"This institution is an equal opportunity provider."

# Partners News

January/February 2021

*We thank the UW Center for Cooperatives for their ongoing support*

*Protecting your wooded land for the future is essential to clean water, clean air, wildlife habitat, sustainable wood supply...all things that are necessary to society and health, and that are gone forever if the land is developed.*

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www.partnersinforestry.com



**Have you paid your PIF dues?**

Happy New Year 2021

## WELCOME NEW MEMBER(S)

Sue and George Holloway
Richard Jenks

## Inside this issue:

# UPDATES ON EXISTING ISSUES

## Wildcat Falls

As you know by now, Wildcat Falls Community Forest has been a reality since September 24, 2020. Partners in Forestry & Northwoods Alliance are very grateful to all who helped advance this very worthy project to completion. Following the closing we continued to solicit public feedback into the creation of the Wildcat Falls Community Forest Management plan. The plan is now completed and guidelines for use are established, at least for now. The overwhelming majority of commenters in the planning phase are in full agreement of the need to protect the features this project demonstrates, including the old growth, creek and falls, rock outcrops and so forth. There has been no disputing this. The full details of user benefits can be found at www.northwoodalliance.org

The NO or not allowed category is simply: NO motor vehicles off the roads, NO removal of wood, plants, minerals or stone, NO fires. Most any foot traffic recreational use is allowed.

An endowment fund was established with (and with financial support from) the Community Foundation of the Upper Peninsula (CFUP). If you are able, and especially if you have not yet donated to this project, please consider a donation to Northwoods Alliance Inc. or the CFUP with Wildcat Falls as the subject. The endowment insures the future of the community forest.

Let's be respectful of other users and neighboring property. We encourage your visit and ask for your support. Wildcat Falls Community Forest, Northwoods Alliance Inc. and Partners in Forestry are equal opportunity providers.

## Northwoods Forest Conservation: A Handbook

The handbook has been a rousing success as a inspiration to landowners and woodland managers. Following our first sending of the books, an up tick in requests followed a December 10, 2020 interview with UPEC, streamed and recorded at https://www.upenvironment.org and on January 1, 2021 WXPR public radio had a feature which was picked up by the Society of American Foresters and the National Woodland Owners Association. This exposure brought requests from all over the country and into Canada, where a Professor of Silviculture at Maritime University in New Brunswick asked for a digital version to use in his teaching. We are very proud of this publication and look forward to the possibility of a second printing. Keeping with the spirit of our assistance from the UW Center for Cooperatives, we have been very generous with this publication, only asking for donations from those able. IF you need another copy or would like the digital version please request to partnersinforestry@gmail.com or nwa@nnex.net or call.

We once again thank everyone who were a part of the handbook project.

## Membership

A continuing problem with woodland ownership is the inevitable aging of many of us who care about the land. We have discussed this since day one, as there are periods where we lose members to death and attrition faster than we can gain new members. Please share the good word about our work, encourage a new member. If you have any ideas to help connect with younger landowners as they inherit family lands, please share your ideas with us.

*This is your coop, please be involved.*

**We thank the University of Wisconsin Center for Cooperatives for their continuing support.**

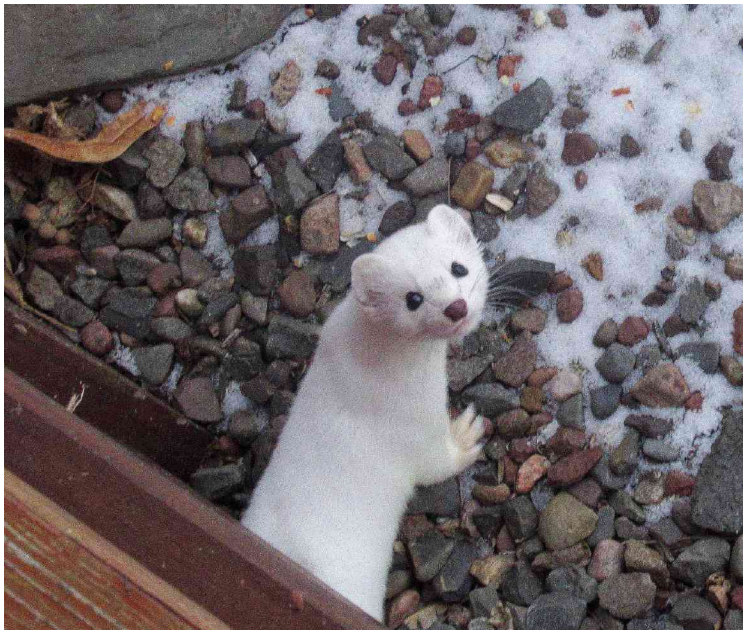
## Global Concerns

From the journal Nature: A new study led by the University College London revealed that land use changes increase the likelihood widespread outbreaks. By disrupting the balance of wild animal communities in our environment, other species that carry diseases known to infect humans appear to benefit. The lead author of the study summed it up by stating, "the way humans change landscapes across the world, from natural forests, grasslands and farmlands has adversely affected the health of species that insure human health."

This echoes the PIF mantra of sustainability and protecting our landscape for the greater good.

The University of California, Davis study on bees was not favorable either. Stating that, just like humans, bees face multiple threats from numerous sources. The study cited *intensive* agriculture as a culprit in serious decline of bees, causing the bees to have a scarcity of food and exposure to pesticides. The summary stated that pesticide exposure harmed bees 1.75 times more than limiting food, however, the effects of both factors were pronounced.

From the National Academy of Science, a study on fungi has revealed that arbuscular mycorrhizal fungi is even more fantastic and complex than thought. It has long been known that fungi play a role in transferring phosphate to plants for the plant growth. A team of researchers from Texas Tech University and Nanjing Agricultural University has confirmed that these fungi also act as nitrogen suppliers to plant. The hope is that this discovery will lead to a new groundbreaking wave of practices to benefit the environment by reducing the need for intense nitrogen applications in many plant species.



*A pesky ermine displays his ego. For more on this amazing little weasel see Partners News March 2019*

*Photo: Myrtle Sharka*

## Federal Conservation: FY21 Spending, Pandemic and Energy Bill Enacted

In late December 2020, Congress finalized a massive spending, pandemic, and energy omnibus bill that was signed into law by President Trump on December 27th. The bill included the final fiscal year 2021 appropriations bills providing annual funding for federal agencies and also included the first round of spending under the Great American Outdoors Act. While concerns had been raised about the Department of the Interior's proposed spending plan under the Act, Congress ultimately referred back to its existing list of priority projects for much of the FY21 Land and Water Conservation Fund spending. Appropriators did incorporate the deferred maintenance backlog project recommendations submitted by DOI. In addition to the spending bills, the end of the year package also included energy, water, and climate related provisions.

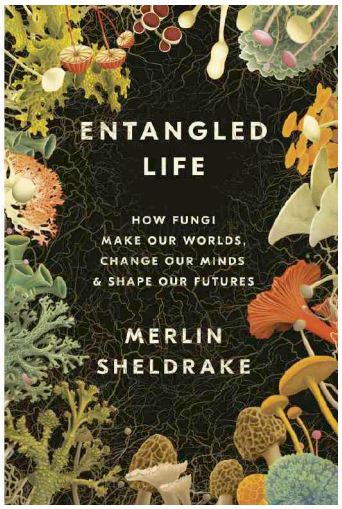
"In a year that has been incredibly difficult for families and communities across America, conservation provides a place where we can find glimmers of hope and common ground," said Whit Fosburgh, president and CEO of the Theodore Roosevelt Conservation Partnership. "This sweeping legislation addresses many issues that are top of mind for hunters and anglers, including investments in habitat and access. We can close out this year knowing we accomplished a lot for conservation and turn our eyes toward 2021 and the goals of investing in climate solutions and putting Americans back to work through conservation.

Some of the key highlights within the more than 5,500 page bill:

**Invests $900 million in the Land and Water Conservation Fund, of this $67.5 million must be used to expand recreational access to public land.**

- Infuses $1.9 billion into our nation's public lands, national wildlife refuges, national forests, and national parks, critical new resources for addressing deferred maintenance projects.
- Increases communities' ability to use nature-based solutions to meet their flood control needs.
- $7 million for states to manage chronic wasting disease.
- $2 million for chronic wasting disease work at the National Wildlife Research Center.
- $3.72 million to fund collaborative chronic wasting disease studies, including research to identify early detection tools and carcass disposal.
- Invests in the restoration of the Everglades, the Great Lakes, and the Chesapeake Bay.
- Allows conservation organizations to access WaterSMART grants, including for nature-based water solutions.
- Updates the Army Corps' Floodplain Management Service program so that it can improve its ability to provide technical assistance that communities desperately need while also prioritizing assistance for economically disadvantaged communities and communities subject to repetitive flooding.
- Ensures consistency in cost-sharing requirements for natural infrastructure projects.
- Directs the Army Corps of Engineers to update guidance on sea level rise and inland flooding.
- Expands the Cooperative Watershed Management Program that allows communities to develop joint solutions to their water challenges.
- Establishes a new program to fund fish passage.
- Recognizes tribal water rights and funds projects that will provide access to clean, safe drinking water and other critical water supplies.
- Urges Natural Resources Conservation Service when converting wetlands to ensure that one acre of impact equals one acre of conserved land elsewhere..
- Strongly encourages the Farm Services Agency to prioritize State Acres for Wildlife Enhancement enrollment in the Conservation Reserve Program.
- Prohibits new oil and gas leases within ten miles of the Chaco Cultural National Historic Park in New Mexico for the next year.

January 15, 2021




## Entangled Life: how fungi make worlds, change our minds, and shape our futures, by Merlin Sheldrake (2020

THE BOOK CORNER

**Review by: Jerry Woolpy**

This book the unit of biology. Since Darwin we've been up and down from organism to population to ecosystem and down to organs, tissue, cells, and organelles. Natural selection has centered upon the natural variation of the genes of an organism and even the genes themselves as though they transcended the organism they were a part of. Variation seemed to be limited by mutations and sexual reproduction until we discovered that genes could be exchanged between individuals of different species and that organisms could incorporate other organisms within themselves--lichens, mitochondria, and chloroplasts being cases in point.

This book takes us much further into the wonderful world of mycelium that connect plants so that they can nurture each other at distances and between species and even influence the behavior of animals like ants and people. In millions of years relations among organisms have developed that we dare call symbiants, predators, parasites, mutualists, and commensalists.

What Darwin started with natural selection of populations has now risen to the interrelationships of whole ecosystems that have taken millions of years to adapt to each other and warned us of the ignorance of agricultural practices and forestry that destroy the interrelations of ecosystems in an effort to maximize the productivity of monocultures.

The diversity of mycelium contains types that include all of these categories of interspecies relations. Here are a couple of notable examples: Plants probably came from water to land only because of the pairing with fungi, because they never could have found nurishment without the aid of fungi. In a temperate forest firs help birch when the birch are leafless and the firs are still actively photosynthesizing; the roles are reversed when the birch leaf out and reduce the amount of light available to the firs. These interspecies communications are made possible by mycelium that connect the roots.

Under domestication fungi can be directed to digest cigarette butts, or petroleum, or even RoundUp. Magic mushrooms may be on their way to controlling the behavior of people, just as gut fungi are already affecting our brains.

Although animal behaviorists have been cautioned not to imagine the motivation of their subjects, the prose of this book is refreshingly anthropomorphic in discussion of what fungi do. Merlin Sheldrake imagines the mind of mycelium. The work is informed by marvelous metaphors, which enhance its charm and illuminate our understanding.

*PIF note: Fungi are an important part of the cycle of life, and are very evident in old growth forest habitats with ancient trees, snags and course woody debris. Here we learn a bit more on fungi.*

*See full size feature at* https://partnersinforestry.com/forest_management.htm

## A new threat to White Pine!

**From Wisconsin DNR Forestry News**

External news articles from the Wisconsin DNR – Division of Forestry

### How to look for white pine bast scale and Caliciopsis canker

By Elly Voigt, DNR Forest Health Communications Specialist and Linda Williams, DNR Forest Health Specialist, linda.williams@wisconsin.gov

Figure 1. Branch mortality caused by WPBS and Caliciopsis canker.

The association between a tiny insect and an inconspicuous fungus is causing branch and sapling mortality. White pine bast scale (WPBS; *Matsucoccus macrocicatrices*) and Caliciopsis canker (caused by *Caliciopsis* spp.) are agents in an insect/disease complex impacting white pines (Figure 1).

WPBS seems to cause minimal damage by itself. However, trees weakened and stressed by WPBS appear to be more susceptible to infection by *Caliciopsis* spp., which may infect trees through the tiny feeding wounds left by WPBS.

The causal fungus of Caliciopsis canker is considered native to North America. In Wisconsin, it has been identified in multiple northern counties (Bayfield, Iron, Price, Vilas, Oneida, Forest, Marinette, and Menominee) and two west central counties (Jackson and Eau Claire) (Figure 2 - has been omitted from this article for space. Please refer to the above PIF website for full story). It is likely that the fungus is present in other Wisconsin counties as well.

To look for this insect/disease complex, first look for tree symptoms, including flagging (dead, brown twig tips) and branch mortality (which usually begins on lower branches but may occur mid-crown as well). There may also be resin oozing from the trunk or branches. Symptoms of this complex can be mistaken for the symptoms of white pine blister rust (*Cronartium ribicola*).

On symptomatic trees, look more closely at the trunk and any branches or twigs within reach for signs of WPBS and Caliciopsis canker. These signs should be visible to the naked eye, but a hand lens may help. White pine bast scales are tiny, black, oval-shaped and lack both eyes and legs

Figure 3. Three white pine bast scales (in center of photo) are exposed after removing the leafy lichen that was protecting them.

(Figure 3). They use a long stylet to siphon sap from outer layers of the tree's phloem (bast). WPBS is often found under lichen or in cracks in the bark and can also be found on twig tips, at the base of needle clusters or tucked into bud scales.

Caliciopsis canker can be confirmed by the presence of its fruiting structures, which are found year-round. These very small, eyelash-like structures can be found on twigs, branches or trunks and cankers (dead spots in the tree's tissue) occur underneath them (Figures 4 and 5). Many cankers can develop. As a branch becomes more severely impacted, it will eventually lose the ability to move water to its needles, resulting in needle death and branch mortality.

Currently, there are no management recommendations for this complex. Look for further information in Forest Health News as it develops.

The DNR keeps a record of confirmed Caliciopsis canker locations throughout the state. If you suspect Caliciopsis canker and WPBS in your stand, please contact your regional Forest Health Specialist for more information and confirmation.

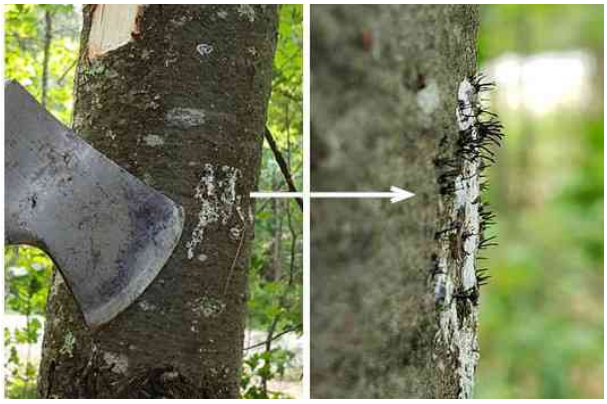


Figure 4. Look closely at resinous spots on the trunk and branches for signs of Caliciopsis canker.

Figure 5. The eyelash-like fruiting structures of Caliciopsis canker can be seen year-round.

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## Wooden You Know

Paul Hetzler

As a card-carrying, registered tree hugger, I have long touted the benefits of trees such as carbon storage, energy savings and improved mental health. And beyond the familiar tree-related blessings such as maple syrup, lumber and firewood, I've written about some obscure things like birch-based candy that fights tooth decay, and health-promoting chaga tea derived from a birch fungus. Then there's basswood bark for fiber, elm bark for baskets, and pine bark for lunch. That stuff is all pretty straightforward.

More highly processed wood products, though, are a mystery to me. Even a fairly mundane example like how a pile of dirty logs becomes a decidedly coveted treasure – I'm speaking of toilet paper, of course – seems like rocket science. But recent developments are truly mind-blowing. Without a doubt, tree-derived stuff has risen to a whole new level: the Japanese will soon rocket a wooden satellite into space.

A joint venture between Kyoto University and Japanese logging company Sumitomo Forestry aims to have the world's first wooden satellites orbiting the Earth by 2023. Really. There are an estimated 6,000 satellites now orbiting the Earth, and most of them are non-functional. Apparently, each time a dead satellite re-enters our atmosphere, it produces alumina particles as it burns up, and these micro-bits remain in the stratosphere for years, eating away at the protective ozone layer. Of course, when wood burns it does not produce alumina. Toasted marshmallows, perhaps, but not any dangerous pollution. Plus, if one of these satellites should break up in space, wood chips are way less dangerous to the International Space Station than the myriad nuts, bolts and metal shards floating around up there.

The engineers at Kyoto University aren't using plywood or OSB board, obviously. Researchers from the University of Maryland, the National Institute of Standards and Technology, and other institutions have found various ways to make wood super-strong and amazingly light and thin.

The University of Maryland's "super wood," as they call it, is equal to steel in strength, yet is lighter than aluminum. Dr. Liangbing Hu, leader of the UM research team, says their low-cost innovation will rival steel and titanium alloys in construction uses, and is much cheaper. Hu expects it to be used in cars and planes in the future (which makes sense, since using it in the past would be tricky).

Scientists at the National Institute of Standards and Technology have combined wood fiber with, of all things, a marine worm to create a product which is comparable to super wood, but is more flexible. Similar work is being done in many other countries, including France and Sweden, where engineers have focused on transparent wood for shatter-proof windows.

The recent news (see the BBC's December 2020 report at https://www.bbc.com/news/business-55463366) about Japanese engineers branching out into wood satellites is pretty amazing, but wood has been moving into unexpected areas for some time now.  A very cool

example is San Francisco-based Allbird, which since 2014 has been making soft, comfortable wood-fiber running shoes. Made from sustainably grown eucalyptus trees, the sneakers are said to be unusually light, cool and comfortable, especially good for hot climates.

But that's a pedestrian use compared to what French tire maker Michelin has been doing since 2018. It's hard to believe that a giant manufacturer like that would take a page from Fred Flintstone. While Fred's tires were puncture-proof, Michelin's wood-based tires will look and perform like conventional tires, which on average are 80% petroleum-derived. Michelin engineers have found a way to produce elastomers – which are stretchy compounds, as you might imagine – from paper-mill waste. These tires are expected to be rolled out within the next two years. Wood-based pneumatic tires can still be pierced by a nail, but are way more comfortable than solid logs. I only hope that companies that produce braking systems aren't inspired by the Flintstones as well.

And finally, a research team at the University of Delaware has developed a way to make adhesive polymers from tree lignin. By volume, the vast majority of a tree is cellulose. Trees produce lignin for strength on an as-needed basis because it takes a lot of energy to make; on a windy site a tree will produce more, and the same tree in a protected location will produce less. It's analogous to a normal parking garage, which needs some reinforcing steel in the cement. If that garage is intended for tanks and trucks, a lot more steel had better go in the 'crete.

Anyway, the University of Delaware group, led by professor of Materials Science and Engineering Dr. Thomas Epps, has created a low-cost adhesive from these lignin polymers. They reportedly made a transparent tape that they say performs as well as commercial Scotch tape. Dr. Epps is now experimenting with a wide variety of tree species to see if the lignins, which differ slightly from one kind of tree to another, could have unique applications.

Considering the miracles that trees are, think about planting a few this spring. You never know – you might be growing an actual cure for the common cold.

*Paul Hetzler has been an ISA-certified arborist since 1996. He claims not to have made any of this up.*

*PIF note: On this topic we sure hope a discovering innovation helps our current poor wood markets.*

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This quote drives our concern and actions.

*"Communities' loss of control of forestland has significantly harmed both people and nature".*

World Watch Institute paper 140, 1998

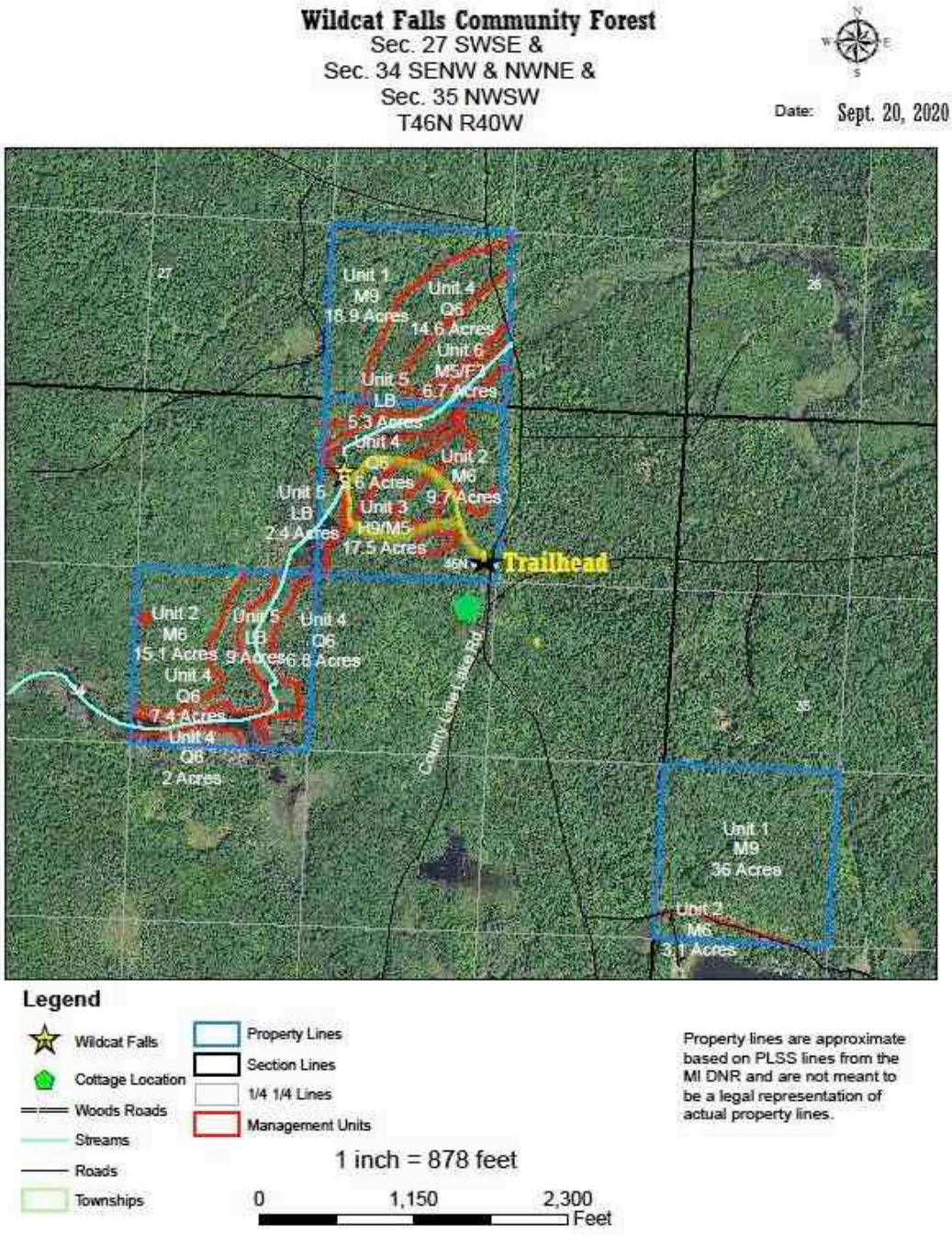
*John Schwarzmann at Wildcat Falls.*

## Forest Management Plan for the Wildcat Falls Community Forest mixes both active timber management with Preservation and old growth protection

By John Schwarzmann

The forest management plan for the Wildcat Falls Community Forest uses both active and passive management practices to maintain the unique qualities of the community forest while providing the potential for future timber sale revenue. About half of the property is concentrated around the falls and stream corridors and is unsuited for timber harvesting for numerous reasons. Those hemlock and swamp conifer dominated forests will be managed primarily for recreation. The other half of the 160-acre property has both dense second-growth hardwoods with diameters between 5 and 15 inches and mature hardwoods between 17 and 21 inch diameter (breast height) trees. These forests are well suited for careful timber management.

*Old hemlock and cedar mix with hardwoods on the community forest at Wildcat Falls.*
*Photo: Ardis Berghoff*




For anyone taking the hike to the falls, they will pass through a hemlock, northern white cedar, white pine forest (Unit 2 on above map). The falls pass through this beautiful hemlock forest before entering a swamp. Like the other adjacent hardwood stands, it appears that the last timber cutting in this 32-arce stand occurred at least 40 years ago and perhaps as long ago as 100 years ago. The stand is a unique example of the native forest community composition and structure. It's very likely that the rugged terrain protected this forest from the large-

scale elimination of conifers that occurred in the beginning of the last century across most of the western Upper Peninsula of Michigan. White pines and some hemlocks were probably cut but enough were left to preserve the native community. With the exception of cutting hazard trees along the footpath that leads to Wildcat Falls, this stand should be reserved from any active timber management for the following reasons:

1) Soils are rocky and exhibit many pockets of the somewhat poorly-drained areas that have a very high impermeable soil layer (fragipan) that impedes drainage. Vernal pools are common and tree roots are at the surface, thus exposed to damage from logging machinery.

2) The site exhibits unique bedrock outcrops with cliffs and large boulders. Logging would be extremely difficult and dangerous.

3) The forest consists of 100--140 year-old hemlock and northern white cedars with scattered white pines that are developing a super-canopy profile. This community is very rare from both a community composition and age structure perspective and is a main focus of the project's conservation motivation.

4) The rising local deer population is high enough to prevent successful regeneration of future northern white cedar and hemlock seedling establishment. Cutting any difficult to regenerate species such as eastern hemlock and yellow birch would be comparable to mining timber rather than managing a sustainable resource.

5) The site may contain both summer roosting trees and winter cave habitat for endangered bats. Bat surveys should be carried out by experts to determine their use of the site.

6) The site is very beautiful and attracts many visitors who hike the trail to the falls. Logging wouldn't be a good fit for people looking for natural beauty, solitude and peace and quiet.

7) The stand has very little timber of high quality or value. Combining this stand with other nearby valuable hardwood stands in a timber sale would likely degrade the economic value of the entire timber sale by including a difficult, low-value product. The stand exhibits high ecological value, but low economic value.

8) There are no logging roads. Any decking of wood products would need to take place on the town road.

Down and upriver from the falls is a 30- acre lowland hardwood forest (Unit 4 on above map). All of the lowland hardwoods are located on very poorly drained, frequently flooded, mucky soils. Black ash is a dominant tree species with northern white cedar as a common species with minor amounts of balsam fir and tamarack. These wetlands lie along Scott and Howe Creeks, Class 1 brook trout streams. Given the abundant seeps on the upland slopes adjacent to the lowland hardwoods, spring and groundwater movement into these sites is abundant. The likelihood that these sites freeze solid in the winter due to the water movement is very low. Black ash is often associated with well-oxygenated lateral water movement into and over muck soils. The lowland hardwood stands should be reserved from any active timber management for the following reasons:

1) Soils are extremely wet and rarely freeze and won't support logging machinery. Any attempt to log these sites would result in extreme rutting and root damage, not to mention that logging machines would get stuck requiring very expensive towing operations to salvage them.

2) These stands provide shade to help keep water temperatures cool for trout and they also provide abundant coarse woody debris for stream habitat.

3) Forest products are low value and difficult to access

Emerald Ash Borer (EAB) (Agrillus plannipnnis) is a non-native insect pest that is extirpating the ash genus from North America. EAB has spread over most of northern Wisconsin and much of the UP at a rate of about 2,000 – 4,000 square miles per year. It is only a matter of a short time before all the black ash will die. It remains to be seen if the site will swamp (raised water table) leading to flooding death of the other trees or perhaps there are enough conifers on the site to maintain enough evapotranspiration to prevent flooding. Black ash forests in other

locations are being converted to alder swamps when conifers are rare. Perhaps some wetland species planting could be considered in the future.

The forests that are suitable for timber management can be divided into three separate, unique types of forest. The largest area is located on the 40-acre tract mainly north of McGinty Lane on the side slopes and top of a drumlin-like hill on the Winegar End Moraine landform (Unit 1 above). This mature forest is dominated by sugar maple sawtimber 17-21 inches DBH, with very tall, excellent quality basswood. These two species make up nearly 99% of the canopy trees. Stocking of sawtimber and hardwood pulpwood is exceptionally high.

Tree heights of canopy dominants range from 80- 92 feet for sugar maple and 85 to 100 feet for basswood. Timber quality is highly correlated with tree height. The tallest sugar maple trees often have a veneer-quality butt log and the basswood exhibit 10 to 30 feet of veneer logs. Veneer and grade 1 logs make up about 50% of the sugar maple sawtimber fraction and 70% of the basswood. The high quality sawlogs provide an opportunity for a substantial revenue timber sale under the right market conditions.

Dominant trees are 100 to 130 years old and were likely seedlings and saplings that were released following a past heavy cut. Due to excellent site quality, the stand can be carefully managed with intermediate thinning, designed to maximize crop-tree potential for the next several decades.

Invasive earthworms, and particularly nightcrawlers (Lumbricus terrestris) are very abundant and have drastically altered the forest floor. The duff layer has been eliminated with a corresponding huge drop in herbaceous species and fungi. By late summer, the forest floor is extremely hard, bare soil. Invasive earthworms alter nutrient cycling and water retention, pulling large quantities of organic matter deep below the rooting zone.

On the far north side of the Wildcat Falls parcel is another mature 19-acre hardwood forest. (Also Unit 1 above) This mature forest is noteworthy in that it has a significant fraction of large hemlock and yellow birch, species that were cut out of most northern hardwood stands in past timber harvests. Stocking of small and medium sawtimber and hardwood pulpwood is exceptionally high. Tree heights of canopy dominants range from 75-85 feet for sugar maple and 85 to 90 feet for basswood. Timber quality is only fair as there are few crop-trees (19/acre) that can increase in grade over the next several cutting cycles. In general, fewer than 35 crop trees/acre is a sign of past high-grading or poor growing conditions for the dominant species. Since this stand has good drainage for sugar maple, it would normally exhibit more crop trees.
Dominant trees are 120 to 170 years old and were likely seedlings and saplings that were released following a heavy cut in the past. The lack of stumps and very high density indicate that the site hasn't been logged in at least 40-50 years. Due to below average number of crop trees, the stand should be managed with thinnings, designed to release advanced regeneration to establish new age classes. Like most northern hardwood stands outside of the Lake Superior snowbelt, regeneration and pole-sized trees are very sparse due likely to deer browsing and very dark conditions with high competition and few gaps. No invasive plant species problems or earthworms were observed during inventory activities.

**High Conservation Value Forest (HCVF)** – This hemlock/hardwood forest has a distribution of diameters of canopy trees with predominantly large tree sizes between 18-24 inches DBH. It reflects past timber harvest activities that removed most of the large conifers such as hemlock and white spruce but lightly cut hardwoods. Unlike most managed stands, the number den and snag trees is approaching levels estimated for the original climax forest as these components derive from lots of dead wood which is uncommon because trees are cut before

they decline and die in managed forests. The large diameter trees and abundant snags are rare on the regional landscape so that this forest is worthy of HCVF management that strives to maintain its unique features such as seeps, vernal pools and retains at least 4 large legacy trees per acre to live out their life and create future snags.

On the SW corner of the Wildcat Falls tract is a 18.6 acre second-growth, even-aged northern hardwood forest dominated by sugar maple pulpwood that regrew after hemlock-hardwood stands were heavily cut for bark about 80-100 years ago. (Unit 2 above) Drainage is variable with low areas containing red maple and slow-growing sugar maple. The only crop-trees are capable of growing into more valuable sawlogs and veneer are found in areas with some side slopes and better drainage.

Future efforts should be made to regenerate gaps to establish new age classes. It appears that this stand has never been thinned. There are no stumps and the density is very high. Like most northern hardwood stands outside of the Lake Superior snowbelt, regeneration of all tree species besides unpalatable balsam fir, ironwood and white spruce that are 6 feet or higher (above the deer browse line) are very sparse due to deer browsing and very dark conditions with high competition and few gaps. No invasive plant species problems or earthworms were observed during inventory activities.

**Future Timber Harvests** – The three forest areas suitable for timber harvesting could be marked for a timber sale at any time due to their very high density. Complicating the decision, however, is the poor economy. Currently, timber prices are very depressed. It isn't unusual for timber sales in northern Wisconsin and the western UP that are heavy to hardwood pulpwood to receive no bids on the open market.

Under good market conditions, even a modest forest thinning could generate significant revenue in a range of 50 to 60 thousand dollars every 15-20 years. That revenue could be used towards tree planting and protective fencing or towards the purchase of other significant conservation properties. While it may make sense to wait and hope for better future market conditions, it may be just as likely that market conditions remain poor or deteriorate even further.

If or when a timber sale is marked and sold, the goals of the sale will be to maintain the high conservation features while providing the growing space for new age classes of trees and allow existing trees to maintain excellent growth and vigor with increased light and soil nutrients available under lower densities. While some small gaps will be created, the overall forest canopy will still be present thereby maintaining the site's beauty.

*John has a Master degree in Forestry. He wrote a very detailed timber management plan for the Wildcat Falls Community Forest. Following a long career in conservation with the State of Wisconsin Board of Commissioners of Public Lands, he has recently retired. PIF & NWA are proud to have him on board as VP of both organizations. We are grateful he shares the rational in the plan with us all.*

*PIF note: The timber plan is incorporated into the Wildcat Falls Community Forest management plan. Besides PIF and NWA board members who assisted in the plan we give special thanks to Ron Eckstein (wildlife) and Rachel Hovel (aquatic & editing) for their efforts into the greater plan. The whole plan is available electronically on request.*

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***Northwoods Forest Conservation: A Handbook*** is now available in a digital format. If you are interested please contact us for the link.

*We are happy to continue to share these wonderful spots to visit old growth, courtesy of John Bates and Our Living Ancestors*

## Doering Woods SNA

***Location and Directions:*** Price County in the Chequamegon-Nicolet National Forest, T40N-R3E, Sections 21, 22, 27, 28 .

From the intersection of State Highways 70 and 13 in Fifield, go east on Hwy. 70 about 17 miles to FR 144, Shady Knoll Road, and turn left (from Minocqua at the intersection of Highways 70 and 51, drive about 21 miles and turn right on Shady Knoll Rd.). Go north 2.2 miles, then turn right (east) onto FR 535 and go 0.5 miles and turn left into a relatively large, signed parking area for the Round Lake Historic Logging Dam. A fee is required to park here.
Or you can continue north on FR 144 another mile, and park along the road at the sign marking the western end of the Doering Woods trail. This is the preferred place to begin a hike into the site.

The Doering Woods occurs within the 3,600-acre Round Lake Semi-Primitive Non-Motorized Area, which contains the origin and upper reaches of the South Fork of the Flambeau River. The restored Round Lake Logging Dam is located where the river leaves Round Lake, and is listed on the National Register of Historic Places.

To begin from the east side of the trail, take the clearly signed Round Lake Trail for about 50 yards, crossing the river, to a trail intersection with horse trail #126 and walk west. Walking in from this side of the trail, you must walk about a half-mile on a poor path through heavily cutover forest to access the site. It's a powerful contrast, if you need one, to the old-growth. Or you can begin from the far west side of the trail on FR 144, which is well marked with a small wooden sign and map. Walking in from the west end of the trail starts you immediately in the old-growth. The best super-canopy white pines are quickly accessed by walking in here.

No marked trail leads you into the section of the Doering Woods that lays to the north of the river – this is a compassed exploration if you wish to make it.

***Size:*** 284 acres in the SNA

***Forest Type*:** Hemlock-hardwoods with an excellent component of super-canopy white pines

***Status:*** Owned by the Chequamegon-Nicolet National Forest. Established as a State Natural Area in 2007.

*Doering Woods white pine*
*Photo: John Bates*

The Doering Woods, the legacy of the Otto C. Doering family (Doering was once president of the Izaak Walton League), features a mature stand of hemlock-hardwoods occurring in part along the undeveloped shoreline of the South Fork of the Flambeau River. The site has a history of selective cutting, but still contains a surprising number of large super-canopy white pines, a number of which measure between 36 and 38 inches dbh – the largest being 41 inches dbh. Usually the large white pines are the first to go when logging takes place, so these are quite unusual.
The hemlocks range from 16 to 30 inches dbh, not exceptionally large by any means, but very lovely, with a smattering of yellow birch interspersed. While the overall site is not a relict forest, it falls somewhere on the continuum between "mature" and "old".

Very little hemlock or white pine reproduction is occurring within the stand, with heavily browsed sugar maple and red maple dominating the seedlings and saplings. For clubmoss aficionados, the groundlayer is occasionally covered with them.

The South Fork of the Flambeau River splits this site. The river flows quietly here, unlike downstream reaches where whitewater enthusiasts like to play. Anglers can catch walleye, northern pike, and musky here, while the rare lake sturgeon patrols the substrate vacuuming up an array of plants, snails, fingernail clams, and anything else it finds edible. Take your canoe from here to join the main channel of the Flambeau, then into the Chippewa and down the Mississippi.

The super-canopy white pines support nesting pine warblers, the only species of bird in Wisconsin that requires large pines for nesting.

## Name-Calling –not our first talk on Porcupines!

Paul Hetzler

If you're looking for signs of wildlife this winter, forget about paw prints. One of our native mammals faithfully plows its "roads" after each snowfall, and you can often follow these channels right to the fearless critter itself. With a truly adorable face and a rather unfriendly backside, the North American porcupine (*Erethizon dorsatum*) is the only animal with a six-million acre park named after it.

One of 29 species worldwide, our North American porcupine is the largest New World species, growing to 91 cm or 36 inches long and weighing as much as 16 kg or 35 pounds. That makes it the second-largest North American rodent behind the beaver, but still puny compared to an African crested porcupine which can exceed 27 kg or 60 lbs. It is also the only cold-hardy porcupine, and one of the few that regularly climb trees.

Its English name derives from the Latin for "quill pig," but the Kanien'kehá:ka (Mohawks) call it anêntaks, which literally means "bark eater." This is descriptive of the animal, certainly, but ages ago it was a less-than-endearing epithet applied to their Algonquin neighbors. Historically, Algonquin territory encompassed what we now call the Adirondacks, a name derived from *anêntaks*. Unlike the Mohawks who have farmed sustainably for at least a thousand years, Algonquins were hunter-gatherers. Either by choice or need, they would sometimes eat the inner bark of pine, maple, elm and other trees. Eventually the Algonquins moved from the area to points north and east, but the bark-eater place name persisted.

Porkies are active all winter, which of course is a great time to track them. More or less bullet-shaped, they make wonderful plows, carving channels through the snow. Since they tend to use the same paths, you can go out after a new snowfall to see which troughs have been cleared in the night. In contrast to most species, our porcupines are not strictly nocturnal, but they do tend to be less active in the middle of the day.

Porcupine feet are pebbly textured and have no fur, and in deep snow you may also see marks where its tail drags side to side as it waddles. In cases where the claws do not register, its footprint can look (I think, at least) unnervingly like that of a small child.

Like all porcupines, ours is covered in hairs interspersed with up to 30,000 hollow barbed quills. This accounts for their cavalier attitude toward scary stuff like humans, dogs and, unfortunately, cars. Quills are not missiles – they aren't launched at a predator, but will come off at the drop of a hat, provided you drop said hat on the porcupine. The barbed quill-ends are amazingly good at sticking to skin and other things. If not removed, quills work their way through flesh, and can be fatal depending on their trajectory.

Quills were and are used the world over by indigenous peoples for embroidering. Usually white at the base and fading to dark brown at the tips, quills have an innate beauty but are often dyed and worked into leather or textiles. In North America, native peoples reportedly would throw a deer hide over a porcupine to harvest quills that stuck to it. I have taken quills in a similar way from road-killed porkies using a leather glove.

Most of the time, quills lie flat. When confronted by a predator, a porcupine raises them, and keeps its back end to the threat. A porky can lash its eight- to ten-inch long tail side to side, creating a protective radius around itself. Fishers, fierce predators and one of the largest members of the weasel family, are quick enough to outflank a porcupine and kill it by repeatedly assailing the quill-free head. My dad remarked that in a survival situation, the porky is the only animal one can kill with a stick. He didn't explain how one would eat it, other than "very carefully."

Having a cute face only gets you so far in life, and some folks despise porcupines because their bark-eating lifestyle damages, or even kills, trees. Porkies are attracted to *salt as well, and will gnaw on tool handles, canoe paddles or other items handled by people, which doesn't thrill the owners of those objects. Rarely, road salt on auto brake lines can be attractive to them, and the outcome is predictable. One year, some bark-eaters got into the crawl space under my house and chewed a large section of the planks beneath the kitchen floor. I can only imagine that some kind of salty liquid may have been spilled decades ago in the kitchen. Unfortunately, some folks intentionally hit porcupines with their vehicles. It's little consolation really, but this can result in flat tires for those misguided drivers!

In addition to eating bark of all kinds, they love herbaceous plants, and are in clover (so to speak) in a

field of alfalfa. They also have a particular weakness for apples. It is impressive how far out on a branch a porcupine will go to get one, seeming to defy gravity.

Porkies usually make their homes in rock crevices and caves, or sometimes in hollow trees. Breeding is in October and December. In May and June, females may birth as many as four pups, but generally just one. Not only do they have a low birth rate, it takes more than two years for them to fully mature. In the wild, a porcupine may live 17 or 18 years, with the oldest on record being 28 years.

A former neighbor of mine, long since passed away, had as a young man been given an orphan porcupine. He said it made a great pet, and showed me pictures of the full-size porky in his arms. Kids and adults alike enjoy watching porcupines, as they are one of the few wild animals that will go about their business, or at most walk away slowly, in spite of such ogling. If there aren't any where you live, perhaps you can make a trip to that State Park. You know, the "Porcupine Mountains." As such in the UP or the Adirondacks in NY.

*(Mohawk spellings courtesy of Salmon River Mohawk Language Program).*

*Paul Hetzler is an arborist, naturalist and author who has live-trapped porcupines in his apple orchard, but tries not to hurt them on the road.*

- *See April 2018 Partners News for more on Porcupines and the Sodium-Potassium balance*



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## Ethics is the Question, Not the Answer

By Marianne Patinelli-Dubay

Does reading the great books of western civilization, studying the philosophical origins of modern society, considering world religions and recognizing art in all its forms promise a good and thoughtful citizen, a moral compass and a commitment to the beautiful? No. Because education is risky, its results are unpredictable whereas training yields a more reliable outcome. The difference between education and training is especially important now when professional trainings related to individual conduct within agencies, institutions and businesses have become commonplace. Both types of instruction are important, and so is understanding that they are not the same. Training makes good soldiers, appropriately behaved employees and citizens dedicated to the values, vision and rules of a system. Whereas education, particularly an education in ethical thinking, enables these same people to know what they *think* about what they're being asked to do and provides them with the tools to decide for themselves whether and how to proceed.

My emphasis this month is on the difference between education and training as it relates to the subject of ethics, by which I mean the worldly trouble we encounter when we (our conscience, our sense of decency, our fidelity to community and virtue) are challenged by what is unfolding right in front of us. Ethics by this definition is not an answer to the perennial question *what should I do*; rather it is the emergence of the question itself. Ethics is the moment of psychic struggle between what is right and what is possible. It is what philosophers call *the event* and it follows then that teaching ethics is an exercise in how to think critically within particular events, in order to draw your own conclusions about how to act in response to them.

Rules govern every public and private system to which we belong and often, belonging requires a training in order to outline what the group considers correct or ethical. Trainings related to organizational codes of conduct and correct behavior are designed to convey the expectations and agreed upon norms of the group. Education on the other hand, includes instruction and strategies related to how to think about and beyond the expectations, boundaries, and behaviors in order to competently enter into the event. Here ethics is the summons that draws us into a critical analysis of what *is* going on, that is in tension with what *ought* to be going on. Clear and coherent thinking helps us

to discern how to move things as they are, closer to the way they ought to be. You might think of ethics as the conceptual valley between these two possibilities, between what is happening and what ought to be happening. Add to that practical ethics, which concerns what we actually do about the disconnect, how we walk into the valley and bridge the difference.

If you accept that, you should also know that education provides no guarantee that any independent reckoning of ethical considerations will turn out in your favor or that decisions will be made, and conclusions drawn that support a position neatly engineered from the outset. If you want to ensure a particular outcome, training is what you're looking for. Education, in contrast, cultivates a person's free exercise of intellectual autonomy which shows itself precisely when what we are directed to do conflicts with what we know through reason, logic and moral interrogation is wrong. Education is the great liberator, which is exactly why it is never the fastest route to conformity.

Education teaches people how to use reason and logic to arrive at a decision, how to apply what is decided to solve a real problem and to improve the events that compelled us to ask a question in the first place. Training is secondary, it takes (ideally) fully developed critical minds and draws the limits of the system, explains the boundaries and the behaviors that the system will tolerate. Training asks whether one wants to belong and if so, lays out the code that belonging requires. Education liberates the individual to decide whether she can and should go along, by endowing her with the tools required to think for herself.

The only way to guarantee that an educated individual will craft a good life is to equip him or her with all of the necessary groundwork of conscience and character. Such a groundwork is of course yet another long procession in the foreground of maturity, it is not guaranteed and the fact that it is not guaranteed in each of us troubles the whole project of ethical education from the get-go. This is some of why education is risky and why *teaching* ethics rather than *training* ethics is in some ways, an act of faith or hope. And despite the uncertainty and the unknowability of outcomes, I contend that teaching and education is essential. Like all things that matter, it asks more of us than simply stating the rules and carrying on. After all, the more education becomes like training, the less we are inclined towards real and complex critique and inquiry or as the philosopher Søren Kierkegaard famously said, "People demand freedom of speech as a compensation for the freedom of thought which they seldom use."

*And, also from Marianne*

## To All the Logger Ladies

By Marianne Patinelli-Dubay

One of my favorite and most overused terms is to "bracket" or to set aside whatever potentially complicates or distracts, while I attend to the business at hand. With some notable exceptions in my personal history, moments when I fell straight down the rabbit-hole of negative reaction or chronically responding to situations that I was powerless to change, I am Ninja-level in the field of bracketing. This ability pairs nicely with a favorite story from my personal file that either illustrates my mastery of bracketing or qualifies me for the Oblivion Olympics.

I always begin this tale by saying that I was old enough to know better and young enough to be forgiven, which puts me squarely in my 20s. I'd been giving a talk on the history of western philosophy and I ended my lecture by asking for questions from the audience. I braced for impact, excitedly anticipating some real hardballs like *can Kant's Metaphysics of Morals ever be used to support a just war,* or *how does St. Thomas Aquinas deal with the problem of evil?* Instead, a woman in the front row raised her hand and simply

asked *where are the women?* More than two decades later of course I don't recall my response, but I'm quite sure I would have preferred something more straight-forward like *please explain the structure of time.*

My response all those years ago notwithstanding, I can imagine my younger self thinking, *women? What women?* You see, I had not noticed that as I traveled the entire history of western thought I had failed to pick up, if you will, a single woman. I corrected for this omission as I continued my work and my studies, but the experience stayed with me as I tried to make sense of how I could have missed that. Now on the far side of a genuinely satisfying career I see that I missed it, because I wasn't looking for it.

'Representation' could be considered the watchword of our current societal moment and legitimate questions about who gets to speak are at the forefront of our political, academic and social discourses. And yet there I was speaking and representing and entirely unaware of being, in a way, alone in the room. How to account for this? Well, it turns out that my mother was right about almost everything. A few gems from my upbringing related to the subject of this column and to my mastery of discernment include: *it's a man's world, don't worry about it* and *don't waste your time looking around just watch where you're going* and last but not least *the world isn't going to rise to your occasion, Marianne, go ahead now.*

Certain schools of philosophical thought are fundamentally intuitive and behavioral and these approaches are often taken up naturally by people who are not formally trained. Stoicism is one of these schools and my mother is what you might call a naive Stoic. Consider this parable from the Roman philosopher Epictetus (55–135 CE) on the danger of losing focus: "Consider when, on a voyage, your ship is anchored; if you go on shore to get water you may along the way amuse yourself with picking up shellfish or an onion. However, your thoughts and continual attention ought to be bent towards the ship, waiting for the captain to call on board; you must then immediately leave these things, otherwise you will be thrown into the ship, bound neck and feet like a sheep. So it is, with life."

Women have achieved access and education that should clear the way for their emergence into traditionally male dominated fields. Yet rather than going forth in joyful pursuit, many are overcome with a societally imposed identity crisis and crippling angst concerning who and how they represent and whether and when they belong. Anxieties and diversions, shellfish and onions. So, if you are a student or a young professional woman deciding whether a career in natural resources is right for you, I encourage you to take the Stoic approach: to find and follow a path that abides with your nature, to learn and comport yourself to the virtues, to observe and model excellence in whatever form it takes and to become excellent in turn. To those farther along a path where women are few, when you come face to face with the question that was put to me more than 20 years ago say simply that *you* are the woman, that this work is woman's work and know that you are there because you were not distracted by whether women came before you, or by how many would be there when you finally succeeded. You have arrived, unburden yourself now and prop the door open behind you, throw on the lights so your sisters know the way and get to work.

Like so much of my mother's wisdom I accepted it because she knew better, which I knew because she told me that she knew better. And over time I have come to see that indeed, always walking around the house with a wet rag is an effortless way to keep the walls clean, a good cut of meat is worth the extra money and always-always, *go ahead now*.

Marianne Patinelli-Dubay leads the Environmental Philosophy Program at SUNY-ESF's Newcomb Campus on the Huntington Wildlife Forest. In addition to teaching and writing, Marianne Chairs the Adirondack Chapter of the Society of American Foresters and is an active member of the Forest Stewards Guild. Please send your comments and topic ideas for future columns to mpatinelli@esf.edu

*PIF note: We truly appreciate our collaboration with Marianne and the Northern Logger Magazine*

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## Wisconsin Family Woodland Owners Rule!

**(Contributed by Emma Sass, Family Forest Research Center)**

Families and individuals own 57% of Wisconsin's wooded land

Most own their wooded land for beauty, privacy,and nature

88% of family woodland owners want their wooded land to staywooded

Half have cut trees for their own use,and a quarter have cut trees for sale in the past five years

Fewer than a quarter have a management plan or have received advice about their wooded land in the past five

Forests provide benefits at local, regional, and global scales. Families and individuals own more wooded land than any other group in the U.S., and their decisions about how to manage and care for their land have broad impacts. Understanding these woodland owners in Wisconsin, including what they do with their land and why, and what their challenges and needs are, is important to help support healthy forests and vibrant communities now and into the future.

To better understand family woodland owners, the USDA Forest Service, Forest Inventory and Analysis program, through the Family Forest Research Center, conducts the National Woodland Owner Survey (NWOS). Below we present results from 228 randomly selected Wisconsin woodland ownerships with 1+ acres who responded to the survey in 2017 and 2018.

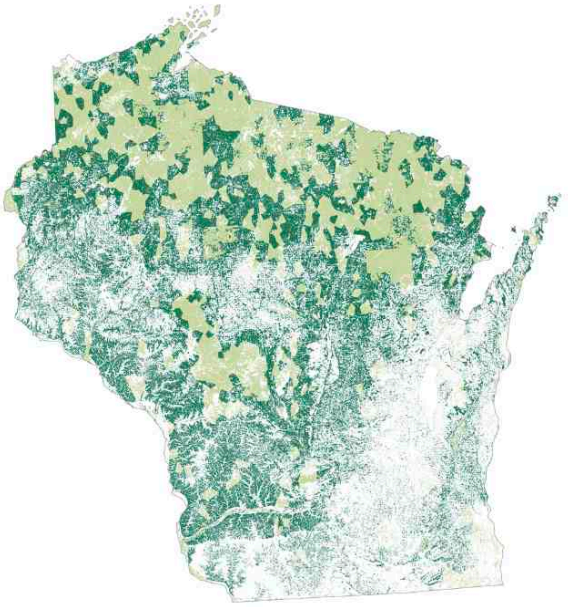
- Family Woodland Owners Dominate: Family woodland owners control 57% of Wisconsin's wooded land, more than any other ownership group. An estimated 340,000 family woodland ownerships control 9.7 million acres in Wisconsin.
- Size of Holdings Makes a Big Difference: The average family woodland ownership (with 1+ acres) in Wisconsin has 28 acres of wooded land. Over half (55%) of the ownerships have relatively small holdings between 1-9 acres, but 44% of the *area* of wooded land is owned by ownerships with 100 acres or more. Because of the increased management options, program involvement, and other dynamics of larger ownerships, all following results are for family woodland owners with 10 or more acres.
- Beauty, Privacy, Wildlife, and Nature are What Matter: The most commonly cited reasons for owning wooded land in Wisconsin are related to wildlife and nature protection, as well as the beauty and privacy the wooded land provide.
- They Love Their Land: The vast majority of owners, 88%, agree or strongly agree with the statement "I want my wooded land to stay wooded." However, most are not involved in traditional land management practices like having a management plan (17%) or receiving advice about their wooded land in the past five years (22%).
- They are Older: The average age of woodland owners in Wisconsin is 63 years. 23% of acres are owned by people who plan to transfer some or all of their wooded land in the next five years.

Woodland conservation and management depend on the people who own it – in Wisconsin, most of these acres are held by individuals and families. We hope additional information about America's woodland owners will lead to more recognition of the roles these people play and will further enhance programs and policies that help the owners, the land, and society.

For more results, visit the USDA Forest Service's National Woodland Owner Survey website at www.fia.fs.fed.us/nwos.

To learn more about the services and resources available to woodland owners in your state, contact your local forestry agency or association *[can specify local resources if desired]*.

Map of woodland ownership



Family woodland (■), other woodland (□), and non-woodland (□) in Wisconsin. Data source: USDA Forest Service.

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# BOBCATS: SHY, NOCTURNAL AND SUCCESSFUL

*by* Richard Gast

In the weeks before Christmas, friends of a friend told me about a bobcat sighting they had, while hiking on a forested trail. And, not long after that, a very dear friend of mine who lives in the same area sent me a couple of photographs she'd taken of a mound and scratch marks she'd discovered in her yard. She told me that she'd also found what appeared to be claw marks on a nearby tree trunk. A bit of research confirmed that both were signs of a bobcat.

Bobcats will cover up their scat (feces) with loose soil, snow, or leaves and leaf litter, much like a housecat will do with the litter in a litterbox; using their hind feet to push materials into a mound. The mound, or pile, will be either at the end of a long scratch or at the center of several scratches from all directions.

Bobcats are highly territorial and mark their ranges with scents from their urine and feces and with claw marks on trees, which alert others to their presence. Male bobcats will also spray, leaving a strong and unmistakable odor behind. If you've ever lived with a male cat that sprayed, you know just what I'm talking about.

Bobcats are solitary animals and are largely regarded as nocturnal, although they may be active at any time of the day or night. Contact with humans is rare and they are not known to attack people. Sightings are regularly reported throughout the region, but are more common in heavily forested areas, especially with rough topography and conifer swamps. Bobcats are not considered endangered or threatened and harvest opportunities exist in many areas.

Males have larger home ranges than females and travel greater distances on a daily basis. According to extensive research, the average home range of a male American bobcat (Lynx rufus) is up to 136 square miles. The average female home range is 33 square miles. In the areas with abundant food sources and prime habitat the range is much less. Home ranges seem to be smaller in areas of better-quality habitat than in areas where habitat is not as good.

**Description**

Bobcats are medium sized cats. Males are generally one-third larger than females. Adults stand roughly 15- to 24-inches at the shoulder. The average body length for a male bobcat is 34-inches; 30-inches for a female. The average weight for a male is 21-pounds; 14-pounds for a female. They are named for their 'bobbed' tails, which are black-spotted and usually between 5- and 6-inches long. The ruff of fur and whiskers around the sides of their faces is characteristic. Ear tufts may or may not be present.

Their soft, dense coat varies in color from light grey to reddish brown; generally shorter and more reddish in the summer and longer and grayer in the winter; and is randomly barred and spotted with black or dark reddish brown. They sport whiter fur on their underside. The fur pattern and coloration provide camouflage, which helps them hide in the surrounding environment while stalking prey or resting.

Albino bobcats have been reported.

*This handsome bobcat finds suitable habitat on the Upper Wisconsin River Legacy Forest. Thanks to Quita Sheehan, Vilas County Conservationist for keeping up with the Snapshot Wisconsin camera.*

**Diet**

Bobcats are predators that thrive, predominantly, on a diet of small mammals. Cottontail rabbits are preferred, but they eat mice, voles, rats, squirrels, chipmunks, rabbits, birds, muskrats, other small prey, and insects, as well. Occasionally, they will kill a larger animal (e.g. turkey, fawn, beaver) and cover the carcass, frequently returning to feed on it. They have been reported to be able to take a porcupine, which the Fischer is famed to do. They are also scavengers and, when food is scarce, will eat carrion; the carcasses of dead animals that they come upon.

**A wildlife conservation success story**

Bobcats are widely distributed across a diversity of habitats within the United States and southern Canada and are, more often than not, considered the most established wild cat in North America. Populations are stable or growing, with twelve recognized sub-species that vary by geographic range. But it hasn't always been that way.

For centuries they were considered a harmful predator species and heavily hunted as nuisances and for their beautiful, and therefor prized, fur coats. As recently as the 1970s, they lacked legal protection in 40 states, where they could be killed on sight and shot or trapped year-round, without limit. Three states, North Dakota, Texas, and Wyoming, continued to allow year-round harvest into the 1980s.

Many northern counties paid bounties on bobcats for decades prior to 1970, when many of the State Legislatures passed a law ending such payments.

The eastern bobcat is the only large cat species still found in most of the area in significant numbers.

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## *Winter scenes in northern Wisconsin from Dave Sladkey*




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# Surviving the Freeze: Animals in Winter

*by* Jackie Woodcock

Winter in the northland is normally marked by abundant snowfall. As Northwoods residents we are hard wired for winter preparation. When the trees have shed most of their leaves and become an array of barren branches, we, like the squirrels are diligently preparing for a long, cold winter. Barbeque grills and lawn furniture get tucked away, wood piles are stacked wide and tall, fuel tanks filled, snow blowers fueled up and snow shovels are conveniently propped near the entrance of homes.

We are prepared and equipped for nature's cold, white glitter we call snow. With the (normal-not this winter as yet) average daily winter temperature being approximately sixteen degrees, double stuffed jackets, insulated boots and hat & mittens become the general attire. We have our own form of hibernation as we load our cupboards with yummy snacks and settle in for a Netflix marathon.

**A freeze/thaw cycle**

But hibernation takes on new meaning for the creatures with whom we share the frozen land. From insect to mammal, miraculous adaptations are taking place around us as the cold season sets in. Have you ever taken a walk in the fall and seen a Woolly Bear? This cuddly looking orange and black caterpillar is seeking shelter in leaf litter and under logs, this is the place where they will hibernate for the winter. As the temperature drops, the woolly bear dehydrates itself and nearly freezes solid during their frigid slumber.

These winter-faring insects produce a chemical called cryoprotectant that acts as an antifreeze and its purpose is to protect the body tissue and organs from being damaged from freezing. When spring arrives and the temperature rises above forty degrees, this fuzzy caterpillar thaws out and continues their life cycle. Shortly after this thawing process the Woolly Bear will spin a cocoon and emerge a month later as a moth.

Throughout the forest, the wood frog has conquered the cold by settling into leaf litter and freezing during the coldest months. Throughout the winter months they will undergo a series of freezing and thawing depending on the temperature. While frozen, two thirds of the water in their body turns to ice. Their heart stops beating, their blood no longer flows and glucose levels sky rocket. These palm sized creatures are able to withstand temperatures as low as zero degrees Fahrenheit for as long as seven months. When the temperature rises and stabilizes, they unthaw and greet the world with an orchestra of chirps before hopping away.

**Winter birds**

In the skies another adaptation is taking place. Most birds flee cold weather by migrating south to a warmer climate, but these journeys are dangerous and energy-intensive. The chickadee instead stays here in the mountains. The chickadee has a number of adaptations that help it survive. These little birds store food throughout the fall and are omnivorous, able to take advantage of almost any source of nutrition: insects, arthropods, seeds, berries, and even fat and meat from carrion.

The chickadee stays warm all day by exercising and shivering, but when night falls, it must find shelter. They will seek enclosed tree cavities and at times, any spot that blocks the wind. When the temperature drops very low, the chickadee slips into a state of controlled hypothermia called torpor in which its body temperature falls by about twenty degrees and their heartbeat lowers from 2,000 beats per minute to 500 to conserve energy and lower its metabolism. As the sun rises the chickadee emerge from torpor, warming itself to normal body temperature by shivering and rejoins its mates for another day of life on the edge.

**Frozen waters**

Let's go to the ponds and lakes and to learn what else has found a way to overcome the cold, harsh temperatures. As ponds drastically change from summer to winter, the painted turtle is going through drastic changes. When ice covers the surface of the water, these reptiles burry themselves in mud, lower their body temperature and metabolism by 95%. Still in need of oxygen, they utilize a spectacular adaptation called cloacal respiration. The blood vessels around the cloaca or rectum are able to extract oxygen directly from water. When spring arrives, they rush to the surface to bask in the sun, adamant in their quest to raise their body temperatures, ignite their metabolism and eliminate acidic chemicals produced during their form of hibernation.

These creatures are just a few among many, adapting to the mountains as they change from lush, green fields to a white-grey, cold hardened landscape. Humans are not alone as we brave the elements. The creatures around us are prepared in their own magnificent way to survive the freeze.

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