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Partners News

May/June 2020

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.

Contact Us

Partners in Forestry
Landowner Cooperative

6063 Baker Lake Road
Conover, WI 54519

partnersinforestry@gmail.com

715-479-8528

PIF's Website:
www.partnersinforestry.com

Have you paid your PIF dues?

Welcome New Member(s)

David Mladenoff

Inside this issue:

UPDATES AND PROGRESS REPORT
WILDCAT FALLS

Recently, a tour of Wildcat Falls and the Upper Wisconsin River Legacy Forest was featured on The Stream, a program by Ben Meyer of WXPR Public Radio out of Rhinelander. At the link one can listen to the interview and see great photos, with some drone photos of the streams and waterfall. (Links are at the end of the transcript, Page 6.)

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Nearby, But Far Different: Two Special Places In Northern Wisconsin, U.P.

By BEN MEYER • MAY 14, 2020

Wildcat Falls in southern Ontonagon County, Mich.
DAN DUMAS/KIM SWISHER COMMUNICATIONS

As the crow flies, Wildcat Falls near Watersmeet and the Upper Wisconsin River Legacy Forest near Land O'Lakes are only 15 miles apart, on opposite sides of the Michigan-Wisconsin border.
But in some ways, these protected places couldn't be more different.

From one, water flows north to Lake Superior. From the other, it flows south, eventually to the Gulf of Mexico.

Huge old-growth trees dominate the area near Wildcat Falls, while a young forest supporting threatened species is common near the Upper Wisconsin River.

But they do have one thing in common. The same man, Joe Hovel, made sure they were protected. As he nears it, walking through the woods, the sound of Wildcat Falls appears to Hovel long before its sight. He's walked through these woods countless times, so finding the falls is no longer a surprise. Even so, it's no less sweet, he says, paraphrasing a friend's description.

Joe Hovel, with his wife, Mary, in the background.
CREDIT DAN DUMAS/KIM SWISHER COMMUNICATIONS

"Wildcat Falls is a place where one can find spiritual harmony through deep discernment," says Hovel.

The 25-foot waterfall cascades over several levels. The rare old-growth forest that surrounds it features hemlock, white pine, and cedar. Exposed rock faces jump off the landscape nearby.

"The property itself is an ecological marvel," Hovel says. "It isn't just the vernal pools, it isn't just the rock outcrops, it isn't just the waterfall, it isn't just the old growth, it's the fact you've got all of these things together. You can go for a hike that's less than a mile and you can see all of this stuff."

Wildcat Falls, as seen from above.
CREDIT DAN DUMAS/KIM SWISHER COMMUNICATIONS

That excitement led Hovel, in his capacity with the non-profit organizations Partners in Forestry and Northwood Alliance, push to protect Wildcat Falls and keep it open to the public. He spent the better part of a decade fighting and negotiating with the Ottawa National Forest and private landowners to make it happen. But now, success has finally arrived, and the land will be preserved as a community forest.

“What’s ten years in the life of an old-growth hemlock or those rock outcrops?” Hovel says of the work his group put in. “What the hell is ten years?”

Scott and Howe Creek is the water source for Wildcat Falls.
“This water will meander, and it’s going to east for awhile, but eventually, its main path is going north,” Hovel says.

After joining bigger streams and rivers, it eventually empties into Lake Superior.

Scott and Howe Creek falls 25 feet to form Wildcat Falls.
CREDIT BEN MEYER/WXPR

Leaving Wildcat Falls, Hovel and his wife Mary have another stop to make. It’s a short drive away, just across the state line in Land O’Lakes. Here are the earliest stages of the Wisconsin River, a comparative trickle to its downstream might.

“This river is just at its beginnings,” Hovel says. “My goodness, by the time it gets even to Rhinelander, it’s a pretty big river.”

This spot is relatively close to Wildcat Falls, but the water flows in a completely different direction, winding through Wisconsin before joining the Mississippi on its way to the Gulf of Mexico.

The namesake waterway as it weaves through the Upper Wisconsin River Legacy Forest.
CREDIT DAN DUMAS/KIM SWISHER COMMUNICATIONS

When Hovel had a chance to protect the forestland surrounding this piece of the waterway, there was no way he could pass it up.

“My first thought was, who would not want to protect our state’s namesake river near its headwaters?” he says.

Completed in 2015, the Upper Wisconsin River Legacy Forest is an agreement between private landowners and the Wisconsin DNR, protecting a tract of more than 1,000 acres.

The agreement was largely facilitated by Hovel’s group. It was largely done to protect habitat for what Hovel calls “a special little critter,” the spruce grouse.

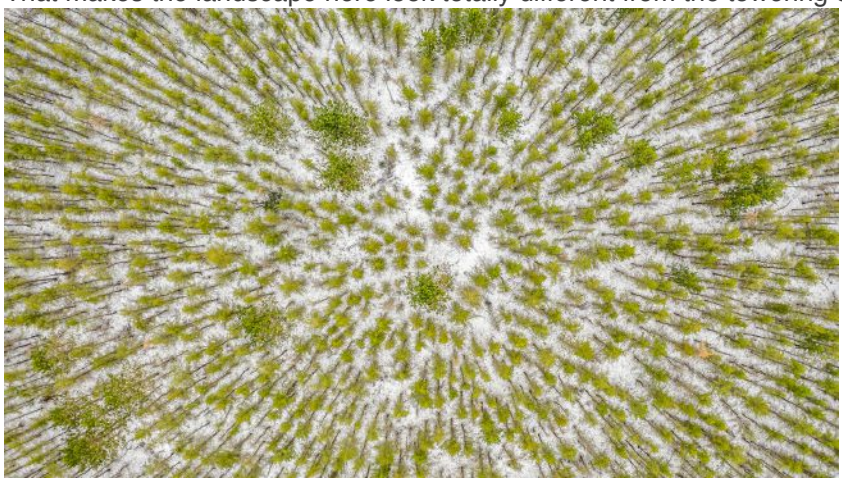
An adult male spruce grouse.
CREDIT CLAUDINE LAMOTHE

Spruce grouse are listed as a threatened species by the Wisconsin DNR, which says the species is at risk of disappearing from the state due to climate change.

"Spruce grouse aren't found in very many places in Wisconsin. It's only the very northern fringe [of the state]. I don't know of an area in Wisconsin that has any better spruce grouse habitat than here," Hovel says.

The species needs the habitat this legacy forest offers: black spruce swamps next to young, recently cut forests of jack pine and similar trees.

That makes the landscape here look totally different from the towering old-growth forest at Wildcat Falls.



Young jack pine stands provide excellent habitat for spruce grouse at the Upper Wisconsin River Legacy Forest.

But besides Hovel's own involvement, these two divergent properties have something else in common.

They're both open to the public, both standing as testaments to conservation of important places into the future.

"The public doesn't come north to see stumps and blacktop," Hovel says. "They come here to see water and trees."

Wildcat Falls can be accessed by traveling here. The main parking area for the Upper Wisconsin River Legacy Forest is here.

Here is the link to preview and download the video –
https://vimeo.com/417332720

Here is the link to preview/download the photos –
https://www.dropbox.com/sh/23xu9hxclmcaezb/AABGMKhHBYrAQrvTYMwA93Gia?dl=0

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FUTURE ARTICLES

We always enjoy member feed back. Let us hear from you!

If you have questions that you would like to see addressed in the newsletter, suggestions for, or have articles for, future newsletters, please contact us at partnersinforestry@gmail.com or by mail:

Partners In Forestry
6063 Baker Lake Rd
Conover, WI 54519

Additional Wildcat Falls Photographs

Marsh Marigolds on Scott & Howe below the waterfall.
Photo: Mary Hovel

Dutchman's Britches.
Photo: Susan Mareth

Quita Sheehan and Susan Mareth sent the photos after a visit to Wildcat Falls to see the spring ephemerals.

Trout Lily.
Photo: Susan Mareth

Hepatica.
Photo: Quita Sheehan

Spring Beauty.
Photo: Susan Mareth

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Over the last several years we have written about the Wildcat Falls property in grants, press releases, and so many other outreach materials. In each of these pieces we have tried to describe what makes this project so special; in essence why it is worth protecting. Wildcat Falls truly is a unique and wonderful place and while we have done our best to communicate this, we realize that something is missing. What we are missing is your perspective, your favorite thing, your special memory from the property. One of the things that makes the Wildcat Falls Property so unique is that is offers a little bit of everything and thus it offers something different to every person that visits it. We are asking you to describe what that special thing is for you. Maybe it is the spring wildflowers? Maybe it is a listening the chorus of frogs in the spring? Maybe it is a walk that you took on the property with a someone special to you. Most likely what you value about Wildcat Falls is not something that we have thought of, which is why we want you to tell us about it.

Details: Please write a short paragraph about what you value about the Wildcat Falls Property. Start your paragraph with the words, "What I value about Wildcat Falls is...." We ask that you keep this concise by keeping it to a few sentences. Feel free to include a photo. Send your submission to us at nwa@nnex.net and include the county that you live in and if you would like to include your name on your submission. We will be posting these submissions on our facebook and the NWA website in the coming months as we work to raise the remaining funds needed to complete the project. When you send in your submission, we encourage you to do one more thing. Send your writing to a few friends and neighbors and, in doing so, share this soon-to-be community forest with your community.

From your friends at Northwoods Alliance.

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We thank the UW Center for Cooperatives for their continuing support. Their support is critical to our outreach, research and educational programs.

Given the uncertainty with the COVID situation we are thinking a bit differently, and practicing more sharing by our newsletters and websites which is critical to replace holding fewer events.

This is your coop. Please be involved. Share an item for the newsletter, expose your business on the website.

Tell us what you are up to in your own management. Send a story or photo of your favorite hike.

Let us know what is important to you, where we can help. Let us learn from each other.

Get out and visit the places we are telling you about. A hike on the Upper Wisconsin River Legacy Forest, wildflowers at Wildcat Falls, hiking at one of the old growth suggestions.

Share your experiences. Do not hesitate to contact us with any questions, comments, rebuttals and suggestions.

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CONSERVATION WITH NO REGRET

WOULD DONATING A CONSERVATION EASEMENT WORK FOR YOU?

This is an article to explain my recent experience of donating a conservation easement to a Wisconsin Land Trust, in this case the North Central Conservancy Trust in Stevens Point, Wi. Donating an easement in my situation meant permanently forgoing selected property rights, such as building development, agricultural farming, farm animals, mining, commercial development and land parceling on 155 acres of 163 acres on a parcel of land. I also consider it a property right to be able protect conservation values.The easement was donated to the land trust and recorded on the property deed. I remain the land owner, pay taxes, retain profits on timber sales and sale of the land, etc.This easement would also apply to future owners. The land trust in a signed agreement agrees to enforce the terms perpetually even in court if neccessary. I had out of pocket expenses to do this which included land trust expenses, tax advice, surveying and a donation to fund future land monitoring expenses.

Why on earth would someone do this?

The best reason for me was to protect wildlife habitat, trees, plants and wetland beyond my days and not have it subdivided in the future. It was a learning curve to get comfortable with this. I attended a UW-Madison Department of Forest and Wildlife Ecology program held at Kemp Natural Resources Station near Minocqua called Wisconsin Coverts Project. A web site for further information is https://fwe.wisc.edu/coverts/ It is free for private land owners and is offered every year. Topics were forestry, wildlife habitat, and landownership issues. Please consider attending this. I attended other conservation seminars. I contacted an attorney in the Sheboygan area who worked with another Wisconsin land trust to see examples of what other land owners did. I contacted Joe Hovel of Partners in Forestry. Joe told me don' t do the deal if you have any regrets.

Here are some things I learned. Conservation easements can be legal charitable donations in both federal and state tax codes. The conservation easement documents I have seen can be tailored to individual land owners. Some easements preserve agricultural farm land, open space, lake shore lines or old growth forests. In my case I reserved logging, forestry and wildlife habitat activity rights, including roads, to assist in those activities. My property remains in the DNR MFL forestry program. I am allowed to participate in other government habitat programs. I can harvest timber, hunt, trap, fish and post the land, etc.

I was able to recoup the cost of expenses previously mentioned because I could show a partially reduced property value on an itemized tax return. The entire piece of land is 163 acres. The easement covers 155 acres. The 8 acres not in the easement are adjacent to the road where there is an old hunting trailer. These 8 acres could be built on. I did this so my kids would have a better chance to someday sell the property if they chose but the new buyer would need to buy the entire 163 acres and leave 155 acres protected for conservation, wildlife and forestry.

I found the people in the North Central Conservancy Trust to be very good people trying to make Wisconsin a better place. The North Central Conservancy Trust web site is www.ncctwi.org. I appreciate that they did an inventory of the trees and plants on the property. I can't tell you the world situation in 50 years but the easement is on the deed in the courthouse to protect conservation values.

The land adjoins a massive county forest. The land has some older pine, a pine plantation, some hardwood, an aspen clear cut and wetland. Animals present are deer, bear, bobcat, wolf, raccoon, fox, turkey, ducks and more. I want the conservation values to always remain with enough management flexibility for future generations to own it.

I would hope "conservation" would spread beyond this piece of land; wildlife produced on this land does not just stay on this land and forestry products grown on this land help the economy. I would like to leave some old growth white pine. The purpose of writing this article is to highlight the idea of exploring your own conservation legacy. My advice would be to talk to other land owners who have done this, talk to land trusts and talk to a tax person who is familiar with this. For my family and me, we have no regrets.

Mark Beilfuss New London, Wi.

A bobcat finds enticing habitat on Mark's land. Wolf, bear and red fox have been photographed there as well.

FOREST PHILOSOPHY

by Marinne Pantinelli Dubay

According to a November 2016 article in the Journal of Forestry, families own 290 million acres of forests across the United States *because they are beautiful*. Of course, that's not the only reason, but as a philosopher merely posing as one of you here in a logging publication, I couldn't resist putting that partially true statement front and center. In fact, owners cited a variety of reasons for maintaining forest properties and yet beauty seems to be the principal driver above wildlife habitat, nature protection, recreation and even family legacy.

In another lifetime or a parallel universe, whichever is more glamourous than the field station office which I currently occupy, I imagine doing philosophy loftily as it relates naturally to concepts like aesthetics and the beautiful. Philosophers define aesthetics as "a kind of object, a kind of judgment, a kind of attitude, a kind of experience, and a kind of value" (Shelley 2017) and it is usually associated with an appreciation of beauty. Philosophers have also spent centuries arguing over what constitutes beauty which is why I love that the question *why a forest*, can be put to 9.7 million forestland owners who overwhelmingly say simply, *this is why.*

But of course, no ideal is simple, and beauty is no exception. On a recent morning my husband and I walked around our family farm and forest going over the particulars of an upcoming harvest. He led me into an area of trees that stands beside the house and before the mountain. He explained that in order to accomplish our management objectives, this area would "look like junk" for a while. I should have been focused on the harvest, but I thought rather about the dimensions of the beautiful, whether utility and short term financial goals are part of the beauty that re-emerges over time as the forest regenerates, as the contour of the mountainside recovers and flourishes more for the cutting.

As the Journal paper notes, financial objectives "such as land investment and timber production, while rated as important or very important by some ownerships, are rated much lower overall compared with amenity-oriented objectives" (Butler et al., 2016) like beauty. In nearly all forest ownerships economics matters beneath, if not alongside aesthetics. Setting aside which is a priority, the economics of a harvest or the beauty of the forest overall, I wondered how the two might be nested. Because if forest owners hold beauty as their highest goal, then the better we communicate that beauty is not at odds with utility, the better able we are to advocate for working forests among owners.

Cherry-picking now from thousands of years of (admittedly) unresolved philosophical disagreement on this subject, consider this small exchange from the 4th Century:

> **Socrates**: In short everything which we use is considered both good and beautiful from the same point of view, namely its use.
>
> **Aristippus**: Why then, is a dung-basket a beautiful thing?
>
> **Socrates**: Of course it is, and a golden shield is ugly, if the one be beautifully fitted to its purpose and the other ill. (Xenophon 1923)

Socrates is talking about simple objects, whereas I'm thinking in terms of a living system. Yet the idea holds; if the well-managed forest is the higher functioning system, and the higher the function the greater the beauty. It follows from here that the key to beauty is twofold: immediacy in terms of utility now, and time over which the careful use or management of a thing reveals or enhances its natural splendor.

In my present reality where all philosophy leads back to the forest, I am heartened by confirmation that the working forest and the beautiful are paired. I feel justified that my craft and my calling, that practical philosophy in search

of the beautiful, does not escape my daily work here among each of you who keep and tend to the land. This affirmation has the symmetry that a calling requires: where ideal and craft and righteousness are one. We could have saved thousands of years of argument had Socrates simply held up the working forest as evidence of the beautiful, and at least a decade of my own self-doubt as I have struggled sometimes to answer the question of *why a philosopher in the forest* because now like so many forest owners I can say, *this is why*.

Please send your questions and comments for upcoming columns to: Marianne Patinelli-Dubay at mpatinelli@esf.edu, *by mail to SUNY-ESF's Newcomb Campus, 6312 State Route 28N, Newcomb, NY 12852 or by FAX at 518-582-2181.*

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From author, naturalist and PIF friend John Bates, in this issue we offer 2 segments excerpted from his book Our Living Ancestors. One is the manual for woodland owners and the second is a great old growth visit in Oneida County.

We thank John for all he does for PIF and the environment, which benefits us all.

A Manual for Private Land Owners

We must not despise land that has felt our heavy hand. Some of that land we must marry and use for our own needs . . . and other parts of that land must be set aside to heal – to turn slowly into old growth again . . . In the sense that a place is recovering, it makes the place that much more precious, as an emblem of how much recovery is possible.[1] - Bill McKibben

The easiest approach to restoration on private property is to leave the forest alone and let natural processes take their course. Though some properties are so altered and transformed that intervention appears essential, over a century or two, natural succession will transform second-growth into old-growth ecosystems.

However, this doesn't always meet the real world needs of landowners. The challenge for many landowners is to develop an approach that leads to restoration of old-growth and the ecological complexity of their land, while still meeting their personal timber management goals. Individual landowners can do "biodiversity tithing" – a portion of one's land can be maintained as truly wild to allow trees to grow old.

But is there a way to manage one's entire property ecologically?

One way is to use the "three-legged stool" of ecological forestry.[2] This approach says to:

1- Leave alone any biological "legacies" in existing stands, such as old and large decadent trees, snags, and other coarse woody debris on the forest floor, as well as populations of herbaceous and understory plants, and the organic matter itself on the forest floor.

2- Try to emulate the natural development of the forest over time. For instance, when thinning a stand, work to replicate how natural disturbances on your land occur.

3- Extend the time in between cuttings and allow older groups of trees to develop.

That sounds fine in theory, but what does it mean on the ground? Here are some clear processes and parameters to consider.

1- One can mimic natural disturbances and speed the process of natural succession by periodically cutting holes in the canopy that simulate small blowdowns or individual trees falling. Canopy gaps need to be large enough to encourage understory growth, but the size of the gap matters. Gaps that are 20 to 30 feet in diameter encourage the growth of shade-tolerant species like maples, yellow birches, beeches and hemlocks. Larger gaps, in the range of 30 to 150 feet in diameter, favor the growth of mid-tolerant species, such as oaks, white ash and white pine. Gaps greater than 150 feet in diameter favor sun-loving species, such as white birch, aspens, red pine, and cherries. Consider giving special attention to what are now uncommon species like white pine and hemlock wherever they are in the understory, since they can live for many centuries and will provide seedstock for new trees over that time.

2- Leave tip-up mounds, which occur when trees are uprooted by wind. The pit forms where the roots were, and provides exposed soil that helps species like red oak, white pine and basswood to germinate. The uplifted mound decays slowly, providing a home to fungi, lichens, bacteria, invertebrates, amphibians and various wildflowers, shrubs, and trees.

3- Leave at least four fallen logs in each acre of forest. These provide habitat for bacteria, fungi, mosses, ferns, wildflowers and trees, as well as invertebrates, amphibians and reptiles. Mosses often cover the logs as they decay, absorbing and retaining moisture, even during periods of drought. These “nurse logs” provide the conditions yellow birch, hemlock, and cedar need to germinate and grow.

Also, leave different tree species on the ground since different trees decay at varying rates and provide diverse nutrients. If you don’t have enough downed trees, cut down a few, and do so every few years until your forest grows old enough to have a few die every year on their own. Leave the stumps as well – lots of plants will germinate on the stumps as they decay. And resist the very human, but very wrong, desire to clean up the organic litter – the branches and leaves – on the forest floor. Allow the brush to decompose on the ground, providing habitat for wildlife and nutrients to the soil.

4 - Leave at least two or three living cavity trees greater than 10 inches dbh in each acre of forest. If possible, leave at least one greater than 20 inches dbh – the larger the better since big trees provide homes for a greater number of species. Select hardwoods like sugar maple and oaks, which live for a long time. But also select some softwoods like basswood, aspens, white birches, and conifers, which are easier to excavate by smaller birds like yellow-bellied sapsuckers and black-capped chickadees.

5 – Leave a minimum of two standing dead trees (snags) and one larger snag in every acre of forest.

6 – Leave or plant at least three mast trees and shrubs per acre. Mast trees provide fruit or seed for wildlife. Hard mast species include species like oak, beech, butternut, hazel, and hickory, while soft mast species, include species like black cherry, pin cherry, choke cherry, and mountain ash.

7- Finally, think about vertical layers in a forest. From the smallest to the tallest, to everything in between, various sizes of trees and shrubs and herbaceous species feed, house and provide cover for a large array of species. Tall white and red pines and other conifers often tower above the canopy to form the supercanopy layer, so leave at least one cluster of pines, hemlocks or spruces in every acre of forest. The large, old trees are the genetic storehouses, the most vigorous and fit of all the trees, that have survived in your woods over centuries. Protect them in all forests, but in particular in early successional forests as sources of seed for natural regeneration.

[1] “We must not despise land that has felt our heavy hand” Bill McKibben, “Future Old Growth” in *Eastern Old Growth Forests*, (Washington, D.C. 1996).

[2] “One way is to try to restore biological integrity” Jerry Franklin, et al, “Natural disturbance and stand development principles for ecological forestry,” Gen. Tech. Rep. NRS-19. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station (2007).

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Selected Old-Growth in the American Legion/Oneida County Complex: Germaine Hemlocks SNA

Location and Directions: Oneida County. T37N-R7E, Section 3 W½SW¼, SW¼NW¼.
From the intersection of U.S. Highway 8 and State Highway 47 in Rhinelander, go north and west on 47 about 10 miles (through McNaughton), then continue west (turn left) on Fawn Lake Road about 2.6 miles, then left (south) on South Doe Lane 0.3 mile to a boat landing on Long Lake. The site is nestled between Long, Corner, and Tyler Lakes. An old road/trail to the right begins 0.1 mile from the intersection of Fawn Lake Rd. and South Doe Lane, and runs the length of the stand.

Size: 88 acres

Forest Type: Hemlock-hardwoods with supercanopy white pine

Age of the oldest-known trees:

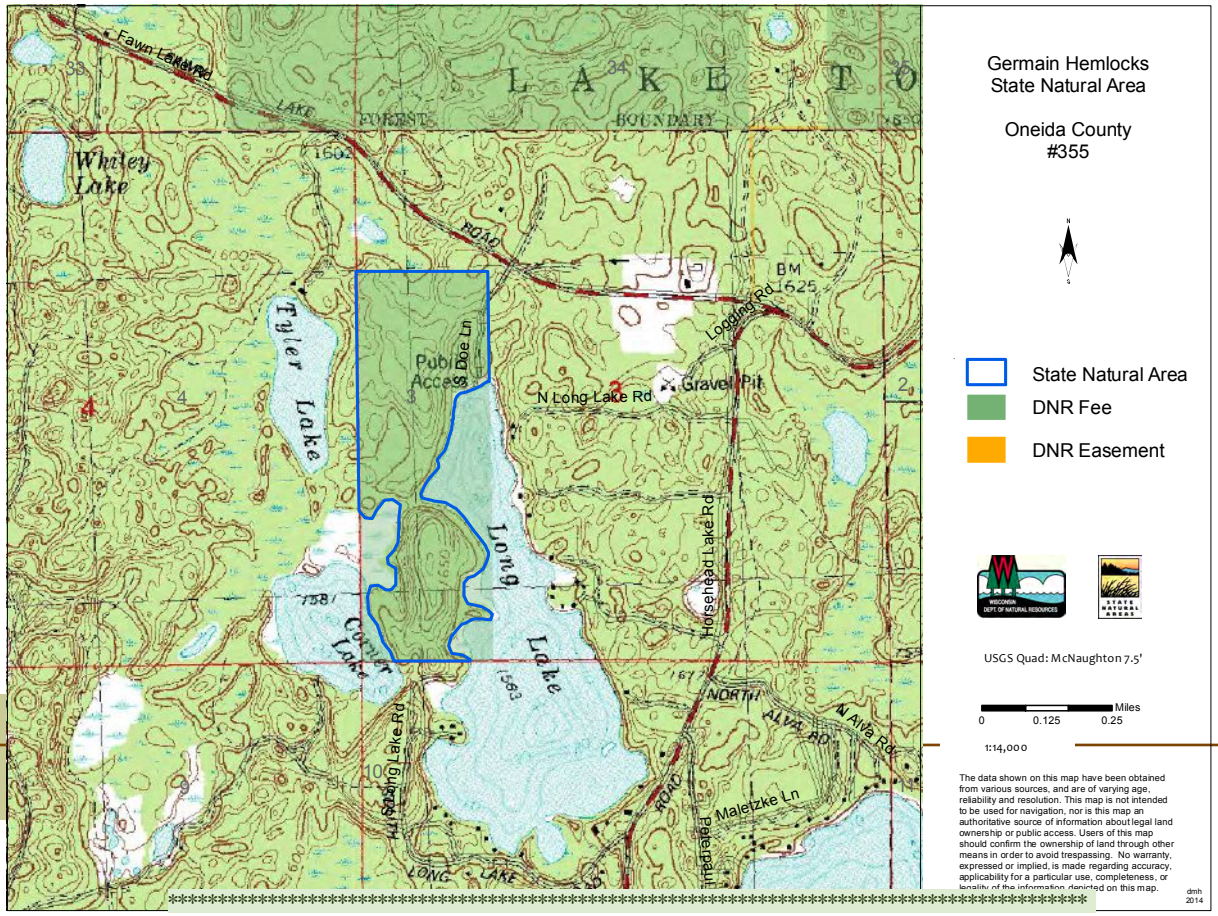
Status: Owned by the WDNR and established as a State Natural Area in 2002.

Description
Situated between three lakes, Germain Hemlocks supports old-growth northern mesic forest dominated by large hemlock with supercanopy white and red pines. With numerous large standing snags, an abundance of coarse woody debris covering the forest floor, and scattered but good reproduction of hemlock, the site contains most of the attributes one looks for in an old-growth stand, except for large acreage.

The sparse shrub layer includes beaked hazelnut, American fly honeysuckle, and maple-leaved viburnum. Along the shore of Corner Lake is a small stand of large red pines with an understory of huckleberry and blueberry. Herbaceous species include Canada mayflower, various clubmosses, intermediate wood fern, wild sarsaparilla, rosy twisted-stalk, partridgeberry, wintergreen, and large-flowered bellwort.

Bird species include common raven, pileated woodpecker, scarlet tanager, ovenbird, blue-headed vireo, and black-and-white, blackburnian, pine, yellow-rumped, black-thoated blue, and black-throated green warblers.

The natural area is named in honor of Clifford E. Germain, first ecologist and coordinator of Wisconsin's State Natural Areas Program, who helped protect many such places during his DNR career.



Another great feature on the Ethics involved in forest management. Transactions between foresters, logger and landowners have a great deal to do with the future and quality of our woodlands, and we want to help you understand all factors in making good decisions. In cooperation with the author, Northern Logger magazine and PIF.

Loggers consistently say that their professional reputation is paramount and that without it, the logging business is a losing game. Foresters say that a logger in good standing will always be given the best jobs and when times are tight, these folks are never more hard pressed for work than anyone else in the supply chain. Yet as I reflect back on the situation we addressed in the April issue, I wonder how can the Curious Farmer be assured that she is indeed working with a logger who understands the value of his reputation especially if the harvest goes forward without a forester to oversee the work.

I put this question to a forester recently who told me that his job is to "provide a service to the landowner, the logger's job is to convert standing trees into revenue. The driving question for a forester might be *how much should I charge the landowner for making sound silvicultural, economic and ecological decisions,* whereas the logger's income is almost entirely determined by his ability to convert a standing tree into dollars." Put another way, the forester is responsible for taking a range of ecological impacts into account when determining what to cut, when and how to cut it, and to make sure the logger is doing what he has agreed to do. In contrast, the logger isn't expected to educate and provide this comprehensive guidance to the landowner.

So if it's permitted for the Curious Farmer to proceed in sole agreement with the logger who is not bound by the expectations that a forester labors under, how can the Farmer can be sure that quality work is done on the land? The field of developmental psychology provides some insights through findings that show people consistently do the right thing when it improves their social capital in areas like reputation, prestige and belonging. It stands to reason then that the best way to ensure that someone does the right thing, is to show that right behavior will increase their stature within the social conditions (like reputation) that *already* matter to them.

In other words those of us who spend a lot of time talking about ethics, should also be clear that acting ethically contributes to status markers that directly impact professional and economic results. But … *hold on* … maybe you're thinking that doing the right thing should be natural, and we should behave ethically because it is right to do so. Well, yes and this is sometimes complicated by the reality that doing the wrong thing can bring immediate economic advantage and doing the right thing sometimes means making less money for more work. In a perfect world this calculation would always be flipped, but in the world in which loggers and foresters make their living, reality is often interwoven with the struggle to maintain good judgement and best practices.

One more thing we know about the disconnect between real life and work, versus ethical preparation for the virtuous life, is that in the clutch of a difficult moment we make an almost instinctive determination involving self harm and benefit. If this is true, then the logging industry would do well to strengthen the real connection between economic benefit and reputation in order to increase the likelihood that professionals who care about their good name and the advantages that it brings will do good, even in the face of the easy-wrong and the short-term gain. The professional who knows his trade, works hard and thinks creatively within adverse circumstances will do alright even in difficult economic terrain. But the logger who also understands what motivates right-doing and combines virtue with a desire to succeed will always come out ahead. That's because doing the right thing is a long term strategy, and it can be difficult precisely because it is the immediate concerns that often trigger our behavior.

If a logger does what she knows to be right because it contributes to her reputation, and if a good reputation keeps her busy all the time then it confirms the familiar adage, *don't sell timber to someone who knocks on your door because the best loggers are too busy to do that*. A good forester wants a good logger to do a job that is worthy of both reputations, and foresters learn early on that "for all the lofty silvicultural principles you learned in school, you get nothing done on the ground except by a logger." In the best situations, the forester and the logger are working in tandem towards silviculturally and professionally sound and mutually advantageous ends.

Please send your questions and comments for upcoming columns to: Marianne Patinelli-Dubay at mpatinelli@esf.edu, by mail to SUNY-ESF's Newcomb Campus, 6312 State Route 28N, Newcomb, NY 12852 or by FAX at 518-582-2181. With gratitude to Russell Reay for lending his professional expertise to this column.

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LIVE LONG AND PROSPER TOGETHER

Paul J Hetzler, ISA Certified Arborist since 1996

I imagine there was a lot more hand-wringing prior to the Covid-19 lockdown in Switzerland as compared to other countries, because since 2008 it has been a federal crime there to isolate social animals. Makes you wonder if Swiss authorities have brought charges against themselves yet, or whether they're waiting until after the crisis lets up.

For social animals from elephants to ants, contact with others of their kind is as essential to well-being as food and water. In fact, a 2015 Brigham Young University study found that loneliness may be a greater human health risk than smoking and obesity combined.

Not everyone responds the same to isolation, and a small percentage of people prefer a hermit-like existence. On the flip side, one can feel lonely while surrounded by others if emotional connections aren't there. While loneliness is an issue for elders, young adults report the greatest feeling of social isolation. This sense declines in middle age, and rises again in the elderly.

Though research has strengthened the thought that isolation causes poor health, the idea is not new. People have long noted the correlation between loneliness, and illness and early death. Author Sadie F. Dingfelder, writing in the *American Psychiatric Association Journal* in November 2006, bluntly states "Loneliness kills, according to research dating back to the 1970s." Dingfelder notes that animal studies show a lowered immune response in rats isolated from their peers. An interesting side bar is that female rats were more resilient than males when faced with acute stress, something also seen in humans.

Long-term isolation is especially bad. Amnesty International says "...the practice of holding prisoners in prolonged solitary confinement…is in violation of international law." Figures on isolation length are not well known, but in one Colorado prison, the average was 8.2 years. Of the estimated 75,000 US prisoners now in solitary confinement, Amnesty spokesperson Erika Guevara-Rosas said "You cannot overestimate the devastating impact long periods of solitary confinement can have on the mental and physical well-being of a prisoner."

Obviously, we are not the only social animal that suffers when separated from others. The renowned animal researcher Dr. Temple Grandin contends that "All domestic animals need companionship. It is as much a core requirement as food and water." Many biologists contend that evolution selected for social behaviors like grouping, altruism, fairness, and reciprocity in lots of species. The phrase "survival of the fittest" has nothing to do with physical strength – it simply means living long enough to reproduce.

Risking one's hide to defend the collective will benefit the individual. Sharing food within a kinship group increases the chances they'll return the favor when it's you who strikes out at the fishing hole or hunting ground.

As an example of the need for socialization, when dogs do not get adequate social bonding and companionship they become distressed. Signs of isolation stress in dogs include destructive behavior and a refusal to eat, as well as prolonged vocalizing, pacing, chewing or licking.

Cattle need friends too. A 1997 study published in the journal *Physiology & Behavior* showed that an isolated cow's heart rate and blood cortisol levels rise. But in the presence of other cattle, a previously isolated cow calms, with behavior and blood markers for stress returning to normal.

A 2015 study of small social animals – ants to be exact – published in the journal *Behavioural Ecology & Sociobiology* concluded that "Social isolation causes mortality by disrupting energy homeostasis in ants." In plain language, lonely ants die young. Ants that were allowed to socialize lived more than ten times longer than isolated ants, although researchers do not know precisely why. Isolated ants tend to pace around more, and do not digest food well. One hypothesis is that social interactions release chemicals related to ants' digestion. And if you think ants are too small to get lonely, studies suggest that cells prefer company, with isolated ones petering out sooner than cells grouped together.

The larger point is that we need to reach out more, both for our own health and that of our family,

friends and neighbors. Though in-person visits are ideal, these days we have to make do with virtual contact. Even a dating App like "Tinder" might help relieve isolation. If your ant comes up, though, definitely swipe left.

Paul Hetzler is a naturalist and an ISA-Certified Arborist. He lives with his wife in Val-des-Monts, Québec.

Please visit paulhetzlernature.org for hundreds of articles on trees and critters. My book of nature essays is at https://www.amazon.com/dp/099860609X

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No one likes bad news, this from Michigan DNR is very bad! The punishment does not seem enough.

Chippewa County man charged with 125 wildlife crimes following DNR investigation

A 56-year-old Pickford man was arraigned Wednesday morning in Chippewa County's 91st District Court on 125 wildlife misdemeanor charges, following a months-long investigation by the Michigan Department of Natural Resources Law Enforcement Division.

Kurt Johnston Duncan faces charges that include illegally harvesting 18 wolves over the past 18 months and killing and disposing of three bald eagles. Wolves are protected in Michigan and are on the federal endangered species list. Bald eagles are protected under state law, as well as the federal Bald and Golden Eagle Protection Act. Duncan, who today pleaded not guilty to all charges, faces:

- **Up to 90 days in jail and $1,000 fine for each wolf.**
- **Up to 90 days in jail and $1,000 fine for each eagle.**
- **Restitution of $1,500 per eagle and $500 per wolf.**
- **Up to 90 days in jail and $500 fine each for the other wildlife crimes.**

Duncan was served four search warrants in March. Other species involved in the charges include deer, turkey, bear and bobcat. DNR law enforcement detectives said that Duncan was using the animals for a variety of reasons, including crafts, selling, or disposing of them, and stated that he was catching the animals because he could and "likes to do it."

Conservation officers collected evidence to support the charges and identified additional suspects who are expected to be charged in the near future.

"We had a team of conservation officers that worked well together throughout this investigation," said DNR Law Enforcement Division Chief Gary Hagler. "Investigations like this require a long-term commitment from everyone involved. I want to thank the prosecutors in this case who worked with our officers. We are happy with the outcome and hope this case sets an example to prevent future natural resource crimes."

The Chippewa County Prosecuting Attorney's Office is seeking $30,000 in restitution to the state for the illegally taken animals. Duncan's cash bond is set at $500. Other conditions of Duncan's bond include having no contact with co-defendants, no possession of a firearm or dangerous weapon, and no engaging in hunting or fishing.

Anyone witnessing a natural resources crime or having information about such a crime is encouraged to call or text the DNR's Report All Poaching hotline at 800-292-7800.

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Just when we thought we had our fill of illness, and Lyme Disease, we learn how little we knew earlier.

TICKED OFF AGAIN

Paul Hetzler

It seems the price we pay for warm weather is the onset of bug bites. Clouds of mosquitoes suck the fun out of outdoor activities, but one bite from a deer (black-legged) tick can put you out of commission for the whole season – maybe longer.

As recently as a decade ago in northern NY State and in the UP of Michigan it was unusual to find deer ticks on you even after a long day outdoors. Technically an invasive species, the deer tick (*Ixodes scapularis*) is another gift from down south, having gradually moved north from the Mid-Atlantic and lower New England states. Generally speaking, they are now widespread in the northeastern US and southeastern Canada.

Deer ticks are arachnids, in the same family as spiders – smaller, but far more dangerous. They are known to vector Lyme disease and a slew of appetizing scourges, including babesiosis, erlichiosis, anaplasmosis, Powassan virus and more. It's fairly common for a tick to transmit multiple diseases at the same time.

Our understanding of tick-borne illness has changed drastically in the past few years. If you have literature older than 2015, throw it out (tick literature – save your other books). As an example, Dr. Ninevah Zubcevic, a tick specialist who teaches at Harvard Medical School, contends that the red expanding "bull's-eye" rash or erythema migrans, once considered the hallmark of Lyme, is actually rare, occurring in fewer than 20% of Lyme cases. Other credible sources put it even lower.

In 2014, the New York State Department of Health commissioned a tick study in four northern NYS counties. It concluded that about 50% of ticks were infected with *Borrelia burgdorferi*, the spirochete bacterium that causes Lyme (not *Lyme's* – those are for mojitos and margaritas). This conflicts with older material suggesting a 20% deer-tick infection rate.

In addition, by 2016, researchers had identified two more deer tick-borne microbes in the genus *Borrelia*. These newbies, *B. miyamotoi* and *B. mayonii*, can give you a so-called "Lyme variant." Sadly, blood tests don't recognize these recently identified pathogens.

This isn't to say we need to panic, though feel free if you like. Avoiding ticks would be the most effective course of action, but if you work or play out in the real world, that's not always an option. The US Centers for Disease Control and Prevention (CDC) recommends using products with 20-30% DEET on exposed skin.

Clothing and footwear can be treated with 0.5% permethrin. Although I am not a fan of pesticides in general, I can't say enough about how effective permethrin is. It not only repels ticks, it kills them within minutes. Another great thing is that it's a once or twice per season application – it is reported to stay effective through at least 20 wash cycles. Always follow label instructions – permethrin is 2,250 times more toxic to ticks than to mammals, but it's still a pesticide.

Out in the woods, never follow a deer trail. Treat your pets regularly with a systemic anti-tick product and/or tick collar so they don't bring deer ticks into the home. Talk to your vet about getting your pets vaccinated against Lyme (sadly there is no human vaccine at the moment).

Check for ticks every evening after showering. They prefer hard-to-see places such as the armpits, groin, scalp, and the backs of the knees. Also look closely at the beltline and sock hem – they like to tuck into the edge of clothing.

If you find a tick has latched onto you, the CDC recommends grasping it with tweezers as close to the skin as possible and pulling straight up until it releases. You may have to pull hard if it has been feeding for some time. Use steady pressure – no sudden motions.

Do not use heat, petroleum jelly, essential oils or other home remedies – please! These treatments may get a

tick to release, but they will also make it disgorge the entire contents of its gut into your bloodstream. Unless you want a disease injection, remove ticks the proper way.

Please note that mouthpart fragments usually remain in your skin afterward. This is not a problem, and will not increase the risk of illness. Apply a topical antibiotic – your body will expel the fragments.

While it was once thought ticks did not transmit Lyme until they had been attached for 36 to 48 hours, experts now say that while you definitely have 24 hours, beyond that you are at risk. But other illnesses can be transmitted within minutes. Hooray, right?

Early symptoms of Lyme disease vary widely – wildly – from person to person. Early Lyme effects may include severe headache, chills, fever, extreme fatigue, joint pain, night sweats, or dizziness. But the first signs could be heart palpitations. Lyme may present with sudden and marked confusion as its first symptom. Too many times it has been mistaken for dementia, and has also been misdiagnosed as depression, and even schizophrenia.

If you've been bitten by a deer tick and have any such symptoms, call a doctor right away. Prompt treatment is critical – Lyme can cause irreversible arthritis, and cardiac impairment, or neurological damage. Most people respond well to treatment, but a few may take months, sometimes more than a year, to recover. It's a shame how little is known about "Post-Lyme Syndrome" or "Chronic Lyme" beyond that they may involve autoimmune responses, and they devastate the lives of those afflicted.

An important point is that the Lyme titer or Western blot test is NOT a yes-or-no assay. Each lab chooses how sensitive – i.e., effective – to make its Western blot. Of the 36 immunoglobulin "bands" identified by the CDC for a complete Lyme test, labs typically check for seven to twelve bands.

Individual labs also decide how to interpret the tests. One lab might count two positive bands as a yes-result, while the next may require three bands. Follow this logic: Two bands present – "Stop whining and get back to work." Three bands – "OMG you poor sick puppy! Take these pills and rest a few weeks." You get the yes-or-no call, sure. But you don't get to see your score card unless you insist.

Also, the Western blot is known to have at least a 36% false-negative rate (*Journal of Clinical Infectious Diseases*, 07/2008). And according to lymedisease.org, "56% of patients with Lyme disease test negative using the two-tiered testing system recommended by the CDC. (Stricker 2007)"

To recap, deer ticks can mess up your life in a big way. Use permethrin on clothes and shoes, check for ticks daily and remove them promptly. Very few Lyme cases involve a rash, and symptoms can be all over the map. Find a doctor who will treat you based on clinical presentation, because testing is unreliable, to put it nicely. For lots more great information, peruse the Canadian Lyme Disease Foundation website at https://canlyme.com/

Now, get ticked off and stay that way!

Paul Hetzler is a naturalist, educator, author and an ISA-Certified Arborist. He currently lives with his wife in Val-des-Monts, Québec.

See more about the Applied Forest and Wildlife Ecology Lab at Michigan State University, and their work on this issue see https://nhardwoods.wixsite.com/nhwresearch

OPINION: Wildlife of northern hardwood forests prior to timber harvests in Michigan

Gary Roloff Guest columnist Apr 18, 2020

There's a huge ongoing, forest regeneration study occurring across the northern forests of Michigan. One of the aspects involves use and impacts by wildlife, especially white-tailed deer.

Northern hardwoods occur over millions of acres in the Great Lakes region. This forest type includes a variety of tree species that currently include maples, oaks, birches, beech, and ironwood, and secondarily conifers (like white pine and hemlock), aspen, and basswood.

Northern hardwoods are valued for timber production and wildlife habitat but concerns about the ability to grow new trees after timber harvest prompted the Michigan Department of Natural Resources (MDNR) to study alternative approaches for managing this important resource. These concerns prompted the "big northern hardwoods study."

This study started in winter of 2017 with collection of data prior to timber harvest. In winter of 2018, MDNR and forest industry partners harvested timber from 140 30-acre sites spread throughout Michigan. One of four timber treatments was assigned to each site. These treatments ranged from the typical, historical way of managing northern hardwoods using what is known as selection silviculture, to more aggressive techniques like seed tree, where most trees are cut leaving 6-8 seed trees per acre. Although a primary focus of the research project is tree regeneration and recruitment, the MDNR Wildlife Division was also interested in wildlife responses to the different treatments.

For 48 of the 140 study sites, the Applied Forest and Wildlife Ecology Lab (AFWEL, afwelsite.com) at Michigan State University deployed four trail cameras within the 30-acre harvest areas to monitor wildlife activity prior to timber harvesting. Although the focus of the project is deer use and behavior and how that affects tree recruitment, cameras offer an opportunity to learn about other species. These cameras collected data for about a year prior to timber harvest and accumulated over 250,000 photos.

One question the AFWEL needed to answer was whether four cameras were enough to reliably portray deer use of the study sites. To answer this question, the AFWEL deployed 25 cameras on one site (a camera every 1.2 acres) and compared deer use among different combinations of the 25 cameras. Although there was considerable variability, the AFWEL found that four cameras portrayed deer use almost as good as 25 cameras for a 30-acre site. Thus, the AFWEL was confident that the camera design would provide meaningful information on deer use to the project.

In the process of sorting through 250,000 photos, the AFWEL quickly recognized that there was an opportunity to collect information on wildlife other than deer, particularly for some of the medium to large-sized animals using the sites. The AFWEL ultimately looked at two broad groups of wildlife: herbivores (or plant eaters) and omnivores/carnivores (or meat eaters). Within these groups, the AFWEL further summarized photos for medium- and large-sized animals. For example, large herbivores included deer and moose, and medium herbivores included snowshoe hare and porcupine. Large carnivores included black bear and wolf, and medium carnivores included bobcat, coyote, fisher, marten and red fox.

Not surprisingly, the AFWEL found that deer used all 140 sites prior to timber harvest. As part of the study, the AFWEL will quantify deer residence time (e.g. how long deer stay in front of the camera, exposing the trees to potential browsing) and behaviors by season. The AFWEL predicts lower residence times and less

deer browsing behaviors in some timber harvest types, particularly those designed to restrict deer access to portions of the harvest areas (e.g., by leaving treetops to shelter seedlings).

Research indicates that predators also affect herbivore behaviors. The camera data provide the AFWEL an excellent opportunity to look at activity times of predator-prey combinations on study sites. For example, the AFWEL found that in the western Upper Peninsula, morning and evening deer and wolf activity peaked at the same times, but wolves also showed an increase in afternoon activity when deer were not active. This frequent wolf activity may reduce the time that deer spend on particular sites, thereby giving the trees that deer like to browse a better chance to recruit into the overstory. This pattern was not as clear in the eastern Upper Peninsula, where deer and wolf activity did not closely synchronize. For medium-sized animals, the AFWEL found that activity of snowshoe hares and porcupines peaked at night, whereas fisher and marten activity peaked during the day.

A big part of AFWEL's work is to continue monitoring sites for wildlife use now that timber harvest is complete. After timber harvest, the AFWEL added four cameras around study sites to monitor deer activity in the surrounding area. This is an important part of the research because a timber treatment that successfully recruits desirable tree species in a landscape heavily used by deer (thus, likely exposing the trees in harvest areas to browse pressure) is a win for forest and deer management; which is the ultimate goal of the project. Hence, knowing how deer are using the areas around timber treatment sites is important.

All of the AFWEL's cameras have a metal tag that read "MSU Forestry Research." So, if you are in the Michigan woods and come across a camera with this tag you are standing in part of the "big northern hardwoods" study.

Gary Roloff is a wildlife biologist and faculty member at Michigan State University. This long-term study is being conducted in cooperation with Michigan State University, the Michigan DNR, the forest products industry, and Safari Club International, Michigan Involvement Committee. For more information, contact Roloff at roloff@msu.edu or Mike Walters at mwalters@msu.edu.

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VALUE-ADDED and Local Markets

PIF is conducting member based research on local and value added marketing to assist you in future benefits from managing your woodlands. Economics play a role in forest protection, thus vibrant local forest economies are helpful to conserving forests. If you have something to offer in this discussion, or just a simple question or comment, please contact Joe. Wood markets are dynamic and often reflect the overall economy. Our hope is to assist in avoiding some of the great market swings, by thinking of alternative markets.

The term Value-Added is used to discuss ways to add value to the landowner and the local economy. It may be locating a better market, but especially is reflective is advocating proper forest management. For example we need to thin young red pine, most often for pulp wood (are fence posts for treating an alternative market?), but the higher value management in long term will be for bolts, saw logs and especially poles. We have discussed in the past, see past features by Hans & John, the importance of growing your hard wood logs to their full potential. Adding size, especially if adding a higher grade, pays dividends in value. We can term these examples of adding value on the stump.

Value added may also be the local crafters who build a special product or a unique item that is in demand. For years the log home market defined such an example. On a regional scale, would not local economies benefit from high value, non-polluting wood manufacturing? Especially with hardwood, high value logs are often shipped and even exported. Such facilities stabilize local economies in forestry regions. These can be larger industry players or may be a cumulative effect of local crafters. This discussion is ongoing, and is ever changing and could expand into non-timber forest products as well. We invite you to be part of it.

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Alternative Education

Given the uncertainty of holding our long established educational events because of COVID, we are committed to helping you learn as we all learn from each other. We will continue to expose the properties we often use for our series of events, and invite your visits, questions and comments. We can certainly host some small group functions in these forests and practice physical distancing as we did with the WXPR feature. Please contact us if you would like a guided hike or visit at Wildcat Falls, the Upper Wisconsin River or elsewhere. We also will continue to communicate through our newsletters and websites. With the continued assistance from UW Center for Cooperatives, our continued actions in promoting the education aspects of sustainable forestry, land conservation and the benefits of such to a growing society is more important than ever. Thus our series, Appreciate Our Common Lands; A Hands on Celebration of the Benefits of Forestland Conservation, continues, albeit in some alternative ways. Let us hear from you!

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GOOD BEES AND BETTER BEES

Paul J Hetzler, ISA Certified Arborist since 1996

On warm, sunny days in April and May, bees of various stripes come out of the woodwork, seemingly lost. By definition, it's only a "real" bee if it's wearing fur, but not everyone wants to get close enough to see whether the thing is covered in hairs. If it looks and buzzes like a bee, it's OK to call it one.
Except for folks who are allergic to stings, most people feel rather warm and fuzzy toward honeybees, or at the very least, don't hate them. Honeybees' role as pollinators of food crops is widely known, and besides, everyone likes honey.

Wasps, on the other hand, are often reviled and feared, not necessarily in that order. Social wasps such as yellow jackets and bald-faced hornets only play nice with their own kind, and are otherwise distinctly antisocial. They can be more dangerous than honeybees because they will vigorously defend their nests. And unlike honeybees, which die after stinging because their venom sac tears away from their abdomen, wasps can sting repeatedly without paying with their lives. It makes you wonder if wasps are some sort of cosmic error, in the same category as poison ivy, rats, and deer ticks. But wasps and hornets actually do a lot of good for our planet.

Solitary wasps, which by the way are much friendlier than social wasps, are beneficial because they prey on insect pests like grasshoppers and emerald ash borers. Though each female wasp digs her own hole, many of these mini-nests can be concentrated in an area. You may have crossed a sandy lot and seen holes made by such creatures. If they were very active at the time, you might have been freaked out as they emerged to see what the racket was.

After paralyzing a bug with her sting, Ma Wasp carts it home, stuffs it down the nest-hole and injects eggs into it so her babies can hatch and eat their way out of the hapless victim. Helpful in the scheme of things, but not very neighborly. The largest such critter in our area is called the cicada-killer wasp, a fearsome-looking assassin which is completely harmless. Unless you are a cicada.

At the other end of the scary-spectrum are braconid wasps. They're often beautiful – metallic green or blue – and so tiny that they look like some kind of small fly. These wasps don't have the horsepower to bring their victims home, so they lay eggs in fly larvae or pupae, and hope for the best. Braconids are among the most important pest-control insects on Earth.

What may come as a surprise is that even the scary wasps are essential pollinators. Not to take anything away from honeybees, but they're hardly indispensable. Except in areas of extreme intensive agriculture, honeybee presence has no measurable effect on pollination rates. Bumble bees, mason bees and other native bees, along with wasps and various non-bee insects, do the job quite nicely so long as they have access to wild, unkempt areas.

In our climate – I should say thus far at least – wasp colonies do not overwinter. In late summer, each colony will produce a few queens, and a handful of disposable males with whom the queen will mate. Replete with fertilized eggs, queens will overwinter in leaf litter, rotten stumps, sometimes grouping together in eaves, attics or other hibernacula. Every wasp we see at this time of year is a queen looking to found her own city-state, which may be disconcerting news to some. Take heart; they don't all want to settle on your front porch. Social wasps are expert paper-makers, chewing up wood and creating beautiful, if terrifying, nests. Paper wasps, which are tame by social-wasp standards, make open-faced "umbrella" homes, while hornets and yellow jackets make enclosed, globe-shaped nests. Hornets usually nest aloft, while yellow jackets also make underground homes.

Carpenter bees can gnaw plenty of wood, but they skip the paper-making step and just nest in tunnels in decaying trees or perfectly sound soffit and fascia boards on homes and barns. They provoke anxiety when the male carpenter bees dive-bomb passers-by, even though guy-bees can't sting.

If you find a wasp nest anyplace other than right by your entry door, please leave it. They're not "murder hornets," so let's stop murdering hornets, and let them bee.

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RED FOX

by Steve Hall

Red fox characteristics

Not to be confused with gray and arctic foxes, which are different species, the red fox comes in a variety of color variations, sometimes within the same litter, ranging from the most common appearance, like the photos of "Mama" and "Pippen" on this page, to animals with brown, black or silverish coats, or any of these colors, along with white, as markings on their coats. Males ("dog foxes") are larger than females ("vixens"), and, as with wolves, northern foxes tend to be larger than southern ones, with natural selection rewarding the higher body mass-to-surface ratio, with its more efficient heat retention. Average weight range is 8 to 18 pounds, with body lengths up to 3 feet, including the tail.

Through their cat-like eyes, foxes have adequate, but not exceptional, eyesight, very keen hearing and a highly developed sense of smell, which, along with their ability to move swiftly and quietly through almost any terrain, makes them formidable and effective crepuscular (dawn and dusk) predators in open country, and nocturnal hunters in areas of concentrated human habitation. Fox will lie in ambush waiting for the sounds of prey moving through grass, which prompts their familiar leaping attack, or underground, which leads to quickly digging the prey out.

Adaptable animals

Red foxes are not only key predators in the northland, but with their omnivorous diets, are much more adaptable than wolves, and can be found in almost any kind of terrain or habitat, anywhere from meadows, to suburban

backyards, to farms or even city parks. In fact, the red fox is the most widely dispersed mammalian carnivore in the northern hemisphere, and quite possibly, the world. Unlike wolves, foxes are not pack animals, and while they are generally, but not strictly, monogamous, they only stay together through the mating and rearing seasons. Also unlike wolves, fox can be prey, to wolf, coyote, fisher, bobcat and Great Horned Owl, as well as predator, so they provide an equally complex, but different, interrelationship with their environments.

Red fox eat invertebrates such as insects, worms, crayfish and mollusks, small rodents like mice, wood rats, squirrels and voles, as well as rabbits, fish, reptiles and birds. Vegetation, such as fruits and seeds are eaten seasonally, and accessible human garbage will be inspected and scavenged. Deer fawn are born in June, and the fox will sometimes stumble upon and take a fawn, an event which involves some luck. The process of natural selection results in the calves of many ungulates, for example, deer, moose and elk, as being nearly odorless, which hinders detection from predators, such as fox, coyote, wolf and bear. The more odorless the calf, the more likely it grows to be able to breed, and pass along its genes, etc. Not to extend this digression too far, but I read somewhere that a grizzly sow in Yellowstone got around this hindrance, by smelling an elk cow in lactation, lingering around suitable grass cover for a calf, and then circling inward in a spiral through the grass until she came upon the calf. Talk about a clever bear!

Now and then, vulnerable farm animals, such as chickens, ducks and lamb will be taken. While farmers used to routinely trap foxes, many now realize that the fox brings far more benefit in its constant predation on crop-destroying rodents and insects, than the harm they cause in taking the occasional barnyard animal, and that secure enclosures, particularly for hens, and guard dogs to keep the fox in the field, but out of the barnyard, are the key to discouraging unwanted fox predation. Always opportunistic, fox will cache prey in various locations, as a hedge against lean times when prey are scarce, thus inadvertently feeding the creatures who sometimes come upon these caches.
Rodents, especially the white footed mouse, are the principle vector for spreading Lyme disease through black legged ticks, which pick up the bacterium *Borrelia burgdorferi* from the rodent, and then share it with you, your dog your cat, or your horse. **Deer are significant carriers of the tick, but Lyme disease starts with rodents**. Our hero in the battle against Lyme disease is any predator which eats rodents, from birds of prey through coyotes and smaller predators, but especially the red fox, which eats huge quantities of rodents. If for no other reason, this should be considered by hunters and trappers.

Mating and young pups
Foxes mate between December and March, depending on latitude and severity of Winter. While foxes tend to be monogomous, multiple males may scrap over the right to mate with a single, unattached, female. After mating, a suitable den is chosen. Foxes may use a hollow log, dig a den under a wall or barn, or enlarge the dens of other small mammals, lining them with grasses and plants to provide warmth and dryness. Fox dens often have more than one entrance to allow safe departure when predators or dogs come digging, or as a simple precaution against being observed.

Two to ten pups are born after about 51 days, and their eyes open after about two weeks. Mom stays close to guard and nurse the pups, who typically wean after a month. During this time, Dad is out hunting almost continually to provide for Mom and pups, but after the pups are weaned, and begin to play about the den's entrance, Dad may help watch the pups, while Mom gets in some hunting and exercise away from the den.

Red fox maintain home ranges of between 3 and 6 square miles while denning, and young may disperse to find their own territories in the Fall, up to 160 miles away. Fox are solitary except during the mating and denning seasons. Ranges of foxes during their solitary periods range up to 20 square miles, depending on availability of prey, and with some overlapping of territories. Foxes release a very musky odor, chemically less potent, but similar to a skunk's odor, which may be readily detected within a few yards, and can be used to locate a fox den, or area of fox activity. Often times when you believe you are smelling a skunk, you may be close to a fox den.

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