosystems beyond their natural

historic range and cause harm to the environment, culture or economy are known as invasive species — including aquatic invasive species, or AIS, when related to water. To learn more about invasive species and ways to get involved in preventing their spread, visit dnr.wi.gov/topic/invasives.

Boaters and anglers on Wisconsin's waterways play a huge role in halting the spread of aquatic invasive species by following AIS laws.

- **INSPECT** your boat, trailer and equipment.
- **REMOVE** any attached aquatic plants or animals (before launching, after loading and before transporting on a public highway).
- **DRAIN** all water from boats, motors and all equipment.
- **NEVER MOVE** live fish away from a waterbody.
- **DISPOSE** of unwanted bait in the trash.
- **BUY** minnows from a Wisconsin bait dealer; use leftover minnows only under certain conditions. (Use leftover minnows only on that same water, or on other waters only if no lake or river water or other fish were added to their container.)

Awareness helps keep round goby at bay and Lake Winnebago in the clear for now

View from High-Cliff State
Park on Lake Winnebago

BILL MCNEE

• PETER JURICH

The round goby has been established in the Great Lakes since 1994, but it wasn't until recently that the goby began knocking on the doorstep of Wisconsin's inland lakes and streams.

It was found in 2015 in Little Lake Butte des Morts, just northwest of Menasha. On the other side of Menasha is Lake Winnebago, a popular Wisconsin destination that provides over 130,000 acres of fishing and boating to visitors and is well known for its world class sturgeon fishery.

The two lakes are separated by a lock that would otherwise allow boaters in Lake Winnebago to travel into other parts of the Fox River system, and vice versa. However, the lock was closed following the discovery of gobies in Little Lake Butte des Morts to prevent further spread.

Round goby (*Neogobius melanostomus*) is a highly invasive, bottom-dwelling fish. They prefer living in the nooks and crannies of a rocky substrate and feed on the eggs of other fish, among other things. These two preferences could make them devastating to the sturgeon that breed on the substrate of the Lake Winnebago System.

Amanda Smith, an aquatic invasive species specialist with the DNR, said gobies can spawn up to six times per year, which in many cases is double the average for fish.

"In general, invasive species tend to displace native species by competing for food and habitat, reproducing rapidly and often, and becoming a nuisance," Smith said. "The round goby checks all of the boxes."

IDENTIFY INVASION PATHWAYS TO PREVENT SPREAD

The plan to close the Menasha lock is consistent with Wisconsin's Aquatic Invasive Species Management Plan. With invasion pathways as the focus, it identifies three keys: Prevent introduction of new species, contain the spread of existing species and control existing populations to minimize harmful impacts.

Invasion pathways are a way to categorize vectors, or the specific mechanisms responsible for the introduction and continued spread of invasive species. Recreational boating, for example,

is one such invasion pathway through which AIS can spread.

"Humans are almost always the vector, at least for that initial or what AIS biologists call 'primary' spread," Smith said. "At the end of the day, the risk will always be there in some form or another, but it's up to us humans to do what we can to minimize it."

Gobies originate from the Caspian and Black Seas of Central Europe and most likely got to the Great Lakes through ballast water in shipping industry-related transfers. The threat to Lake Winnebago in large part focuses on that lake's sturgeon population, one of the largest in North America.

"There are few, if any, lakes where gobies and lake sturgeon are found together," said Jean Rombach-Bartels, the DNR's northeastern secretary's director. "Because of the size and uniqueness of the Winnebago system, we don't know what the goby could do to the lake sturgeon population or future of the fishery in general."

The DNR is actively working to prevent the gobies' further spread upstream of Little Lake Butte des Morts into Lake Winnebago and the miles of river habitat that lead into that system of lakes.

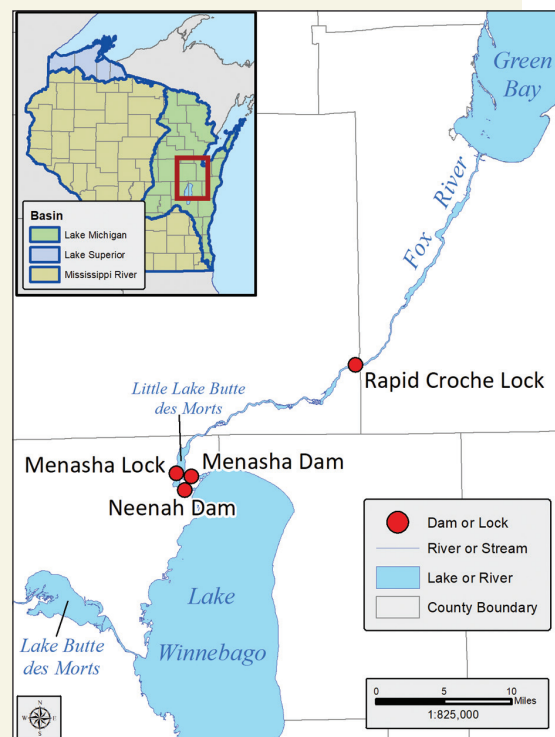
In addition, the agency is helping the Fox River Navigational System Authority determine whether an electrical barrier would prevent gobies from passing through, allowing the reopening of the lock at Menasha. Unfortunately, such a plan has presented many challenges and is far from realization.

"Overall, preventing the round goby from spreading further inland is not a 'one size fits all' solution," Smith said.

COMMUNICATION IS KEY

Rombach-Bartels appreciates the frustration felt by boaters who want the lock open for recreation. Despite the challenges, she added, there's a success story here: more awareness of aquatic invasive species issues.

Through the DNR's partnerships with the Fox River Navigational System Authority, the Fox-Wolf Watershed Alli-



ance, UW-Oshkosh and Wisconsin Sea Grant, communication efforts have been ramped up and anglers are taking notice.

"The only thing that keeps gobies from getting into Lake Winnebago is people being aware that would be a bad thing," Rombach-Bartels said.

Proof of the DNR's successful communications efforts is seen in how the goby came to be discovered in Wisconsin in the first place, she noted — "the fact that it was a young man who was part of a school fishing club who caught that first goby and did the right thing by calling us."

"That has really elevated the importance of everybody's voice."

More awareness has been a key to keeping the goby in check, for now. "Nearly six years later, we can still say we don't have gobies in Lake Winnebago," Rombach-Bartels said.

"We really have to do our best to protect the natural environment we've got here in our own back yard and not to take it for granted because, in a blink of an eye, things can change."

Peter Jurich is a science writer for UW-Madison's Waisman Center.

RESTORING WISCONSIN'S GREAT LAKES



- **ABOUT THE TEXT:** Stories for this Special Report were coordinated and edited by Susan Tesarik, communications and outreach coordinator for the DNR's Office of Great Waters. Additional editing and proofreading by Andrea Zani and Kathryn A. Kahler, *Wisconsin Natural Resources* magazine.
- **ABOUT THE PHOTOGRAPHY:** Several of the images used in this special section are past entries in the "Wisconsin's Great Waters" photo and writing contest, sponsored each year by the DNR's Office of Great Waters. Selected entries are used in the program's annual calendar highlighting Lake Michigan, Lake Superior and the Mississippi River. For information, visit dnr.wi.gov/topic/greatlakes/contest.html.

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To learn more about the DNR'S Office of Great Waters, visit dnr.wi.gov/topic/greatlakes.



To learn more about the Great Lakes Restoration Initiative, visit glri.us.



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Front cover photos: Ashland Breakwater Lighthouse, Lake Superior, by Brian Taylor; splashing at Cave Point County Park, Lake Michigan, by Bill McClenahan; kites over Lake Michigan at Two Rivers, by Bill Pohlmann; Apostle Islands National Lakeshore tree, Lake Superior, by Michael DeWitt.

Back cover photo: Cave Point County Park on Lake Michigan, Door County, by Michael Knapstein.

Designed by Thomas J. Senatori.



Children can color and cut out Flat Smokey, then take photos with him while practicing fire prevention and safety.

Safer with Smokey Bear

Flat Smokey project helps teach kids about wildfire prevention

CATHERINE KOELE

With all the challenges associated with the pandemic, like most of us Smokey Bear also has been hibernating over the last year.

Many of the in-person fire prevention events where the public typically would encounter Smokey Bear have been canceled or moved to a virtual setting. But getting Smokey's message to the forefront of people's minds is still an important role of the fire prevention program in the DNR's Division of Forestry.

Despite the extended nature of COVID-19, the public has been eager to get outside and visit Wisconsin's beautiful state parks and forests. That's

understandable, of course, since sitting around a cozy campfire, roasting marshmallows with family and friends, creates memories that can last a lifetime.

Now more than ever, it's important for the DNR to find opportunities to teach people — especially future

generations — about protecting our natural resources from unwanted human-caused wildfires. Educating children about wildfires may be one of the best ways to help prevent them.

Over 98% of all wildfires in Wisconsin are caused by people! The good news is most of these can be prevented.

To create awareness for Smokey Bear and his fire prevention message at a time with no in-person interaction, the DNR has worked in partnership with Dale Hubert's Flat Stanley Project to adopt a Flat Smokey concept. A pullout page is included in this magazine.

Families are urged to do a short fire safety activity with children and grown-ups to discuss the differences between good fires and bad fires. Then kids can color and cut out Smokey Bear, taking Flat Smokey with them on outdoor adventures.

Snap a picture with Flat Smokey while practicing fire prevention and safety with family and friends. And

CATHERINE KOELE PHOTOS



post photos of all your activities with Smokey on social media, using #FlatSmokeyWI.

For readers of any age, Flat Smokey also makes a great bookmark.

As you continue to get outside and enjoy the outdoors, remember what Smokey always says: "Only you can prevent wildfires!"

Catherine Koele is a wildfire prevention specialist for the DNR.



U.S. FOREST SERVICE

*Motivations may vary,
but the outdoors provides
common ground for resolute
achievements*

ANDREA ZANI

For those who undertake adventures in perseverance, it often is as much about the journey as it is the end result.

Three athletes recently pursuing outdoor challenges of different sorts and in different seasons would likely find themselves in agreement on that.

Despite the demands of their exploits, these determined individuals discovered that the beauty of the outdoors can make any journey memorable.



Melodee Liegl

COURTESY OF MELODEE LIEGL

CARRY ON SWIMMINGLY

Marathon runners are familiar to most, but how about marathon swimmers? That's exactly what Melodee Liegl of Milwaukee considers herself — and last summer, she logged the water miles to prove it.

Liegl lives in Delafield, part of Waukesha County's "Lake Country," where she completed numerous long solo swims in area lakes as she sought outdoor challenges for herself during COVID-19.

Swimming up to 11 miles at once, Liegl totaled more than 100 miles and 50 hours in the water over a three-month period for what she called her "20 Lakes in 2020" challenge. She added even more miles on other swims in embracing her own version of lake life.

Feting feats of

*Conditions can "change on a dime"
Melodee Liegl said of swimming
in Lake Michigan, where she has
competed in two long-distance relays.*



DIANE WARPINSKI

James Warpinski

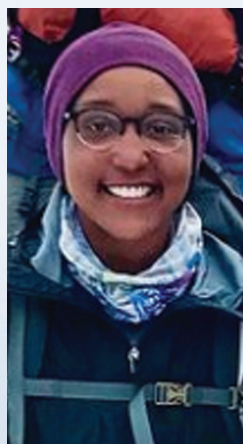
FINDING A NEW PERSPECTIVE

Last May, cancer survivor James Warpinski was planning to celebrate his triumph over the disease by running Green Bay's Cellcom Half-Marathon, a 13.1-mile event on the Fox River State Trail and a run he had done before. But because of another disease, COVID-19, plans for the event changed.

Instead of hundreds of participants with large cheering crowds, it would be a "virtual" run, "just me and the pavement," he said. Runners were asked to complete a 13.1-mile run in a safe and socially distanced way and note their finish time to run organizers.

Rather than let himself be disappointed about the new approach, Warpinski welcomed it. Turns out, the solitude of this unusual half-marathon was "an experience of mindfulness better than any meditation," he noted about finishing the "race."

The virtual event, he added, allowed him a unique opportunity to experience the trail "with fresh eyes and new perspectives."



EMILY FORD INSTAGRAM

Emily Ford

WINTER WARRIOR

Through-hikes of Wisconsin's Ice Age National Scenic Trail have been completed before, yet not a single woman had done it in the off-season. Until Emily Ford.

Ford, of Duluth, Minnesota, became the first woman to accomplish the 1,200-mile feat in winter when she arrived at the western terminus of the Ice Age Trail on March 6 at Interstate State Park in St. Croix Falls. That was 68 days after her trek had begun on Dec. 28 at the trail's easternmost point in Potawatomi State Park.

In between, Ford used Instagram to share tales of her trek with Diggins, an Alaskan husky borrowed from a friend's sled dog kennel for the occasion. Her social media following grew exponentially as she offered updates and encouraged everyone to embrace the outdoors.


"Hey, once we are done with this trail, keep getting out there," she said in one post. "There's heaps of world left for you to see."

Read on for more about these three outdoors lovers and their exceptional adventures.



Andrea Zani is managing editor of Wisconsin Natural Resources magazine.

endurance



Open water swimming offers both challenges and great rewards for Melodee Liegl.

No pool, no problem for swimmer seeking a new challenge

MELODEE LIEGL

Swimming has always been my sport.

It's the perfect activity for someone like me because I was born with hip dysplasia. I had surgeries as a child, and in 2017 and 2018 had to have complicated replacements on the same hip.

I was back in the water at exactly one month and spent many hours swimming and water walking for my recovery. I wouldn't be where I am physically without swimming.

My first open water swim was in Lake Amy Belle in Hubertus in 1996, a 1-mile swim. That's when I fell in love with open water swimming.

I kept trying to find longer distances to challenge myself in the open water, from a 3-mile swim in the Racine Quarry in 1997 all the way to a 36-mile swim in the Red River in North Dakota and Minnesota in 2016.

There were many more swims of

different distances during that time. The Three Rivers Marathon Swim in Pittsburgh was fun because you swim up and down the rivers — Allegheny, Ohio and Monongahela — for a total of 18 miles.

I have done two relays: Chicago to Michiana, Michigan (42 miles) and North Chicago to South Chicago, (26 miles). Lake Michigan is always challenging, and conditions can change on a dime.

The Swim Around Key West (12 miles) is one of my favorites because I like the tropical swims and warmer waters.

LAKE WATERS TRIED AND TRUE

With the COVID-19 shutdown preventing access to my pool, I was unable to swim. I would walk instead, but that could not replace how I felt after swimming.

On May 3, it was a beautiful sunny day in the 70s, and I thought I would

try a swim in Silver Lake. I recently moved to Delafield, one of the cities that make up Waukesha County's "Lake Country," and there are many area lakes.

Even though I don't like to use a wetsuit, I did that day because the water was 53 degrees and my body was not acclimated to the cold. I started out with a 52-minute swim, and it felt wonderful!

Over the next couple of weeks, I was swimming up to two hours at a time in Silver Lake. I then tried Nagawicka Lake and soon after did Upper and Lower Nemahbin lakes. Then it was time to say goodbye to the wetsuit.

On June 28, I swam the perimeter of Upper and Lower Nashotah lakes and Upper and Lower Nemahbin lakes. My friends crewed next to me for the 8.5-mile swim, which took nearly five hours.

In July, I swam in five new lakes.

ALL PHOTOS COURTESY OF MELODEE LIEGL

Beaver Lake is one of my favorites. Public parking is available, and I became very familiar with the perimeter of the lake. If I wanted more distance, I'd do a double or triple loop.

GOING THE DISTANCE

It wasn't until August that I thought I could possibly swim in a total of 20 lakes in the area and make that my challenge! With organized swims still canceled by the coronavirus, I made up my own "20 Lakes in 2020" event.

There really was no training involved because I am used to swimming long distances. The biggest issue was knowing where to park and access each lake. In August, I swam 10 lakes and then finished my "20 Lakes" challenge on Sept. 1.

My favorite lakes to swim are Beaver, Silver and Oconomowoc. I enjoyed exploring new places, inspiring others and making new friends — I often will chat with someone when I'm on shore if I see they are watching me.

I usually swim by myself, mostly because it is hard to find someone who wants to swim as long as I do. Unlike distance running, you can't talk to someone while you are doing it.

I have always been a morning swimmer and for lake swimming, I usually swim as soon as the sun is up. If I start even earlier, I use a blinking light in my tow buoy. The bright

orange tow buoy belt wraps around my waist and drags behind me for safety. It allows people to see me and also holds a few small items, such as car keys or extra goggles.

By swimming early, I don't have to be worried about boat traffic. I always swim with an ID bracelet. I stay close to the piers when I swim and figure if I need to get out, land is only a few feet away. I carry nutrition (energy gel packs) in my swimsuit for when I need to replenish.

WHAT'S NEXT

This summer, I am hoping to do a documented swim — a point-to-point swim or double crossing of a lake for greater distance.

That kind of swim is more complicated than what I've been doing. I'll need to find people who know the chosen lake and can help organize kayak and boat support.

To document a swim, kayak or boat escorts are required. Such a swim also requires observers who track details of the swim such as water temperature, wind direction, navigation points, nutrition breaks and timing of the swim.

We are so lucky to have many beautiful lakes in our state, and I'm eager for my next challenge.

From pools to rivers to lakes and oceans, Melodee Liegl of Delafield swims them all.



MELODEE LIEGL'S LAKE SWIM LIST

They call it Lake Country for a reason — the area in the northwestern corner of Waukesha County features beautiful waterbodies everywhere. Here's a look at the area lakes conquered by endurance swimmer Melodee Liegl during her self-created "20 Lakes in 2020" swim challenge last summer, with times in parentheses. She did even more long swims last year, but these are the outings she counts as her "20 Lakes" challenge.

- June 6: Upper and Lower Nemahbin, two lakes, 5.8 miles (2:40)
- June 18: Silver Lake, three laps, 7.3 miles (3:40)
- July 3: Upper and Lower Nashotah, two lakes, 4.1 miles (1:55)
- July 4: Nagawicka Lake, 5.1 miles (2:46)
- July 5: Pine Lake, 6.1 miles (3:10)
- July 25: Beaver Lake, two laps, 7 miles (3:39)
- July 26: Moose Lake, two laps, 3.8 miles (2:00)
- Aug. 9: Lac La Belle, 8.5 miles (4:10)
- Aug. 12: Golden Lake, 3.3 miles (1:38)
- Aug. 15: North Lake, 4.7 miles (2:32)
- Aug. 16: Oconomowoc Lake, 6.7 miles (3:32)
- Aug. 19: Lake Keesus, 4.7 miles (2:21)
- Aug. 20: Little Muskego Lake, 6 miles (2:40)
- Aug. 21: Rock Lake, 6.2 miles (3:02)
- Aug. 22: Lake Ripley, 3.3 miles (1:36)
- Aug. 23: Okauchee Lake, 11 miles (5:13)
- Aug. 26: Pike Lake, 3.7 miles (1:45)
- Sept. 1: Little Cedar Lake, 3.8 miles (1:50)

Love of all things swimming has produced many fun experiences for Melodee Liegl.



Running Green Bay's Cellcom Half-Marathon has provided James Warpinski with many memories over the years, but perhaps none as unique as last year's event.

Half-marathon along state trail invigorates

body and soul

JAMES WARPINSKI

I think of how this race was supposed to be with the crowds, the music, the excitement. I had registered months ago before our world entered its collective pause and the race went virtual.

For me, the Cellcom Half-Marathon isn't just another routine race netting me a shiny finisher's medallion and a designer T-shirt. It's much more personal. Several years ago, the race helped me restore a sense of control over my life when that control had been surgically cut away.

At 13.1 miles, a half-marathon is ambitious for anyone, crazy for most, just right for me. Today, I'll run downtown and back along part of the official race route. There won't be anyone to talk to along the way. Just me and my thoughts,

Starting at home, I breeze through the first mile on the grounds of St. Norbert Abbey then to the Fox River

Trail. This was one of my favorite running routes and my bike route to work hundreds of times before my retirement.

The adrenaline is flowing and I'm feeling great! At the boat launch, eager anglers are lined up, waiting their turn to join the early risers whose pickups and boat trailers already almost fill the parking lot.

Birds announce their presence in a wooded area. I'm struck by the profusion of bird sounds and can identify at least a half-dozen different birds singing out, opening their day in song.

A pair of bicyclists speed past me in their fitted biking attire. Next, a rollerblader strides by in rhythm to her music.

Two women approach me carrying flowers in plastic pots. Where are they coming from? I've seen many people walking their dogs on the trail, but who takes their plants out for a walk?

A family shows up on the trail — mom in front, two preschoolers on little bikes in between, dad bringing up the rear pulling baby in a Burley.

Along comes a different set of parents, two geese with 16 goslings

waddling across the trail. Three of the young ones are just sitting on the trail. No hurry to get anywhere. We have something in common.

TRAIL IS THE PLACE TO BE

Across the river, one of the area's many paper mills hums with the constant activity of the massive paper machines, the life blood of our community. Its two 300-foot smokestacks had been symbols of the plant's success but are now coming down, their technology obsolete.

A rest area appears on the left, but signs announce the area is closed and instruct in bold letters and an oversized ruler: This is 6 feet. Must keep my distance. Closed — another consequence of the coronavirus.

Through the deserted downtown Green Bay area, nothing is open today. No cheering crowds, no water stations, no porta-potties. Just me in need of a restroom.

At Mile 7 of my run, under the Mason Street Bridge, a few families fish from lawn chairs. At Mile 8, someone has left plants for passersby to take. The plants look attractive, but I don't think they'll make it the next 5 miles until I get home.

Here's that family of geese again. This time, the adults see me coming and hiss a warning: Leave our young alone. So many families on the trail.

NO RECORDS, JUST THE RUN

When I last ran the Cellcom, I'd made it a point to talk to some of the other runners at the prerace event. What was the story behind their shirts and distinctive clothing, the signs they carried, their reasons for racing? I found each person had a story to share.

For one, running was a momentary respite from providing care for an ailing spouse. For another, it was to acknowledge a return to action after hip replacement. Others ran in honor of a loved one suffering from cancer or some other illness.

The event was the path I had followed in my own recovery from cancer. This virtual event is my fourth Cellcom Half-Marathon since cancer became my new lifelong companion. I've given up on personal records, but find myself simply enjoying the experience of running, uncomfortable as it was getting now.

I still have 4 miles to go. My body is tired, and my mind is starting to drift. Time to stop for a moment. Oh! Smell

DIANE WARPINSKI

those blooming lilacs and get moving again.

Pink and white wildflowers along the way. Here are some bright yellow weeds and the ever-present dandelions. Just under 3 miles to go. I'm feeling tired and winded now, barely noticing my surroundings. I just want to make it to the finish line.

Back in my neighborhood, the final stretch. A mom approaches with her infant perched high up in a bike seat. Trailing behind are three children, the youngest with training wheels. Mother goose and her goslings on wheels.

STAYING IN THE MOMENT


13.1 miles at last! With running, there's always a next time, another opportunity to experience the trail with fresh eyes and new perspectives.

Today, I encountered the sights, the sounds and the smells along the trail in ways I'd never done before. Today, I saw runners, walkers and rollerbladers, anglers, boaters and bicyclists, happy families — not to mention the geese.

This run had started as a competition with myself to record a respectable time. But in the end, I recorded something of much greater value than that.

When opportunity allows, I hope to run this half-marathon again, along with thousands of others, but in a different way. No longer obsessing about my pace, I'll take the time to experience the course and its surroundings.

I'll look for opportunities to meet my fellow runners and ask them about their stories, their hopes and dreams. Maybe I'll get to share my own story to encourage them in return.

While I may not win any prize or gain a large medal for my efforts, I will be in the present moment. 

Dr. James Warpinski of Green Bay is an avid runner who appreciates the many ways being outdoors can boost health and wellness. A retired allergist-immunologist, he teaches professional development at the Medical College of Wisconsin-Green Bay and takes special interest in the power of patients' stories.

ABOUT THE FOX RIVER STATE TRAIL

From its north trailhead in downtown Green Bay, the Fox River State Trail extends 25 miles along the Fox River and on a former rail corridor. For details, check dnr.wi.gov/topic/parks/foxriver.



ANDREA ZANI

It took just about all Emily Ford had to finish her 1,200-mile winter through-hike of the Ice Age National Scenic Trail — and she couldn't have done it alone.

Her own fortitude and an abundance of support from friends and strangers kept her going as she and her canine companion, Diggins, conquered everything from frigid temperatures and raging winds to fatigue and pain to knee-deep snow and ice to complete the “thousand-miler” trek.

“The temps are finally up!” she noted at one point on her Instagram social media account. “The cold weather was a rough go for a bit. My lungs protested every single day, but I couldn't not hike!”

“I still have all of my fingers and toes, but some are turning fun colors.”

With updates like that plus regional and national news coverage along the way, the 28-year-old Ford saw her Instagram account grow from a couple hundred followers at the start of her hike to more than 10,000 by the time she reached the end.

About 100 people cheered her final steps — watching her become the first woman to complete a through-hike of the Ice Age Trail in winter — and her Instagram following continues to grow.

By sharing her adventure, Ford hopes to get others excited to enjoy the upper Midwest's “fourth season,” as she calls it, the way she does.

“I know it's cold in the Midwest, but keep getting out there,” said Ford,

whose work as a gardener allows her time for winter pursuits. “Layer up, bundle up and embrace our fourth season.”

As a Black and gay woman, Ford also is hopeful to use the attention to encourage all people to feel comfortable experiencing the outdoors.

“I want people to know that literally ANYONE can play outdoors, no matter which boxes you do or do not check,” she posted on Instagram. “Through my time backpacking, I’ve never really met another brown person backpacking, skiing or mountain biking.

“I know that brown people are outdoors — I see it on Instagram now! — but I want to add to the story.”

LOST AND FOUND

For Ford, the story of her Ice Age Trail hike included ups and downs — like the day she took a fall and broke a hiking pole. Luckily, she wasn’t seriously hurt.

“I ate it while going down a hill and must’ve wedged it in between some rocks on my graceful tumble down,” she said of the pole. Her partner and a friend were able to reach her within a couple of days with a new pole.

On another day, Ford lost her glasses and extra mittens along the route in Portage County. She used her cell phone to text Patty Dreier, president-elect of the Ice Age Trail Alliance board of directors and a county resident.

Dreier was eager to help. Because that particular stretch of the trail follows County Highway A, Dreier was able to drive out in her car and slowly covered a 4-mile stretch of road.

At first, she found nothing, so she decided to walk a bit. When a man in a pickup truck stopped to ask Dreier if she needed help, she explained she was trying to find something lost by a friend.

He nodded and rolled away slowly, then stopped again and called out: “Hey! Are you looking for glasses?”

Dreier was able to return the glasses to Ford, no worse for the wear. The Ice Age Trail Alliance, which works to build, maintain and promote the trail, related the story on its own Instagram account.

“It was divine intervention, I am positive,” Dreier said in the post. “I have never felt so much warmth and joy on a bitter cold, windswept roadside.”

‘TRAIL ANGELS’ EVERYWHERE

So many people offered support to Ford during her trek.



Glasses lost and found bring together new friends Emily Ford and Patty Dreier in Portage County.

EMILY FORD INSTAGRAM PHOTOS



A 60-pound pack holds everything Diggins and her human companion need.



“The trail angels keep coming out of the woodwork!” she posted at one point, noting that even small gestures made a big difference. “It’s amazing how a pack of Skittles will turn the mood around.”

In Milton, she was able to find rest and food with new friends. “I happened to say yes to sleeping on the deck of two wonderful folks, one of which makes a bangin’ chicken wild rice soup and homemade rolls and the other who is a PT and took care of my weary 28-year-old body,” said Ford, who nursed aches and pains including a sore ankle on the trek.

“That’s the way of the trail: You meet those you find favor with and then you must leave the next morning,

only to keep them in your heart.”

In Cross Plains, staff at the Ice Age Trail Alliance headquarters treated her to lunch. In Lodi, she fueled up on local baked goods and encouragement from middle school students.

“Lodi is quite awesome,” she noted. “The middle school has this Trail Trekkers program for the kids. They left me a bunch of signs at the trail-heads.

“The best line from one of the students was, ‘Push through this hike because no one else will do it for you!’ Tough love from a middle schooler.”

Another group of “cool 4th graders and Girl Scouts” spent time chatting with Ford in Cornell.

“I love little kids’ questions,” she

said. “Best one of that day was, ‘Do you ever get bored?’ I promptly responded, ‘Yes, all of the time while hiking!’”

In Shell Lake, Brickyard Pottery & Gallery welcomed Ford inside for a warmup. “We were having a rough morning and happened to stumble upon Brickyard Pottery at a magical moment,” she posted. “A little bit of tea, food and good conversation goes a long way.”

On several occasions since many campgrounds were closed, generous farm owners let her pitch her tent on their property not far from the trail.

After staying at Back2Basics Family Farm in Westfield, she posted, “I was able to help with night chores before heading off to bed. ... Tonight, I am on an Amish farm just outside Coloma. Super thankful for my little square on their land.”

INSPIRED BY STATE'S BEAUTY

All these stories are indicative of the support Ford said she felt throughout

her hike, from the very beginning.

“So many folks have stepped up to support me on this trip,” she posted a day before her departure, and the support only increased as more people followed her journey.

“So much trail support,” she noted later, posting many times about supporters, new friends, Ice Age Trail Alliance volunteers and others who aided her efforts, including leaving treats and water along the route and paying for meals at stops along the way.

“I wish I could name you all here, but you know who you are. Thank you to everyone.”


It was Diggins, though, who offered her steady and constant companionship. “So thankful for this little trash monster,” Ford said. Diggins even had her own hashtag for social media — #digginsthe dog.

Ford started her hike with a sled for her gear, but soon ditched it and went with just her 60-pound backpack. Sometimes she camped and sometimes she stayed in nearby lodgings or with

friends and kind acquaintances.

She received supply drops when needed, including a new pair of boots after wearing through the soles on her first pair. And she took several “zero days,” for rest.

Along the way, Ford found the beauty of the Ice Age Trail inspiring.

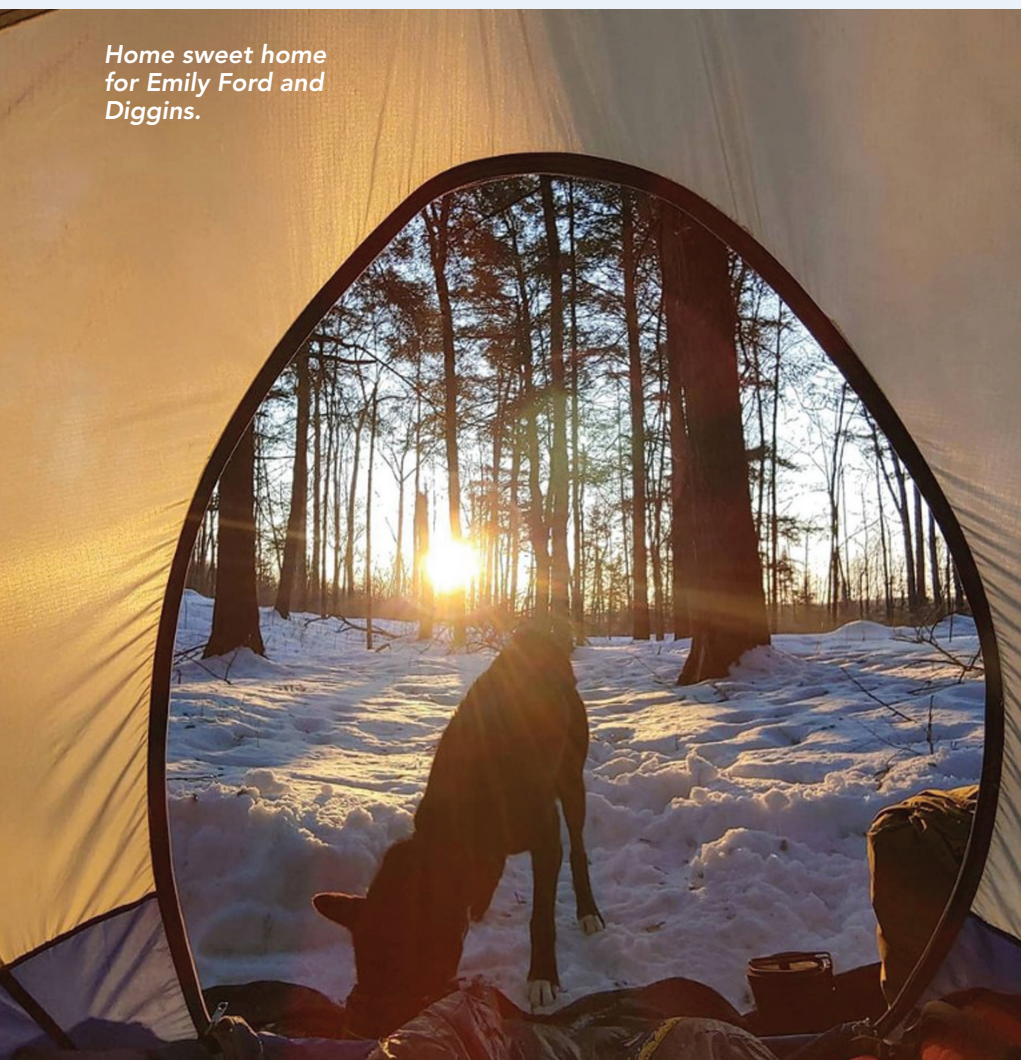
“We stayed out at some amazing spots!” she noted. “One last time: Wisconsin, you have some beautiful forests. ... So much trail magic!” 

Andrea Zani is managing editor of Wisconsin Natural Resources magazine.



More than two months after her journey began, Emily Ford completes her Ice Age Trail hike on March 6 at Interstate State Park.

PATTY DREIER

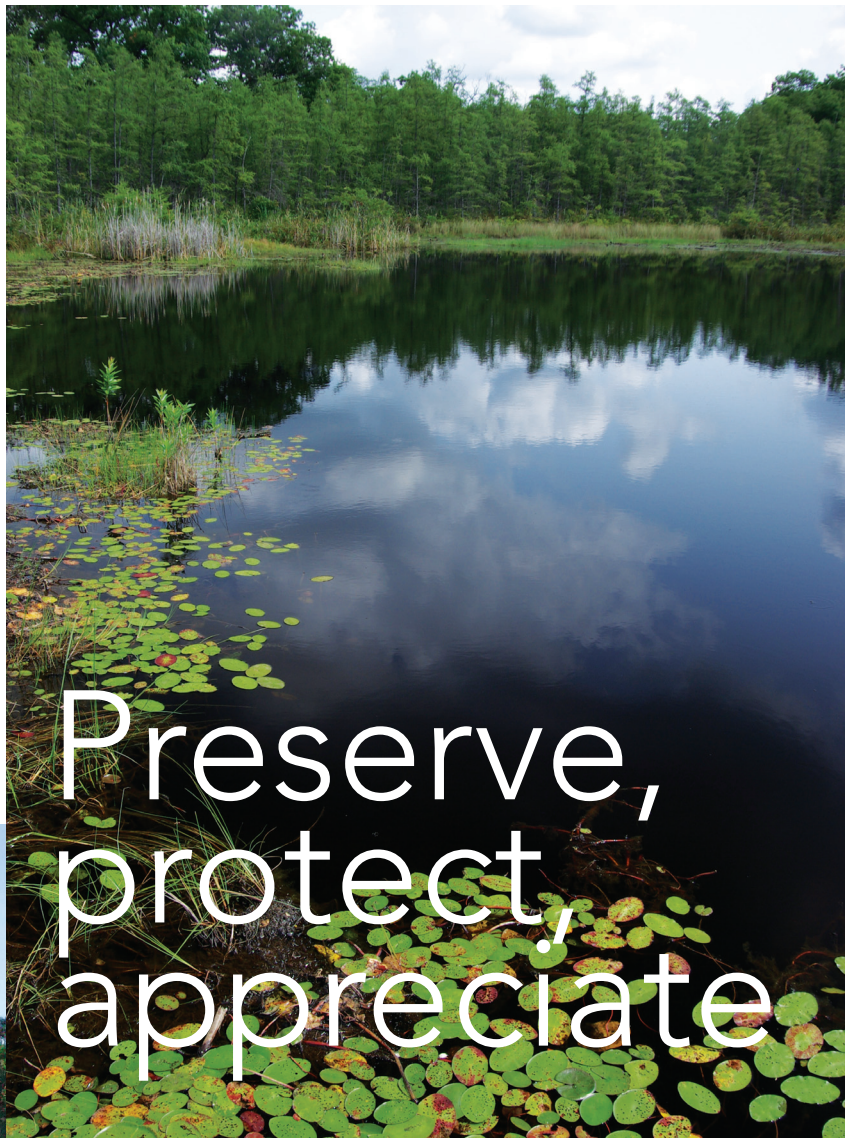


Home sweet home for Emily Ford and Diggins.

EMILY FORD INSTAGRAM

ABOUT THE ICE AGE TRAIL

The Ice Age National Scenic Trail covers about 1,200 miles of marked trail and unmarked connecting routes, all in Wisconsin. It is managed as a partnership with the Wisconsin Department of Natural Resources, the National Park Service and the Ice Age Trail Alliance. For details, check dnr.wi.gov/topic/parks/iceagetrail, nps.gov/iatr and iceagetrail.org. To see all of Emily Ford's posts with numerous photos from her through-hike, check out her Instagram account @emilyontrail.



Preserve, protect, appreciate

State Natural Areas
Program strategizes
to safeguard natural
heritage lands

Beulah Bog State Natural Area is filmed by James Donovan for a PBS Wisconsin documentary. One of the state's southernmost bogs, it requires special care to ensure the unique landscape can adapt to future climate conditions.

LISA GAUMNITZ

On a warm, sunny March day, honeycomb ice floats over mats of last season's pickerel weed at Beulah Bog State Natural Area in Walworth County, masking the spongy peat beneath.

Short tamarack trees with cones hanging from stunted branches ring the outer edge of the bog lake, and taller tamaracks reach skyward away from the shoreline.

A single puff of tawny cotton grass, a welcome holdover from last year's growth, clings to its stalk, while the blood-red funnels of pitcher plants poke through the ice, soon to unfurl a new set of insect-trapping leaves in a bed of sphagnum moss.

The ancient bugling calls of sandhill



THOMAS MEYER PHOTOS

cranes rise as two pairs take off.

Spring is coming to one of Wisconsin's southernmost bogs, bringing new life to a unique landscape sculpted by immense forces over thousands of years and now protected as part of the Wisconsin State Natural Areas Program.

The SNA Program celebrates 70 years in 2021, making it the nation's oldest statewide system of natural areas. It also is the largest — nearly 700 jewels sparkling across Wisconsin with the sole statutory purpose of saving for now and future generations a living record of diverse prairies, forests, wetlands and other natural communities in the state.

For Wisconsin, these areas represent the legacy of geologic forces, geographic destiny and immutable time, and the collective commitment to caring for these special places.

The last 30 years in particular have challenged this natural heritage, as invasive species, climate change, historic levels of white-tailed deer, encroaching development and other human-caused stressors collectively pose an existential threat to many of these sites and a seemingly endless task for their caretakers.

"These places that still retain a semblance of Wisconsin's pre-settlement landscapes and the native species they support are in danger of winking out," said Thomas Meyer, the DNR conservation biologist who has played a big role in shaping the system over the last three decades.

Despite the challenges, Meyer and other DNR staff plus 60 partners like The Nature Conservancy, the U.S. Forest Service and The Prairie Enthusiasts that own State Natural Areas aren't throwing in the towel. They're tooling up and evolving their approaches to meet these challenges.

A new strategic plan has been created to save these diverse habitats, many of them globally rare, by working smarter.

New technologies developed with partners are helping prioritize the identification, protection and management of natural areas in an era of limited resources and changing environmental conditions. Grants, donations from the Natural Resources Foundation of Wisconsin and other organizations, and thousands of hours from volunteers are adding to the work that can get done at dozens of sites.

"We can't use the same protec-

tion strategies they did 70 years ago, or even 35 years ago when the last strategic plan was created," Meyer said. "Even in that seemingly short period of time, the impacts to the environment have changed, sometimes significantly."

SIZING THINGS UP

Conservation giants Aldo Leopold, John Curtis and Albert Fuller planted the seeds for the State Natural Areas Program in the 1940s, compelled by their concern Wisconsin was losing its vast southern prairies and wetlands and other places they could take students to see native flora and fauna.

Plant species, not whole, functioning ecosystems, were their focus. That was reflected in 1951 when the State Legislature created the State Board for the Preservation of Scientific Areas and the group set the minimum size for protecting prairie at 1 acre and 10 acres for woods.

If a site harbored a diversity of native tree and plant species, even if it was a tiny remnant of a previously more widespread ecosystem, it was deemed worthy of protection.

"The scientific thinking has evolved tremendously since then," Meyer said. "Those little places just don't cut it anymore."

"What we've been trying to do for a few years is to protect not only small specific examples of a given natural community — like a dry prairie, for example — but the full diversity of community types that all reside in the same larger landscape and flow from one to another."

Nick Miller, scientific director at The Nature Conservancy, said this landscape-scale approach recognizes that some wildlife species need larger

habitats, such as many warblers that live only deep in large blocks of forest.

Other species need more than one habitat to survive and require room to roam. State-endangered wood turtles, for example, need streams for hibernating, forests for foraging and sand for nesting.

And all species are part of, and depend on, a larger community of species linked across larger landscapes.

"All of these factors and more have led us to protect larger habitats, habitats that are connected and enable species to move across Wisconsin's landscapes and also to work with landowners outside of State Natural Areas to minimize impacts that



The State Natural Areas Program marks 70 years of protecting places that represent Wisconsin's natural heritage, such as Beulah Bog, where tawny cotton grass lines the path.

extend into preserves," Miller said. "Partnering with farmers on water quality is one example."

SHIFT FOCUS TO SURVIVE CHANGE

That approach is especially important as climate change means some species will have to move, perhaps long distances, to find the conditions they need to survive under potentially warmer and wetter settings. Some already are.

The Nature Conservancy, with partners including science experts from the DNR, developed a new landscape-scale vision for conservation called the Resilient and Connected Network (also known as Conserving Nature's Stage).

Together, they've produced maps and an online tool that identify the places across Wisconsin and the U.S. where species have the greatest chance of surviving, as well as habitat corridors that will give species access to these resilient areas.

This vision for climate resilience is now guiding where and how The Nature Conservancy protects and manages lands, and where they'll designate their next nature preserves, Miller said.

Those tools are helping the DNR shift in its new strategic plan from trying to keep all State Natural Areas looking like they did prior to Euro-American settlement to a more pragmatic goal — "less diorama and more dynamic," the plan's drafters said.

"We envision a system of State Natural Areas that protects the full range of Wisconsin's natural heritage, addresses environmental challenges through stewardship and is valued by all generations."

CLIMATE IMPACTS AFFECT PLANNING

Meyer and other conservation biologists and SNA managers are now turning the new strategic plan into a boots-on-the-ground implementation guide for managing the system.

For years, DNR Natural Heritage Conservation staff have been working as part of the Wisconsin Initiative on Climate Change Impacts to analyze how climate change will impact State Natural Areas and Wisconsin's rare species and to weigh adaptations. More recently, workshops have helped SNA managers translate the science into action at specific sites, including Beulah Bog.

SNA crew members Trent Leaf and Mackenzie Manicki and NHC colleague Amy Staffen teamed with the Northern Institute of Applied Climate Science to dig into likely climate changes and potential threats to the bog and ways to adapt management.

Survival of this southern bog will depend largely on what happens on surrounding land. There, upland oak savanna with scattered white and bur oaks and an understory of native plants vie with non-native buckthorn and honeysuckle and are fragmented by subdivisions flanking Beulah Bog's southern border.

More precipitation is predicted for the future climate here. That raises concerns of increased runoff from uplands carrying nutrients and sediment into the bog that could disturb the

water chemistry supporting this unique assemblage of acid-tolerant plants, said Pete Duerkop, the district ecologist with responsibility for the site.

To counter that threat, crews carefully place and angle firebreaks on upland oak savanna that surrounds the bog to minimize gullying. Prescribed fire in the savanna will in turn boost a healthy, native plant understory and filter runoff.

Warmer temperatures are expected to goose the growth of brush and invasive species, limiting oak regeneration and reducing the vigor of native plants in the understory. To help maintain the upland oak communities, SNA crews conduct regular prescribed burning and brushing.

cold, anoxic conditions may diminish with the higher temperatures forecast.

By tending to uplands, adapting management where possible and partnering with land trust volunteer stewards, managers hope to build healthy surrounding ecosystems and resiliency.

BROKEN DREAMS TO GLOBAL TREASURE

In Adams County, another State Natural Area features one of the program's best examples of landscape-scale management.

Quincy Bluff and Wetlands SNA is a short detour off Interstate 90 near Mauston but feels a world away, down country roads past a smattering of houses and potato fields. DNR



Wild lupine at Quincy Bluff and Wetlands offers ideal habitat for the endangered Karner blue butterfly and other species.



DNR conservation biologist Jon Robaidek helps to manage Quincy Bluff and Wetlands State Natural Area near Mauston, where the view from Lone Rock features a panorama of the property's various habitats.

SNA crews and Kettle Moraine Land Trust volunteer stewards will keep a keen eye on invasive species in an attempt to control them before they get a foothold.

Managers won't be able to counteract all climate change impacts. Tamaracks here are already at the southern edge of their range, so increasing temperatures may reduce their extent in the four kettle bogs. And the thick layer of peat created when the bog plants decompose under

regional ecologist Jon Robaidek and conservation biologist Josh Karow are responsible for this site and 17 others in the area.

"This is an amazing property, the most beautiful in the state," said



Management strategies at Quincy Bluff and Wetlands include prescribed burns and native plant seeding.



JOSH KAROW PHOTOS

Karow, who lives 2 miles away and hunts and hikes the area when he's not managing the habitat.

"You can stand on the property and not see anything that is man-made except for the fire tower, which will be coming down. The property is 7 miles long and 3 miles wide and uninterrupted by roads."

At 6,700 acres, Quincy is the third largest State Natural Area in the state. Pieced together by the DNR over the last 30 years, it was crowned in 2013 by The Nature Conservancy's donation of 1,700 acres and an endowment of \$178,000 to care for it, Robaidek said.

Quincy's location yields an amazing diversity of habitats, species and landforms. It is found on the lakebed of former Glacial Lake Wisconsin and near the ecological tension zone where Wisconsin's northern mixed forest transitions to its southern prairies, with plants and animals of both intermingling.

When glaciers receded and the ice dam holding the glacial lake broke some 10,000 years ago, the lake drained, leaving a flat, sandy plain with scattered sandstone buttes and mesas rising 100 to 200 feet above the plain, including the namesake Quincy Bluff, which extends 2 miles.

The sandy soils were poor for growing crops and rich in broken dreams. The property's maintenance shed once housed a private fish farm raising minnows. A commercial wild rice operation, cranberry bog and practice area for water skiers have all come and gone.

A large aerial map inside the maintenance shed outlines the restoration

challenge and promise ahead with a mix of prescribed burns, brushing, selective timber harvests and native plant seeding. Yellow outlines show the habitat types Robaidek and Karow are aiming for. "Barrens to sand prairie. Oak woodland. Oak to oak-pine barrens. Old-growth."

Oak savannas, prairies and barrens are all globally rare, and in Wisconsin, less than one-tenth of 1% of the acreage of these ecosystems present at statehood remains.

"We're caring for and restoring ecosystems that are rarer than many you'd see in the Amazon rainforest," Karow said. "People don't grasp the truly special and incredibly rare nature of a place like this."

A SUITE OF ECOSYSTEMS

Prescribed burning is one good way to achieve certain management goals for Quincy.

"We are trying to return fire to where it used to be before settlement," Robaidek said. "With our having a large site and sole ownership, we can return fire to a larger area with multiple habitats with one big burn."

A section of young sand prairie shows how the restoration effort can have gratifyingly quick results. It was a fallow farm field until Robaidek and Karow conducted a prescribed burn and seeded the field with 30 species of native grass and wildflower seed col-

lected earlier from the property itself.

Wetlands are maintained as habitat for migrating waterfowl and shorebirds stopping over en route to Canada. A 1,000-acre sedge meadow gives way to undulating hills with scattered jack pine, Hill's oak and a variety of shrubs.

Grasses and plants characteristic of barrens and sandy prairies are found here again. Last summer, when Robaidek and Karow were collecting seed, they discovered a Karner blue butterfly, an endangered species.

"After all this barrens work, it was pretty rewarding to find it here on the property," Robaidek said.

At the top of Lone Rock, one of the property's sandstone buttes, a panoramic 360-degree view showcases the variety of habitats, along with the crew's handiwork. For Robaidek and Karow, what they do here is a labor of love.

"I'm just a small blip in time in the management of this thing," Robaidek said. "We're not going to see the end of this, but we do see the changes we are making to the landscape."

The work will go on long into the future, Karow added.

"We're painting a 200-year picture here," he said. "All we can do right here is the best we can to push this to the next level and hope the next people keep pushing it in the same direction."

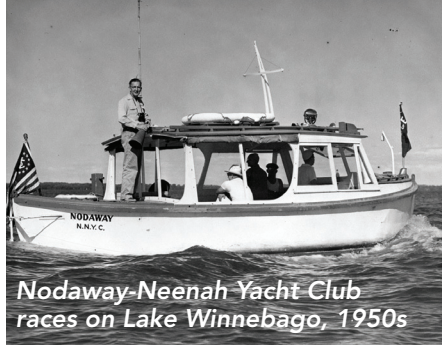


Lisa Gaumnitz is a natural resources educator and program and policy analyst for the DNR.

MORE ABOUT SNAs

The perils and promise of State Natural Areas are evident in Beulah Bog and Quincy Bluff and Wetlands, two SNAs whose beauty and uniqueness are shown in unprecedented aerial and on-the-ground video footage in the new PBS Wisconsin documentary "Wisconsin's Scenic Treasures: Southern Vistas." Guided by DNR conservation biologist Thomas Meyer, the show features 15 State Natural Areas filmed last summer. Stream it on-demand at pbswisconsin.org and on the free PBS app.

Nearly all State Natural Areas are open to the public to enjoy bird watching, hiking, hunting and fishing. Most are largely undeveloped and do not have restrooms, trails and other facilities like state parks. For details on the program and SNAs statewide, go to dnr.wi.gov and search "SNA."



Nodaway-Neenah Yacht Club races on Lake Winnebago, 1950s

NEENAH HISTORICAL SOCIETY



Harry Purinton, founder of the Sail Training Foundation

SAIL TRAINING FOUNDATION



Regatta on Madison's Lake Mendota, August 1934

EUGENE SANBORN

HERE WE GO SAILING PAST

Lessons in the sport have a rich history on Wisconsin lakes



COURTESY OF STEVE CARPENTER



Sailing instructors then and now — Steve Carpenter in the mid-1970s, above, and Henry Pudlo today

TIM SWEET

TIM SWEET

Anyone listening to pop radio 40 years ago would no doubt remember the Grammy Award-winning 1979 song “Sailing,” by Christopher Cross.

I have always savored the chorus: “Sailing takes me away to where I’ve always heard it could be. Just a dream and the wind to carry me. And soon I will be free.”

A high school friend, Steve Carpenter, introduced me to sailing in the mid-’70s, a few years before Cross won his Grammy. Carpenter’s family kept their boat moored in the Neenah Harbor next to Riverside Park.

“I remember as a fairly young kid, maybe 10 years old or so, we would go out sailing on Lake Winnebago in the 21-foot lightning class sailboat my dad built out of mahogany in our basement and garage,” Carpenter said.

His father helped hone Carpenter’s sailing skills and he eventually became a teenage sailing instructor for younger kids in Neenah.

“We would teach students the parts of the boat, mast and sails as well as techniques for reading the wind, tacking and so forth,” he said.

Carpenter’s involvement was part of a rich history of sailing, sail training and racing on Lake Winnebago and other inland lakes in Wisconsin, not to mention the bays and broad expanses of the state’s two Great Lakes.

LONG PART OF THE COMMUNITY

Sailing might conjure visions of “champagne wishes and caviar dreams,” a lifestyle for the rich and famous. But in Wisconsin, sailing is generally no such thing.

At the Neenah-Nodaway Yacht Club, for example, the stated goals are simple:

- To promote pleasure sailing and racing on Lake Winnebago;
- To establish a standard code of rules and signals for the lake; and
- To discourage extravagant expenditure in yachting.

Dating to 1864, the NNYC is one of the oldest yacht clubs in the nation. It promotes sailing for all ages, sponsors community events and supports the Fox Valley Sailing School.

Don Reid, a former commodore of the NNYC, said large lakes in Wisconsin have lent themselves well to sailing through the years.

"Inland sailing in Wisconsin started in several places all within a decade or two of each other," he said, noting clubs in Neenah, Menasha, Oshkosh, Fond du Lac, Lake Geneva and Pewaukee — all starting in the mid- to late 1800s.

By the mid-1900s, sailing instruction became more widespread.

At the Fox Valley Sailing School, based out of Neenah's Recreation Park, "We have been teaching youth and adults sailing and water safety since 1958," group treasurer Kirsten Schrang Tarafa said.

"Our story is very much that of a small-town community sailing school that has enjoyed generational support and participation of local families on the board of directors for decades."

In Madison, the unassuming Hoof-er Sailing Club on Lake Mendota was established in 1939, offering programs for UW and the community. The Milwaukee Community Sailing Center aims to "make Lake Michigan accessible through quality programming," said program manager Teresa Coronado.

And a number of other state sailing groups have similar goals, many tracing their roots back for years.



TIM SWEET

Max Spiegel, the author's grandson, sharpens his sailing skills on Sturgeon Bay.

JUST RIGHT FOR BEGINNERS

Wisconsin's sailing tradition can be found deeply rooted in the Door Peninsula — as might be expected from land nearly surrounded by water.

Associated with the Sturgeon Bay Yacht Club, the nonprofit Sail Training Foundation has kept the tradition of youth and adult sailing lessons alive and well in Door County for nearly 70 years.

The STF was started in 1952 by Harry Purinton. His son, Richard, described an unusual training method his father employed with beginning sailors.

"One of the ideas he implemented was to set up several prams on the grass on the club's front lawn," Purinton said. These small beginner boats were used on shore by the trainees.

"One young sailor at a time would get in the pram, and the instructors and other students would angle the boat to the wind, as if tacking, going through the maneuver of coming about, or jibing, all in a controlled manner," Purinton explained.

His father created a small booklet containing basic sailing nomenclature, theory and his own simple illustrations, titled "Start 'Em Out on the Grass."

"This was a beginner's booklet used for many years," Purinton added.

AHOY, SAILORS

One of our grandsons has taken lessons through the Sail Training Foundation for the past four summers, and my wife, Cindi, and I began learning there two years ago. At age 64, she likes to try new things and especially loves a challenge.

The STF's teenage instructors, certified by the U.S. Sailing Association, have all the qualities of outstanding educators — particularly patience and kindness for beginners.

Though we recently became proud owners of a 1975 Flying Scot sailing dingy, I don't know if we're quite ready to become racers at this point. But I find it relaxing to sit in a lawn chair along the shore on a warm summer night and watch the sailboats dancing on the water.

The words of Christopher Cross play in my head. "Sailing takes me away to where I've always heard it could be. ..."

Tim Sweet writes about the outdoors from his home in Appleton.



MILWAUKEE COMMUNITY SAILING CENTER

Beginners can learn the ropes with sailing schools and groups.

LEARN TO SAIL WISCONSIN

While not all-inclusive, here are groups that often do community outreach to make sailing more accessible.

- Fox Valley Sailing School: foxvalleysailingschool.org
- Neenah-Nodaway Yacht Club: nnyc.org
- Sail Training Foundation: sailtrainingfoundation.com
- Sturgeon Bay Yacht Club: sturgeonbayyachtclub.com
- Ephraim Yacht Club: eyc.org
- Fond du Lac Sailing Club: fdlsail.com
- Oshkosh Yacht Club: oshkoshyachtclub.org
- Green Lake Sailing School: greenlakesailingschool.com
- Sheboygan Youth Sailing Center: sheboyganyouthsailing.com
- Sailing Education Association of Sheboygan: seasheboygan.org
- Madison Youth Sailing: madisonyouthsailing.com
- Hoof-er Sailing Club, Madison: hoofersailing.org
- Okauchee Lake Sailing School: okaucheesailing.org
- Pewaukee Lake Sailing School: plss.org
- Milwaukee Community Sailing Center: sailingcenter.org
- South Shore Yacht Club, Milwaukee: ssyc.org
- Lake Beulah Sailing School, East Troy: lbssonline.org
- Kenosha Community Sailing Center: kenoshasailing.org
- Geneva Lake Sailing School: glss.org
- Delavan Lake Sailing School: delavanlakesailingschool.com
- Saint Croix Sailing School: saintcroixsailingschool.org
- North Coast Community Sailing, Bayfield: recreationandfitnessresources.org/sailing

Many hands make *happy* trails

*Public-private partnerships help
secure access to the outdoors*

ANNE SAYERS

Nothing beats a sunny afternoon hike with my human and furry companions.

Meandering through restored prairie where native blooms dot the greenscape fills us all with joy. When the trail leads us into town, we enjoy the boardwalk along the rambling creek where trout run.

We also enjoy the quaint coffee shop where I can get my caffeine fix and Dotty gets her doggie treat. Or sometimes we'll enjoy a beer and a meal by the water's edge and marvel at all the smiling people passing by.

This little community near the Ice Age National Scenic Trail is a happy happening place because of the valued outdoor spaces and public access to them. The trail attracts visitors who spend their day exploring the area's natural beauty and looking to build out their itineraries with stops at coffee shops, breweries, gift stores or playgrounds.

But the creation of public trails is no small feat. The small segment of the Ice Age Trail I just described took the

cooperation of both public and private partners to bring it to life.

The Ice Age Trail Alliance manages over 80 easements and 120 handshake agreements with private entities granting trail access. To fully complete the development of the thousand-mile footpath, it will take an estimated 1,200 private landowner transactions.

"The Ice Age Trail would not be the treasure it is today without the generosity of private landowners who are willing to share one of their greatest assets — their land," said Kevin Thusius, director of land conservation for the Ice Age Trail Alliance.

Wisconsin is fortunate to be home to not one, but two National Scenic Trails that draw visitors from near and far.

The Ice Age Trail runs entirely in Wisconsin, and the North Country Trail spans

200 miles across the northern reaches of the state. Beyond Wisconsin, it continues in both directions for a total of 4,600 miles, stretching from Vermont to North Dakota.

Like the Ice Age Trail Alliance, the North Country Trail Association manages hundreds of easements and handshake agreements to ensure trail

access. They estimate 20 to 25 more partnerships are needed to complete the route in Wisconsin.

GENEROUS FAMILY GIFT

Thanks to the Thewis family in Mellen, the North Country Trail is gaining an approximately 3- to 4-mile critical link. Steve Thewis, a third-generation landowner, recalled his fondest memories on the family's property.

"My grandfather settled this land and

Anne Sayers and Dottie enjoy hiking the Ice Age National Scenic Trail.

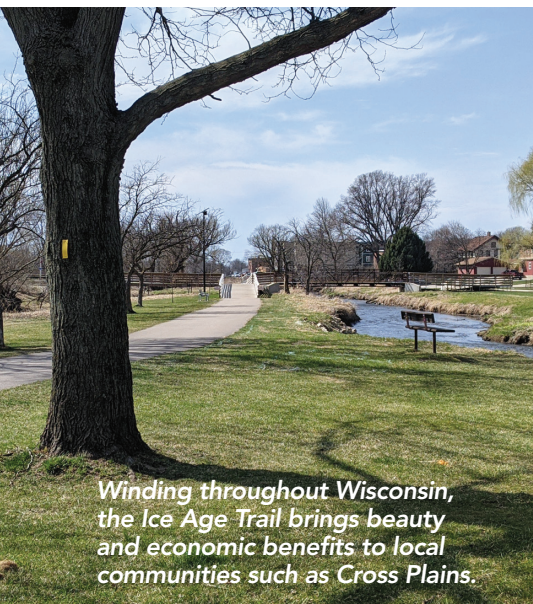


COURTESY OF ANNE SAYERS



Scenic vistas await visitors to the North Country National Scenic Trail.

CHRISTOPHER TALL



Winding throughout Wisconsin, the Ice Age Trail brings beauty and economic benefits to local communities such as Cross Plains.

LYSIANNE UNRUH

was a trapper,” he said. “His route was along the Tyler Forks River that passes through the property, and as a kid, I used to ride along in the 55-gallon barrel strapped to the tractor as he drove.

“Now, my daughter and I walk it barefoot looking for fish, just like we used to when she was little. We’ve gained so much from it, and we want others to be able to enjoy it, too.”

With the help of the North Country Trail Association and the DNR, Thewis brought his four siblings to the table. The five of them each owned a parcel of their grandfather’s original property, all in one contiguous line where the trail could pass through and connect to public land in Iron County.

It was a process, but everyone had the same end goal in mind.

“Some people are so proud of their land. Why wouldn’t you want to share it with others?” Thewis said.

Bill Menke, retired Wisconsin regional coordinator for the trail association, said the situation with the Thewis family presented a rare opportunity.

“It was a unique scenario to be able to traverse such an expanse of territory with five to seven easements that all lined up simultaneously. It’s almost unheard of,” he said. “The Thewis family has just been great to work with.”

FOR ENJOYMENT BY EVERYONE

As we hike Wisconsin’s trails and soak up all the scenic beauty we can, it is worth appreciating the generosity of private landowners like the Thewis family who share these special places with us.

Outdoor recreation is a leading reason why travelers visit Wisconsin every year, and it’s these selfless gifts, the efforts of volunteer trail builders and the management by organizations and agencies that bring many of our outdoor recreation assets to fruition.

These public-private partnerships help drive the economic activity supporting the livelihoods of Wisconsin residents, when recreationists drawn to protected places purchase gear or plan a full itinerary.

The outdoor recreation industry is multi-faceted, and this robust offering benefits Wisconsin. The Department of Tourism’s Office of Outdoor Recreation is working to ensure the industry has all the support it needs.

So, the next time the trail leads me to a favorite watering hole, I’ll raise my glass to all of the generous people who make these treasured outdoor destinations available to be enjoyed by many.



Anne Sayers is the acting secretary of the Wisconsin Department of Tourism, where she combines her love for marketing, organizational management and all things Wisconsin. Find more travel inspiration for your next adventure at travelwisconsin.com.

Rugged single-track trails challenge bicyclists at Blue Mound State Park.

KATE GODDING

WISCONSIN TRAIL REPORT

Wisconsin’s thousands of miles of trails provide endless opportunities for scenic views and wildlife sightings. Discover the wonder of Wisconsin’s outdoors on your next hike or bike ride.

Check Travel Wisconsin’s Trail Report for conditions on the trail network before you go: travelwisconsin.com/trailreport.

Here are a few of the state’s many trails awaiting your visit.

■ Ice Age National Scenic Trail, Lodi segments:

Just over 7 miles of trail pass through the Ice Age Trail Alliance’s Steenbock Preserve. Head into the woods to climb the iconic Gibraltar Rock for views of Lake Wisconsin and the Baraboo Hills before passing through prairie, the city of Lodi and into the Lodi Marsh State Wildlife Area.

■ North Country National Scenic Trail, Brule-St. Croix Chapter:

A route to historic waterways, inspiring vistas and whispering pine forests, the trail passes through open prairies and boglands. Walk in the footsteps of Native American and European explorers, and roam into Wisconsin Lake Country. Pass through Pattison State Park to view Big Manitou Falls, Wisconsin’s tallest waterfall.

■ Blue Mound State Park: More than 15 miles of off-road, single-track trails with significant elevation challenge cyclists and offer spectacular views of the rocky outcroppings. A steep connector trail accesses the 40-mile Military Ridge State Trail.

■ Peninsula State Park: In addition to the 12 miles of rugged off-road trails, the park’s Sunset Trail is 9.6 miles of fine gravel and asphalt that accommodates recreational bicycles, wheelchairs and hikers. It traverses Weborg Marsh, cedar and maple trees and cliff communities.

— WISCONSIN DEPARTMENT OF TOURISM

Campfire cooking can be way more than s'mores

KYLE CHEREK

When it comes to camping, there are generally two types of folks.

Some people jump at the opportunity to set up an amalgamation of geometry made out of nylon and polyester and collapsible poles, sleep in the unpredictable outdoors, cook over an open flame, endure bees, beetles, mosquitoes and many other manner of critter — all for the fun of it.

Others, meanwhile, consider camping a form of penance for earlier unknown wrongs. For them, the smell of wood smoke and wind through trees is best experienced from a deck, attached to a fully climate-controlled home.

Maybe I am drawing too sharp a contrast, but the divergence between those who consider a Wisconsin summer without camping a partially wasted summer and those who don't is mighty, and real.

That said, among those in the pro-camping camp there are nuances. That may be especially true in the realm of culinary adventures in camping, about which I know a few things, for the camping set is full of variations.

I have known friends who plumbed the depths of true rustic outdoors cooking: a rock circle, a wood pile and all the heating and eating left to what could be foraged, fashioned and forked.

Then there are others who bring enough pans, stands and plans to make Julia Child's well-appointed kitchen — now ensconced at the Smithsonian — seem like a half-hearted outfitting.

Most of us land somewhere near the rustic, but not without some of the advances of the modern age.

While winging it may be OK for some, packing for camp and



COURTESY OF KYLE CHEREK

its cooking is a crucial part of the whole endeavor for me and my wife. Between her insistence that we will not run out of, or need to run into town for, anything and my enthusiasm for a neat and well-packed car, cooler and cargo rack, our pack game is pretty solid.

MAKING THE MOST OF IT

Planning what you will cook in the open air is a balance between faith and risk: the substance of things hoped for

vs. the reality of who knows what the weather will be like while you cook.

Would that a few campfire cast iron skillet meals would have been less gritty, courtesy of out-of-nowhere winds, if only we had packed a splatter guard or something of the sort to cover the skillet.

Packing for cooking outdoors is also a clever game of doing the most with the least. My wife relishes this sort of challenge and inevitably comes out with something delicious I could never have imagined made with a skillet, fish spatula and some kitchen twine.

Truth be told, I am somewhat new to camping. It was part of my childhood only in the way that trips to Disneyland and the opportunity to order whatever I wanted at Baskin-Robbins were — few and far between.

As with so many good things in my life, I came back into the camping fold when I fell in love with my wife, who embraced camping as a way to engage the natural world and relax. Our phones are turned off, we sing instead of listening to music, we honor the sun and its cycle.

She definitely falls on the side that considers it a partially wasted summer if we do not sleep in a tent perfumed by the combination of fresh air and wood smoke, our stomachs full from a meal cooked in cast iron over a campfire.

Thankfully, we don't have to go far in our gorgeous state. Replete with dozens of state parks and forests in which to camp and explore and dozens more state trails to hike, we have an amazing variety of outdoor spaces to enjoy.

CAST IRON IS KEY

For my wife and me, the one essential of good camp cooking is cast iron.

You can have your tripods, your rotisseries, Dutch ovens, camp stoves or weenies on a stick cantilevered over a flame daring the fire gods to burn them with every sizzle and spit. But for us, the balance of ease and attention cast iron gives is surely the way to go.

There is something elemental, pioneering and present about cast iron. It takes a bit to heat up, but that is one of the reasons we are so drawn to it for camp cooking, a study in planning and patience.

Camp cooking with cast iron pushes us into inventive culinary corners.

Anyone can do one-skillet enchiladas, but can you pull off a peach cobbler or a cast iron crispy-edged pizza? You get the idea.

Also, we cook with fire — the real thing, hot and honest and the way humankind first started cooking.

Foodies familiar with the Netflix series “Chef’s Table” will certainly remember the episode featuring legendary Argentine chef Francis Mallmann. From the show’s first season in 2015, it is a must-see for real background in cooking over an open fire.

Let’s put it this way: In Greek mythology, Prometheus may have brought fire to Earth, but Mallmann taught us how to cook with it with éclat.

WARMTH IN THE WOODS

One of the beautiful things about cooking over or alongside an open fire while camping is the wood — or better, the alchemy of the wood turning to flame and heat. There’s poetry to it.

One of my favorite writers, and one of my favorite people, was my late friend Josh Ozersky. In the introduction to a book on BBQ cookery, Ozersky paraphrased something that architect Buckminster Fuller once told a boy who asked why wood burned.

Fuller explained that through the tree’s leaves, the sun’s light had been trapped in the very trunk and limbs of the tree. The fire, he said, was “the sunlight unwinding from the log.”

If that subtle poetry applied to a campfire isn’t a compelling enough argument for why we camp, I don’t know a better one.

We put up with dirt in our shoes, eschew showers for fresh air and sunshine, and gather together around a shared source of heat, light and a delicious meal — all as the Earth’s rhythm dictates our day.



Kyle Cherek is a culinary historian, food essayist and former host of the Emmy Award-winning TV show “Wisconsin Foodie” on PBS. He and his wife own Amuse Bouche Entertainment Productions and together create unique culinary events including presentations, cooking demonstrations and storytelling dinners.



JESSICA KAMINSKI



DNR FILES

ITEMS NEEDED

Open fire, grate, cast iron pan and cast iron lid, silicone oven mitt.

INGREDIENTS

- 2 tablespoons unsalted butter
- 2 red onions, halved and thinly sliced
- 3 tablespoons raw sugar
- 1½ pounds mixed heirloom cherry tomatoes (4 to 5 cups)
- ¼ cup chopped and pitted cerignola or kalamata olives
- 2 tablespoons chopped fresh thyme leaves
- 1 tablespoon extra-virgin olive oil
- 1½ teaspoons sherry vinegar
- 1 large pinch each of kosher salt and freshly milled black pepper
- 1 10-inch pie crust

INSTRUCTIONS

- Get a medium-high fire going, with flames licking the grill grate from time to time. Let it burn until you’ve got glowing, ash-covered coals and embers, then shovel a bed of embers off to one side. Position the skillet lid over the flames to heat, handle up.
- Put the skillet on the grate. Add butter and melt, then stir in the onions and a pinch of sugar. Keep stirring until the onions are caramelized.
- Keeping an eye on the onions, toss together the tomatoes, olives, thyme, olive oil, vinegar, salt and pepper. Stir it all into the skillet with the now-caramelized onions.
- Re-rake the hot coals from the side of the fire pit, making sure to keep some coals out of the bed to use for continued heating of the lid.
- Carefully arrange the pie crust on top of the tarte mixture, tucking the edges into the sides of the skillet. Cut several vents in the pastry lid so steam can escape. Put the skillet directly on the bed of coals.
- Cover the skillet with the hot lid and heap red coals on top. It is key that the coals on the lid remain blazing hot during baking; should they cease to glow, heap on fresh red ones. This bake takes about 20 minutes to achieve a crispy, golden crust.
- After about 20 minutes, pull the covered skillet from under the coals, place on the grate and carefully remove the lid. Continue to heat until the juices bubble up through the vents in the crust and look thick, like jam.
- Let cool 5 to 10 minutes in the skillet before slicing into wedges and serving.

READERS WRITE

GAME FISH A BIG HIT

I just wanted to congratulate the staff of *Wisconsin Natural Resources* for producing the Spring 2021 edition. It is the best one I have seen. Photography and writing were excellent. I also wanted to ask if there is someplace I can buy or obtain a poster of the Game Fish of Wisconsin pictures that appeared in the issue. A number of years ago, I obtained a poster you had published and have it mounted at my lake home in Shawano. ... Keep up the good work.

Greg Martin
Addison, Illinois



Thanks for the kind words! Several readers asked about the "Game Fish" piece from the Spring issue. Unfortunately, it is not available as a full-size poster at this time, but the magazine was designed so those pages, printed on a bit heavier paper, could be easily removed and saved.

TEETH HOLD THE CLUE

I found this skull while cleaning up a perennial flower bed in my yard in May 2019. Can you please tell me what it is? This is a rural area of Fitchburg with plenty of woods, farm fields and critters! Thank you.

Anita Clark
Fitchburg

Wildlife biologists Rich Staffen and Paul White, both small mammal experts for the DNR, agreed on the ID. Here is Staffen's reply: "I believe it is a striped skunk. This is based off the dental formula from the second picture, which appears to be three incisors, one canine, three premolars — missing the first; second and third are somewhat combined, but two roots — and one large molar, angled. But it's also based on the size and shape of the top of the skull."



MR. AND MRS. CARDINAL

A beautiful northern cardinal pair, perched together in my back yard. Taken in Richland County.

Jackson Kinney
Blue River

TIMELY TALE OF LAKE LIFE

I just read the Spring 2021 issue cover to cover! My husband and I recently moved to Lake Okauchee. The ice has just come off the lake. Ted Rulseh's article on "Lake Awakenings" was so timely. I ordered his book. Thank you for a great issue and all the wonderful work the DNR does.

Elaine Jacobsen
Oconomowoc



Send your letters to: Readers Write, WNR magazine, P.O. Box 7921, Madison, WI 53707. Or email dnrmagazine@wisconsin.gov.



IN FACT, THAT'S A LONG-EARED OWL

On page 59 of the Spring 2021 issue, there's a photo of an owl identified as a great horned owl. It's a small photo, but it looks more like a long-eared owl to me, which would be a rarer owl to see.

Pat Wilson
La Crosse

Looks like the owl is actually a long-eared owl in a "scared" pose. You may want to have Ryan Brady check it out.

Thomas Goltz
Wausau

Good catch by these two readers and others who asked about the owl. DNR conservation biologist and bird expert Ryan Brady notes: "This is indeed a long-eared owl, which is a smaller, slimmer and less robust owl than the great horned. Also, the 'ear tufts' — which aren't ears at all — are proportionately longer and set closer to each other than in the great horned owl. The reader's reference to a 'scared pose' is accurate. When alarmed, most owls flatten their feathers to become slimmer, more erect and, hopefully for them, more difficult to see.

"Long-eareds are uncommon to rare in most areas of Wisconsin, especially during nesting season. In nonbreeding season from October to April, small numbers overwinter in mostly the southern half of the state. Where numbers are sufficient, they are known for communal winter roosts of five to 25 or more birds. These roosts are sensitive to human disturbance and may be abandoned if visited frequently by birders, photographers or an unknowing public."

FLY FISHING FAN WEIGHS IN

First, the compliments. I find the "new" version of WNR to be quite satisfactory and offer my congratulations on a publication that's maintained its high standards and produced issues that are eminently readable, interesting and informative.

However, as a lifelong devotee of fly fishing, I feel compelled to point out its absence in the DNR staff authored "Gear Up to Go Fish" article of the Spring issue. ... Although fly fishing is often associated with Wisconsin's trout stream fishery, the method is now applied to everything from muskies to carp to panfish. Fly fishing was "invented" long before spincasting, spinning or baitcasting. In fact, the only type of rod angling that's older than fly fishing is likely the cane pole itself.

E.R. Waskawic
Omro

Thanks for the note, and you are right about the longevity of fly fishing. Requiring a bit more finesse than other types of angling and sometimes challenging for beginners, fly fishing is certainly something we'd love to include more about in future issues.



HAPPY HERONS

We had fun watching a family of green herons being raised in our back yard. It was interesting tracking their development from hatchlings until they left the nest. As they matured, they would go from branch to branch, tree to tree, waiting for their parents and exploring the world around them. Upon leaving the nest, they found our ornamental pond to be very interesting. Our goldfish were not amused!

Jim and Nancy Jazdzewski
Stevens Point

YES TO THE HUNT

I was happy to see the article in the recent issue about female deer hunters (Fall 2020). I know we are in the minority, but our numbers are growing. 2020 was my 50th consecutive year gun hunting and my 40th consecutive year bow hunting for deer. I was determined to get a buck last year, and I succeeded after 30 hours in my stands.

It wasn't a trophy as far as points go, but it was a trophy to me as a celebration of 50 years of hunting. I love spending time in the woods. I love the peace and solitude and enjoy seeing the wildlife. Years ago, I bought the book "Is She Coming Too? Memoirs of a Lady Hunter," by Frances Hamerstrom, and all I can say is, "Yes, I am!"

Mary Roen
River Falls



Father-son memories grow more meaningful as years go by

WILL BUROS

Throughout my life, I have marked my time here on Earth by outdoor mileposts — the first time I caught a trout by myself, the first pheasant I shot on the wing, my first buck big enough to justify a shoulder mount.

But it was the day my father felt that I realized my time here is not only measured in first times, but also in last times.

It was my father, Walter Buros, who taught me to hunt and fish. He was fond of reminding me he'd sacrificed several good years of fishing while I was more interested in throwing rocks at fish than casting lures. Still, with his tutelage, I eventually got hooked.

There wasn't anything I didn't think he could do. He would brag how, in his younger days, he could jump over a four-strand barbed-wire fence without getting snagged.

Behind our house was a small woodlot filled with oak trees and gooseberry brambles. It was the perfect habitat for rabbits and squirrels, and it was the perfect training ground for my father to take his young son hunting.

We started with simple walking expeditions into the woods. Once, while he guided me and my younger

cousin, Carl, through the woodlot, we stumbled upon the remains of an old soup bone left half buried, undoubtedly, from a neighborhood hound.

As my father turned it over in his big hands, he got serious and proclaimed we'd made an important discovery — we'd found a dinosaur bone.

Our eyes grew wider as he pointed out teeth marks where most likely, he said, a *Tyrannosaurus rex* had felled this *Brontosaurus*. As he motioned to the landscape and described how dinosaurs once had roamed this land, he was not only improving our observation skills, but also expanding our imaginations.

TOGETHER OUTDOORS

When I was old enough to carry a gun, he got me an old Stevens Crack Shot .22. Armed with that little gun, my father and I would stalk elusive

small game in the back woods.

On one transformational hunt, I peeked inside the hollow log we'd often sit upon to rest and talk.

"Dad, there's a rabbit in here!" I shouted with excitement. "Should I shoot it?"

"Go ahead!" he shouted back.

In hindsight, it wasn't all that difficult or sporting to shoot a "rabbit in a barrel." Still, with that simple pop, I became a hunter.

Through the 1970s and '80s, my father and I were hunting and fishing partners. We made yearly trips to Minocqua to cast for muskies. Back then, a mere follow constituted a successful day on the water.

There was our annual trip to Wau-pun to hunt Horicon Marsh geese. Since we rarely saw geese on the Mississippi River near us, we would join the firing line of rentable blinds along



Will Buros cherishes many memories of times spent on outdoor pursuits with his late father, Walter.



KATHRYN BUROS PHOTOS

ALL GOOD THINGS ...

As the years went by, the opportunities to hunt with my father started to wane. He was carrying a bit too much weight from a bit too many Friday night fish fries, and I found myself hunting alone or with my now grown cousin Carl.

One day, when my dad was in his late 60s, I suggested we go hunt rabbits in that little wood lot behind our old home. He was game and joined me as we went back to where he'd taught me to hunt all those years ago.

The woods, while still familiar, had changed a great deal. Old favorite oaks had fallen, and the landscape was becoming overrun with young maples. The hollow log where I had shot my first rabbit was gone.

As we pushed through the brush together, I saw more coyote tracks than rabbit tracks. I was surprised at how small the lot was — it had seemed much bigger when I was young.

Suddenly, I heard my father yell to me. I made my way and found him on his back in the tangle of a gooseberry bush.

Frightened, I yelled out, "Are you OK?"

I was relieved to hear him say yes and that he had just lost his footing. I kidded him about being like a turtle on its back and reached to help him up.

As I hefted him off the ground, I saw an expression on his face I will never forget. His mouth was pursed in serious contemplation, and his eyes were fighting back tears.

the border of the marsh and sky blast at geese that vaulted overhead seeking safer cornfields beyond.

We lived in Vernon County, and when I was a young man there were very few local deer. So we drove an hour "up north" to the Cataract area near Fort McCoy to hunt. It was nothing to see 30 deer a day, though rarely would we see a buck.

In my late 20s and 30s, my dad and I began turkey hunting together. We were both simply amazed that in a mere handful of years we had watched the state's wild turkey population surge from nothing to harvestable levels.

We used an old friction call my dad had bought in 1967, when he drew a tag to hunt turkeys in the Necedah National Wildlife Refuge during one of Wisconsin's early failed attempts to reintroduce the birds.



"I couldn't get up," he confessed. "If you weren't here to help me, there'd have been no way I could have gotten to my feet. The days of jumping fences are behind me — my hunting days are over."

I assured him that wasn't true, and over the next handful of years I did find a few ways to accommodate him for hunting.

On one of our last deer hunting outings, Carl and I drove my father to a thick wooded Vernon County ridge. After I'd hiked out on an unsuccessful search for deer, I returned to see my father asleep in the car.

I rapped on the window and started to give him guff about nodding off. He pointed to the other side of the car. I walked around his old Buick, and there lay the last buck he ever shot. Dad died in 1998.


NEVER TOO LATE TO APPRECIATE

The older I get, I feel myself trying to hang on to the way things have "always been." It's the common urge to rage against change.

But when I reflect on all the lessons of the old woodlot — from when my father held that "dinosaur" bone to the day he fell — I realize there is always change. And sometimes that's not a bad thing.

After all, there are now more muskies up north, there are more geese everywhere and there are more deer where I live in southern Wisconsin.

Perhaps it's not change I rage against. My feelings may be my feeble attempt to relive all those days gone by.

Change is as inevitable as the certainty of last hunts. Maybe I'm not as upset with the fact there will be last times as I am upset that it took me until now to truly appreciate all the times that came before. 

Will Buros, a retired educator from Cazenovia, has been a lifelong hunting and fishing enthusiast. His essay on outdoor memories with his dad is shared just in time for Father's Day.

BACK IN THE DAY

DNR owes much of its pictorial history to the affable Dean Tvedt

KATHRYN A. KAHLER

One name that has appeared for decades in this magazine and other DNR publications is Dean Tvedt. His role in documenting Wisconsin's conservation history is immeasurable, with thousands of photos to his credit. Tvedt died in February at the age of 96.

Tvedt was known to friends for his quick smile and love for reminiscing about his days at the DNR. After retiring in 1987, he could be seen most mornings having coffee with friends at a local eatery near his home in Mount Horeb.

He had nearly perfect attendance at monthly meetings and annual gatherings of fellow DNR retirees. Upon joining the group — formally known as the Association of Retired Conservationists — Tvedt wrote a profile for their website, wisarc.org, telling his life's story.

"I grew up on a farm near Cross Plains where I attended a one-room country school," he wrote. "Since our farm was the closest to the school, I had the prestigious job of starting the wood-burning furnace each morning during the colder months. Needless to say, I wasn't very popular if the fire went out before the teacher and other students arrived."

"It was at Mount Horeb High School where I joined a camera club



Dean Tvedt

and became interested in photography. My first camera had a hole in the bellows and needed to be taped to produce a usable negative.

"There was something about capturing and preserving a moment in time."

After a photographic job with Commonwealth Telephone Co. and a stint in Japan with the Army Corps of Engineers, Tvedt returned home and got a job with the Wisconsin Conservation Department as a staff photographer.

"We not only produced photos for departmental use, but also 16 mm movies that were used by many schools and conservation clubs around the state," he recalled.

Television was next.

Along with DNR colleagues Wilbur Stites and Staber Reese, Tvedt produced the DNR show "Wisconsin Outdoors."

EAGLE ADVENTURE

Some of the DNR's early images reveal scenes from the other side of the camera lens — photographers at work. Surely, Tvedt related countless stories of his filming adventures to his friends

and fellow retirees, but little was captured in writing.

Fran Hamerstrom, who with her husband, Frederick, were pioneers in the field of wildlife management in Wisconsin, related one such filming adventure in her book, "An Eagle to the Sky," first published in 1970.

A chapter called "The Moviemakers" told how Tvedt and Reese once traveled to the Hamerstroms' central Wisconsin farm in the mid-1960s to film Fran's rehabilitated golden eagle in pursuit of prey. The DNR film crew agreed to bring "a fox in a box" for prey, and Hamerstrom would have her eagle, Nancy, in "top-notch flying condition for movie day."

The day of the shoot, Hamerstrom met the five-member movie crew at Buena Vista Marsh, where she had been training Nancy. The area provided the open fields necessary for the shoot.

One of the film crew, Bob Davis, placed the box with the fox where Hamerstrom said Nancy had made her last kill.

"The plan was for me to cast Nancy off and when she reached sufficient altitude and got into good position, I'd give the signal for the fox to be released," Hamerstrom wrote. "It was breathtaking. Nancy, cast off into the



Longtime DNR photographer Dean Tvedt goes to work on Trilby Lake in Vilas County in 1952. Tvedt died in February at age 96.



Dean Tvedt, left, and Staber Reese, circa 1971.

STABER W. REESE

mate object open up like an umbrella. It ran as only foxes can ... but after a short and spirited chase the fox took refuge among the people."

The people, in this case, were "a conglomeration of men, cameras and tripods." No amount of shouting worked to chase the fox to more open ground for filming. Still, Tvedt and his fellow crew were not deterred.

"Good moviemen are practical," Hamerstrom noted. "If they can't get what they are after, they tend to return with what I believe they call 'footage.'"

"At one point in the proceedings, the fox sat down on an untrampled patch of snow. 'Hold it,' called a photographer. We were glad to hold it; we were winded. Even Nancy was panting, and only the fox showed no sign of exertion.

"Tripods and cameras took position and the soft whir of incipient footage could be heard. ... A cameraman called, 'Get it to move.'"

Hamerstrom ran to her car and found "an almost empty bottle of instant coffee" to toss at the fox as an incentive to take off.

"What a charming scene: Fox in sunlight, sitting at rest; coffee bottle flying past his nose missing it by inches; fox getting up slowly and

going over to sniff the bottle.

"It is sad to realize that editorial scissors probably cut this footage."

TOLD WITH A SMILE


Hamerstrom's story continued a bit from there, relating the reluctant fox being chased by the dogged camera crew. When the fox found its way into a nearby abandoned shed, a net was retrieved to try to nab the animal in hopes of getting the production back on track.

That was when Frederick Hamerstrom "drove up to see the great fox hunt," Fran recalled in her book.

"Instead, he was astonished to see a fox shoot around the corner of the shed. It was followed a moment later not by a golden eagle but by ... a man with a net who lunged and barely missed the fox, fell headlong in the snow, gathered himself up and took up the chase again."

As for Nancy, "she sat on a snow-bank," watching the entire Keystone Cops caper.

"From time to time, some of us helped with the chase, while all the movie cameras stood unmanned, failing to record this episode," Hamerstrom wrote.

While we don't know how Tvedt told his side of this story, we're sure it was with a smile and a twinkle in his eye. 

Kathryn A. Kahler is associate editor of Wisconsin Natural Resources magazine. "An Eagle to the Sky" by Frances Hamerstrom is currently out of print, but used copies may be available. Excerpts republished with permission of John Wiley & Sons Inc.; permission conveyed through Copyright Clearance Center. All rights reserved.

wind, circled, and quickly gaining pitch, came into perfect position.

"Three cameramen, two from car tops, crouched over their cameras, and exultantly I gave the signal. Davis opened the release door. Nothing happened. No fox appeared.

"Nancy made her second swing over the countryside, and at my repeated and rather frenzied signals, Davis started kicking the box. Again, no fox."

FOX ON THE RUN

By this time Nancy had stopped flying and was perched half a mile away. Finally, Davis shook the fox box until the animal fell out. More pet than wild animal, it trotted a short distance, then sat down next to a long snowbank.

Nancy slowly flew back in the direction of the fox and repositioned herself nearby "waiting to see what I wanted her to do next," Hamerstrom wrote.

"It seemed that things had come to a standstill. But eventually the fox took the initiative by wandering over in an offhand manner to sniff Nancy. ... When it got uncomfortably close and was almost upon her, she panicked and opened up her six-and-a-half-foot wingspread to take off.

"It is unlikely the fox had ever before seen a stately and almost inani-



Fran Hamerstrom shows off her golden eagle, Nancy, at her farm in Portage County. The noted conservationist once wrote about an encounter with DNR photographer Dean Tvedt and others who went to Hamerstrom's farm to film the majestic bird.

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OUTSIDE IN WISCONSIN

LAKE ALVA BIRCH-HEMLOCK STATE NATURAL AREA



Tucked into the northeastern corner of the sprawling Northern Highland-American Legion State Forest in Vilas County lies a State Natural Area harboring an ecosystem at one time widespread but now uncommon. Here, at the Lake Alva Birch-Hemlock Forest, remnant old-growth stands of large sugar maple, basswood, white pine, red oak, hemlock and yellow birch give visitors a glimpse of how northern Wisconsin's forests once appeared.

Signatures of old forests — standing dead snags and decaying downed tree trunks cloaked in mosses and fungi — are scattered about the site. The jumbled topography, a reminder of the thick glacial ice that molded this terrain, adds visual interest.

Anchoring the natural area is Lake Alva, a small wild lake edged by a conifer swamp of black spruce, white cedar, tamarack and balsam fir. A mat of sphagnum moss along with bog rosemary, cinnamon fern, orchids and carnivorous pitcher plants carpet the floor. An old access lane loops through the site and makes for easy exploration by foot.

Visit dnr.wi.gov and search "Lake Alva SNA" for information. And see inside this magazine for more on the DNR's State Natural Areas Program, celebrating its 70th year in 2021.



— THOMAS MEYER