"This institution is an equal opportunity provider."

Partners News

August/September 2022

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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PIF Board

Joe Hovel
Jim Joyce
Joe Koehler
Charlie Mitchell
Margo Popovich
John Schwarzmann
Rod Sharka

Have you paid your PIF dues?

WELCOME NEW MEMBER(S)

Richard Peterson Jones (05-2022)

Inside this issue:

UNIVERSITY OF WISCONSIN CENTER FOR COOPERATIVES

We are very grateful to the University of Wisconsin Center for Cooperatives for their continuing support which enables our forest conservation and outreach.

Thanks to funding from the UW Center for Coops, we still have some books in the Northwoods Forest Conservation series.

The Handbook had a limited reprint, while the Celebrating Local Woods and Managing for the Future prints were a bit larger quantity.

If you or someone you know would benefit from these please let us know. They are also available electronically.

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JOE'S COMMENTS

Sad and tragic news received recently about the Michigan firefighter killed in an Oregon forest fire. Colin Hagan was the son of Shawn and Jean Marie Hagen who were very active with Trout Unlimited and the Pilgrim River Watershed Project, especially in the early years. In fact, Shawn first showed me the project lands in 2007, while he was working in the UP for the Forestland Group. The past five years I had reconnected with Shawn on the WI Forest Advisory Committee. My heart is out to the family, I can not envision a worse scenario for a parent to endure.

Climate, Carbon & Community

This issue of Partners News contains an assortment of information on the link between climate mitigation and conservation, and discusses the importance of community in all this.

Under the direction of John Schwarzmann and with support from the UW Center for Cooperatives grant award this year we are working on the feasibility of PIF members seeing carbon credit opportunities going forward. This is the third of a series of educational articles John has compiled in this quest. We welcome your questions and comments.

This is timely with the passing of the Inflation Reduction Act (IRA), which has a lot to do with conservation. The Forest Legacy Program receives significant funding from this legislation, which will have a great focus on land conservation for climate mitigation. In the original Build Back Better proposal, even the Community Forest Program would have had double the funding currently seen, but unfortunately that was not in the IRA. We hope Community Forest and other conservation programs not making the cut of the IRA will benefit indirectly at least. The Community Forest Program has grown in demand to be a sought-after source of funding. Even though it is better funded today (double or more from 10 years ago), the application process has become hotly competitive.

As has been obvious to many readers, the Community Forest philosophy has tremendous value to regions such as ours where forests are the driving force of the local culture. In our years of conservation efforts, we are very proud of the conservation successes we have been involved in. We displayed much of this in Northwoods Forest Conservation; A Handbook, and hope there are many more going forward. Many of these projects have opened lands to perpetual public access and all of them protect water and wildlife through protecting land. These are community benefits, without a doubt.

However, the true Community Forests, including the Pilgrim Community Forest of which we were a supporting partner, and especially the Wildcat Falls Community Forest go much further than that. We are all stakeholders in these forests and our involvement is critical to the success and long-term health of these projects to transcend generations. In this issue you will see more examples of that effort: protecting land for wildlife and people.

As you will read within, we now are requesting local community support for the Headwaters Cedar Community Forest (HCCF). The HCCF will open 200 acres to public non-motorized use, protect the headwaters of the Ontonagon River, maintain integrity in the surrounding NHAL State Forest and assure habitat for birds, and all wildlife and the rare plants within. This is a special project in the Town of Land O Lakes and has widespread community support. As a Lac du Flambeau Band of Lake Superior Chippewa elder stated when viewing project photos; 'There is medicine in those woods and it needs to be protected for the health of future generations.'

We are very grateful to the USFS Community Forest Program for recognizing the value of this project. A $200,000 award to create a Headwaters Cedar Community Forest, for all of us here in the Northwoods of Wisconsin and the UP. Like wise the Bedford Hills NY based Weeden Foundation granted $25,000 for protecting this valuable bird habitat, containing the Northern Goshawk. The Upper Peninsula Environmental Coalition awarded $10,000 to this project across state lines, as we all know that protecting forests is not a state specific proposition. A generous area donor has also been a big part of the early fundraising efforts in supporting our conservation goals.

We do need to focus on achieving the matching funds, and community support at any level is vital. With the Wildcat Falls Community Forest, over 100 donors contributed between $10 and up to $30,000. With the recent rate of forest fragmentation in this area, and the increasingly urban character of the Northwoods landscape, we need to act to accomplish this goal. We would have thought 15 years ago, after the NHAL boundary was expanded, that this project could have been a great fit for state forest acquisition. That is not possible under the priorities of the legislature with the Joint Committee on Finance scrutinizing any conservation in the north, as the committee is controlled by anti-state ownership voices. (I am encouraged the committee does support the Forest Legacy projects so vital to the North). Thus, I am extremely grateful for federal funds at almost 50% of goal to achieve a Community Forest in Vilas County.

See www.northwoodalliance.org (and www.partnersinforestry.com) for updates on this and other projects which will be prioritized after HCCF is a success. Northwoods Alliance is a 501c3 conservation organization, and shares several board members and office space with Partners in Forestry.

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BITS AND PIECES

Do not underestimate the importance of forest health in capturing and sequestering carbon. Our grandkids health may well depend on it, as the headline below indicates.

Arctic warming happening faster than expected, study finds — a sobering backdrop as U.S. climate bill nears passage

Recent studies and real-world extreme weather events are providing steady evidence of global warming's intensifying impact on the planet.

The link below cites funding for forest protection in the new climate bill.
Good news in terms of the values being recognized as well as the practical aspects of funding.

As Congress funds high-tech climate solutions, it also bets on a low-tech one: Nature

From boosting forest preservation to incentivizing climate-smart farming practices, the Inflation Reduction Act includes an acknowledgement that land is a profound ally in the fight against climate change. *Full story below from Washington Post* https://www.washingtonpost.com/climate-solutions/2022/08/14/nature-climate-solutions-inflation-reduction-act/

Many thinks technology is the answer in countering climate change, but did technology help create the problem? Let's give nature a chance to counter climate crisis and the extinction crisis by conserving important tracts of land. All landowners have a stake in the game.

For those who think we are short of deer and have too many predators, see this photo count from the snap-shot Wisconsin camera on the Upper Wisconsin River Legacy Forest.

Animal Tag	Photo Count
Bear	51
Bobcat	69
Cottontail	6
Coyote	60
Deer	2392
Dog, Domestic	96
Fisher	51
Grouse	3
Other Bird	6
Raccoon	3
Snowshoe Hare	123
Squirrels and Chipmunks	9
Turkey	6
Wolf	3

Celebrating the Community Forest Program of the USDA Forest Service which enabled the community to acquire a special place (and we are working on another Community Forest).

Wildcat Falls Community Forest is a popular destination, as this shows, from a donor and is representative of comments we receive.

> "My family and I had a nice walk yesterday at Wildcat Falls... Such a remarkable old forest of hemlocks and cedar. I hadn't heard about your organization, but I saw the signs, looked at your website, and I sure appreciate your efforts."

We hope you all do also!

Recent activity at Wildcat Falls deserves our heartfelt thanks.

A big thank you to Rod Sharka and Steve Garske for eliminating the European Swamp Thistle in June, before an infestation got out of control.

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SELLING YOUR CARBON CREDITS

By John Schwarzmann

If you own private timberland and want to sell carbon credits, how do you go about doing that? The answer is: it depends on how many acres you own. Small landowners have to pool their lands with others to develop a carbon project while very large landowners that own more than 3,000 acres can sell carbon credits as a single, stand-alone project.

To date, most carbon credit projects have involved large land holdings due to the technical and legal complexities of pooling many small properties as a single project. Let's say you own 40 acres of large white pine that sequester large amounts of carbon that would be an attractive forest in a carbon project. Since it's a small tract, it stands a good chance of being pooled with properties with lower carbon sequestration potentials. Since the properties are pooled, they would receive a single price for their carbon credit thereby creating “winners” who add fewer tons per acre of carbon sequestration, and “losers” who add more tons per acre but receive the same price as the low sequestration property.

Another hurdle to overcome in pooling lands is the 40 or 100-year time commitment for lands that sell carbon credits in the voluntary or compliance markets, respectively. The long-term commitment can scare off landowners from joining a pooled carbon project because they may believe that future heirs would want to withdraw lands from the carbon sequestration project. While some carbon credits are not paid out to the landowner and kept in a buffer pool to safeguard against small-scale withdrawals or natural disasters that could eliminate a forest, the buffer credits are not sufficient to allow landowners to withdraw more than a very small percentage of the lands out of the program.

If a group of like-minded small landowners or a large landowner decides to sell carbon credits, their first step is to contact private consulting firms that specialize in developing and selling carbon credits. These firms would ask for legal descriptions, deeds, property tax forms and other documents necessary to establish ownership, acreages and types of forests located on each property.

The second step would be for the firm to garner as much data as possible from aerial photos, timber cruises, projected timber harvests, etc.., to develop a model that would estimate the amount of existing carbon in your forest and the anticipated carbon capture through additional growth in the coming years. With estimated carbon sequestration, the firm would also estimate potential prices for the credits and revenue. With those estimates in hand, the landowner(s) can decide to enter into a multi-year contract with the project development firm to measure and sell carbon credits or seek estimates from other firms.

Once the contract is signed, the third step is for the project development form to send out their foresters to your woods to establish long-term plots where forest carbon and growth are measured. After the initial round of measurements, the firm has up-to-date data to more accurately estimate carbon sequestration and potential carbon credits from the properties.

At the direction of the landowner(s), the fourth step is where your carbon credits are sold either on the 40-year voluntary market or the 100-year compliance market. A given carbon credit (1 ton of carbon sequestered) may sell for more or less on the market depending on the other ancillary benefits that come with the carbon. Buyers may be willing to pay more per unit carbon for tracts that also provide excellent wildlife habitat or protect endangered species.

Once credits are sold, revenue is generally divided into four separate pools. 1) Immediate revenue to the landowner; 2) Credits retained in the buffer pool; 3) Credits used to pay for the project development firm's services; 4) Credits held to pay the landowners in future years if the forest sequesters additional carbon based upon

the measurements in repeated inventories. One major advantage for landowners is that much of the revenue is paid out up-front right after credits are sold.

Carbon credit prices can vary but they have recently fallen in a range of $4 - $10/acre per year over the life of the contract in the voluntary market and $12-$16 per acre per year in the compliance market for Wisconsin forests. Carbon credit sales won't make you wealthy but they can offer a significant additional source of revenue in addition to income from timber, maple syrup or hunting leases.

John is retired from the Forest Supervisor position he held with the Wisconsin Board of Commissioners of Public Lands, and now places more focus on the issues Partners in Forestry and Northwoods Alliance are involved in. John is Vice president of both organizations, and head forester.

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Lakeshore Logging Saga

The lakeshore logging saga continues, with PIF and NWA vice president John Schwarzmann and Ardis remaining diligent in the pursuit.
Aesthetics, erosion and more are all concerns.
https://www.channel3000.com/i-had-to-speak-up-two-northwoods-friends-push-wisconsin-dnr-to-protect-lakeshore-forests/

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Timber harvest at the Community Forest:

John Schwarzmann, with help from Paul Stearns, has set up a timber sale on the hardwood stand, mostly on the hill north of County Line Lake. This practice will enhance the growth of the dominant crop trees by removing suppressed and deformed competition, and is in line with the Management Plan for hardwood management at extended rotation. John wrote the Management Plan in 2020 and earlier this year wrote an update to include the addition 40 acres. The addition '40' should be enrolled in the MDNR Commercial Forest Reserve in January 2023 which will help with holding costs by lowering the real estate tax. Thanks guys!

...And more on Wildcat Falls!

The 2021 addition to Wildcat Falls Community Forest includes the pond which provides flow to Scott & Howe Creek, and Wildcat Falls. Photo Rod Sharka

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Northwood Native Plant Society Visits Wildcat Falls

By: Rod Sharka

On Sunday, Aug., 14, I led a hike into the Wildcat Falls property for the Northwoods Native Plant Society. The Northwoods Native Plant Society is an informal group of professional and amateur botanists and nature geeks like me who take turns leading trips to special habitats primarily in search of rare, native plant species. But the focus for this outing went beyond searching for rare native plants. In addition to all of the amateur and professional botanists, we were privileged to have retired geologist, Mike Porter along. Mike gave us a fascinating geology lesson on the unusual rock outcrops on the property, putting the age of the exposed rock escarpments present at approximately 1.6 billion years old. He explained how the rock there was originally sedimentary rock, i.e., sandstone, that was then buried and modified over hundreds of millions of years under immense pressure to the point of being partially melted and modified by extreme forces. This explains the exposed appearance of being twisted and folded. Then, fissures in the rock were penetrated by liquids that left deposits of various minerals such as copper, zinc, gold, silver, uranium, etc. There is also an abundance of quartz present which formed from silica dioxide precipitating out of water that flowed through fissures in the rock, or from the melting and re-cooling of the sandstone. Mike explained that this is why mining geologists look for the presence of quartz in rock as an indication of potential mineral veins being present. With all of the quartz at Wildcat Falls, it's a good thing that Northwoods Alliance Inc. now owns the property and also owns the mineral rights as well. It would be tragic if a mining company could come in and begin mining operations as they have in so many other public lands in the U.P.

The botanists on the hike also did not disappoint. Several relatively uncommon to rare plants that were found include Lesser Rattlesnake Plantain Orchid (Goodyera repens), an uncommon lichen called freckled pelt lichen (Peltigera aphthosa), and a rare lycopodium (club moss) called Northern firmoss (Huperzia selago, AKA Lycopodium selago). See accompanying photos.

I think that everyone along on the hike gained a special appreciation for how special this property is. As Joe has said many times before, you can visit many places in the U.P. to see waterfalls, and many places to see clean trout streams, and many places to see old growth hemlock and cedar, and many places to see interesting geology, and many places to see rare plants, but to see all of these things together in one condensed place like the Wildcat Falls Community Forest, is rare and special indeed.

If you are interested in learning more about all plants or just a nature geek like me and enjoy attending adventurous outings to very special places with like-minded people, check out the Northwoods Native Plant Society Facebook page for more information.
https://www.facebook.com/northwoodsnativeplantsociety

Wildcat Falls is your Community Forest, we welcome your visit and appreciate your support.
Wildcat Falls, Partners in Forestry and Northwoods Alliance are equal opportunity providers.

Northern Firmoss

Lesser Rattlesnake Plantain Orchid

Freckled Pelt lichen

Wildcat Falls plant photos: Rod Sharka

Wildcat Falls Outing photos: Rod Sharka

Geologist Mike Porter

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WICCI Report, warmer winters and extreme rain are stressing Wisconsin's forest resources

By Dea Larsen Converse, WICCI Communications Director

A focus on climate impacts to Wisconsin's forests in the most recent assessment from the Wisconsin Initiative on Climate Change Impacts (WICCI) shows that warming temperatures and changing precipitation patterns are impacting Wisconsin's urban and rural forests. Wisconsin's average daily temperature has become three degrees Fahrenheit warmer and precipitation has increased 17 percent, about five inches, since 1950. The last two decades have been the warmest on record and last decade was the wettest.

> "Wisconsin forests cover nearly half of Wisconsin and provide a unique opportunity to address climate change by reducing concentrations of greenhouse gases while simultaneously providing essential social, environmental, and economic benefits." – Stephen Handler, WICCI Forestry Working Group Chair

Climate Impacts to Forests

- Warmer winters. Winter has warmed about twice as fast as other seasons in Wisconsin over the past few decades. In Northern Wisconsin, where most of Wisconsin's forests are located, warmer winters are reducing the snowpack that insulates trees and other organisms, impacting forest operations such as harvesting and transportation that rely on frozen ground, and creating less lethal conditions for pests and diseases.
- Deer herds. With less severe winters, especially in Northern Wisconsin, larger numbers of deer are surviving and having a big impact on forest regeneration as they browse on understory plants, including sensitive species.
- Extreme weather events. Extreme storms are happening more frequently and creating a great deal of damage in forests through flooding, erosion, and deposition of nutrients and invasive species seeds. These extreme storms also cause considerable damage to infrastructure on forest land.
- Summer droughts and longer growing seasons. Warmer temperatures, longer growing seasons, and decreasing summer precipitation in Northern Wisconsin, are increasing the risk for wildfires, pests, and disease. Reduced snowpack and earlier springs are also drying out vegetation at a faster rate in the spring and summer. While prescribed fires could help, it is becoming increasingly difficult to find a safe window to use them as the climate changes.
- Impacts on communities. While all communities in Wisconsin are at risk, historically disadvantaged communities bear a disproportionate burden and suffer the greatest harms. For example, large canopy trees can play a big role in helping urban areas become more resilient to climate change, yet studies are showing a disparity in the location of tree canopy in some cities. Also, Wisconsin tribes are working to help culturally significant species, like paper birch, adapt to changing conditions with resources like climate change vulnerability assessments.

On their webpage, the WICCI Forestry Working Group suggests solutions and offers tools to help landowners and forest managers address climate impacts.

WICCI is a nationally recognized collaboration of scientists and stakeholders working together to help foster solutions to climate change in Wisconsin.

Balancing Carbon Storage and Wildlife Habitat

Forests are a critical natural climate change solution. Carbon stored in trees and soils lessens atmospheric carbon dioxide, a greenhouse gas that contributes to a warming world.

A tree stores carbon in the form of wood, bark, roots, and leaves, so it stands to reason that if we cut fewer trees and allow them to grow, forests will store more carbon. But, if all forests across the landscape become "late successional"--or mature in age and structure--such a habitat would not be beneficial for all wildlife species. Indeed, many species require early successional habitat made up of young trees, shrubs, and openings created by natural or human-caused disturbances.

In the Northeast's spruce-fir habitat, the imperiled Canada lynx is sustained by its prey, snowshoe hare, which often prefer young forest stands. Many other mammals and birds require adjacent patches of both mature and early successional forests.

How can we balance the carbon storage of old forests with the young, more open habitat needed to conserve many of our wildlife species?

One answer, according to University of Vermont (UVM) researchers, is to create a mosaic, or patchwork, landscape. Managing for a diversity of forest, shrub, and grassland habitats for at-risk wildlife species forms a heterogenous landscape.

"The importance of diverse habitat conditions across the landscape may be increasingly overlooked, especially by the public, as forest carbon storage takes center stage," said Caitlin Littlefield, a former NE CASC fellow and lead scientist for Conservation Science Partners. "As more attention is focused on maximizing forest carbon, we risk unintentionally compromising the long-term sustainability of other objectives, such as maintaining important habitat for at-risk wildlife species."

In a new paper published in *Conservation Science and Practice*, Littlefield and NE CASC Principal Investigator Anthony D'Amato advocate practicing forest management through a lens of climate adaptation. Doing so, their work argues, will help maintain forests for carbon benefits while also providing refuge for wildlife. Climate change adaptation prioritizes landscape diversity, complexity, and connectivity.

To make their case, the authors examined four forest and open woodland habitat types in the Northeast and Upper Midwest. This region transitions from hardwood forests and more northern spruce-fir forests to grasslands and oak savannas in the west and to sandy pine barrens of the coastal Northeast. These habitats support some of the greatest wildlife diversity in the temperate zone between the tropics and the arctic.

Following glacial retreat, natural disturbance agents—beavers, flooding, wind, hurricanes, ice, and fire—as well as Indigenous people maintained open meadows, shrublands, and early successional habitats scattered throughout the otherwise forested landscape. In modern day, many of these open habitats have begun converting to late successional conditions due, in part, to fire exclusion, beaver trapping, flood-control dams, and insect suppression. Loss of small- to moderate-scale natural disturbances has contributed to homogenization of forests across the region.

In each of the four ecosystems, the authors found that managing only for mature stands of trees fails to provide critical habitat for sensitive wildlife species. Restoration of these four habitats across the widespread landscape will support biodiversity, increase resilience to change, and may ultimately store more carbon over time by resisting carbon loss from catastrophic disturbance like severe wildfires and drought-induced stress on trees. Restoring these habitats often involves reintroducing natural disturbances and practices such as controlled burning.

"Characterizing trade-offs and critically evaluating the consequences of alternative management options can help avoid practices that may ultimately reduce ecological complexity and the adaptive capacity of forested systems," said D'Amato. "This sort of critical evaluation of stand-level management actions can then facilitate landscape-scale

planning that supports a diversity of habitats while also suggesting where we ought to invest in maximizing forest carbon."

Early Successional Habitat in New England's Northern Hardwoods

There is currently less early successional forest—and less old forest—across New England since forests rebounded from European settler clearing. Wildlife species that rely on early successional habitat have declined—including American woodcock, ruffed grouse, and most notably breeding songbirds.

The golden-winged warbler has experienced one of the steepest declines of any North American songbird. The bird nests near the ground in early successional patches of two and a half acres or more and often relies on surrounding mature forest for foraging.

"Wildlife that require early successional habitats in the Northeast include nearly 90 different kinds of birds, mammals, reptiles, and insects, many of which are 'species of greatest conservation need,'" said Jim Oehler, Wildlife Habitat Program Supervisor for New Hampshire Fish and Game Department. "Strategic, carefully planned, and carried out forest management is critical to restoring and maintaining healthy populations of these species, particularly in light of climate change."

Relative to mature forests, early successional forests store less carbon overall, but they do sequester, or capture and store, carbon at relatively high rates. This, in combination with a mix of wildlife habitat across the landscape, would compensate for the trade-off of not pursuing maximum carbon storage.

"This paper affirms the value of conserving and maintaining an array of forest conditions, including early successional forests, on public and private lands and reinforces the importance of not focusing on a single objective, like simply maximizing on-site carbon storage," said Michael Snyder, Commissioner of Vermont Forests, Parks and Recreation. "As demonstrated by this work and by initiatives like Vermont Conservation Design, wildlife habitat restoration and active forest management are becoming more critical for conserving and connecting a diversity of habitat types across the New England landscape."

Tallgrass Aspen Parklands of Northern Minnesota

In northern Minnesota, tallgrass aspen parklands, a patchwork of grasslands, groves of aspen trees, shrub thickets, peatlands, and wetlands, support wildlife species that benefit from this natural mosaic of vegetation. Islands of trees and shrubs provide important movement corridors for elk, which have rebounded through restoration efforts from regional extirpation in the early 20th century. Elk rely on scattered tree cover for protection but venture into open areas for grazing.

Maintaining Minnesota's tallgrass aspen parklands through mowing, tree harvest openings, and prescribed burns supported the return of elk populations. Sharp-tailed grouse and sandhill crane have also largely recovered from dramatic declines.

Although cutting some trees means losing out on their carbon storage, intact grasslands and peatlands store an exceptional amount of carbon belowground. Rewetting of peatlands by the reconnection of waterways can reduce carbon emitted from burns smoldering underground while supporting localized groundwater recharge. This risk reduction is more important as climate change amplifies wildfire and drought threat.

Midwestern Oak Savannas

The oak savannas in the Midwest historically contained scattered fire-tolerant oak trees, with deep tap roots and sprouting ability, growing in an understory of grasses and flowering herbaceous plants, such as wild blue lupine. This habitat is critical for the federally-endangered Karner blue butterfly, which lays eggs almost exclusively on lupine.

The savannas now occupy a fraction of their pre-European settlement area due to agricultural conversion, logging of oak trees, and ongoing land-use change. The pockets of savanna that remain are increasingly dense and shaded with

fewer fire-adapted trees and less herbaceous species diversity, as wildfire and Indigenous burning have been excluded from the landscape.

Many imperiled wildlife species, such as the eastern box turtle, depend on the oak tree's unique rooting structure, on native plants, and on the patchiness of vegetation that frequent fire creates. This is another ecosystem in which the thinning of trees and burning of woody plants required to maintain open savanna conditions reduces tree carbon. But again, native grasses supply tremendous belowground carbon storage capacity. A matrix of shaded and open conditions provides climate change protection that supports wildlife species in adapting to increasingly hot, dry conditions.

Coastal Pitch Pine Barrens

The imperiled pitch pine barrens, in sandy inland pockets along the coastal Northeast, historically supported fire-adapted pitch pine, thickets of scrub oak, and an understory of blueberries. Here, too, fire exclusion has resulted in denser stands of trees and establishment of competitive and invasive species. Rare and dwindling wildlife species, including the New England cottontail rabbit, barrens buckmoth, and birds such as the whip-poor-will, rely on the barrens.

In addition to reducing important habitat conditions for these at-risk wildlife species, the increase of less fire-tolerant tree and shrubs makes forest stands more susceptible to drought and pests and increases fire severity, which can release a large pulse of carbon. Restoring low severity, prescribed fire helps alleviate drought stress, reduce invasive vegetation, reestablish critical wildlife habitat, and prevent higher severity fire risk, which keeps more carbon out of the atmosphere.

Balancing Trade-Offs

In applying a lens of climate adaptation to these four case studies, Littlefield and D'Amato reveal trade-offs between carbon and wildlife habitat and highlight landscape-scale management paths that accommodate both goals. Promoting habitat for some imperiled wildlife species is incompatible with maximizing tree carbon storage in each particular forest or woodland. But, by pursuing a mosaic of habitat conditions at the landscape scale, natural resource managers protect ecosystem adaptive capacity—and therefore carbon—in the face of climate change while accommodating a range of wildlife species' needs.

"It is critical to recognize that climate change itself is one of the most serious threats facing wildlife in this region and globally," said Littlefield. "We don't have the luxury of unlimited time to devise the 'perfect' balance of maximizing carbon storage and wildlife habitat across the landscape. Assessing vulnerabilities and risks, explicitly acknowledging trade-offs, and prioritizing ecological complexity and landscape heterogeneity may well be the best way to keep carbon out of the atmosphere while protecting wildlife and hedging our bets in an uncertain future."

This article was written by Shari Halik and originally appeared on the website for the University of Vermont's Rubenstein School of Environment and Natural Resources.

Great Lakes Silviculture Library https://silvlib.cfans.umn.edu/

Northeast Silviculture Library https://www.uvm.edu/nesl/

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Future Articles

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:

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Vengeful Veggies The horror of an invasive species

By Paul Hetzler

If you scorch some veggies on the stovetop, it's a bummer, but if vegetables burn *you*, it could mean a trip to the hospital. This is the season when the risk of getting chemical burns from wild parsnip, an invasive species whose population has exploded in the past decade, is highest.

A relative of Queen-Anne's lace, wild parsnip typically gets 3-6 feet tall. From late June through mid-July, it's topped by pale yellow, umbrella-like flower clusters. It can be found in vacant lots as well as in yards, pastures and gardens. Because it's so effectively spread by mowing equipment, it is found along most roads in northern New York.

The root of this biennial menace is perfectly safe to eat – it's the same parsnip we plant in our garden. It's the sap which causes problems. Gardeners usually harvest their parsnips after the leaves have faded away, and don't give them that second season to bolt and flower.

Like the well-publicized giant hogweed, wild parsnip sap is phytophototoxic, a tongue-twister word meaning it reacts with sunlight to cause second- and third-degree burns on exposed skin. These often take months to heal, and sometimes leave a permanent scar. The sap can also cause blindness if it gets in the eyes.

It's a small consolation, but one can't get burned by merely brushing up against wild parsnip. Plus, once it's is dry it poses no threat, unlike poison ivy which can cause a rash even after sitting for several years. All the same, it's a good idea to wear gloves and long sleeves when handling wild parsnip.

As everyone knows, when fighting zombies, you grab a shovel and aim for their heads. The same goes for wild parsnip, except you aim for their feet. Wild parsnip's second-year taproot is very hard to pull out, but is easily cut with a shovel. It's not necessary to get the whole root; just dig as deep as you can to sever the taproot, pry up and the plant will die. You don't even have to touch it.

If you're hopelessly outnumbered by wild parsnips, mow them if at all possible. Mowing right after they flower will keep them from making seeds while you muster some shovel-wielding townsfolk (pitchforks and torches are optional) to help you. Always wear protective clothing when mowing wild parsnip, and unless you have a Level-A Hazmat suit, don't use a string trimmer on it.

While I'm no fan of herbicides, wild parsnip poses a real threat to children. Selective products kill parsnip but leave the grasses. Glyphosate, the active ingredient in Roundup, is non-selective. It has gotten well-deserved criticism in recent years, but desperate situations may require desperate measures. Glyphosate is effective as a spot application on first-year plants ("rosettes") in early September. Summer applications kill the tops but not the roots, which sprout back.

Roots of first-year plants can be dug in the fall and consumed, but there's no way we can eat our way out of an infestation.

Former CCE educator Paul Hetzler tries not to burn vegetables, or get burned by them.

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Wishbone Trees

By Paul Hetzler

Splitting a wishbone may bring good luck to the person who gets the larger piece, but when a wishbone-shaped tree rips in half, it's bad fortune to all. One might think the section lying on the ground is the loser, but the tree left standing is toast as well; too badly damaged to be safe.

In the majority of cases, we can keep a double-trunk tree from splitting through preventive care.

There should be a town called Narrow Forks – it seems like a cute name. For trees, narrow forks or unions occur when the angle of attachment between two competing or codominant trunks is acute (as opposed to cute). The narrower the angle at which two trunks meet, the weaker they are attached to one another. Narrow unions always get worse with age, and usually end up failing in a storm or under an ice load. Strong unions are open and U-shaped.

In part, having more than one trunk (in trees, anyway; unsure about elephants) is genetic. Environment plays a part, too: forest trees usually develop strong central leaders. But open-grown trees get "confused" and many of their branches become leaders.

The bulk of tree imperfections are safe, but some are not. If a building, play area, or other "target" is within striking distance of either half of a large wishbone tree, action is needed. Obviously, trees with major defects can be removed. However, many times a weak union can be safely braced.

The dormant season is the best time to have landscape trees evaluated, as tree architecture is easier to see without leaves. That said, a hazard assessment at any time of year is better than none.

Although a tree with additional problems like damaged roots may have to be removed, judicious pruning along with the right cable system can save most multi-trunk trees.

A word to the git-er-done crowd: Don't fork yourself. Improperly installed cables will make the situation even more dangerous. Cable systems must conform to the American National Standards Institute (ANSI) A300 Part 3 Supplemental Support System Standard (apologies; I would've picked a shorter name). While it sounds like a government project, the ANSI A300 is industry-written and research-based. It specifies minimum size and load ratings for each element; cables, eye-bolts, anchors, etc., depending on tree size.

Sometimes, a synthetic line is preferable because it allows more movement. Other situations call for galvanized steel cables and bolts. Either way, a Certified Arborist who knows the ANSI standards should do the design and installation. Proper cable systems are inconspicuous, located two-thirds to three-quarters between the fork and the treetop.

For a fraction of the cost of removal, most wishbone trees can get an extended lease on life this way. Recent storms are a reminder that microbursts and derechos can trash structurally perfect trees. Extreme weather events aside, I've never seen a properly installed cable system fail. On the other hand, I've seen many substandard ones break.

Paul Hetzler has been an ISA-Certified Arborist since 1996. He'd like directions to Narrow Forks, if possible.

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Have you checked out PIF's website?

www.partnersinforestry.com

The website is for members to expose your business, service or tree farm, share thoughts, ideas, articles, photos, and links.

This is your COOP, we need your input as much or more than your dues.

Daycare Forests

By Paul Hetzler

Although the Grimm Brothers' tale of Hansel and Gretel surviving alone in the woods after being abandoned by their parents is based on a grim reality – the famine of 1314-1320 – there are compelling reasons to take kids into a forest today. As long as they are closely supervised, of course, and are brought to their respective homes afterward.

Research on the health benefits of being in a forest environment is so compelling that daycares in Finland "built" forests for kids to use. As part of a study on childhood immune systems and overall health, these ersatz woodlands were made by spreading topsoil over play yards, which had been either gravel or concrete. The soil was then planted with native shrubs, trees and flowers. For obvious reasons, gingerbread houses were not included in the forest plots.

The idea that immersion in nature helps us feel good is old news, of course. Patients in rooms with tree views have shorter hospital stays and report less pain as compared to those who do not have access to a natural vista. University students have been found to score higher on cognitive tests when their windows face natural settings.
Evidence goes far beyond casual observation. Real-time brain imaging with fMRI and PET scans, as well as blood-cortisol levels, heart rate and blood pressure have been used in a host of studies on the benefits of nature over the past two decades. Science has demonstrated that spending time in nature does so much good that doctors are now recommending "forest bathing," which is simply 20 minutes a day in the woods. Forest bathing is prescribed along with medications to treat anxiety, pain, high blood pressure and other ailments. Controlled studies have also revealed that after just an hour in the woods, memory performance and attention span improve by 20%.

Older research has shown improved eyesight, brain development, and mental health among children exposed to nature, but it seems no one looked at the effect of nature on children's immune systems until recently. A 28-day study conducted in 2020 through the University of Helsinki compared a number of immune markers in 3-, 4-, and 5-year-olds at ten daycares throughout the urban core of Helsinki. Four of the ten daycares had been greened-up with mini-forests, while the rest were conventional city play-lots, either paved or covered by gravel.

After just four weeks, the microbial community in the guts and on the skin of children who played in nature was more diverse than it was at the beginning of the project. A higher diversity of skin microbes is correlated with stronger immune systems. To be specific, and maybe too technical, the "nature kid" group had lower levels of a protein called IL-17A, which is linked to autoimmune diseases. They also had elevated blood T-cell counts as compared to their initial baseline, and to the group that didn't get a chance to play in the woods and eat dirt, or at least get dirt on them.

The University of Helsinki study, which you can find in the journal **Science Advances**, includes a statement by the authors that "The results of this study support the hypothesis

that low biodiversity in the modern living environment may lead to an un-educated immune system and consequently increase the prevalence of immune-mediated diseases." There we have it: among other benefits, the forest educates our immune systems.

The Finnish scientists admit their work is not finished, however. They recommend larger studies (this one had 75 children participating) to confirm their findings, and also say that while they've shown being in nature gives kids healthier immune systems, they do not yet know exactly how or why it happens.

We need to think of nature as an essential part of our health, and act accordingly. I encourage everyone to start forest-bathing as soon as possible for lower blood pressure and smarter immune systems. And we should get Hansel, Gretel and all other children out in the woods more often, too. Just don't leave them there.
Paul is relieved to have a legitimate excuse for a dirty house.

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BUMBLEBEES

The world's favorite herbicide is making it harder for buff-tailed bumblebees to keep their hives warm enough to incubate larvae, new research finds.

Bumblebees (Bombus terrestris) face food shortages due to habitat loss and the widespread monocultures of agricultural crops. Like honeybees, they feed on nectar collected from plants, and store more of it in their nest. They also gather nectar and pollen to feed their young.

Bumblebees are unique in their ability to maintain a collective 'thermostat' of sorts, to keep warm in areas where other bees cannot; they do this by regulating their own body temperature and the colony's heat by 'shivering'.

This makes them important pollinators in cooler areas, and is essential for developing larvae, which can only reach adulthood if their brood is kept between 25 and 35°C. When food is in short supply, the colony cools down, and larval development can be affected. But a new study published in Science has found that resource depletion is not the only thing messing with the bees' incubation.

Glyphosate is used by farmers and gardeners alike, to kill weeds and regulate crops. The chemical inhibits an enzyme present only in plants, fungi, and some bacteria, and so it was long thought to be harmless to bees. However, this study is the latest of many recent reports on the nonlethal – but undoubtedly harmful – effects of glyphosate on bees.

To get a clear picture of how this chemical affects bumblebees, researchers at the University of Konstanz kept 15 bumblebee colonies in a lab. Each colony was divided into two sections by a wire mesh, with equal numbers of worker bees on each side. On one side, workers were given ordinary sugar water and pollen. The other side was fed the same – except their sugar water was spiked with 5 mg/L of glyphosate.

The workers could see and touch each other through the mesh, but because bumblebees do not exchange liquid food like honeybees do, cross-contamination was not a concern. To avoid bias, researchers feeding the bees were not told which side of the colony was being given the herbicide-laced liquid until all data were collected.

Firstly, they wanted to find out if individual bees would be affected by glyphosate exposure. They isolated workers from both sides of each colony and gave each bee a 'brood dummy': an imitation larva covered with wax from previous

broods, that the bees care for as if it were real. Regardless of whether the bees had been fed with glyphosate-laden or ordinary sugar water, they set about tending to their dummy, and although individual bees exposed to herbicide were slightly more sluggish in their incubation duties, the results of this experiment were statistically weak.

But of course, as social animals, bees really need to be observed as a colony to see the full effects of any stressor. Therefore, the scientists proceeded to look at thermal ability "at the colony level" – this is where they found significant differences. On each side of a colony, the researchers recorded temperature data in two sections of a brood: one with pupae, and one with larvae.

Thirty days after the colonies were divided and half of each put on a diet of glyphosate-tainted sugar water, the scientists limited their food resources and began to measure the changes in brood temperature on both sides of the nests. "When colonies were undisturbed and well-fed," the authors wrote, "no difference in mean nest temperature between the two sides of a colony was detected."

"However, when colonies experience resource limitation, effects of glyphosate exposure became evident." When their food supply was reduced, the nests that had not been exposed to glyphosate cooled down, but not below the optimum range for larval development.

But on the other side of the mesh, where the same resource limitation was paired with glyphosate exposure, temperatures dropped much faster, eventually dipping below the optimal range for growing young bumblebees. In the wild, this phenomenon could reduce breeding rates in periods of food scarcity, and contribute to a further decline of bumblebees worldwide.

Since bumblebees are important pollinators – and, in lab research, are considered surrogates for how other wild bee species might be affected – the findings of this study are both illuminating and alarming. It's still unclear exactly why glyphosate affected the bumblebees observed, but based on previous research, the scientists suspect it may be due to the impacts of glyphosate on the bees' microbiome.

Regardless of the underlying chemical effects, the study raises concerns about the "subtle, nonlethal" effects of a herbicide once thought to be harmless.

This research was published in the Journal Science.

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The Giving Tree

By Paul Hetzler

For more than a thousand years in eastern North America, anyone who wanted to build a house or replace a roof, or maybe just needed a few storage bins, a canoe, and a snow shovel, knew where to shop. In what is now southeastern Canada and northeastern US, the American elm (Ulmus americana) was a blend of Canadian Tire and Réno-Dépôt for many First Nations peoples.

Although elms are still present in our forests, Dutch elm disease, which has the appropriate acronym "DED," now kills them before they can reach maturity. This fungal pathogen from Asia appeared in Western Europe shortly after the first World War, and by 1930 had migrated to the US. It took a few years to discover Canada, but reached there in 1946. Disease spores are spread by two bark beetles, one native and one introduced.

As the DED fungus spreads, it clogs xylem tubes that bring water and nutrients up to the leaves. Where elms grow crowded together, as was the case in many towns and cities up until the 1970s, DED also spreads through root grafts. This is the way in which whole elm-lined streets became denuded in a matter of a few years. A few trees show a degree of natural resistance, but all native elms succumb eventually.

Before the arrival of DED, these fast-growing trees attained their largest proportions in the rich flood plains of eastern North America, where they grew to thirty metres tall, their trunks reportedly more than three metres across. Elms tend to shed their lower branches early in life and typically have upright, vase-like forms.

This expanse of knot-free bark on the lower trunks of great elms was ideal for the roofs and walls of longhouses back in the day. Prodigious sheets of elm bark were peeled in spring and early summer and then anchored flat to bake in the sun. Once dry, a sheet of elm bark is the equivalent of plywood.

Covering a longhouse was an impressive feat, as some of them are known to have been over fifty metres long. Elm was also used to enclose smaller dwellings and outbuildings. In fact, elm was perfect for making items as diverse as canoes, trays, snow shovels, ladles, grain scoops, baskets, and containers of all sizes.

Fresh elm bark has the feel of thick, wet leather, and may be worked in much the same fashion. It can be bent, sewn, clamped, cut, or tied into an array of useful articles. Once dry, the roof panels, utensils, containers, and other useful items become rock-hard and will hold their intended shape, even if exposed to moisture again.

The Haudenosaunee (Iroquois) made extensive use of elm "plywood." After sheets of bark were laid out flat, holes were easily punched with something sharp like a hawthorn, or drilled using a bow-drill, along the edges while the bark was still pliable. In a few days the sections were ready to lash to the log framework of a longhouse which might be home to dozens of families.

Being consummate agronomists, the Haudenosaunee stored massive amounts of grain in each of their towns. European colonisers such as Jacques-René de Denonville, Governor General of new France (1685-89), wrote of their amazement at finding tens of thousands of bushels of corn on hand in giant elm-bark bins and cribs in the Haudenosaunee villages they gleefully burned to the ground.

I am told the Haudenosaunee made primarily elm-bark canoes because paper-birch trees were not as abundant in most of their territory as to the north. Being heavier than birch-bark vessels, elm canoes were not portaged, but used locally for travel on lakes and rivers.

Between late spring and mid-summer, elm bark can be removed with no more effort than peeling a banana. To be sure, that "peel" is heavier, but it lifts off the tree trunk with ease. Elm bark shrinks as it dries, but unlike the "skin" of many other species, does not readily split. Not only is fresh elm bark easy to work with, it is fun to the point of being addictive. Ever since an Abenaki friend taught me to make elm rattles, spoons, and baskets over thirty years ago, I try to locate a small elm or even a branch to peel every spring.

Small to mid-size elms can be found throughout their native range from Nova Scotia south to northern Florida. In higher elevations, where soil type rather than climate often limits where elms can grow, isolated stands of elms may see less-frequent DED infestation cycles. These stands often grow for decades, becoming large before they perish.

Some of North America's largest old elms can be found in places such as New York City's Central Park and on the campus of Penn State University. These old-timers exist thanks to a regimen of systemic fungicide injections and insecticidal sprays. In fact, Penn State clears its campus for a few days each year so helicopters can spray its elms.

Chinese and Siberian elms are very resistant to DED, but neither comes close in size or shape to American elms. Since 1983, the Elm Research Institute in Keene, New Hampshire has promoted "American Liberty Elms," some of which have resistance to DED, but are not immune. Hybrids between Chinese and American elms have fair resistance, but they still cannot fill the shoes, as it were, of Ulmus americana.

Although it may be a long way off, someday we will again have massive elms like those whose bark once covered longhouses. It is a sight I'd love to see.

ISA-Certified Arborist Paul Hetzler tries not to bark up the wrong tree.

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HEADWATERS CEDAR COMMUNITY FOREST UPDATE

Northwoods Alliance Inc. (NWA) and conservation partners are pleased to announce a significant advance toward establishing a Headwaters Cedar Community Forest in the Town of Land O Lakes. This project is a forested tract just south of the Michigan border with unique ecological and recreational values. The project was recently awarded close to 50% of the funding necessary to complete the community forest, through a successful grant from the USFS Community Forest and Open Space Conservation Program. "We are grateful that the USFS recognized the conservation value of this project. Moving forward, the success of this project will depend on support from the community. We are optimistic, as we see strong community benefits from conserving this unique parcel", said NWA vice-president John Schwarzmann. According to Schwarzmann, a Headwaters Cedar Community Forest will permanently protect 200 acres within the Northern Highland State Forest, valuable wetlands, unique flora & fauna and impressive areas of old cedar-hemlock forest. NWA is conducting biotic inventories of the parcel, and has worked for years to protect this parcel for the public good.

The goals of this project are; 1) to create perpetual public access to the 200-acre community forest, while obtaining community input; 2) permanently protect and responsibly manage the broad range of habitats on the property, to ensure that the diverse flora and fauna continue to thrive; and 3) establish a model of a community-managed forestland. In addition, a Headwaters Cedar Community Forest would support tourism and forestry as primary economic drivers of the local economy while offering a venue for natural resource education.

Director Joe Hovel summarized the financial situation for completing the Community Forest project, "Final figures will be determined by a certified appraisal, but the proposed budget to accomplish this goal is $420,000. With the Community Forest award of $200,000 and the funds raised to date from conservation groups and foundations, we now need to step up our efforts in the community to raise the remaining funds. We are currently reaching out to the public for help, as it truly is community action which will make this project a success."

The Community Forest Program was authorized by Congress in 2008 to address forest fragmentation at the local level, and to engage communities as stakeholders in the management of the forests. In their efforts to engage the local community in protecting the Headwaters Cedar property, NWA has partnered with a number of local and regional organizations. Our current list of partners includes: the Lac du Flambeau Band of Lake Superior Chippewa, the Town of Land O Lakes, Partners in Forestry Cooperative, Land O Lakes Fish & Game Club, Wisconsin Green Fire, Northwoods Land Trust, University of Wisconsin Center for Cooperatives, The Nature Conservancy of WI, Sustainable Resource Institute and Wisconsin DNR Division of Forestry.

Supporting partners with significant financial assistance to date include $10,000 from the Upper Peninsula Environmental Coalition, $25,000 from the Weeden Foundation of Bedford Hills NY, and $20,000 from generous anonymous donor.

NWA thanks all those who have contributed in any way to this conservation effort of which the benefits truly cross state lines. The project protects the beginning of the Ontonagon River, and critical bird and wildlife habitat.

For more information on Northwoods Alliance Inc. and Headwaters Cedar Community Forest, visit www.northwoodalliance.org, contact nwa@nnex.net, or Hovel at 715-479-8528.

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DAILY SCIENCE

Submitted by Rod Sharka

The below paragraph By Warren Cornwall was taken from Anthropocene newsletter and gives another reason why it is so ridiculous to feed deer. There is more to the story but this sums it up.
A new force in animal evolution: Selfies of people feeding wildlife

Researchers found that people feeding wild deer might be creating evolutionary pressure toward more aggressive deer that beg for food. If people need another reason why it's usually a bad idea to feed wildlife, here's one: It might cause a species to evolve toward being more aggressive towards humans. There's already abundant evidence of downsides to giving handouts to wild animals. Bears that get hooked on human food are shot when they become a nuisance. Treats can be unhealthy (I once wrote about a wild moose in Vermont that was fed, among other things, jelly donuts.). Feeding sites can become a breeding ground for disease as animals pack together. Then there's the occasional time when animals attack while they are being fed.

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