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GROUNDWATER: POWERING WISCONSIN'S ECONOMY

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# WISCONSIN LIGHTHOUSES

# Back in the day

## Bear in the hole

*Finding a hibernating bear turns into a lifetime memory.*

*Stephen Lars Kalmon*

Dad's hair on his nape stood on end as he cautiously peeked over the stump's top and brought his gun to port arms. His thumb was on the hammer, his finger in the trigger guard.

"Shhhh," he whispered loudly, "I can smell 'em." He sniffed loudly and peered around as if expecting an attack. "He can be anywhere and on us in a minute."

This day we had found some long black hairs in a nest of leaves in a hollow stump's bottom.

"Look there," he had whispered as he pointed to the find. "Bear's here! Get down, get down or he'll see you."

We crouched down, but I couldn't see anything to be alarmed about. "Stay down!" he rasped again. I did, and didn't know why.

Finally after a five-minute squinty-eyed search he said, "OK, must'a scared him off," as he felt the nest's circle for body warmth. Finding none, Dad's hope faded, his hair fell back in place and we hunted our way home.

My father's back was very familiar to me; how well I knew the breadth of his shoulders and his tracks in creek bottom mud as we leaped across. We had taken many hunts, with me in his footsteps.

Whether we were hunting deer, squirrels or rabbits, they became secondary to the search for bear sign in every hollow stump, bones left from the "white pine days" and blackened from fires of old; we checked each one thoroughly for bear sign. Every hollow log, too, was a possibility, and today had been a day when we came close to finding a bear at home.

Dad's anticipation never left me and since that time, whenever in the woods, I have searched every hollow log, stump and large tree for bear sign and always hoped to find a loaded den.

One day it happened.

During hunting season about 45 years ago I was on a drive through a flat forty of popple. A gentle storm had piled 6 to 7 inches of fluffy, swans-down snow on everything on top of a base of a foot or more. It was tough walking and snow from bushes

and alder brush cascaded down upon my shoulders. We drivers stopped often to hoot, but there was no shooting yet.

About halfway through I paused for a breather. Searching the scene, I discovered a black hole in a hump of snow at least 5 feet high and 10 feet across. It had been formed by a popple tree fallen to about a 45-degree angle that had pulled up the tall-grass sod around its roots. There was a black hole in its side. Hair standing up, chest frozen with excitement, breath rasping, I approached. I was going to look in that hole. Carefully I knelt there and slowly came closer to it, my face a foot away. I could see nothing, all was blackness. Closer and closer I went until my face was in the hole; everything was still black. Nothing. Disappointment filled me, then suddenly there was a long brown nose 6 inches from mine with a glittering green eye on each side!

Without thought I leapt backwards at least 40 feet, my .444 Marlin at port arms, my thumb on the hammer and my finger in the trigger guard. No bear was attacking me; the world was silent and the hole was just as it had been.

I did not notice my tracks as I plowed my way back to nature's igloo; maybe I had made the leap. Now I noticed there were front paw tracks just outside the entrance. It was as if the bear had reached out to test the snow just as we might stick a toe in the water before leaping in. In my excitement I had not noticed those tracks earlier. Peering with caution into the hole, I saw the bear, head barely discernible, in a curl and fast asleep.

When the deer drive was over without a shot being fired, the bear and his den created a lot of excitement in the gang. We all hiked back there and took quiet peeks. Throughout the winter my family and I would go to it and marvel at this wonder of nature; it was often spoken of at our supper table.



**"Closer and closer I went until my face was in the hole ... then suddenly there was a long brown nose 6 inches from mine with a glittering green eye on each side!"**

In the middle of March I became concerned when the bear had torn away the front and top of his den. He lay there shivering and shaking as water dripped on him from the upper edges; he lay in water. Bare skin showed between clumped wet hair. I knew he was freezing to death. Any day now he would be dead.

Saddened, I went home and told the story to my kids and wife. She said, "Why don't you call the game warden and see what he says?" I did so, told him the story, and that the bear was dying.

"He is not dying," he said.

"Oh, yes, he is," I said, "He is so dying. His eyes are closed already. It won't be long now." I had seen a lot of animals die. I knew the signs.

"No, he is not dying. That is just his body waking up. His whole body, muscles and digestion are stimulated by this shivering."

"No, no, no. Nope, he is dying — and I want his hide. I found him!"

The warden's voice became gravelly and hoarse like he had trouble swallowing something.

Finally he was able to croak, "OK, OK, if it dies you can buy the skin." Man, he must have been in some kind of pain. Satisfied, I put down the phone.

Now some 45 years later, I have no bearskin rug.

What I do have are great memories I can share spiritually with Dad: images in full color of a large hibernating bear that bravely overcame the death to which, in my mind, I had sentenced him. ❧

*Stephen Lars Kalmon was reared on a farm in Taylor County in the Chequamegon National Forest, where he has lived for 54 years. Except for a six-year hiatus, he is a lifelong resident of Taylor County. He was a freelance writer for daily and weekly newspapers, including the Marshfield News Herald where this story was originally printed in the 1980s.*



PHILIP SCHWARZ

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**CENTER**

**Groundwater: Powering Wisconsin's Economy**

**FRONT COVER:** No matter the season, Wisconsin's lighthouses provide dramatic backdrops where the fluidity of lake waves meets the solidity of shore. This photo of the Wisconsin Point Lighthouse near Superior was taken as part of the Great Lakes photo contest.

©TERRY W. WHITE

**BACK COVER:** Northern white cedar trees, also known as arborvitae (Latin for "tree of life"), form an archway over an ice-fringed trout stream at Foulds Creek State Natural Area in Price County. For more information about the SNA program visit [dnr.wi.gov](http://dnr.wi.gov) and search "SNA."

BACK COVER PHOTO BY THOMAS A. MEYER, DNR

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A Mother's Day storm brings crashing waves to the Wisconsin Point Lighthouse at the entry to the Duluth-Superior harbor. This photo was submitted to the Wisconsin Great Lakes annual photo contest and writing project, which takes submissions throughout the year. For more information, see [dnr.wi.gov](http://dnr.wi.gov) and search "Great Lakes Photo Contest."



# Picturing Wisconsin lighthouses

WISCONSIN LIGHTHOUSES PAINT AMAZING PORTRAITS  
THROUGHOUT THE YEAR.

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*Joseph Warren*


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Whether photographed in the gales of winter near ice-crusting piers, through canopies of brilliant fall colors or when the sun dips behind the horizon, Wisconsin's lighthouses have always provided dramatic backdrops where the fluidity of lake waves meets the solidity of shore.

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Rising above the cedar-lined bluffs of Door County, standing atop the sandstone cliffs of the Lake Superior Apostles and providing watch over southern Wisconsin's urban harbors, these historic structures bridge our past and present. Though their keepers are now gone, many of these lights have been automated and remain active.

Some lighthouses are more easily accessible than others. Some may only be viewed by boat, but many are open to tours during summer months, including the Pottawatomie Lighthouse at Rock Island State Park and Eagle Bluff Lighthouse at Peninsula State Park.

Several of the photos on the following pages were submitted to the Department of Natural Resources through the annual Wisconsin Great Lakes photo and writing contest, others were collected elsewhere, but all are impressive. If you're planning a trip this year to one of Wisconsin's lighthouses, make sure to remember the camera — you won't be disappointed. 

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*Joseph Warren works in DNR's Bureau of Parks and Recreation.*





**Eagle Bluff Lighthouse in Peninsula State Park.** During the summer months, visitors can take a tour of this lighthouse that was built in 1868. Several other lighthouses around the state, including the Pottawatomie Lighthouse at Rock Island State Park, may also be open for seasonal tours.

DOOR COUNTY VISITOR BUREAU



The Sherwood Point Lighthouse was the last manned lighthouse on the Great Lakes.

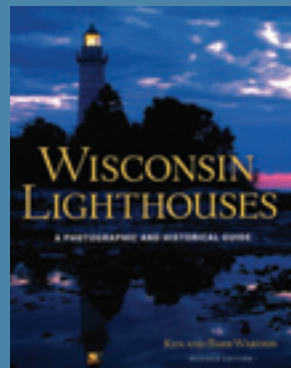
DOOR COUNTY VISITOR BUREAU



Port Washington's Breakwater Lighthouse has an art deco design.

RANDALL SCHERKENBACH

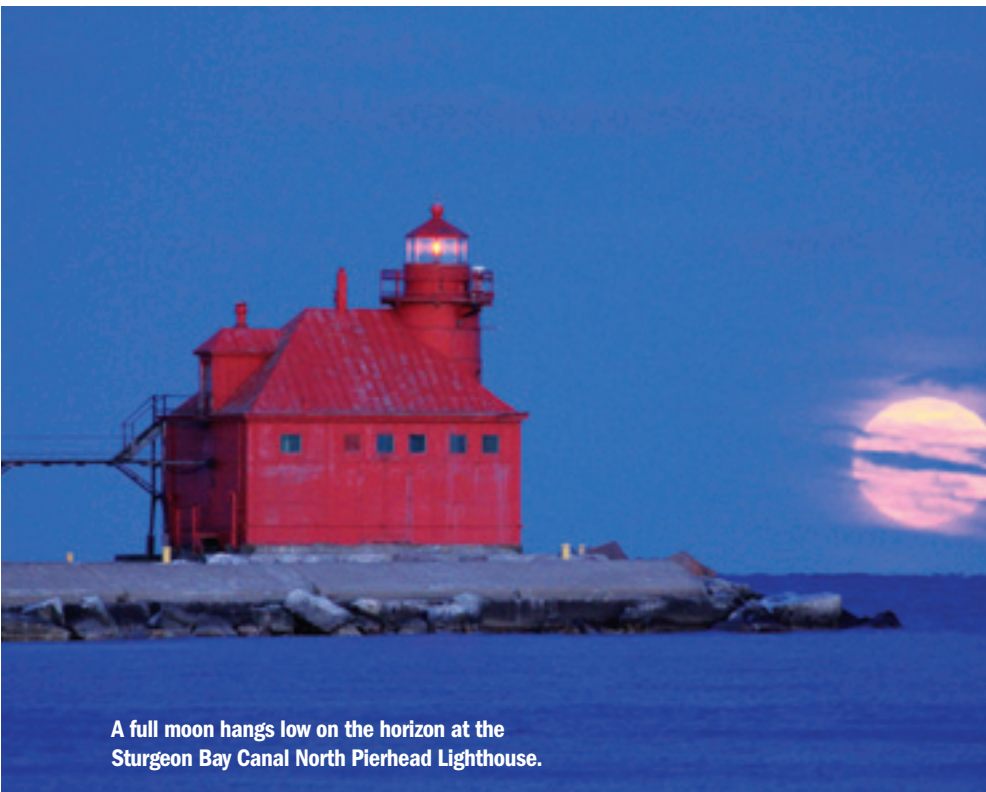
>>> **WISCONSIN LIGHTHOUSES: A PHOTOGRAPHIC AND HISTORICAL GUIDE**



Ken and Barb Wardius, Wisconsin Historical Society Press, 224 Pages, \$24.95

With most lighthouses built well over 100 years ago, each has its own story to tell, and authors/photographers Ken and Barb Wardius have meticulously researched and chronicled these histories into this comprehensive guide that documents the state's lighthouses on both Great Lakes Superior and Michigan, and also on Lake Winnebago, the state's largest inland lake. More than 150 photos taken by the authors and pulled from historical archives offer a snapshot of the lighthouses today, as well as what life was like when the lights were first lit. Convenient for the reader/traveler, this guide provides the current status of each lighthouse and how to get there. A handy chart shows which towers are still active and what public viewing and tour opportunities are available, making it an excellent companion for any maritime history enthusiast. For more information, visit [https://www.wisconsinhistory.org/whspress/books/book.asp?book\\_id=422](https://www.wisconsinhistory.org/whspress/books/book.asp?book_id=422)

WISCONSIN DEPT. OF TOURISM



A full moon hangs low on the horizon at the Sturgeon Bay Canal North Pierhead Lighthouse.

# Preserving pine relicts a prescription for good health

MARY KAY BAUM TACKLES HEALTH CHALLENGES AND GARLIC MUSTARD.

*Lisa Gaumnitz*

After four decades of public service and social justice work, 69-year-old Mary Kay Baum has returned to the land to continue her life's work and care for her own health.

Diagnosed 12 years ago with cognitive impairments likely due to early onset Alzheimer's disease, the former community organizer, lawyer, school board member, county board member, ordained minister and one-time mayoral candidate for Madison is now a constant presence at Ridgeway Pine Relict State Natural Area in Iowa County.

She recruits schoolchildren to seniors to help sow prairie seeds and pull garlic mustard. She documents that work with her camera, along with the site's unique mix of plants, rock formations and wildlife, and carefully hikes the steep hillsides to show newcomers its treasures.

Baum believes her medical treatment and time in nature have stopped the progression of her cognitive and neurological problems.

"I feel fully embraced by the land when I'm out here," she says.

She is among a growing number of Wisconsinites who are finding good health, personal meaning and escape from a hectic world in the Wisconsin State Natural Area System. These 681 sites preserve unique geological and cultural features and some of the best remaining prairies, savannas, wetlands and other landscapes in Wisconsin. They also provide some of the last refuges for hundreds of rare plant and animal species.

Whether exploring these special places, helping care for them or introducing them to new people, Wisconsinites like Baum are embracing the evolution in the public's relationship to our 66-year-old natural areas system.

"When the natural areas concept was developed, these parcels were hands-off areas, really open only for scientific research purposes," says Thomas Meyer, a conservation biologist with the State Natural Areas Program for the last 25 years. "We've come all the way around the block. We are not only encouraging but facilitating, where appropriate, the public so they can have access to these places and get to know them."

## Finding peace and purpose where pine persists

A stone's throw away from the Military Ridge State Trail and U.S. Highway 18-151, Ridgeway Pine Relict State Natural Area is one of the system's hidden gems and a link to a long-ago past.

The 550-acre natural area takes its name from the pine forests that have hung on in the area for the last 10,000-plus years, even as the surrounding landscape has changed drastically, says Matt Zine, a DNR conservation biologist and former longtime manager of the site.

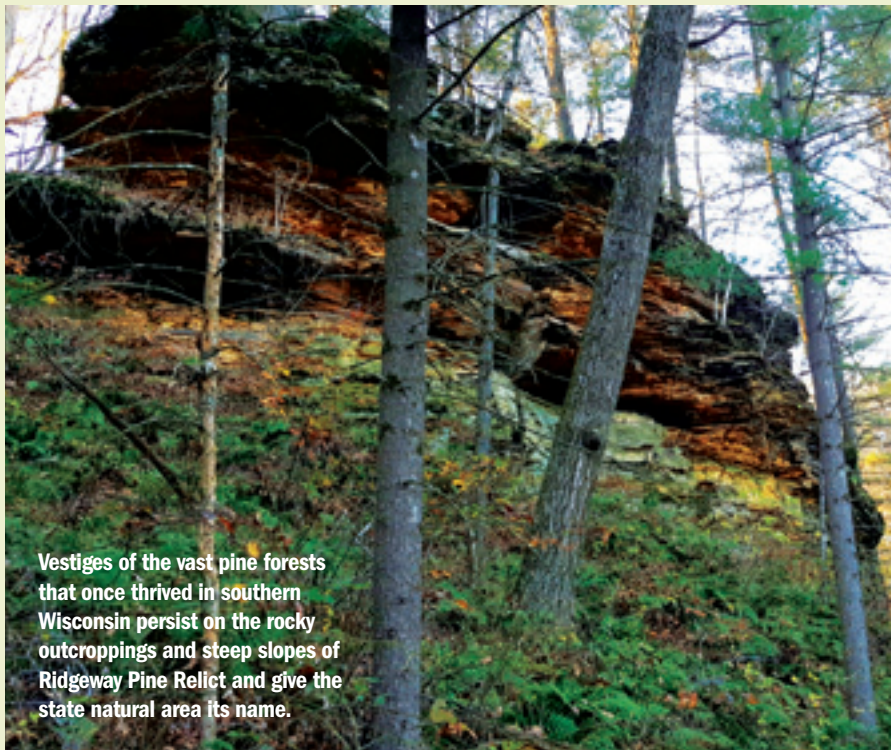
Vast pine forests covered southern Wisconsin, thriving in the cooler temperatures of the glacier that covered much of the state just east of modern-



**Mary Kay Baum scatters prairie seeds during a winter volunteer workday she leads at Ridgeway Pine Relict State Natural Area in Iowa County.**

MICHAEL SKVAROK





Vestiges of the vast pine forests that once thrived in southern Wisconsin persist on the rocky outcroppings and steep slopes of Ridgeway Pine Relict and give the state natural area its name.

MARY KAY BAUM

day Ridgeway. As temperatures gradually warmed and the glaciers receded, the landscape became drier and fires more frequent. Prairie and oak savanna replaced the pine over most of the landscape.

Yet, some pine clung to the area's steep slopes and rocky outcrops, protected from fire. They've regenerated and matured while more southern species have grown up around them.

Now, oak and red and white pine are interspersed with smaller amounts of jack pine, sugar maple, mountain maple and more. The ground layer is a mix of southern and northern plant species. Research shows that more than three-quarters of the 25 most common species in the northern pine forests can be found in the southern relicts including Ridgeway. Some of the ground-layer species that typically occur farther north include Canada mayflower, starflower, wintergreen and blueberry.

Baum enjoys the mashup of northern and southern plant species and admires the persistence of the pine. She loves to tell their story of perseverance and adaptation, and it's hard not to feel she's sharing her own story of recent years.

In her early 50s, Baum was falling a lot, struggling to find the right words and noticing subtle physical changes in her reflexes, gait, grip and strength. She worried that the early onset Alzheimer's disease that had affected her mother and an aunt

would soon affect her. Doctors' original prognosis seemed to bear this out.

She retired as executive director of Madison-area Urban Ministry, a long-standing social justice nonprofit, and helped found forMemory. The organization is a support and advocacy group for people directly or indirectly affected by Alzheimer's or related challenges whose symptoms started before the age of 65.

More testing over the years revealed that her cognitive and physical changes were not due to Alzheimer's disease after all but to an underlying epileptic syndrome. Medication and lifestyle changes have successfully controlled the syndrome and Baum remains a force of nature for people with cognitive changes and a champion of nature for all of us.

She got involved with Ridgeway Pine Relict State Natural Area in 2015. Raised on a dairy farm in Grand Chute, Baum had been looking to buy a home near land she could explore and help preserve. She found it within walking distance of the natural area and got involved with the volunteer program before she even closed on the house.

Now, she and Steve Strutt, a 2015 University of Wisconsin-Madison wild-life ecology graduate who grew up on a farm across the road from the natural area, have taken the lead in organizing volunteers. They help pull garlic mustard and cut brush to aid work by state natural area crew members and to intro-

duce more people to the site. Bill Carden of Barneveld recently joined as a leader of the group and has been very active wielding the chainsaw.

DNR has been increasing management of the site in recent years to maintain habitat for rare species and restore the full range of plant communities on site from prairie, oak savanna and woodlands to the pine relicts. To control invasive species, SNA crew members have removed brush such as honeysuckle, conducted prescribed burns on 75 acres in 2016 and planted 87 acres of fields to prairie.

The volunteers have incorporated as Friends of Ridgeway Pine Relict under the state's nonprofit statute to formalize and foster their efforts to empower more people to appreciate and preserve this precious area, Baum says. They've set up a bank account to receive donations to help fund volunteer activities, a Facebook page and a web page.

### Work and play

On a sunny January day in 2016, Baum and Strutt have organized a volunteer work day to hit both of their group's goals — restoration and exploration.

By the advertised start time, several cars have pulled off the county highway and a handful of people have emerged, ready for a day of scattering prairie seeds and burning brush. Strutt comes over to the group, introduces himself and says, "Mary Kay must be running late. We might as well get started."

He leads the volunteers down a path to a snow-covered field of brome grass that gives way to steep ravines covered in oaks and the occasional green of white pines. Several brush piles await, ready to burn.

Just then Baum arrives, jauntily and colorful in a purple knit cap, purple jacket and purple, orange and pink scarf.

"You can tell I'm the leader ... the one who comes late," she says. "I couldn't find my keys ... they were around my neck," she laughs as she tells the group.

Baum shares her story with the group and how it inspires her to bring a variety of people, including seniors from a local assisted living and memory care facility, to help care for the site and enjoy it.

She passes out a paper titled "Some A, B, C's of Friendin' Just About Anyone" to help volunteers work with her and others who might have cognitive changes.

Baum has volunteers fill out a waiver form and calls the Iowa County Sheriff's



Volunteers discovered a great blue heron rookery at Ridgeway Pine Relict SNA.

MARY KAY BAUM

Department to alert them to the brush pile fire while Strutt gives a safety talk and uses a wand attached to a propane tank to light one pile.

Volunteers transfer seed from brown bags where they've been stored in plastic buckets: Canada wildrye, Indian grass and



Retired farmers and seniors from a local assisted living and memory care facility are among the volunteers helping care for and enjoy Ridgeway Pine Relict. Here, Norm Vanden collects seed he and other volunteers later scattered on the snow.

MARY KAY BAUM

an assortment of wildflowers collected by Baum and other volunteers last fall.

Retirees, including some from a local assisted living home, helped collect the seed and scatter it. She shows us a photograph she took the day before of a retired farmer scattering prairie seeds at the site.

"This is the biggest smile I've ever seen on this gentleman," Baum says. "I'm proud to have been a part of making their day ... they were so happy to be back on the land and doing something constructive."

Today, the volunteers continue that work. They scatter seeds on top of the snow so the seeds will sink down as it melts and get pushed into the soil by snow and rains.

The work goes quickly and Baum encourages volunteers to take a break and enjoy the hot chocolate, tea and cookies she has brought. She gives them a few minutes of rest and then hands out walking sticks — repurposed cross-country ski poles — and says she wants to take them to see the rock wall.

"Part of our work party is promoting and getting the word out," she says.

### A living museum, no longer hands off

Getting the word out about state natural areas was not what Wisconsin conservation giants Aldo Leopold, Norman Fasset, John Curtis and Albert Fuller had in mind when they hatched the idea, nor was it part of the 1951 charter that officially established these special places. Originally called scientific areas, these sites were protected for scientific research by DNR, the University of Wisconsin system and others. They were places where professors could bring their students to see the native plants and animals present for thousands of years before statehood, Meyer says.

The sites' purpose evolved in the 1960s and 1970s as ecology became a field in its own right and there was a growing recognition that native plant communities needed to be protected if future generations were to see them. A generation later, it became clear that the public needed access to these places if they were to care about what happened to them, Meyer says.

"The realization came in the late 1980s and 1990s that we couldn't treat natural areas as hands-off living museum pieces," he says. "As the program matures and grows, we have a lot to do to take care of it. We need more people to do management on the ground and people

who will rally to our aid."

Natural Resources Board policy and practice reflected this view, requiring that public land bought with public dollars be open to low-impact activities like hiking, bird-watching and nature study as well as to fishing, hunting and cross-country skiing.

Legislation effective in 2007 extended that public access requirement to land bought by conservation organizations using Knowles-Nelson Stewardship Funds.

The vast majority of natural areas, both those owned by DNR and by other partners, have few or no facilities like the trails, bathrooms and interpretive signs more typically found at state parks. For those willing to explore with a compass





Steve Strutt grew up on a farm across from the state natural area but had never ventured onto the property until meeting Baum. He has since played a key role with the volunteers tackling invasive species on the site.

MICHAEL SKWAROK



For Mary Kay Baum, exploring Ridgeway Pine Relict is as important as helping restore it. She makes sure other volunteers get to enjoy doing both.

MICHAEL MENITZ

or GPS and native plant guidebooks or apps, state natural areas provide great scenic beauty and the wonders of nature.

Baum and Strutt love discovering these wonders and sharing them with others. They share sights like the great blue heron rookery with eight nests and the property's prehistoric rock formations, and sounds like the pileated woodpecker that teenagers exploring the site with Baum identified using an app on her smartphone.

"This is a best-kept secret," says Strutt, 25. Though he grew up across the highway, he had never set foot on the state natural area before September 2015. He was putting up some fencing with his father when they saw two people on the state natural area — Baum and Jared Urban, coordinator of the volunteer program.

Strutt connected with the two and has since been a workhorse at the site, clearing brush, getting certified in using a chainsaw and taking down whole groves of invasive honeysuckle.

"It's what I love to do," he says. Working with Baum has helped him learn to slow down and observe more, instead of being straight-up goal oriented. "You see what's still there to be appreciated, not what needs to be gone."

### Appreciating what's there now

Baum leads the volunteers through the brome field and starts down a steep ridge line between the trees. She digs her walking stick in the snow and moves carefully sideways down the hill, much like a cross-country skier might "walk" down a steep hill.

She pokes the stick at desiccated oak leaves still hanging from a young, knee-high sapling. "Isn't this something?" she

says. "To have young oak and young pine growing together."


Up ahead, one of the volunteers says, "Oh my goodness." Baum, right behind him, says, "It's even more magnificent than the last time I was here."

The path comes to an abrupt stop on a cliff and there's a 50-foot drop to the valley floor. On the opposite cliff, huge icicles hang off the sandstone rock formation and the curve of the gorge is coated with thick, milky ice.

The group lingers for a while and then follows Baum back up the path. She stops frequently to point out rocks, a hardy pine seedling and a fern frond growing from a rock.

"It's important that places like this are available to the public. You just learn a lot — even sense it — when you spend time outdoors. Even 20 minutes a day can help your brain," she says.

The volunteers rejoin Strutt at the burn piles while Baum lingers in the woods and carefully picks her way up another steep ridge line. She crouches down to take more photographs.

"When I slow down and am quiet in nature, I experience a deep connection with all that surrounds me," she says later. "I sense the wonder of the land around me. I am drawn to renewed hope ... hope that together we can imagine and work toward that deeply interconnected world that is meant to be." 

*Lisa Gaumnitz writes for the DNR's Bureau of Natural Heritage Conservation.*



## HOW YOU CAN HELP

**VOLUNTEER:** Join in volunteer workdays to help restore Ridgeway Pine Relict State Natural Area. Contact Volunteer Coordinator Jared Urban at [Jared.Urban@Wisconsin.gov](mailto:Jared.Urban@Wisconsin.gov) or 608-267-0797 or Mary Kay Baum at [marykbaum@gmail.com](mailto:marykbaum@gmail.com) or 608-935-5834.

**DONATE:** Make a tax-deductible donation to help restore Ridgeway Pine Relict through the Natural Resources Foundation of Wisconsin's State Natural Areas Fund. Donate online by visiting [wisconsinconservation.org](http://wisconsinconservation.org) and clicking the "Donate" button. In the special purpose section, designate your gift to "State Natural Areas." You can also send a check made out to the Natural Resources Foundation of Wisconsin at P.O. Box 2317, Madison, WI 53701. Please note your designation to State Natural Areas in the memo line.

PIRABY



Envirothon competitions include hands-on field exams, such as identifying soil horizons.

# Opening the door to lifelong opportunities

## ENVIROTHON PROGRAM TEACHES CONSERVATION THROUGH COMPETITION.

*Kayla Zacharias / Photos by WI Land + Water*

Middle school and high school students around the state are currently preparing for Wisconsin's ultimate environmental science challenge: Envirothon. It's a day of exams, field challenges and team presentations that showcase the kids' knowledge of environmental science. Envirothon is an opportunity for students to collectively learn about natural resource management and practice their problem-solving skills.

Students spend months preparing for the exams they'll take in forestry, soils and land use, aquatic ecology and wildlife. To keep them on their toes, county conservationists, natural resource professionals and professors work together to create a new test each year. They make the tests as hands-on as possible, weaving fieldwork into the questions. For example, the soils and land use exam could involve identifying soil horizons. Students might have to match trees with their leaves in the forestry exam. All of the exams take place outdoors, unless items used for them could be damaged by the elements. Teams prepare for the tests in unique ways — teachers work the material into their classes, clubs meet after school or advisors find new ways to teach their teams.

"We brought in speakers and professionals who worked with us to develop hands-on technique and understand the material," said Jenelle Wempner, a participant of the 2015 and 2016 Wisconsin Envirothon from Middleton High School. "We'd work out in the field when the weather was nice, identifying species or taking soil samples and analyzing them for texture and composition."

Wempner's high school offered advanced placement environmental science, but most of the material was self-taught. She believes that helped them most at the competition, which Middleton has won the last two years.

While students have plenty of time to prepare for the exams, team presentations are another story. The presentations are based on a hypothetical scenario, prompting students to find a solution for a specific problem surrounding the current issue — this year, agricultural soils and water conservation stewardship. The scenario is posted just a few weeks before Envirothon, giving students limited time to put together their presentations. Despite all the hard work that goes into participating, students find the experience extremely rewarding.

"Material aside, I enjoyed the company of the people," said Wempner. "Envirothon exposes you to like-minded students from across the state, and in our case, the country. Being able to make those connections and meet so many great people was an amazing experience."

Until recently, every team that registered for Envirothon was allowed to participate because relatively few teams were doing so. Now, the youth education committee recommends that advisors sign up as soon as registration opens, because



Weather permitting, teams from across Wisconsin spend months preparing for field exams, then must prepare team presentations based on a hypothetical scenario, like agricultural soils and water conservation.



Envirothon teaches teamwork, problem solving and environmental awareness, and paves the way for future opportunities.

they've had to put a cap on how many teams can participate in the last few years. There aren't qualifying events, so teams are given spots on a first-come, first-served basis.

Kim Warkentin, youth education director for Wisconsin Land + Water, said presenting to agriculture educators and Future Farmers of America (FFA) has helped get more schools involved. Envirothon's youth education committee also works with individual counties and the Department of Public Instruction to promote the event. County conservationists sometimes present to schools or even train teams themselves, said Kim.


Collaboration between students, educators, volunteers, conservation professionals and Envirothon's youth education committee makes the event possible. Without them, students across Wisconsin would miss out on an experience that increases their environmental awareness and paves the way for opportunities in the future.

"Most of my teammates and I are studying natural sciences. If nothing else, the respect for our environment instilled in us through the competition is some-

thing that won't leave us, even as we grow and move on to different things," said Wempner, who now studies geology and chemistry at UW-Madison. "It helped me land an internship with the U.S. Forest Service in Ketchikan, Alaska.

I was able to apply a lot of the techniques I'd learned through Envirothon and I don't think I would have gotten that amazing opportunity without my background from the competition."

Students will open the doors to opportunities far and wide at this year's Envirothon on April 7 at Wisconsin Lion's Camp in Rosholt. The team with the highest overall score will go on to participate in the week-long North American Envirothon in Emmitsburg, Maryland, where they will compete for recognition, scholarships and prizes.

For more information, parents and teachers can view the 2017 brochure and program guidelines by finding Wisconsin Land + Water on Facebook or visiting [wisconsinlandwater.org/events/envirothon](http://wisconsinlandwater.org/events/envirothon). 

*Kayla Zacharias recently graduated from UW-Madison and is now a communications specialist for Wisconsin Land + Water.*



Teams from Middleton High School won the statewide competition in 2015 and 2016. This year's competition is April 7 in Rosholt. Winners will go on to the North American Envirothon in Emmitsburg, Maryland.



The porosity and permeability of bedrock determine how water moves through it. This photo is from southwestern Wisconsin where sandstone and dolomite is the principal aquifer. The cross-sectional illustration shows how Wisconsin's four main aquifer types are stacked on top of each other. The green layer represents crystalline, gray is sandstone and dolomite, brown is eastern dolomite and gold is sand and gravel.

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## WISCONSIN GEOLOGY REVEALS INTERESTING HISTORY.

*Eric Verbeten*

Take an imaginary walk down into Wisconsin's "basement" and have a look around; some interesting history awaits. Inspect the walls of the foundation and a few things are obvious. For one, the walls are made up of different materials and they are warped, full of cracks and weren't poured at the same time. These craggy rock formations that make up the underbelly of the state formed hundreds of millions of years ago, but still play a major role today, impacting the quality and availability of groundwater. Along with the sand and gravel left behind by the glaciers, these geologic formations provide groundwater to over two-thirds of the people living in Wisconsin.

Few are more intrigued by this historic blueprint than Department of Natural Resources Hydrogeologist Larry Lynch, who has worked on many groundwater-related issues during his more than 30 years with DNR.

"In order to know what is happening with water at the faucet, it's essential to know what we're dealing with underground," says Lynch. "We need to understand how different geologic forma-

tions interact with water and how water moves through them. When looking at a rock formation, we have to understand two keywords — porosity and permeability."

Porosity measures how much empty space is between the solid particles in the rock, meaning the more hollow spaces it has in it, the more porous the substance. On the flip side, permeability measures how connected those void spaces are.

Each characteristic alone doesn't tell the whole story about the rock, but in combination they can answer a lot of questions about the presence and movement of groundwater, like where it is found, how much is available and how quickly it will replenish from water trickling in from the surface.

For example, a mixture of sand and gravel is both porous and permeable because water can move easily through the well-connected pores between the rounded sand grains and gravel-sized rocks. Clay, like that found in the bottom of a lake, has a very high porosity but a low permeability because the clay particles are flat but not necessarily neatly stacked. There is more empty space between the clay particles but water can't move as easily through the plate-shaped particles.

Digging deeper, the foundation gets older and is often more dense. Igneous rocks like granite are massive, not granular. Very little water is contained within the rock, but instead accumulates in cracks and crevices.

Let's take a more in-depth look at the rock types that make up Wisconsin's basement foundation and ultimately determine how much groundwater is available by location.

## Wisconsin aquifers

An aquifer is a rock or soil formation that can store or transmit water. Wisconsin's groundwater reserves are held in four main types of aquifers: sand and gravel, eastern dolomite, sandstone and dolomite and crystalline bedrock.

**Sand and gravel aquifer** – The sand and gravel aquifer is the sediment covering most of the state except parts of southwest Wisconsin. As the name suggests, it is made up mostly of sand and gravel deposited from glacial ice or in river floodplains. Glacial deposits are loose and referred to as soil — but they include much more than just a few feet of topsoil. These deposits are more than 300 feet thick in some places in Wisconsin.

Glaciers, formed by the continuous accumulation of snow hundreds of thousands of years ago, played an interesting role in Wisconsin's geology. Snow turned into ice, which reached a maximum thickness of almost 2 miles. The ice sheet spread over Canada and part of it flowed south toward Wisconsin and neighboring states. As the ice flowed, it ground up the underlying rock and carried it along in what is known as glacial drift. As the ice melted, large amounts of

sand and gravel were left behind, forming "outwash plains." Pits formed in the outwash where buried blocks of ice melted, forming what are now lakes.

The sand and gravel aquifer was deposited within the past million years, with its outwash plains forming some of the best aquifers in Wisconsin. Many of

the irrigated agricultural lands in central, southern and northwestern Wisconsin use the glacial outwash aquifer. Other glacial deposits are also useful aquifers, but in some places, large glacial lakes accumulated thick deposits of clay. These old lake beds of clay, however, do not yield or transport much water.

Due to the sand and gravel aquifer's dual role of being part groundwater storage and also the land we walk on, it is highly susceptible to human-induced and naturally occurring pollutants.

**Eastern dolomite aquifer** – This aquifer runs from Door County to the Wisconsin-Illinois border and consists of a layer of dolomite underlain by a layer

known as Maquoketa shale. These rock formations were deposited 400 to 425 million years ago. Dolomite is a rock similar to limestone in that it holds and transports groundwater through interconnected cracks and fractures. The amount of water a well can draw from this aquifer depends on how many fractures intersect with the well and how well-connected the fracture network is. As a result, it's not unusual for nearby wells to vary greatly in the amount of water they can draw from this layer. Some wells hit the network, some do not.

Groundwater in shallow portions of the eastern dolomite aquifer can easily become contaminated in places where the fractured dolomite occurs at or near the land surface. In those areas (such as parts of Door, Kewaunee and Manitowoc counties) there is little soil to filter pollutants carried by precipitation from the land surface. Little or no filtration takes place before the water reaches large fractures in the dolomite. Groundwater quality problems, such as bacterial and viral contamination from human and animal wastes, can result in these "karst" areas, where sinkholes and caves are known to occur.

The Maquoketa shale layer beneath the dolomite was formed from clay that doesn't let water through easily. Therefore, its importance is not as a major water source, but as a barrier or shield



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The eastern dolomite aquifer is similar to limestone and holds and transports groundwater through cracks and fractures.

between the eastern dolomite aquifer and the deeper sandstone and dolomite aquifer.

**Sandstone and dolomite aquifer** – This aquifer consists of layers of sandstone and dolomite bedrock that vary greatly in their water-yielding properties. In dolomite, groundwater mainly exists in cracks and fractures. In sandstone, water occurs in pore spaces between loosely cemented sand grains. These formations can be found over the entire state, except in the north central portion.

In eastern Wisconsin, this aquifer sits below the eastern dolomite aquifer and the Maquoketa shale layer. In other areas, it lies beneath the sand and gravel aquifer. These rock types gently dip to the east, south and west, away from north central Wisconsin, becoming much thicker and extending to greater depths below the land surface in the southern part of the state.

The rock formations that make up the sandstone and dolomite aquifer were deposited between 425 and 600 million

The sand and gravel aquifer that covers most of the state was deposited by receding glaciers as "outwash plains."

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## LOCATIONS OF WISCONSIN AQUIFERS



These maps show the location of three types of bedrock aquifers in Wisconsin. A fourth, the sand and gravel aquifer, is the sediment covering most of the state except parts of the southwest.

THOMAS SENATORI / BASED ON MAP BY DAVE HART, WGNHS



**The crystalline bedrock aquifer is Wisconsin's basement, composed of hard rocks like granite, gneiss, basalt and quartzite.**

years ago. The sandstone and dolomite aquifer is the principal bedrock aquifer for the southern and western portions of the state and can produce large amounts of water. In eastern Wisconsin, most users of substantial quantities of groundwater, such as cities and industries, tap this deep aquifer to meet their water needs.


**Crystalline bedrock aquifer** – This is the oldest of the four aquifers and is composed of different types of rock formed during the Precambrian Era. This era lasted from the time the Earth cooled more than 4,000 million years ago, until 600 million years ago, when the rocks in the sandstone and dolomite aquifer began to form. During this lengthy period a lot of change happened: sediments rich in iron were deposited in ancient oceans, volcanoes blasted ash and lava all over the globe, mountains were built up and then slowly ground down, molten rocks from the Earth's core flowed up through cracks in the upper crust and sank back down.

All this activity played a role in shaping the aquifers we have today, and what remains are many different hard and crystalline rocks (granite, gneiss, basalt and quartzite) underlying the entire state as a "basement." But they peek out in areas like the north central region, where they rise up and are the only rocks found beneath the shallow sand and gravel top coat.

The cracks and fractures in the crystalline bedrock aquifer transport and

store water, in some areas more than others. Some are full of interconnected cracks while others contain very few. To obtain water, a well must intersect these cracks where the water accumulates; the amount of water available to a well can vary greatly, even within the area of a single homesite. In general, the fracture networks in this aquifer are poorly connected when compared to the eastern dolomite aquifer. As a result, this aquifer rarely provides adequate quantities of water for larger municipalities, large dairy herds or industries.

Wells in the crystalline bedrock aquifer can provide good quality but limited quantities of water. Most wells tap the upper part of the aquifer because that is where most of the fractures are found. Where overlying sediments are thin, the aquifer can be susceptible to contaminants from the land surface.

To a large extent, the composition and configuration of Wisconsin's aquifers determine where we build our homes, cities and businesses. Read the story about the challenges Wisconsin faces in protecting groundwater and providing clean, pure drinking water to maintain our economy, environment and health in "Groundwater: Powering Wisconsin's Economy," inserted in this issue. 

*Eric Verbeten was formerly a communications specialist with Wisconsin DNR. He now works for the UW-Madison Space Science and Engineering Center. Portions of this story appeared in previous versions of "Groundwater: Wisconsin's Buried Treasure."*



Cathy Stepp, Secretary  
Wisconsin Department of  
Natural Resources

Dear Readers,

I'm honored and pleased to introduce our very popular groundwater insert for *Wisconsin Natural Resources* magazine's February 2017 issue.

Over the years, we've seen interest in this document grow — this is the fourth edition of the insert since its first release in the 1980s, and every time it comes out our readers snap up the thousands of copies we print. That speaks not only to the great following our magazine has, but also to how much our citizens care about safe, clean drinking water for everyone in the state.

In this edition, we take you through a snapshot review of our groundwater resources in "Groundwater by the numbers." Our readers can also learn the important role groundwater plays in keeping our businesses going with "Powering Wisconsin's economy," viewing different economic profiles of Wisconsin businesses.

In our "Challenges and solutions" section, we talk about some of the critical groundwater issues of the day we face as our state continues to change and grow. Finally, private well owners can learn how to keep their drinking water safe.

We hope you enjoy this edition of the groundwater insert, and thank you for your continued support of the DNR and our great natural resources. We are committed to keeping our state's groundwater and surface waters clean and safe, and we will continue to work together with all our state and local partners and stakeholder groups to address water quality issues across Wisconsin now and in the future.



Youth workers Trey Nelson (left) and Neil Oustigoff, Jr., from the St. Croix Chippewa Indians of Wisconsin, prepare to erect bluebird houses. They also spent part of the summer setting fyke nets and banding geese.



# Helping themselves, helping their tribes, helping the environment

IT'S NOT JUST ABOUT THE MONEY FOR PARTICIPANTS IN THE SUMMER TRIBAL YOUTH PROGRAM.

*Story and photos by Marcus Smith*

Whether it's the Youth Conservation Congress, the Wisconsin Explorer Program, youth hunting events or annual kids' fishing clinics, the Wisconsin Department of Natural Resources has a range of programs designed to foster an appreciation of Wisconsin's natural resources in young people. A little known addition to that list of youth-focused initiatives is the DNR's summer tribal youth program.

Under the state grant program, Wisconsin-based, federally recognized American tribes or bands can obtain funding for Native American youth to earn money while working on natural resources projects. The program also provides Wisconsin's Native American youth with a look at potential careers in resource management with their respective tribes, federal agencies or DNR.

Although the program became law in

2013, the backstory began years earlier.

### **Program takes root**

In 2007, Steve Petersen, Northern Highland-American Legion state forest superintendent, began discussions with Lac du Flambeau tribal council leaders about a summer program where DNR staff would mentor tribal youth to encourage them to pursue careers in natural resources. The program got underway

in summer 2008.

A year later, John Gozdziwski, secretary's director for DNR's northern region, met with Mic Isham, a member of the Lac Courte Oreilles tribal council and head of the tribe's department of natural resources, about a similar program for their tribal youth. Under Gozdziwski and Isham's leadership, the DNR, Lac Courte Oreilles Conservation Department and U.S. Forest Service developed a 12-week multi-agency summer youth program. A college intern and six employees worked on stream shocking, campsite relocation and trail maintenance, in addition to other tasks.

Gozdziwski then worked with the Lac du Flambeau's tribal leadership to broaden their project from a mentorship to a summer youth employment program, with an emphasis on natural resources management. While the summer youth programs were being operated by the Lac Courte Oreilles and Lac du Flambeau, Gozdziwski searched for ways to expand the program to other tribes.

### Opportunity knocks with a new governor-sponsored initiative

The Wisconsin Walleye Initiative was created by DNR with the support of Gov. Scott Walker, with the goal of increasing walleye production at state-owned, private and tribal fish hatcheries, and improving public accessibility to waters stocked with walleye.

While the walleye initiative was being developed, Gozdziński had several conversations with DNR Secretary Cathy Stepp about the tribal youth programs underway in the northern region of the state. Stepp, along with Mike Huebsch, then secretary of the Department of Administration, supported expanding the program. Funding was included in 2013 Wisconsin Act 20.

While Gozdziński credits Stepp, Huebsch and Walker, he also acknowledges the role played years earlier by several tribes in laying the foundation for the program's expansion.

"The summer tribal youth program developed because of work begun by the Lac Courte Oreilles and Lac du Flambeau, two of the Chippewa tribes up north," Gozdziński said. "Both tribes saw the value of a partnership to help their youth years before the program became law. The state budget provided the dollars in 2013, but four years prior to that, these two tribes were saying, 'Hey, this is good stuff.' If the program helps youth, it also helps the tribe and the DNR to bond together on something that's very positive."

### Lac Courte Oreilles Band of Lake Superior Chippewa

I'm riding in a boat on the Chippewa Flowage with two summer tribal youth workers from the Lac Courte Oreilles Band of Lake Superior Chippewa and Dan Yankowiak, DNR parks and recreation specialist. Yankowiak manages the flowage, a 15,300-acre impoundment in Sawyer County with some 200 islands.

Yankowiak is taking us to one of the 11 campsites on the flowage managed by the DNR, where the youth workers he supervises will begin their first assignment of the day. Yankowiak, along with his co-crew leader Brady O'Mara and crew coordinator Thayne Marlow, supervises six youth workers taking part in the 2016 summer tribal youth program. The youth workers are employed by the Lac Courte Oreilles Conservation Department and U.S. Forest Service.

After reaching the island, Yankowiak and the youth workers got over their



maintenance assignments on the island and get down to work. I asked Yankowiak to describe one of the projects his crew worked on.

"We noticed the benches on one of the islands were in bad shape," Yankowiak said. "The DNR purchased an island from a private landowner who had this rough milled pine left on site that he planned to use to build cabins. We were able to take the pine, plane it down and make benches for our campsites. The kids learned construction skills and got out on the flowage."

Many youth workers return to the program each summer, making Yankowiak's job somewhat easier because they don't require as much training.

"Usually the kids who come back are the hard workers who know the program and those are the kids we want on board," he said.

O'Mara and Thayne Marlow are co-crew leader and crew coordinator, respectively. This is O'Mara's second year with the program. His crew worked on a project at the Wild Rose fish hatchery where they cut birch poles and brush for future ponds. O'Mara recently graduated from the Lac Courte Oreilles Community College with a degree in natural resources.

"For me, the program is a way to get

a foot in the door, to see how the agency works," he said.

As crew coordinator, Marlow helps Yankowiak plan each day's activities and wants to work as an environmental engineer.

"This summer the crew built a hoop house, did stream restoration and worked in the Flambeau State Forest, helping out with the elk project," Marlow said. "We all work well together. I definitely recommend my relatives take part in the program. You learn a lot."

### St. Croix Chippewa Indians of Wisconsin

The day I visited with the St. Croix tribe, a group of youth workers were preparing to erect bluebird houses, just one of the tasks the workers had been involved with for the summer.

"We helped out at our own ponds where the tribe's been raising walleye and helped out at the Spooner fish hatchery," Tristen Oustigoff, the youth supervisor for the program, told me. The workers also kept busy setting out fyke nets to count young fish. This is the tribe's third year participating in the program.

Oustigoff, and youth workers Trey Nelson, Neil Oustigoff and Jameson Matrious, also cleaned culverts, banded geese and cleared beavers away from ponds.



**James White, Jr., a member of the Oneida Nation, removes weeds from one of the 200 islands on the Chippewa Flowage managed by the Department of Natural Resources.**

Sarah Slayton is the environmental and natural resources director for the St. Croix and manages the program. Her office promotes the program in their tribal paper, and on the tribe's website and electronic bulletin board. Slayton is enthusiastic about the program because it highlights the role her office plays in improving the quality of life for the tribe and its youth.

"I think the program's been great, just to be able to have youth involved with what we do here at the office," Slayton said. "Sometimes we are a little bit under the radar, and the word doesn't get out like it should. The program has really helped with that. Youth are exposed to projects that provide for protection and enhancement of the natural resources, things the tribe appreciates a lot. I think it's been a good program."

### **The Oneida Nation**

You would never know how hot it is by watching Tiana Danforth work. Along with several other youth workers, this St. Norbert's sophomore is pulling and lifting tree branches into a chipper at a steady clip. For this, her third and final summer in the program, Danforth and her co-workers are participating in community hazardous tree removal and wood waste reduction activities. When

there's a break in the action, I ask what motivated her to become involved with the program.

"My sister told me about it because she works with the program that handles all the youth jobs," she said. "I thought it was interesting to explore nature and find out what these people do."

This summer Danforth has operated a high pruner and tractor under close supervision.

"I know most of the people around here, so they will come up and say 'Thank you for helping us take care of this,'" Danforth said. "I recommend it to other kids. It will teach you a lot about trees and nature, which is very important."

This is Joseff Cornelius' first year in the program. Like at other reservations, providing services to tribal elders plays a key role in youth worker assignments.

"This is an elder's house, so we came here and removed trees that we'll put in the chipper to be used for firewood or funeral burning," he said. "I think this is a good program and it gets me a new experience, something I wouldn't have done before."

Cornelius plans to attend UW-Stevens Point and become a wildlife biologist.

Dan Brooks, the forestry and trails program manager for the Oneida, supervises the youth workers.

"We do a lot of forestry work here," Brooks said. "We generate woodchips, firewood and specialty wood for community members for sculpting or basket making. We offer tree services to community elders, 55 and older. We also offer those same services — whether it's tree removal or planting services — to all our programs."

Brooks said the tribe has 22 natural resource trails they try to keep safe from hazard trees. This year they focused primarily on forestry because of the blow-downs that occurred.

"Part of the program is career growth programming, which means expanding their thoughts on natural resources-related fields," Brooks said, "trying to help them understand what kind of curriculum is involved in attaining a natural resources degree. The program also helps them hone their communication and writing skills."



**Dan Brooks, forestry and trails program manager for the Oneida Nation, chats with youth workers Joseff Cornelius and Tiana Danforth.**



**Oneida Nation youth worker Tiana Danforth spent part of the summer providing tree services to community elders.**

### **The Stockbridge-Munsee community**

When I asked how his tribe decides which projects their youth workers will undertake, Randall Wollenhaup, ecology department manager for the Stockbridge-Munsee, said planning begins with a staff meeting in early spring.

“I talk to the other departments,” Wollenhaup said, “be it forestry, hydrology or environmental, to find out what projects they want the youth to work on and how much time they have to donate to the program. We set up a rough schedule with their projects, then fill in with smaller things.”

Wollenhaup said the youth workers do a lot of stream surveys on reservation waters. They learn how to operate a backpack shocker or staff a barge shocker, measuring and identifying fish. Fish surveys are a mainstay and are conducted annually, he said.

“Last summer, the community came to us about landscaping around the tribal office,” Wollenhaup said. “They were looking for suggestions to be sure nothing they planted was invasive. The youth workers went out and got all native plants from around the reservation, brought them in and planted them. They’ll follow up with interpretive signs

to identify plants that have a cultural significance to the tribe, such as species used for medicine.”

The youth workers also stayed busy removing invasive plants from elders’ property, Wollenhaup said. “We talk to the elders if we remove invasives. We let them know why and tell them some of the impacts they have on the environment. I’m really a fan of the program. It helps us pass on the knowledge we’ve acquired. It’s something the staff looks forward to each year; the opportunity to work with the kids.”

### **Secretary’s directors help make a difference**

Jean Romback-Bartels is the DNR secretary’s director for the northeast region. She works with the Oneida Nation, Stockbridge-Munsee, Menominee and Forest County Potawatomi. She meets with the tribes accompanied by Shelly Allness, DNR’s tribal liaison. The meetings cover a range of topics in addition to discussing the youth worker program.

During one of those meetings, members of the Oneida Nation expressed an interest in increasing their trail system. Romback-Bartels suggested it could serve as a project for their youth work-

ers. During a meeting with the Menominee tribe, members told her it was difficult to find people interested in taking part in the tribe’s wildlife or fisheries program, because their young people are afraid to go into the woods.

“It was amazing to me that they were struggling with that,” said Romback-Bartels. “Yet now, they’re looking to take the tribal youth involved with the grant-funded summer project and get them involved with the bear surveys or the fish surveys, to get them into the woods and more comfortable with the outdoor environment.”

One constant for both Romback-Bartels and Gozdziński is their commitment to using the youth worker program as a way for Native American youth to learn about natural resources management career opportunities outside of their tribe. Romback-Bartels has dispatched foresters to meet with youth workers to encourage them to consider careers in forestry with the DNR.

“It’s important for these kids to realize that while there may be limited job opportunities on their reservations in a particular program, we give them other options,” she said. “All the tribes submit annual reports on the youth program when the summer is over. Some indicate a lot of the tribes have staff who have been in positions for 30-40 years. There may be a vacancy now and again, but not nearly often enough to allow for all of the tribal youth to find positions, especially in their natural resources program. We give them an opportunity to see what DNR has to offer as an alternative career path.”

In addition to each tribe submitting an annual report to the DNR, many of the youth workers make presentations to tribal elders on their summer projects.

“These public-speaking opportunities not only build confidence but reinforce the personal importance of the program so the tribes can continue to feel it’s important to work with us,” Romback-Bartels said. She has attended several presentations and remembers one given by Stockbridge-Munsee youth workers.

“It’s always a pleasure to watch the youth and how truly important the program was to them,” she said. “You can see it in their eyes; you can see it in their smiles and the pride they take in presenting this to the people who matter most to them.”

*Marcus Smith is a DNR public affairs manager stationed in Milwaukee.*

# The North American conservation model

A UNIQUE TRADITION IN NEED OF AN UPDATE

John Motoviloff

The storyline behind the development of the North American Model of Wildlife Conservation reads like a novel — full of weighty themes, epic plot twists, wanton destruction and clear-eyed heroism. While the arc of this story might have been complete a generation ago, a postscript is necessary today to bring it into the modern age. First, however, let's go back to the beginning.

## In the beginning

As the glaciers on what is now North America began to recede some 10,000 years ago, Paleo-Indians made their way across the Bering Strait, then spread southeast across the continent. These nomadic hunters encountered herds of great beasts like bison and mastodon roaming the plains while a host of lesser beasts — elk, deer and small game — called the woodland home, to say nothing of the fowl-rich marshes and fish-thick waters. Native people enjoyed this bounty for thousands of years, as did the earliest explorers and traders in the 1500s and 1600s.

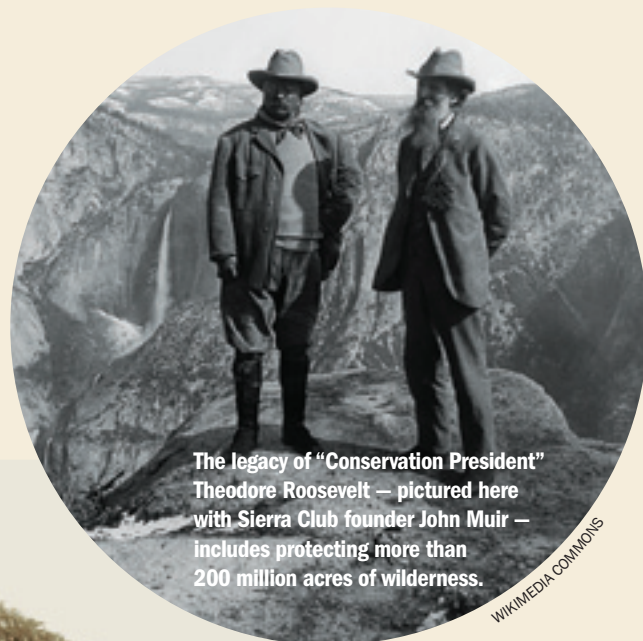
However, intensive trapping, market hunting, the introduction of non-native species and habitat loss all took a toll on wildlife in eastern North America. By the mid-1600s, beaver populations along the East Coast had crashed and white-tailed deer numbers were declining. Pioneers heading west, followed by the establishment of railroads in the mid-1800s, began to tax wildlife populations there. By the late 1800s, the thundering herds of buffalo that once

roamed the Plains were reduced to a few hundred individuals. Populations of elk, bears, bighorn sheep, wild turkeys — and even white-tailed deer — had also been decimated.

## Literature and law

While the conservation movement was still decades in the future, some interesting developments in literature and law seemed to anticipate it. Ralph Waldo Emerson's "Nature" was published in 1836 and Henry David Thoreau's "Walden" in 1854. While different in tone and particulars, both works staked out new ground in defining our relationship to nature. The colonial and pioneer ethic focused exclusively on the usefulness of natural resources such as fur, hides, meat and trees. Emerson, Thoreau and others in the Transcendental movement championed nature's spiritual, restorative and aesthetic qualities.

An 1842 Supreme Court decision would prove to be of greater importance still for the conservation movement. A landowner on the New Jersey coast had tried to exclude others from harvesting



The legacy of "Conservation President" Theodore Roosevelt — pictured here with Sierra Club founder John Muir — includes protecting more than 200 million acres of wilderness.

WIKIMEDIA COMMONS



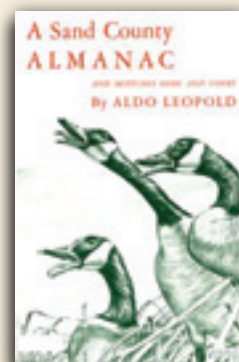
A hunter stands atop a mound of bison skulls, showing in the starkest of terms prevailing attitudes toward wildlife in the late 19th century.

WIKIMEDIA COMMONS

oysters from a mudflat he claimed as his own. The defendants had a right to harvest oysters there, the court argued, because certain natural resources — the right to fish in navigable waters, for instance — were held in the public trust to be enjoyed by all. While the basis for this decision was formed in Europe centuries ago — the Magna Carta of England of 1215 — its consequences for our developing nation were profound. Natural resources belonged not to the British crown or wealthy few, as was the case in Europe, but to the American people. It was the government's job to protect these resources.

## The age of conservation

It can be argued that these events in the middle part of the century set the stage for the spate of conservation legislation and policy initiatives that would follow: the establishment of Yellowstone National Park in 1872, the passage of the Forest National Reserve Act in 1891, and the Lacey Game and Wild Birds Preservation and Disposition Act of 1900. Known as the "conservation president," Theodore Roosevelt left



"A Sand County Almanac" is the most famous work of Aldo Leopold. One of the founders of wildlife ecology, Leopold is remembered for his scientific insights and poetic writings.



The Dingell-Johnson Act passed in 1950 placed an excise tax on fishing equipment with monies used for fish habitat programs.

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behind an astounding legacy: more than 200 million acres of wildlands set aside, plus scores of wildlife refuges, national parks and monuments established during his time in office from 1901 to 1909.

This trend continued into the 20th century. The Protection of Migratory Birds Treaty Act (1916) — which made illegal the transport and sale of migratory birds and their feathers — effectively outlawed market hunting. Another landmark piece of conservation legislation, the Migratory Bird Hunting Stamp Act (1934) secured millions of acres of waterfowl habitat across the nation via the sale of duck stamps. Other crucial funding initiatives, the Pittman-Robertson Act (1937) and Dingell-Johnson Act (1950), generated money for game and fish habitat, respectively, through excise taxes placed on firearms and hunting/fishing equipment.

In the second half of the 20th century, more federal legislation continued the trend: Clean Air Act (1963), Clean Water Act (1972), Endangered Species Act (1973) and Convention on International Trade in Endangered Species (1973).

These laws and initiatives did not occur in a vacuum. Conservation organizations began to emerge in the late 1800s. Theodore Roosevelt, George Bird Grinnell and others helped found the Boone and Crockett Club in 1887. The Audubon Society and the Sierra Club



Similar legislation — the Pittman-Robertson Act of 1937 — taxes firearms and ammunition and is used for wildlife habitat.

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were also founded in the late 1800s. Like their successors in the 20th century — Ducks Unlimited, Rocky Mountain Elk Foundation, Trout Unlimited and the National Wild Turkey Foundation, for instance — these early groups worked to protect land and wielded considerable political clout for wildlife.

#### Basics of the model

Hunters and anglers — as individuals

and through conservation organizations — were the first to recognize that wildlife and wildlands were in jeopardy and that something had to be done. This coalition made possible the funding system we know today as the North American Model of Wildlife Conservation. In this model, conservation is paid for via two basic sources: license and stamp sales, and excise taxes on hunting and fishing equipment. The basics of the North American model can be summarized as follows:

- Public lands and the wildlife on them in North America are held in the public trust — for all to enjoy.
- It is the charge of government to manage this resource in a sustainable way, not only for the present but also for the future. History has taught us that commercial harvest of wildlife — and wanton slaughter as happened with bison populations — were costly mistakes that cannot be repeated.
- Governments are charged with managing game populations by setting bag limits, seasons and methods of take in a fair and democratic way, and with public input and review. Private conservation groups play an important role in this process, by mobilizing hunters, anglers and other conservationists to participate.
- Sound science should guide population estimates and forecasts. The science, known as wildlife ecology, was founded in part by Aldo Leopold in the 1930s.
- Hunting and angling are rights for all. No group or individual may be discriminated against. When possible, accommodations — like barrier-free fishing/hunting structures and special hunts for the disabled — should be made for those who cannot access resources in a traditional way.

#### The future of the model

Following the Depression and Dust Bowl years, wildlife populations and funding blossomed in the second half of the 20th century in the United States and Canada. A prosperous postwar economy meant strong license sales and plenty of outdoor supplies were purchased. Children, boys especially, generally hunted and fished if their fathers did. Set-aside land was plentiful for pheasants and other small game. Frequent clearcuts in public forests meant productive habitat there. The table appeared to be set for decades to come.

However, models are built on as-

**Silent sports — and those who participate in them — may prove a pivotal voice and funding source in the future of conservation.**



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sumptions. Chief among the assumptions of the North American model is that license and equipment purchases would continue at steady levels. While this had been the case for the second half of the 20th century, it will become problematic in the future.

While today's fathers hunt and fish at about the same rate as their fathers, 18- to 34-year-olds are participating less. Other activities (such as biking, hiking, paddling, bird-watching and other "silent sports") and shifting demographics from rural to urban or suburban contribute to this. Whatever the cause, the fact remains and will only become more stark if one looks at implications for young children today. Since recruitment usually happens at the family level, one declining generation would seem to beget another declining generation until at some point, the critical mass necessary for funding ceases to exist.

The other assumption — that those who pay for conservation dictate conservation policy — also proves troubling. On the face of it, there would seem to be an entire group of conservationists who are outside the conservation funding stream and thus outside the conservation debate — namely, silent sports enthusiasts who might not buy licenses or the kind of equipment that funds the current approach. Is it fair to exclude them, even if they are not paying? Is it wise to exclude them, especially given their size — millennials are the largest generation in U.S. history — and their




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**Continued conservation funding depends on recruiting new hunters, both male and female.**

passion for the outdoors, even if they enjoy it in a different way?

#### **New directions**

While some assumptions behind the North American model may not hold, the model itself, or some version of it, should not necessarily be discarded. Because millennials are not hunting and fishing in the numbers of previous generations does not mean they aren't interested in hunting and fishing. Perhaps a new approach centering on key beliefs of this generation, such as environmental sustainability, needs to be advanced. While

we are considering the next generation of hunters and anglers, should we continue to assume the current gender ratio of 90 percent male and 10 percent female, or some other? While we are questioning assumptions, could we revisit what activities require license fees and what equipment is taxable? These are worthy and important questions, and no doubt will need to be addressed as conservation agencies continue to look for innovative ways to fund their missions. 

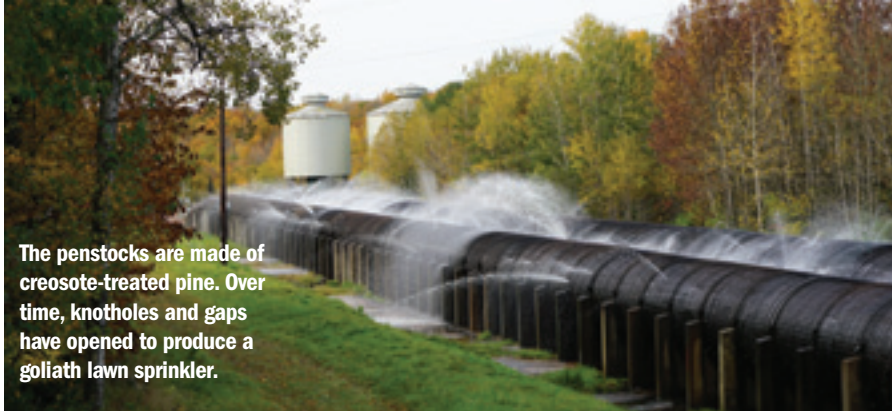
*John Motoviloff is a program specialist for the Shooting Sports Program in DNR's Bureau of Law Enforcement.*

# Wonders crystallize through the ages



Massive ice formations crystallize each winter near Grandfather Falls north of Merrill where the Wisconsin River passes through two giant penstocks that generate electricity for the area.





The penstocks are made of creosote-treated pine. Over time, knotholes and gaps have opened to produce a goliath lawn sprinkler.

## GRANDFATHER FALLS ICE CASTLES MAY BE A THING OF THE PAST.

Story by Chris Schotz / Photos by Polly LaMontagne

Some natural features rest through the centuries without fanfare. Imagine the entire volume of the Wisconsin River dropping nine stories in a mile-long torrent, and now imagine shoving that entire river into two wooden straws. That would be a place revered by the Ojibwe and called Grandfather by 17th century French missionaries — the steepest plunge on the 430-mile river and an attraction that goes back through a thousand years of portage trails and timber drives.

Grandfather Falls was a place that saw 300 birchbark canoes portaged in 1850 and stagecoach excursions soon after. Tourists paddled and poled upstream to rusticate beneath the mist and witness the logs thumping over the falls when impatient drivers hadn't jammed the river shut as the springtime floods subsided.

One legendary jam stacked logs 200 feet high and a mile long. As the river backed up for miles and months, the spectators gathered on shore to watch the snarl attacked with peaveys and dynamite. A post office was established for this thriving fishing resort and named in honor of Peter Champagne, the mill owner and dry goods entrepreneur who ran the stage station. Local homesteaders rushed to the booming locale and went about building the first dam as a means to ration the log drive flow. By 1876 Champagne's station had grown into a hotel capable of hosting a February dance that detained 40 revelers until breakfast on account of a fiddle smuggled aboard a sleigh. No doubt those 19th-century excursionists strolled down to the frozen falls to contemplate the byproduct of mist confronting subzero air.

Massive ice formations are still a mystical sight at Grandfather Falls today thanks to a novel exhibition of New Deal engineering. It had long been a challenge to take advantage of the full 94-foot descent of the river. A 1906 dam

harnessed the upper 31 feet of the falls and produced the 20 kilowatt-hours that powered the mill and parts of Merrill. Some proposed the construction of two additional dams, but by 1936 the mill was bust and Wisconsin Public Service was able to launch the machinations that would power the entire county with megawatts to spare.

The solution was to divert the Wisconsin River into a half-mile canal before forcing it through two massive redwood pipes known as penstocks. By the end of 1938, Grandfather Road had been relocated and Champagne had become a ghost town akin to Atlantis. Some 100,000 board feet of California redwood had been assembled and banded into the 11- and 13-foot-diameter penstocks that would thrust the river downhill into the turbines that would be dedicated by the freshly inaugurated Gov. Julius Heil in January 1939. The diversion exposed the Precambrian bedrock of the old riverbed to the eyes of Ice Age Trail hikers who marvel at the chutes and bowls carved by a million years of fast current. As the penstocks reach the end of their life span, another sight has drawn the attention of travelers on Highway 107.

The original redwood penstocks were replaced in 1975 with creosote-treated pine still in use today. While perpetual moisture does prevent rotting and shrinkage, over time the knotholes and gaps opened to produce a goliath lawn

sprinkler. Although there is no danger of failure, WPS measurements registered 2015 as the leakiest year on record. This became especially apparent after a routine dewatering procedure allowed the staves to dry out and shrink for a week. Eventually the boards re-swelled and sealed the gaps, but there was one perplexing leak above the west turbine that sprayed high into a white pine 30 feet away.

The leak was monitored through the summer but subsided on its own in fall, so no tedious dewatering projects were initiated. Repairs are a major project that must be undertaken cautiously so the penstocks don't implode while drained or burst when the river is released, so no work was done that fall to fix the leak that wasn't leaking. As winter arrived the cascading spouts solidified as if someone yelled "Freeze!" and suspended them in the air. Ice built into hollow castles through which the spurts of Wisconsin River water could still be seen, and as temperatures dropped past the point of possible patching, the tremendous leak at the downhill end reopened. As winter wore on, the ice house grew, and while the penstocks were never in jeopardy, the white pine on the receiving end of the spray felt the icy weight and lost several sturdy branches.

The wall of ice finally melted over the summer and the hole is patched, but as the penstocks reach the end of their lifetime the leaks are gushing at unprecedented levels. Waterfalls cascade through adjacent cedars. With streams of river water lost for generations, the penstocks are due for repair. Though this winter promises to be an amazing season of ice castle viewing, it could likely be the last. It's no longer cost-effective to build enormous pipes of wood. Steel is the material of choice for 2017. The leaks that once built a 1,000-foot kingdom of ice will be entirely dedicated to power generation, but not before one more spectacular show. 

*Chris Schotz is a middle school history teacher in Rhineland, Ice Age Trail volunteer, bike trail builder, historian and author of "Underground in the Underdown."*



### BEST PLACE FOR VIEWING

**Grandfather Falls has three different parking areas located 12 miles north of Merrill on Highway 107. They are all connected to New Wood County Park via the Ice Age Trail.**

## Write



### KUDOS FOR AUGUST ISSUE

I just had to write about the August 2016 issue of *Wisconsin Natural Resources* magazine. I've been getting the magazine for 30 years or so, as long as I can remember. But this issue touched on several things of interest to me. I'm an amateur beekeeper. This is my fourth season. I read the "Wild about honey" story and loved it. I'm not sure you could go about getting honey that way these days. But I bet it would have been fun to try. I have been using my wildlife camera for years to take pictures or short movies of animals and birds that roam my 12-plus acres in Chippewa County ("Get the picture with Snapshot Wisconsin"). It sees things that I would probably not see otherwise. And then there's "Native plant gardening...for the birds and bees and butterflies." I have a little over 2 acres planted in native prairie restoration. It has been over eight years since I planted some of these natives. This year I was amazed at some of the plants I have growing just past my backyard. And, I have the harrier hawk prowling mine and the neighbor's fields ("Getting to know the gray ghosts"). The light-colored male dips and dodges just as you describe it in the article. Wow!

Paul Nicolai  
Chippewa Falls

### LEG-BANDED COOPER'S HAWK

I read the article about Cooper's hawks ("A Cooper's hawk family album," February 2000) and to my surprise I have one living in my backyard. He comes every morning to eat the prey he caught. He has been here since May 1, 2016, and still comes every morning. We share our yard with the hawk and hope he stays. Just a beautiful bird and he is banded with a blue band on the right leg and a silver band on his left leg. What a gorgeous bird to have and watch with a cup of coffee in the morning. Thank you for the article!

Michael Joyce  
Milwaukee

Thanks for sharing your observation, Michael. Just so you know, you can report the sighting of a leg-banded bird at [www.reportband.gov](http://www.reportband.gov). If you see a banded Cooper's hawk, send a direct email to Bob Rosenfield, a UW-Stevens Point professor who has studied and banded Cooper's hawks for more than 35 years. His email is [Robert.Rosenfield@uwsp.edu](mailto:Robert.Rosenfield@uwsp.edu).

### COMMENT ON A STORY?

Send your letters to: Readers Write, WNR magazine, P.O. Box 7921, Madison, WI 53707. Or email letters to [dnrmagazine@wisconsin.gov](mailto:dnrmagazine@wisconsin.gov). Limit letters to 250 words and include your name and the community from which you are writing.



### WEAVING A DEW-SPANGLED WEB

The fishing was poor yesterday. The weeds were tall and hard to navigate. The residents of the weeds were holding still and photogenic.

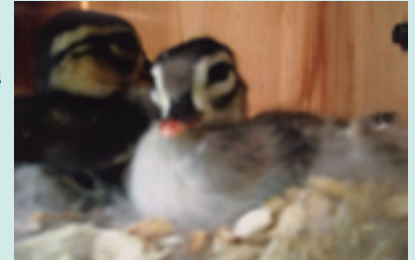
Len Harris  
Richland Center

### NEST BOX SUCCESS

Three years ago my neighbors cleared the woods behind my house in order to make room for their new building. There was a tall oak, which was home to a wood duck family. I thought if I built a wood duck house, would they come back?

I went to my local DNR office in Plymouth, got information on how to build one and asked many questions on a good location. With advice and building directions in hand I constructed the new home and mounted it on a tree in my yard. It took until the third year when I observed eggs in the box and wood duck activity in the area. I photographed the new arrivals on June 18, 2016. I know there were around a dozen eggs in the nest. Not all of them hatched, but at least this is a start of a new generation of ducks I hope continue to return to the area. My house is located approximately 300 feet from Lake Ellen, so the ducklings have their work cut out for them. Looking forward to what next year will bring.

Tammy Dassow  
Cascade



### 50 YEARS OF SALMON

Just thought I would let you know that in the spring of 2017 will be 50 years since the first salmon were planted in Strawberry Creek in Sturgeon Bay. I worked for the DNR

out of Asylum Bay which is by Oshkosh. If you can see the photos of the planting, I was the driver in the third truck. I remember stopping at the chamber's office and picking him up to ride along with me. My stepdad was Larry Surgery who was the district fish manager out of Green Bay. The people at the drop site were so happy and had to have their pictures taken with a bucket of fish. At the end we did get to tube them into the creek. Just a little history of the salmon. We haul them over from Osceola hatchery.

Dave Wedler

Thanks, Dave! Bradley Eggold, DNR fisheries biologist stationed in Milwaukee, provided this photo of the 1969 stocking of chinook salmon in Lake Michigan.



DNR FILES

### NO ACCESS TO THE WEB?

Don't have access to a link we mention in a story? Let us know when you want to follow a link we list. We'll do what we can to get you a copy of the material if it is available free of charge and is relatively short in length.



#### PUFFBALL MUSHROOM

This photo was taken in my backyard in Eau Claire.

Dan Perkins  
Eau Claire

#### TRUMPETER SWAN X40

It was noon on a beautiful fall day in 1998 and the Flambeau State Forest was ablaze with color. My husband Charlie and I had just arrived at our cottage on the Flambeau River. We were having lunch on the screened porch overlooking the river when I noticed we had a visitor. Swimming by our dock was a very large, long-necked white bird.

Charlie, an avid photographer, grabbed his camera hoping to get a photo of the beautiful bird. I decided to share the rest of my sandwich with our visitor hoping to keep it around for the photo shoot.

We both ran down the incline to the river. I tossed bread to X40, but he/she wasn't hungry and swam right past the bread toward me. This wasn't a hungry swan, it was a lonesome swan. X40 kept us company for about three days. We were thrilled, but wondered why the bird was tagged and where it came from. There was no phone service at the cottage so we had to wait until we got back to our Oregon, Wisconsin home to investigate.

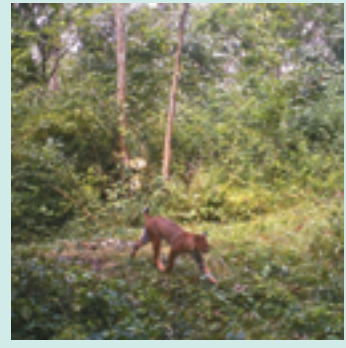
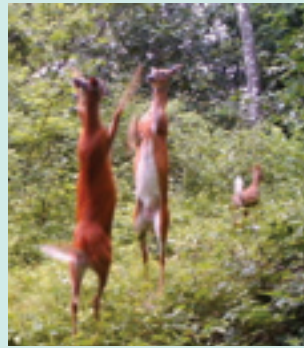
I called the Wisconsin Department of Natural Resources and was directed to Pat Manthey. She knew all about X40, who had quite a past. She said that in the late 1990s there were 18 nesting pairs of trumpeters and most of them raised young which resulted in 300 trumpeters, 51 of them cygnets that fledged. X40 was one of them and had quite a reputation.

In 1996, X40 was living on the Bad River Slough on the Bad River Indian Reservation. In the spring of 1998, he was reported to be in Babcock and from there he moved to nearby Bass Lake where he was known as an unfriendly neighbor. The residents and X40 did not get along. If he liked you, he liked you; if he didn't, he would hiss at you, slap you with his wings or kick you with his feet. One resident had a dog that couldn't go outside without being chased and hissed at by the unruly swan. Pat Manthey got so many complaints that she decided to catch the swan and move him.

X40 was caught, wings clipped and given a long ride on an all-terrain vehicle to remote Swamp Lake, which was only a few miles — as the swan flies — from our cottage. Once X40 molted and sprouted new feathers, he was able to fly again. Deciding he didn't like the life of a recluse, he flew back to civilization. That is when he visited us.

By the time I called and gave Pat Manthey details about our visiting swan, she had heard from Bass Lake residents that the ornery swan had returned and was once again up to his old tricks. The plan now was to once again snag X40 and take him to central Wisconsin with the hope of giving him the urge to migrate even further south. And, that as they say, "is the rest of the story." X40 was not welcome at Bass Lake, but we found him to be a delightful guest.

Dorothy Kruse  
Oregon



#### TRAIL CAMERA CATCHES

Here are a couple of pictures from a trail cam set up on my brother-in-law's farm in La Crosse County. Interesting to capture a bobcat in the daylight. As far as the deer, I'm not sure what they were doing, but the fawn wanted nothing to do with it.

Dave Thompson  
Monona

Kevin Wallenfang, big game ecologist in DNR's Bureau of Wildlife Management, provided the following explanation for the deer's behavior: What they're doing is kicking at each other with their front hooves in an act of aggression. It's impossible to say why in this situation, but you can regularly see this kind of behavior when there is a limited food supply like during winter feeding. Because of that, it's one of the reasons we discourage people from winter feeding; the deer exert a lot of energy fighting over the food, plus there's a likelihood of injury to the loser.

#### CREX CRANE CLARIFICATION

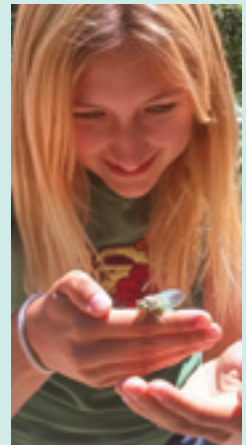
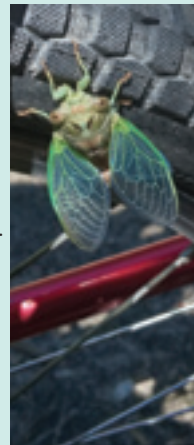
Thank you for publishing the article on sandhill cranes at Crex ("A graceful touchdown") in the October 2016 edition. We continue to see an increasing number of visitors coming to Crex each fall to witness this wildlife spectacle. There was one point of confusion in the article that needs clarification. The article implies that birds traveling through Crex in the fall will end up on the Platte River in the spring during the return trip. The birds that come to the Platte River are a separate subspecies of cranes. The lesser sandhills that gather on the Platte River follow the Central flyway north. These birds winter in the south central U.S./Texas gulf area. The greater sandhills in the eastern population that come through Crex follow the Mississippi flyway transferring over to part of the Atlantic flyway to winter from Tennessee south to Florida. Dave Fronczak with the U.S. Fish and Wildlife Service has recently published a paper based on data from radioed cranes that details the migration movements of cranes in the eastern population. The central population of lesser sandhills using the Platte is much larger than the eastern population of greater sandhills that stage throughout Wisconsin and the upper Gerat Lakes states. When you are standing out in the marsh watching thousands of these birds fly over, it is an incredible sight no matter where you are.

Steve Hoffman, Wildlife Biologist  
Crex Meadows Wildlife Area

#### CICADA HAS NEW WINGS

While camping at Peninsula State Park in early July, I noticed a fresh-hatched cicada on the wheel of my mountain bike. It was fascinating to look at up close, as he had just crawled out of his shell. My daughter, Andrea, enjoyed the "nature" moment!

Margaret Reisenauer  
Sheboygan



#### "WHITE" THE CHIPMUNK

I'm sending photos of a white chipmunk that appeared this summer in our garden. It is not true albino because of having black eyes and some hint of normal stripes. An active little fellow with the flash movements that you cannot miss. Thought readers of your magazine would find him of interest!

Dennis Belmont  
Kenosha



*You're right, Dennis! This chippie isn't a true albino, but rather displays leucism. Many leucistic birds and mammals have splotches of white (also known as piebald), but they can also be entirely white. If you look closely, you'll see the residual natural striping on this little fellow.*

#### IN HONOR OF THOSE WHO SERVED

I liked your article on the Leopold benches ("Winter building," October 2016). I made a bench inscribed with the words "In honor of those who served" for our family reunion. Our family has a long history of military service, dating back to the Civil War. On the sides of this bench, I woodburned the names of 46 family members who served in the U.S. military. One of my friends is a big guy. He is 6 feet 3 inches tall and about 300 pounds. He also has multiple sclerosis. He can't sit in a normal chair. It is so hard for him to get back on his feet. So I made him an Aldo Leopold chair. It is wide enough for only him, and I raised the seat 4 inches. It is very sturdy and he can get in and out of it easily. He loves it! Thank you again for the great article!

James Olson  
Wilton

#### RECALLING PRAIRIE CHICKENS

I enjoyed your prairie chicken story in the October 2016 issue of the magazine. In the early 1950s my two younger brothers and I spent a lot of time in the woods between farm chores and harvesting. For several winters in a row we set out an oats/barley mix for the prairie chickens in an area along the creek where their tracks were plentiful among the alders. Though we saw them flying in the summer we never saw them on the ground at any time. They were a flock of six. And it appeared they ate very little if any of our offerings.

One time Dad did shoot one, the meat was dark red. I don't recall much about its taste. Anyway, divided up among our large family there wasn't much to taste.

Dad and Mom settled on the farm in 1929. Dad said when he used to plow in the fall the prairie chickens would follow down the freshly turned furrow enjoying earthworms and bugs. This was in Taylor County about 6 miles east of Perkinstown on what is now known as Perkinstown Avenue.

I have watched sharp-tailed grouse dancing at the Pershing Wildlife Area near Hannibal in west central Taylor County. They displayed their bluish air sacs and at times perched atop my blind. Seeing and hearing them was a great experience.

Stephen Lars Kalmon  
Withee



#### DEER STAND VISITOR

Didn't see a lot of deer up north. But in Vilas County I had this visitor. He (or she) made the day a little more enjoyable.

Michael Rasmussen  
Town of Delavan



#### CAMOUFLAGED DUO

While piling wood for our campfires at the cabin this summer, my husband Kevin and I found these two gray tree frogs. It seemed a little late for their breeding season, which is usually June through mid-July. They looked so cute together I had to take their picture. I really enjoy listening to the chirping sounds of the male and female back and forth in the trees. I'm so glad they found each other! This picture was taken on August 12, 2016, in Lake Nebagamon. I love reading your magazine! I learn so much about nature and I like supporting it too! Thank you!

Cindy Donley  
Duluth, Minnesota

*Thanks, Cindy! We asked Rori Paloski, conservation biologist in DNR's Bureau of Natural Heritage Conservation, to confirm your identification. Here's what he said: They are definitely either gray treefrogs or Cope's gray treefrogs. Gray treefrogs are generally a bit more common, but the two species are physically identical and can only be told by genetics, chromosome numbers or their breeding call. Because only male frogs call, the writer was actually hearing two males, not a male and female.*

#### FIRST DEER

I'm sending a photo of my daughter (Alexia, age 11) from the first weekend in October. This had to be the single greatest thing I have ever been able to experience with her. She had been on 10 hunts before she even saw her first deer, beginning last December, and it turned out to be this one. In her words, "it was totally worth it!" It was an emotional night for sure.

Joseph Kreuser  
Muskego



#### CORRECTION

In the "Let it snow" story in our December 2016 issue, we incorrectly identified Darren Parks as an employee of the Dane County Parks Division. He should have been identified as Darren Marsh. We regret the error.

# Keeping it wild: Outdoor food and forays

## 'SCONNIE CHOWDAH? YOU BETCHA!

John Motoviloff

Life is a series of trade-offs. You have time or money. Live in the city or country; on the coasts or in the heartland. Sometimes, however, with a little luck and imagination, you can have both.

I was at a juncture like this several years ago, when I had a mean craving for the creamy East Coast fish chowder I grew up on. The problem? The closest chowder house was a thousand miles away. I could have bought a frozen block of cod or haddock, but that was cheating — a far cry from the buckets of flounder and porgies my brother and I caught along the New Jersey coast as kids.

My craving was made worse by the fact I had gone to college in Boston — Mecca for “chowdah” — where I would scrape together my meager earnings for a bowl of the real item whenever I could. To add insult to injury, my wife had grown up in the Chowdah Belt, near Cape Cod, which meant both of us had the craving.

But ‘Sconnies don’t cry in their beer. Generations have earned their keep sawing logs, hacking away in mines, tilling rocky soil and toiling in factories. As I sat and pondered a 5-gallon bucket full of ice-caught panfish, I resolved to take the matter into my own hands. It was time to make chowder.

The fish were glistening, fresh and beautiful! The crappies looked like dapper gentlemen with their flecked tweed sides. The perch were sunbursts, wriggling bright on a bed of snow. The bluegills were thick and marl-colored. Sharpening my fillet knife, I resolved to do them justice.

I began my chowder the way it’s been done for centuries — with good fish stock. I put the filleted carcasses, heads and all, into a kettle of water, threw in vegetable peelings and let the whole thing cook down. A good chowder is thick, so as the stock simmered, I sautéed chopped vegetables (celery, onion and potato) in butter and added a few tablespoons of flour. I strained a quart of the fish stock through a sieve, right into the pot, and let it simmer.

As carpenters need to test their framing work before tacking down the siding, so cooks need to check the broth before adding the main ingredient. It wasn’t quite there, so I put in salt and pepper to taste, added chopped parsley, a large bay leaf and a pint of heated whole milk.

My chowder, it appeared, was on the road to success. I had only two more steps. Adding fish was the easy one. Fish in chowder needs only a quick dunk; all the more so with panfish. I dropped in the fillets and watched them turn from translucent to flaky white.

The other step — getting my wife’s approval — was trickier and more nerve-wracking. I pattered, put a loaf of French bread in the oven. I made a green salad. I’d even bought a six-pack of Sam Adams for the occasion. I dipped a spoon into the thick broth — good body, smooth taste, hint of green herbs and just enough salt and pepper. I was ready.



KERRY MOTVILOFF

I called my wife, Kerry, in.

She leaned over and smelled, then tasted. All was silent. I held my breath. She nodded and made the pronouncement.

“Good,” she said. “Really good, for freshwater fish.”

Now this might seem like faint praise, but New Englanders are terrible chauvinists when it comes to food. Real fish and chips is made from haddock. Fried clams can only be cooked with their bellies on. Lobster is the be all and end all. Translation: this soup would never be, could never be, New England chowder. But it was ‘Sconnie chowder. And pretty darn good at that.

*John Motoviloff is a hunter, fisher, forager and proud Wisconsin transplant. He also wrote “Wild Rice Goose and Other Dishes of the Upper Midwest” (University of Wisconsin Press, 2014), from which this recipe is adapted.*

### 'SCONNIE CHOWDER

- 2 pounds fish carcasses (which have been filleted) with heads left on**
- 2 quarts water**
- 2 tablespoons butter or bacon fat**
- 1 bunch green onions or one yellow onion, peeled and chopped**
- 2 stalks celery, chopped**
- 2 cups potatoes, peeled and chopped**
- Salt and pepper to taste**
- Green herb, chopped, such as fresh parsley (1 tablespoon) or dried thyme (½ teaspoon)**
- 1 bay leaf**
- 2 cups milk, heated but not boiled**
- 1 pound firm-fleshed fish fillets (panfish, bass, northern pike or walleye)**

1. Save potato peels, onion ends and celery trimmings.
2. Heat 2 quarts of water in a stockpot; add vegetable peelings and fish carcasses. Cook until reduced by half.
3. In a heavy kettle, heat the butter or bacon grease. Briefly sauté vegetables until onions wilt. Add flour and toast lightly.
4. Pour fish stock through a strainer into the heavy kettle, stirring browned vegetables. Simmer until potatoes are just tender.
5. Add salt and pepper to taste. Add green herbs and bay leaf.
6. Heat milk. Mix into chowder.
7. Add fish fillets and cook just until they begin to break.
8. Turn off heat. Serve with crusty bread, green salad and Wisconsin beer.

SOUP IMAGE: SHUTTERSTOCK

## Traveler

### Shadows of a Cambrian shoreline

*Saddle Mound through the ages*

*Julie A.M. Hess, Robert J. Hess, Anna N. Hess and Abigail M. Bostwick*

Sometime deep in the Cambrian eon, a fierce rainstorm raged and a group of small, soft-bodied creatures meandered through the shallow, subtidal landscape seeking shelter on what would become Saddle Mound in Jackson County. Tempestuous water churned up the thick silt as these organisms made their way through sand. Never in their wildest dreams could their ganglia conceive that these murky waters would make them immortal.



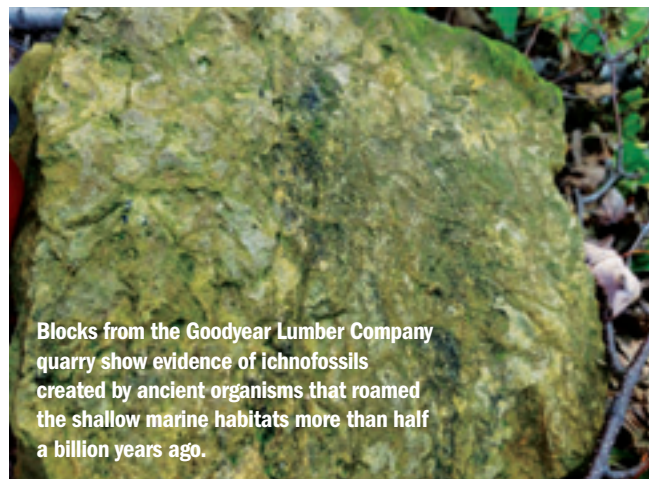
WISCONSIN HISTORICAL SOCIETY

**A tramway operated by the Goodyear Lumber Company moved quarried stone down the south slope of Saddle Mound.**

Around 510 million years ago, when Wisconsin lay somewhere near the equator, the trails that these organisms left behind were preserved in layers of silt and sediment and can now be observed in several areas across the state in a geological layer known as the Mt. Simon-Wonewoc formation. It is an Upper Cambrian formation easily identified by its sparkly, coarse quartz (arenite) sandstone. Examples are found not just in Wisconsin, but throughout the Midwest.

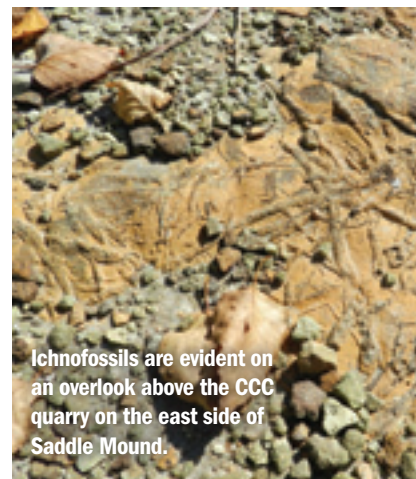
Many of these sandstone outcroppings are scattered through west central Wisconsin. In Jackson County elevations range from 760 feet on the sand flats at Shamrock to about 1,400 feet at the peak of Saddle Mound. Mt. Simon Upper Cambrian

sandstone is typically up to 115 feet thick and is popular for building materials. Quarries and rock-cuts in many of these



**Blocks from the Goodyear Lumber Company quarry show evidence of ichnofossils created by ancient organisms that roamed the shallow marine habitats more than half a billion years ago.**

ROBERT HESS



**Ichnofossils are evident on an overlook above the CCC quarry on the east side of Saddle Mound.**

ROBERT HESS



**Saddle Mound is a 1,400-foot sandstone outcropping in Jackson County about 15 miles east of Black River Falls.**

sandstone bluffs expose the bedding planes that were likely part of a scattered barrier island system. For the intrepid fossil-hunter, these rock outcroppings provide a rare glimpse at these trace fossils, where ancient organisms roamed through shallow marine habitats.

Preservation of these delicate organisms is a very rare occurrence in the worldwide fossil record. Some prime examples in the Mt. Simon formation have shown preserved mounds where jellyfish were likely beached during a storm, along with preserved trails and burrows where mysterious snail-like creatures moved through the sandy aquatic shorelines. Krukowski Quarry is a well-known Wisconsin example of Mt. Simon sandstone and hosts incredibly well preserved specimens of jellyfish and ichnofossils, or trace fossils. Most have been removed and donated to museums or private collections. These trace fossils

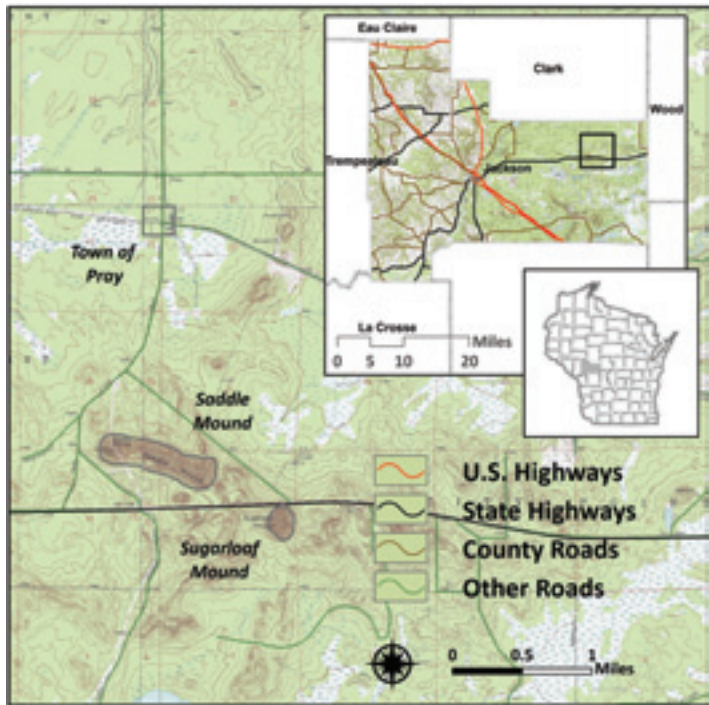
can also be found throughout the sandstone promontories of central Wisconsin, at Irma and Chase hills in north central Wisconsin and in west central Jackson County.

In Jackson County, at the top of Saddle Mound, what appear to be worm trails wind through the stone left exposed from century-old quarrying. Also, just north of Saddle Mound, in the area of the small unincorporated town of Pray, are other trace fossils called Climactichnites. These are band-like, ridged trails characterized by the fact that they show no trace fossil evidence of the animal bodies that made the tracks through the low-tide shallow-water habitat.

Today Saddle Mound is covered in tall pin oaks and blanketed by a thick carpet of Pennsylvania sedge and blackberries — quite different from its beginnings as a shoreline of a Cambrian marine environment. Tall, gritty sandstone faces are exposed to the elements,



ANNA HESS



ANNA HESS

eroding more slowly than the surrounding areas, marking where these sandstone bluffs were once a murky shallow seashore.

Saddle Mound hosted several quarries over its history. Two are still visible with century-old drill holes evident on the side of the rock face. On the west side was the Saddle Mound quarry operated by the Goodyear Company. They mined surface stone outcroppings from 1891-1895 but were primarily involved in the logging business. The town of Goodyear was a small sawmill settlement in what is now Merlin Lambert County Park. The timber harvesting and quarry operation, built by C.A.

Goodyear from Tomah, prospered until 1894 when the area was completely logged off. In 1895 the mill was dismantled and shipped to Star Lake in northern Wisconsin, where it began a new operation in 1896. No longer profitable, the quarry also closed in 1895.

The quarry atop Saddle Mound had a double-track narrow-gauge tramway for moving quarried stone down the slope. Its eroded path is still evident today beneath the detritus of the forest floor, along with rusted remnants of steel cable. The tramway went straight up the south slope of Saddle Mound. Gravity was used to alternate tram cars, with the loaded car descend-

ing the slope, pulling the empty car to the top for loading. The bottom car stopped at a spur line of the Goodyear, Neillsville and Northern Railroad. There sandstone was transferred to rail cars and hauled southeast to Mather, transferred to rail cars on the main line, and then shipped on to Tomah and points beyond. Some

to area fire headquarters in Black River Falls.

Saddle Mound is a truly unique part of Wisconsin geology and local history. If you find yourself in beautiful eastern Jackson County, be sure not to miss the challenging hike to the top of Saddle Mound, and journey back in time to gaze at the ancient



Robert Hess sits atop the old narrow-gauge tramway on the slope of Saddle Mound.

ANNA HESS

of the stone was also hauled out by a horse-team, to be loaded onto the adjacent Green Bay and Minnesota Railway Line at the village of Pray.

During the 1930s, the Civilian Conservation Corps quarried stone from the east side of Saddle Mound to build the Tomah ranger station, the Goodyear Company building in Tomah, part of the school in Tomah and the nearby Pray ranger station. The CCC built a truck road up the south slope of the mound to remove materials. Now highly eroded in the sandy soils, the roadway reveals several sandstone rock-cuts.

A fire tower situated between the two quarries was also built in the 1930s and was recently decommissioned. A small cabin was built at the base of the mound for the agent who logged lonely hours in the tower scanning the skies for smoke. The site of the cabin is now evidenced by the small grouping of cedar trees at the bottom of the degraded truck road. This cabin sported a double-copper-wire crank phone system that ran from Saddle Mound to the Pray ranger station and from there across the cranberry marshes and Potter's flowage. Today, in Merlin Lambert County Park, an old road traversing west across the flowage marks where this old phone line went

traces of mysterious organisms in the sparkly sandstone. If in your future Wisconsin adventures you find fossils, you can report them to Wisconsin Geological Survey: [wgnhs.uwex.edu/about/people/experts/](http://wgnhs.uwex.edu/about/people/experts/)

*Julie Hess is a senior paper process engineer, moonlighting as a naturalist during her spare time. Bob Hess has more than 45 years of experience in natural resource management, many in the Jackson County area. Anna Hess is a natural resource manager for the Minnesota DNR, and spent many years working in Jackson County. Abigail Bostwick has studied earth sciences and documented ichnofossils across Wisconsin. She lives near Tomahawk and is the author of several young adult novels. Thanks go to the Jackson County Forest and Parks office for access to their archives, and to Kay and Tom Sholtz and Lynn Moeller for additional information on ichnofossils in the Pray area.*



## SADDLE MOUND HISTORY

For more history on the Saddle Mound/Pray area, look for a series of articles by Fred Rodgers published in the Black River Falls Banner Journal from 1936-1937, and "The Wisconsin Valley Line," written by Raymond Specht and John Cline in 1979. History on the fossils of these Wisconsin sandstone promontories can be found in "Wisconsin Through 5 Billion Years of Change," by Byron Crowns and other updated literature.

# Wisconsin, *naturally*



## FOULDS CREEK STATE NATURAL AREA

*Thomas A. Meyer*  
State Natural Areas Program

Foulds Creek State Natural Area harbors an amalgam of forested and nonforested natural communities that span a spectrum of moisture and nutrient gradients from northern mesic (moderate moisture) forests to wet-mesic forest to cedar swamp to bog. The primary feature is a large, central conifer swamp with several good quality stands of northern white cedar, also known as arborvitae (Latin for “tree of life”). Eastern hemlock, white pine, yellow birch, sugar maple, red maple, white spruce and balsam fir are components of the adjacent upland forest canopy. Below it, in the shrub and ground layer, are early low blueberry, American starflower, bunchberry, wood sorrel, Canada mayflower and wild sarsaparilla. Rising above the surrounding plain of glacial till and organic peat deposits is a prominent esker running through the site’s interior. Eskers are long, narrow, winding ridges of sand, gravel and boulders that were deposited by meltwater streams flowing under glacial ice. Several alkaline springs and spring seeps originate at the base of the esker and flow through an adjoining conifer swamp, eventually feeding into Foulds Creek. The forest interior provides important breeding and stopover habitat for many neotropical migrants and other bird species. Warblers are well represented, and include Blackburnian, magnolia, chestnut-sided and black-throated green warblers. The natural area also protects a great blue heron rookery and an active pack of timber wolves.

Foulds Creek State Natural Area is within the Chequamegon-Nicolet National Forest in Price County. The site is owned by the U.S. Forest Service and was designated



a State Natural Area in 2007. It is also recognized by the Forest Service as a federal Research Natural Area. There are no designated trails or other facilities on the property. Visit [dnr.wi.gov](http://dnr.wi.gov) and search “Foulds Creek” for a map, access directions and more information.

