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Partners News

April 2016

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Inside this issue:

Welcome New PIF Member(s)

Bethany Lyons

Photo by Curt Webb

Forester Bethany Lyons and Keweenaw Land Trust President Keren Tischler are excited about the Forest Legacy project in their neighborhood. See story "Pilgrim River Legacy" on page 6.

PIF NEW MEMBER PROFILE IN THE U.P. WITH BETHANY LYONS

PIF: Please tell us about your education, and what sparked your interest in forestry?

I grew up in the suburbs of Minneapolis. My family wasn't particularly "outdoorsy," but I would find myself wandering in the woods in our local parks and lounging on the branches of the big white pine in our front yard. My Father grew up in Marquette, Mi and would often reminisce of his days by the Big Lake, playing in the endless woods, hunting, and fishing. Thus, my choice was clear, as I chose Northern Michigan University for my undergraduate education in Marquette. I received a B.S. in Biology with an Ecology emphasis in 2010.

I loved my degree and my undergrad experience. I became an avid hiker, backpacker, and mountain biker. It was the perfect setting. I loved the U.P. so much, I had to stay. I moved two hours northwest and completed a Master's of Science in Forest Ecology and Management at Michigan Technological University. One of the reasons I went into Forestry was simply the land itself. I wanted to stay here and spend my days in the woods. But, my prominent reason was, Forest Management is a field where industrial needs and environmental objectives can meet, coexist, and thrive together.

PIF: Please tell us about your work experience.

After my Masters in 2012 I left the U.P. for a time, as I was hired as a Forestry Assistance Program Forester for Presque Isle and Cheboygan Counties. It was a wonderful entrance into the industrial forestry world. I learned a lot about landowner objectives, markets, management planning, and state and federal forestry programs. I spent a year as an Assistance Forester before moving back to the U.P. when I was hired at Northern Hardwoods in 2014. I started as a log scaler with the opportunity to eventually move up to a full-time Forester. Scaling was an important experience as those same concepts apply in the woods when cruising hardwood timber. As part of my duties I began to branch out and started connecting with private landowners interested in forest management. As I started setting up and supervising timber sales on private lands, J.M. Longyear LLC purchased Northern Hardwoods and absorbed its foresters, including myself. I have been working for Longyear since October of 2015.

PIF: What are your duties at J M LONGYEAR?

I procure timber sales from state, federal, and private land bases including Non-Industrial Private Landowners. I work with contracted logging crews, truckers, and road builders to coordinate accessing, harvesting, and hauling timber products.

I have also become the unofficial tour guide for sawmill visitors and for Michigan Tech students visiting as part of their Wood Anatomy course.

That being said, I am primarily interested in working with private landowners. I enjoy working with families as every landowner is different and every forested parcel is unique. Therefore

I'm always challenged to keep thinking about forest management in a way that is adaptive and productive.

PIF: What service or ability do you wish to convey to help landowners?

I can offer a lot of the same services as others: wildlife habitat consultation, management planning, timber sale administration and set-up. However, if there is one thing that I believe can set me apart from others, I would hope it would be my commitment to a long-term relationship. I don't want to simply harvest timber; I want to help manage it over time. I want to know you and your family and be as much like the family doctor as the family forester. Too often I've asked landowners 'when was the last time management occurred on the property?' and I get the response, "I don't know." I hope to manage forestland, implement silvacultural techniques, be a good steward, and build relationships.

PIF: Care to give us a glimpse of your outside interests?

I took on a few hobbies and projects as of late. We recently bought a house and some land and ever since then it's been non-stop busy. I have a continually growing "herd" of critters including 3 goats for milking, 19 chickens for eggs, 2 pot-bellied pigs for fun, and 2 dogs for belly rubs…for them not me. We cooked our first batch of maple syrup this year and we're hooked! We may expand next year. I have honey bees on the way this year too, another first!
When I have time now I like to bike (road and mountain), do some day hikes or overnighters exploring state land and wilderness areas, snowshoe and ski, and I love to garden.

PIF: What is your favorite place in the UP, favorite plant and tree?

McCormick Wilderness Tract: less traveled old growth hardwoods and pines with an interesting history. The place makes you feel like you've stepped back in time!

My favorite feature in the U.P. is the landscape. The big rock outcrops and steep slopes are a reminder that there are some places best left untouched.

My favorite plant is the Trout Lilly: a reminder that winter is over and summer is on its way.

Favorite trees are white and red pine for the very unique and lovely way the wind sounds through them.

PIF: Your closing remarks for now.

Sustainable forest management is Stewardship, and is good for the environment, understanding that people are included within the "environment," and this management occurs on generational time scales.

Bethany can be reached at bethanylyons@jmlongyear.com or 906 281 2077

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Have
you paid your PIF dues?

UPDATE ON THE TWO PRIMARY LAND CONSERVATION FUNDING PROGRAMS BENEFITING WISCONSIN

By PIF Board Member Dick Steffes

The Knowles-Nelson Stewardship Program, a state program benefiting land conservation for public values, is currently 26 years old, and authorized by law in 10 year increments. The Legislature and Governor, if they did nothing, could let Stewardship run (as last changed) until 2020. However, each recent biennial budget has resulted in tinkering or outright threats to this critical conservation program. Stewardship followed the Outdoor Recreation Action Program (ORAP) which provided land conservation direction and funding in Wisconsin from the early 1960s to 1989. Governors Gaylord Nelson and Warren Knowles provided the leadership to form and renew ORAP. As that program reached its end, a legislative committee studied future conservation needs. Rep. Spencer Black, Sen. Dale Schultz and others served on that committee, leading to the 1st Stewardship program in 1990. Governor Thompson and later Governor Doyle appointed committees which helped form the 2nd and 3rd Stewardship programs in 2000 and 2010 respectively. One may notice an equal number of Democrats and Republicans in these conservation leaders who gave our state these critically important conservation programs over the past 50 years. There has been a truly bipartisan nature to Wisconsin's land conservation history.

Governor Walker's 2015-2017 biennial budget proposal called for zero funding for Stewardship. Thanks to an outpouring of support for conservation by the public, and support by leadership and many members in the Legislature, funding was included in the final budget, once passed. Perhaps in this budget with massive borrowing for state highway work, a relatively smaller amount for land conservation seemed reasonable. *I would note, as a side bar, that after the money borrowed for these programs is paid off in 20 years, as citizens we will still have the conservation land while all the highways built will be in dire need of repair!*

For fiscal year 2016 (ends June 30th) the allocations for Stewardship are:

DNR Acquisition (fee title 1/3, easements 2/3)	$ 9,000,000
County Forests (50% grant to counties)	5,000,000
Non-profit Conservation Org. (50% grants to NCO)	7,000,000
DNR Property Development (showers, campgrounds)	3,750,000
Local Gov. (50% grants to local parks & recreation)	6,000,000
Recreational Boating Aids (grants for local districts)	2,500,000
Total	$33,250,000

In total, this is a 39% reduction from previous Stewardship funding. To be positive, the public was energized by the lack of conservation funding in the budget proposal; the Legislature and Governor heard that loud and clear. Be prepared in the next budget cycle when we'll likely see a repeat of the threat to ongoing conservation.

For the DNR acquisition category, $6,000,000 is available for conservation easements. Working forest easements (Forest Legacy), with public rights very similar to open MFL but become permanent, are the type of conservation land protection with great potential given the current political climate and the funding structure. The very recent Forest Legacy easement which we were all enthused about at the Wisconsin River

headwaters is a prime example of the importance of these easements. There is bipartisan support for the benefits of these easements for jobs, economic benefits including tourism, outdoor recreation, wildlife habitat and sustainable forestry.

Presently, $5,000,000 is available as grant funds for County Forest additions. That and the NCO and LUG (Local Government) grants generally are used for fee title land purchase. Given the short time remaining until June 30th, unused FY16 funds will lapse. Any project started now likely will come out of the FY17 funding. Proposed projects, no matter how well-orchestrated, take many months. Funding levels for Stewardship in FY17 will mirror those of FY16.

The federal Land and Water Conservation Fund (LWCF) is now in its 51st year. Funded by a portion of offshore oil and gas lease revenues, it was designed to generate $900 million per year nation-wide for land conservation and public recreation. Only once in 51 years did Congress appropriate the full amount for the fund. Generally, one third and rarely one half of the legally authorized amount is appropriated each year while the remaining lease revenue has been diverted to fill other budget holes. LWCF's second 25-year law expired in 2015. Congress has recently renewed it for a 3-year term. Like Stewardship in Wisconsin, the former bipartisan support for LWCF in Congress has been marked by some in the far right's efforts to end the program or to convert it to other uses. It took a joint effort by Democrats and conservation minded Republicans like Senator Burr of North Carolina to salvage the 3 year extension of LWCF. Threats to the program continue as other bills pass through Congress, potential vehicles for taking another whack at the integrity of LWCF.

There was a fairly dramatic rescue a few months ago. The Chairman of the House Natural Resources Committee was determined to cut and change this 5 decade conservation program. Most Democrats solidly supported LWCF renewal, but the Republicans who value conservation were critical in this effort. The 3 year authorization involved leadership pulling LWCF out of that committee's control in order to pass it as part of an overall budget compromise early in Congressman Ryan's time as Speaker. As mentioned earlier, there will be more challenges to LWCF as the various factions are still in place.

Federal Forest Legacy, funded by LWCF, is about $62,000,000 for FY16. Unfortunately, Wisconsin has no projects in the queue. But, the Pilgrim River Forest in the UP is scheduled to be completed with FY16 funds and represents a grand success story we are all excited about. Most importantly, other great projects will go forward as well as additions to local parks, iconic national parks and forests and important fish and wildlife habitat protection.

Conservation minded citizens are fortunate to have programs such as Stewardship and LWCF in place. Your opinions and values, put forth to our elected officials, carry a great impact and keep these critical programs productive. We must remain diligent going forward as our elected officials discuss these programs and we must convey our feelings to them.

Dick is retired from a long career with Wis. DNR in real estate and negotiated many of the important projects now benefiting the public. He remains a tireless advocate for conservation and maintaining working forests.

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Please consider sharing your experiences and interesting observations with us for the newsletter.

FOREST LEGACY PROJECT ON THE PILGRIM RIVER ADVANCES WITH LWCF FUNDING!

For nearly a decade, a committed partnership of conservation interests in the U.P. have strived to protect a critical parcel of forest habitat very close to Houghton and Michigan Technological University. These efforts advanced significantly two years ago with a Community Forest grant protecting 275 acres. Recently, Michigan DNR announced (see www.partnersinforestry.com) the award of a federal grant from the Land and Water Conservation Fund through the Forest Legacy Program to protect another 1300 acres. This project ranked number 18 in the country in this very competitive process. The Pilgrim Legacy Forest includes over ten percent of the Pilgrim River watershed, and protects river, feeder streams, forest features, special plants like Canada Yew, and multiple public recreation opportunities. Partners in Forestry is very proud to be a part of this important endeavor.

Photo contributed by Rachel Hovel

Charming feeder brooks merge with the Pilgrim River on the project.

"Securing a Forest Legacy grant for a working forest conservation easement on upstream portions of the Pilgrim River corridor, together with the adjacent Pilgrim Community Forest, is a commitment to the integrity of the forested and riparian habitats in this watershed and the services it provides in the form of food, shelter, livelihood and recreation. As such, this is a real gift with a lasting legacy. I am delighted by this progress and thankful for the patient partnerships supporting the project."

Keren Tischler, President, Keweenaw Land Trust.

"These past years our coalition of recreation and conservation partners has continued to work toward our shared vision to ensure that 1,500 acres of the Pilgrim River Valley land remain wooded, undeveloped, and always open to the public for non-motorized enjoyment. We are excited to be awarded a Forest Legacy Program grant, which follows up on the Community Forest success in 2014, to acquire conservation easements on the remaining Project parcels. The source of this new funding is a U.S Forest Service allocation from the Federal Land and Water Conservation Fund. More importantly, the source of matching funds for the new grant comes from over 550 donations totaling $270,000 from supporters. This very strong statement of local engagement was a key component of our grant application, and one that contributed to its high ranking. Thank you for helping to make possible our shared goals of conservation and perpetual public access for enjoyment of this wonder of nature; that is what the Pilgrim River Watershed Project is all about."

Bill Leder, President, Copper Country Chapter Trout Unlimited and head of fundraising

"The Pilgrim River Watershed Project is essentially in my back yard. Private landowners are lucky to own larger tracts of land but not everyone has a forty they can explore and experience those connections. Having such a large continuous land base, in the heart of the Keweenaw, set aside for public use with continuing forest management, is a legacy I'm excited to watch and hopefully participate in for years to come. The land presents incredible opportunities for public involvement, recreation, education, research, and will act as an exemplary model for long term sustainable forest management."

Bethany Lyons, local forester

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FUTURE ARTICLES

Future stories we are working on and hoping to share with you soon:

- Roy D' Antonio of Associated Title on the things to look for in title issues when buying or selling a real estate holding
- Dustin Bronson on woody biomass.
- Information on the Managed Forest Law, pros and cons and what DNR Foresters can and cannot do for the landowner
- Golden Goose Forestry-Siver Culture or Silviculture by Paul Hetzler
- Timber Theft by Paul Hetzler
- Updates on big trees, White Pine and more

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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Joe: Recently I had a very pleasant contact with Paul Hetzler from upstate New York. It was not long before he offered stories for Partners News. Their forests being pretty much the same as ours and with his great writing style, we are fortunate and thank Paul for his contributions.

Trees: White Pine Bears Important Fruit

By Paul Hetzler

The old saw "money doesn't grow on trees" will remain valid unless bartering ever becomes the norm, in which case fruit and nut growers will be awash in tree-grown currency. Figuring exchange rates would be quite a headache, I imagine. Our eastern white pine isn't considered a crop-bearing tree and it certainly doesn't sprout cash, but it has borne priceless 'fruit' all the same.

The tallest trees this side of the Rockies, white pines of up to 230 feet were recorded by early loggers. The current US champion stands at 188 feet tall, and in New York State we have several over 150 feet. *(PIF: after the demise of the MacArthur in Forest County, Wisconsin and the Leaning Giant in the Estivant Pines in the UP, some of us are curious to learn more big tree specifics)* In terms of identification, white pine makes it easy. It's the only native pine out east that bears needles in bundles of five, one for each letter in 'white.' (To be clear, the letters are not actually written on the needles.) It produces attractive, six-inch long cones with resin-tipped scales, perfect for fire starting and for wreaths and other holiday decorations (might want to keep those away from open flames).

White pine is renowned for its exceptionally wide and clear (knot-free), light-colored lumber used for flooring, paneling and sheathing as well as for structural members. New England *(as well as most of the Midwest)* was built on white pine, and in some old homes, original pine floorboards twenty or more inches wide can still be found. Impressive as its premium lumber is, white pine's most precious gift is invisible. And hopefully indivisible.

About a thousand years ago here in the northeast, five nation-states decided they spent too much energy disputing borders and resources, and devised a system of governance to resolve inter-state issues, leaving each nation-state otherwise autonomous. It's said that white pine, with its five needles joined at the base, helped inspire the original five member nations (a sixth was added in 1722) to form the new federal structure, and white pine remains a symbol of this confederacy, the Iroquois. The tree was, and is, depicted with a bald eagle, five arrows clenched in its talons to symbolize strength in unity, perched at its top.

The Iroquois confederacy comprises fifty elected chiefs who sit in two legislative groups, with a single elected head of state. Historically, only women could vote. Women also had the sole power to impeach a leader not acting in the public's best interest, and could quash any legislation they deemed rash or short-sighted. A chief was expected to be able to recite the Iroquois constitution from memory, a feat which is still practiced today on some reserves, and takes nine full days to complete.

Jefferson, Franklin, Monroe, Madison and Adams wrote of their admiration of the Iroquois confederacy. Franklin and Madison were particularly enthusiastic about it, and exhorted the thirteen colonies to adopt a similarly structured union. During the drafting of the US Constitution, Iroquois leaders were invited to attend as advisers.

Among the earliest Revolutionary flags was a series of Pine Tree Flags, and the white pine remains on Vermont's state flag. The eagle, though removed from its pine perch, has always sat on US currency, holding in its talons a bundle of thirteen arrows symbolizing strength in unity, or E Pluribus Unum. I suppose in a metaphoric sense, our money did grow on a tree.

Paul Hetzler is a Natural Resources Educator at Cornell Cooperative Extension

See 'Some interesting points about our White Pine' on Page 22.

Photo contributed by Rod Sharka

PIF VP John Schwarzmann is diminished by the height of the white pines he manages near the Peshtigo River.

Attached is information about white pine weevil. It came originally from a USFS publication.

It is a very good idea to keep white pine seedlings and saplings in partial shade of a 40-50% overstory coverage until the trees are 16 feet tall. At that stage, most of the overstory should be removed at temperatures above 15 degrees. White pine can be very brittle and leaders and often entire trees can snap in cold temperatures from logging damage. Keeping the trees in a partial sun condition also helps limit the incidence of white pine blister rust.

The exception to this rule is if trees are located on extremely rich soils where growth is so fast, side shoots can develop into decent leaders if the terminal leader dies. I have seen that occur in more southerly areas of the state but in the north it's a very good idea to keep the seedlings in partial shade.

John Schwarzmann, Forest Supervisor
Board of Commissioners of Public Lands

White Pine Weevil

Figure 1 - *Adult white pine weevil.*

The white pine weevil (figure 1) - *Pissodes strobi* (Peck) (Coleoptera: Curculionidae) - is a native insect attacking eastern white pine (*Pinus strobus* L.). The present distribution of *P. strobi* is transcontinental, coinciding with the natural distribution of eastern white pine, Sitka spruce, and Engelmann spruce, two spruce species that it also attacks.

In the eastern United States, the white pine weevil may attack at least 20 different tree species, including ornamentals. However, eastern white pine is the most suitable host for brood development. The tree species attacked can be grouped as follows:

Severely attacked

eastern white pine, *Pinus strobus* L.
jack pine, *Pinus banksiana* Lamb.
Norway spruce, *Picea abies* (L.)

Commonly attacked

foxtail pine, *Pinus balfouriana*.
limber pine, *Pinus flexilis* James
western white pine, *Pinus monticola*
Scots pine, *Pinus sylvestris* L

Occasionally attacked

mugho pine, *Pinus mugo* Turra
Jeffrey pine, *Pinus jeffreyi* Grev. & Balf.
blue spruce, *Picea pungens* Engelm.
Douglas-fir, *Pseudotsuga menziesii* (Mirb.) Franco
red spruce, *Picea rubens* Sarg.
white spruce, *Picea glauca* Voss

Life History and Developmental Stages

Pissodes strobi has one generation each year. The adults hibernate in the duff underneath host trees. In early spring the adults emerge and crawl up the trunks of host trees. They are strong fliers and are known to fly on warm, sunny days at canopy level. After reaching the terminal shoot of the host, males and females begin feeding just below the terminal bud cluster. Eggs are laid in small urn-shaped feeding cavities made in the bark by the female. Egg cavities can be distinguished from feeding holes by the dark brown excrement cap the female deposits to seal off and protect the eggs. Egg laying begins just below the terminal bud cluster and can extend down the upper half of the terminal shoot. Eggs may be laid singly or in clusters of two or more eggs per cavity. On average, each female may lay 100 eggs, although as many as 200 have been reported. Often, two or three mating pairs may occupy a leader. When this occurs, many eggs

are laid. While most of these eggs hatch, survival to adult generally is determined by larval competition for food. When only a few eggs are laid, the larvae usually are drowned in pitch. When this occurs, the terminal shoot may be deformed but not killed. The egg, 10 mm (.04-inch) in length, hatches in 6 to 14 days, depending on weather conditions. As eggs hatch, groups of larvae form a "feeding ring," burrowing down the leader first in the inner bark and then between the wood and the bark. At the end of their feeding period, the larvae construct pupal cells in the pith and wood of the stem (figure 2). Pupal cells are characterized by the small strands of wood lining, creating a chip cocoon. There they remain inactive for 5 to 6 weeks, first as pupae and later as callow adults.

Figure 2 - *White pine weevil larva in chip cocoon.*

Beginning in late July and during August and early September, increasing numbers of adults chew small round emergence holes through the chip cocoon and bark (figure 3). The adults (figure 1) are brown, 6 to 7 mm (.24 to .28 inch) long, and covered with white and tan scales, arranged in large and small spots. In the fall, the young adults feed on buds and bark tissue of the stem and branches. Although mating often occurs, egg production is inhibited by a reproductive diapause (rest period). As average daily temperatures continue to decline, adults seek shelter in the litter beneath the host trees. They may continue to feed at the base of the tree during the day, but eventually hibernate. Most overwinter within 20 cm (8 inches) of the boles of the host trees. Generally, adult white pine weevils live only 1 year, although some have been reported to live 2 or 3 years. Details of the life cycle of *P. strobi* (figure 4) have been studied by many researchers.

Figure 3 - *Adult white pine weevil recently emerged from chip cocoon.*

Evidence of Infestation

The first evidence of attack in spring is the tiny glistening droplets of resin exuding from the feeding punctures made by the adults on the previous year's growth, just below the terminal buds. Two to three weeks later, eggs are laid in new punctures that do not produce resin droplets. Feeding by larvae effectively girdles the stem, causing the new shoot to wilt and the needles to turn reddish brown (figure 5). The wilting is noticeable in June in the southern part of the range and progressively later in the North and West. By the end of the season, larval feeding may extend below one or more whorls of branches. In such cases, all whorls above the larval feeding collar die. A successful attack always kills the previous year's growth (figure 6), although 3 or even 4 years' growth often is affected. Circular holes, 2 to 3 mm (.10 to .12 inch) in diameter, on an infested stem indicate that adults have emerged.

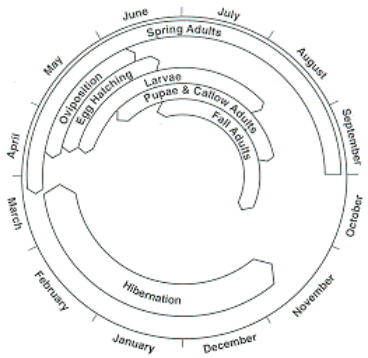

Figure 4 - *Life cycle of the white pine weevil in the eastern United States.*

Figure 5 - *Early evidence of attack by white pine weevil. Symptoms include crystallization (white) of pitch from feeding, reduced growth and wilting of new shoots, and browning of needles.*

Figure 6 - *White pine showing death of leader and top lateral growth from weevil attack.*

Damage Caused

Weevil attacks cause four types of damage to occur: growth reduction, stem deformation, increased susceptibility to wood decay organisms, and tree mortality. Tree mortality is rare and only occurs in small trees (less than 1.3 m or 4 ft tall) growing very vigorously in full sunlight.

Each weevil attack reduces tree height growth by 40 to 60% in that year. Stem deformation is common because one or more laterals takes over terminal dominance of the attacked tree. If two or more laterals take over, a forked and often very bushy tree results (figure 7). If only one lateral gains dominance, the stem often maintains a crook for many years. Stem deformities may result in wood defects such as compression wood and bark-encased knots that reduce the value of sawn lumber. This reduction in wood quality is considered the major impact of white pine weevil. Finally, part of the dead leader usually persists for many years (figure 8) and may act as a point of entry for heart rot organisms such as *Phellinus pini* Ames, the major heart rot disease of older eastern white pines.

Figure 7 - *A "bushy" open-grown white pine, showing the effect of numerous attacks by the white pine weevil.*

Figure 8 - *White pine deformed by the white pine weevil. The remaining dead leader provides a pathway for disease organisms.*

Weevil-Tree Interactions

The white pine weevil prefers vigorous leaders, 4 to 9 mm (.16 to .36 inch) in diameter. They also appear to prefer thicker bark, which increases the survival of immature stages. Weevils utilize a range of bark thickness from 1 to 3 mm (0.3 to .10 inch), but prefer the 1.5- to 2.5-mm (.06- to .09-inch) range. Other characteristics of white pine provide some resistance to attack. Laboratory experiments indicate that the water content of the terminal shoot affects the number of eggs laid, with relatively low water content significantly reducing the number of eggs laid. Field observations suggest that rainfall, soils, and other factors that affect stem water content during the egg-laying period may affect the extent of weeviling and whether or not the leader is killed.

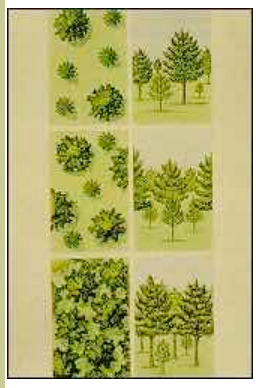

Figure 9 - *Crown closure: A, 25%; B, 50%; and C, 75%. Young white pine should be grown under an overstory of approximately 40 to 50% crown closure. This will provide enough shade to discourage weevils but allow in enough light for adequate growth. Most unmanaged natural stands have 70 to 80% crown closure.*

Silvicultural Practices To Reduce Weevil Damage

The weevils prefer open-growing trees and fully sunlit terminals with diameters of 5 mm (.2 in) or more. Growing pine under a hardwood overstory reduces weevil attack by slowing the growth of the leader, and by reducing sunlight and temperature below that preferred by female weevils. The hardwood canopy also affects the dispersal of the adults in fall by intercepting most of the ultraviolet light that strongly stimulates the weevils. Under such conditions, fewer pines are attacked, the number of eggs laid is small, and larval survival is considerably reduced. However, heavy shade can be detrimental to the growth of white pines. Thus, there must be a balance between sufficient shade to reduce weevil injury and enough light to maintain adequate tree growth. As a goal, approximately 40 to 50% crown closure of the overstory trees should be maintained (figure 9). Most unmanaged stands have a natural crown closure of 70 to 80%.

A second important silvicultural practice is to maintain high densities of young white pine until the trees reach about 6 m (20 ft) in height. This is especially important in open-grown plantations or stands. It is possible to culture young white pine in an open-grown situation if the density of the regeneration is kept high. A minimum of 800 trees per .4 ha (1 acre), that is, 2- by 2.4-m (7- by 8-foot) spacing, should be grown, although 1,200 per acre, or 1.8- by 1.8-m (6- by 6-foot) spacing, would be preferable. Not all trees need to be white pine. Density creates competition, which forces rapid height growth with minimal terminal diameter growth. Competition also forces laterals on weevil-attacked trees to "straighten" quickly. In addition, it causes natural lower branch mortality, which augments pruning for control of white pine blister rust. This practice may require pre-commercial thinning of plantations when trees reach 6.1 to 7.6 m (20 to 25 ft) in height.

Silvicultural techniques that reduce stem (leader) moisture content during the weevil's egg

laying period (see figure 5) also are likely to reduce the incidence of weeviling. Growing pine under a hardwood canopy, dense stocking in open-grown stands, and planting on well-drained soils are management strategies that could reduce stem water content at the time of day and year weevils are laying eggs. The practical problems of using these techniques need further evaluation.

Mechanical Control

In ornamental plantations of small trees and in stands of saplings, pruning the infested terminals and branches before adults emerge can reduce the weevil population. Subsequent or simultaneous pruning of laterals and forks can aid the trees in forming a nearly straight main stem. Pruning should be done as close to the topmost unaffected whorl of branches as possible and should be done as soon as possible after the first indication of weevil attack. Usually this means the first sign of wilting. This will prevent the loss of more than one season of growth and reduce the overwintering weevil population. Infested terminals should be destroyed or removed from the site.

Banding of trees and bases of leaders with sticky substances may retard dispersal of adults and reduce attack on selected trees. Sticky substances should be applied on tape or other material, not directly on the bark. However, because adults can fly to leaders, banding by itself may not prevent weeviling.

Ecosystem Management Implications

Eastern white pine occurs on a very wide range of sites and was historically a component of most forest cover types within its botanical range. Across this range it has played many ecological roles, occurring in relatively pure stands or in mixture with other pines or hardwoods. Not only is it a very valuable timber species, but it has high wildlife and esthetic values. Unfortunately, over most of its range it has never regained its previous dominant status following the extensive logging of the original "pinery."

White pine weevil is not a tree killer and, therefore, does not play an obvious role in the abundance or survival of white pine. Nevertheless, it has had an important influence on how slowly white pine has regained a significant role in many forest stands. In many areas, regeneration following logging was open-grown, and young stands often were poorly stocked, creating ideal conditions for weevil survival. Trees were attacked numerous times, slowing growth and creating trees of very poor wood quality. This, along with the introduction of white pine blister rust, *Cronartium ribicola* Fisch, in the early 1900's, gave eastern white pine a reputation as a difficult species to culture in forest stands. Management of the species, therefore, was reduced and the amount of white pine regenerated by forestry activities was limited.

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Early Bat Sightings? What's going on?

by Rod Sharka

There has been a lot of chatter and buzz recently among local birders, professional naturalists, and wildlife biologists about numerous bat sightings being made during the unseasonable warm spell experienced during the second and third weeks of March. It seems bats were observed actively flying around in mid-afternoon on mild, sunny days. Reports of sightings have originated from across the northwoods from Copper Falls State Park, the Ironwood, Bessemer, Mercer areas, along the Pilgrim River in Houghton, MI., and Marquette, MI.

According to Licia Johnson, lead naturalist at the North Lakeland Discovery Center in Manitowish Waters, apparently, some bats will go in and out of hibernation briefly if the weather is quite warm. However, they don't remain active long, so they don't need to feed extensively, which is good given that the insect hatch at this time of year is minimal.

However, another factor is likely to be at work here - white-nose syndrome (WNS). In a recent email referring to these sightings, a USFS wildlife biologist stated*: "It is far too early for the bats to emerge. It has nothing to do with the unusually warm early spring. They have roused from hibernation to fight WNS infection, but they are going to starve/freeze to death. Not enough bugs out yet for them to meet their caloric needs. We are witnessing the mass die-off that has been*

Little brown bat with WNS

predicted for so many years. This is a truly tragic event that is occurring before our eyes, and we are powerless to stop it. My advice: imprint these images of those daytime bats in your minds' eye because we won't see many bats ever again. At least not in our lifetimes."

White-nose syndrome , a Eurasian fungal disease that has killed an estimated 6 million bats in North America, disrupts the hibernation cycle of bats, repeatedly awakening them and burning up their fat reserves. They then are forced to leave their hibernation site (locally, commonly old, abandoned mine shafts or natural caves), to look for food, which ultimately leads to their deaths from starvation. Some winter colonies have experienced 100 percent mortality.

According to local naturalist John Bates, White-nose syndrome is now in 26 states and five Canadian provinces, and appeared throughout much of the U.P. in 2014-15. The disease has now been confirmed in Minnesota and may be affecting our area as well.

But, why should I care about bats?, you might ask. According to a recent USDA study published in a Science Magazine Policy Forum, pest-control services provided by insect-eating bats in the United States likely save the U.S. agricultural industry between $3.7 billion to $53 billion a year, and yet insectivorous bats are among the most overlooked economically important, non-domesticated animals in North America. "Bats eat tremendous quantities of flying pest insects, so the loss of bats is likely to have long-term effects on agricultural and ecological systems," said Justin Boyles, a researcher with the University of Pretoria and the lead author of the study. "Consequently, not only is the conservation of bats important for the well-being of ecosystems, but it is also in the best interest of national and international economies."

In the recent book, *Bats In Forests; Conservation and Management* edited by Lacki, Hayes, and Kurta, research was cited suggesting an increasing recognition of the importance of bats **for sustaining the health of forested ecosystems**.

So, is there any hope for saving important bat populations? Perhaps... if we hurry.

According to Matt Miller, the director of science communications for The Nature Conservancy, a potential biocontrol effective at combating white nose syndrome may be on the horizon.

Researchers from Georgia State University, studying the volatile organic compounds (VOC's)) released from cultures of the bacterium *Rhodococcus rhodochrous* for their ability to retard the ripening of fruit such as bananas. The researchers inadvertently also discovered that these VOC's were also effective in inhibiting the growth of fungi. Preliminary tests have shown promising results in the VOC's ability to inhibit the growth of the WNS fungus on bats in a laboratory setting.

Of course, the use of biocontrols have had a checkered history filled with unintended consequences. The impacts of the bacterium on native organisms would have to be thoroughly tested, and methods of exposure would have to be developed. The question is a matter of time. Will the safety of this potential biocontrol on natural ecosystems be established, and effective, practical methods of release be developed before it is too late? Let's hope so.

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DON'T FLEE FROM THESE FLEAS

By Paul Hetzler

If you've been tromping around in the woods lately, especially if it's a mild day, you may have noticed dark specks collecting in depressions in the snow. If you look closely you'll notice these little pepper flakes bouncing around. They're called snow fleas, but don't panic—they're not real fleas.

They're not especially fond of snow, either, but other than that, snow fleas are aptly named. On sunny days in late winter they often congregate near the bases of trees or collect in footprints. While snow fleas are the size of actual fleas, they haven't the least interest in you or your pets (but please don't take that personally). Try not to step on them, as they may give us the means to improve both organ transplantation and ice cream.

Snow fleas, a type of 'springtail,' were classified as insects until recent DNA sequencing pegged them as another type of arthropod called a hexapod. Apparently there's now heated debate as to whether springtails constitute a hexapod class or merely a sub-class. You have to love scientists. First they study an obscure organism to develop life-saving technology, then come to fisticuffs over what to call it.

Whatever their label, snow fleas are beneficial in many ways. As decomposers of organic matter, they help create healthy topsoil. They and their hexapod cousins are one of the most abundant types of soil 'animals,' numbering around 100,000 individuals per cubic yard of topsoil.

Besides eating algae, fungi, nematodes, protozoa and a wide range of organic matter, they consume organisms and spores that cause damping-off wilt and other plant diseases. In fact, springtails are being studied for their potential to control plant diseases in greenhouses.

Snow fleas also produce a unique glycine-rich protein that keeps ice from forming inside their cells even at very cold temperatures. This newly discovered molecule is unlike any previously known protein, and is the basis for research on more efficient storage of transplant organs. Organs could be stored for much longer if this protein allows them to be kept at below-freezing temps without damage.

A slightly less important application, but a welcome one to many, is that snow fleas could improve ice cream. Eventually we may see ice cream that never forms ice crystals no matter how long it sits neglected in the freezer.

Springtails lack a respiratory system and must breathe through their skin. As a result, they're quite vulnerable to drying out, and hop around to find moist, sheltered places as well as things to eat.

A true flea uses its tarsi, or toes, to vertically jump as much as seven inches, which is roughly the equivalent of a person jumping 500 feet straight up using only their toes. A snow flea, however, is not nearly so athletic. It can use its two tail-like appendages to bounce a fraction of a flea-jump, perhaps equivalent to a human leaping a mere dozen feet in the air. (I feel so much less inadequate now.)

During warmer months snow fleas and other springtails are even more active than they are in winter, although without a snowy background for contrast they're hard to see. They forage extensively in the humus layer and move throughout the soil profile, even deep down. Springtails can be found up in the forest canopy as well as on water, where surface tension keeps them from sinking. If you go out with a flashlight some June night you can see springtails bopping about on standing water.

Just hearing the word 'flea' can set folks on edge and start them scratching, so it's unfortunate about snow fleas' name. Try thinking of them as springtails, and keep an eye out on bright winter days for these jittery critters that help make topsoil, and could one day help save our life. Or at the very least, our ice cream.

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The effect of deer browse on a northern hardwood forest in Baraga County, MI

By Rachel Gauthier[a] and Yvette Dickinson[b]

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Many landowners are concerned either about the presence or absence of deer on their property. To demonstrate the effect of deer browse on northern hardwood forests, Gary Willis (MI DNR) worked with John McInnis in December 2001 to set up the JOMAR Canopy Gap Regeneration Study by building a fence to exclude deer from a canopy gap recently created by timber harvesting. Recently, we visited the JOMAR Study on John McInnis's property in Baraga County, MI (Figure 1) to repeat the vegetation measurements that were done in 2002 shortly after the fence was built, and investigate the impact of deer on the forest in the last 13 years. Calvin Norman (Junior in Wildlife Ecology and Management, Michigan Technological University) also helped with the data collection.

The data collected in 2002 showed that the saplings and seedlings that were abundant inside the fenced exclosure were overwhelmingly sugar maple with a few red oak and balsam fir. There were somewhat fewer seedlings and saplings outside of the fenced exclosure, suggesting that deer browse may have impacted the regenerating trees. In addition, there was a greater abundance of bracken fern and wild sarsaparilla outside than inside the fenced exclosure.

Figure 1 The JOMAR Canopy Gap Regeneration Study

In 2015 we found that the abundance and species of the seedlings and seedlings was similar both inside and outside the fence, suggesting that deer browse might be having little impact on the regenerating trees. Most of these regenerating trees were sugar maple, with some yellow birch.

Figure 2 This maple seedling has been repeated browsed. Notice the crooked stem where side branches have grown to replace the main stem after being browsed in the past, and the numerous short branches near the tip after more recent browsing.

However, we observed abundant evidence of browsing outside the exclosure with many of the saplings outside the fence "hedged" by repeated browsing over time (Figure 2). Furthermore, the ground flora species had changed with an increase in Canada mayflower and partridge berry inside the fenced exclosure.

White-tailed deer prefer to browse on Canada mayflower and partridge berry amongst other species, and the greater abundance of these species inside the exclosure suggests that the absence of deer browsing inside the fenced exclosure had allowed these species to flourish.

While browsing by deer did not affect the species or abundance of tree regeneration in 2015, this lack of impact may be due to the low deer population in the Upper Peninsula that have been reported following the last three uncharacteristically cold winters. However, deer browse did appear to impact the understory plant community, as evidenced by the observed sapling hedging and changes in the ground flora.

Landowners interested in monitoring the impact of deer on their own forest may wish to study the understory plant species present in their forest. The presence or absence of species known to be preferred by deer, such as leather leaf, Labrador tea or tag alder, may be a good indicator of the impact deer are having on the forest.

Furthermore, interested landowners may wish to establish their own deer exclosures by erecting a deer proof fence within the forest and observing changes in the abundance and composition of understory plants and regenerating trees inside and outside the fenced area through time. The exclosure established in this study was 8 ft tall, and encompassed an area that was 75 ft x 85ft. Photographs of the forest repeated over time can be used to record the changes you observe. In addition, there are a number of options if you are concerned that deer have become a problem on your own property, including fencing, repellents, and scare tactics. Hunting seasons can also be beneficial, if regulated appropriately.

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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.

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GERMANN ROAD FIRE PROPERTY ASSESSMENTS – WHY SOME HOMES SURVIVE

by Jolene Ackerman, DNR wildland urban interface coordinator

This review of the Germann Road Fire has pertinent information for all home owners in pine country and how to be prepared for a wildfire.

On May 14-15, 2013, the Germann Road Fire burned 7,500 acres in northwest Wisconsin. A forest fire of this size gives us an opportunity to study the developed properties within the fire perimeter to get a sense for why some homes survive a wildfire and others do not. After the fire, a team of DNR fire control staff conducted post-fire research on 96 of the 100 properties within the fire perimeter. The purpose of the research was to take a look at the features of buildings and area 100 feet around them. We wanted to find out what type of fire burned on each property and what features contributed to buildings surviving the wildfire or being destroyed or damaged by it.

Property characteristics

We counted 270 structures within the perimeter off the fire. Property sizes ranged from small lake lots to parcels 39 acres in size. Most of the properties (72 percent) could be considered seasonal use and were not the owner's primary residence.

There was a huge range in driveway length, with the lake lots having short driveways and some driveways to secluded cabins being a quarter mile or longer. On more than one-third of the properties, the home could not be seen from the road. *There does not appear to be a connection between driveway length and whether the home survived. For example, six homes burned on properties with driveways shorter than 150 feet in length.*

Average driveway width was 17 feet. Thirteen driveways did not meet the minimum standard of being 12 feet wide (6 of those homes were destroyed). *No homes were lost on properties with a driveway wider than 20 feet.* We found gates on 15 driveways. *A larger percentage of homes burned on properties with a gated driveway than ones without a gate.*

We noticed some quality of fuel break on at least 67 percent of the properties. Features such as rock or cement landscaping materials, exposed soil from recent construction, lawns, driveways and lakes all counted as fuel breaks. The majority of features classified as fuel breaks did not seem to be intentionally constructed as a means to mitigate wildfire threat. *Creating fuel breaks and doing things like keeping grass mowed and leaves raked up gives a home a better chance of surviving a wildfire because these actions remove fuel, thus lowering a fire's intensity.*

Primary structures (aka 'homes')

There were 48 cabins, 35 houses, 10 mobile homes, 1 bar, 1 commercial pole building, and 1 LP storage facility in the properties assessed. Average assessed value was $80,000. They ranged from a $3,500 seasonal mobile home to a $313,000 year-round residence (both destroyed). *There does not appear to be any correlation between assessed value and whether the home survived.* During the fire, 23 homes and seasonal cabins burned, including three year-round residences. Seasonal properties tend to have longer driveways and less maintenance of the vegetation around them. *A higher percentage of seasonal homes burned compared to year-round homes.*

As expected, the greater the distance between the home and the nearest vegetation that could be considered unmanaged, the greater the survival rate of the home. *The average distance to vegetation on properties where the home survived was 27 feet.* The average distance to vegetation on properties where the home was destroyed was 19 feet. The National Fire Protection Association (NFPA) recommends a "fuel modification area" extending at least 30 feet from structures. This 30-foot area around homes is more commonly called Defensible Space.

All types of fire were in play during the Germann Road Fire: crown fire, surface fire, flying embers and structure fires. We documented the type of fire that burned on properties as much as possible. Many properties had more than one type of fire on the property. The most common type was surface fire and was thought to have contributed to the destruction of nearly half of the homes. Crown fire was noted on 8 properties. On five of these, the home was destroyed. Firebrands (flying embers) are thought to have caused the destruction of two homes.

On 19 properties, an outbuilding burned within 30 feet of the home. In 12 cases, the home was destroyed; on three properties the home was damaged and the other four times the home survived or was saved with fire suppression assistance. *Buildings are considered to be 'long term heat sources,' with a tendency to burn much longer than vegetation. The structure-to-structure loss on this fire is significant and may be cause for renewed emphasis on keeping buildings more than 30 feet apart. In cases where existing outbuildings are already within 30 feet of the home, emphasis needs to be placed on the creation of a 30-foot defensible space around the outbuildings as well as the home.*

Outbuildings

We counted 174 outbuildings in the path of the Germann Road Fire. Most of the buildings were tool sheds, garages and outhouses, with an assortment of miscellaneous other buildings (e.g., cabins, campers, pole sheds, wood sheds, etc.). In total, 81 were destroyed 22 were damaged and 62 were saved or survived. When conducting the assessments, it was easy to see why such a high percentage of outbuildings burned. *They tended to be very close to unmanaged vegetation.* The average distance between a destroyed outbuilding and unmanaged vegetation was 6 feet. The average distance between an outbuilding that was saved or survived and unmanaged vegetation was 17 feet.

Conclusions

We can't stop every fire from happening. And large scale wildfires, like the Germann Road Fire, are going to occasionally burn in Wisconsin. We can take what we learn from small and large fires and use the knowledge to make recommendations to property owners about their responsibilities in being prepared for wildfires. Encouraging people to make their homes and outbuildings "Firewise" and improving access for emergency vehicles will go a long way to keeping people and property safe when a wildfire moves through an area.

DNR filmmakers used video footage of the fire damage and an interview with one of the property owners to create a 4-minute video called "Be Ember Aware." The video and highlights of this research can be viewed at dnr.wi.gov (keyword 'ember').

For more information on the post-fire research, contact Jolene Ackerman, DNR wildland urban interface coordinator at 608-267-7677 or Jolene.ackerman@wisconsin.gov.

WHAT IS THE NEW CAUSE OF LYME DISEASE?

Scientists at the Mayo Clinic in Minnesota have identified a new type bacteria as a cause of Lyme disease. For decades, Lyme disease has been associated with infection with the bacteria *Borrelia burgdorferi*. Lyme disease was originally discovered in the town of Lyme, Connecticut, in the 1970s. A number of children were diagnosed with rheumatoid arthritis, and researchers looking for the cause eventually focused on deer ticks in the kids' back yards.

The Spread of Lyme Disease:

Since then, Lyme disease has spread from New England to nearly half the counties in the US and 300,000 people are infected every year. That number is an increase of 1000% over the CDC's estimates prior to 2013.

Now, the Minnesota researchers in collaboration with the CDC have found that not all cases Lyme disease in the region surrounding the Mayo Clinic are caused by *Borrelia burgdorferi*.

The New Species as a Cause of Lyme Disease:

The new species they identified has been provisionally named *Borrelia mayonii*. It is transmitted by the same species of ticks (*Ixodes scapularis*) and treatment is the same, but symptoms are slightly different. *B. mayonii* is more likely to cause nausea, vomiting and generalized rashes rather than the so-called bulls' eye rash considered typical of classic Lyme disease. Now that we know there is a new version of Lyme disease, doctors will need to be alert as it begins spreading across the country.

Lyme Disease Treatment:

Lyme disease is best treated early with antibiotics. Even after completing the treatment, symptoms sometimes linger, a condition the CDC terms post Lyme disease syndrome. When treatment is delayed, the infection can cause damage to the joints or even the heart.

Source: The People's Pharmacy

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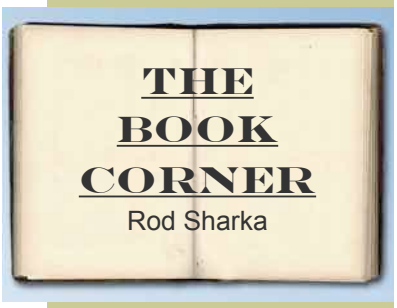
For this issue of Partners News, may I recommend the following book for your reading pleasure:



The Wild Trees; A Story of Passion and Daring, by Richard Preston. In *The Wild Trees*, author Richard Preston tells the spellbinding story of Steve Sillett, Marie Antoine, and the tiny group of daring botanists and amateur naturalists on their quest to discover, measure, and study the largest, tallest living tree specimens on earth, and in doing so discover a dangerous, hauntingly beautiful, and unexplored world above California. The voyagers are young - just college students when they start their quest - and share a passion for these trees, the coast redwood trees of Northern California.

As the author points out in the beginning, "This book is narrative nonfiction. The characters are real and the events are factual..." This is a masterful, compelling story where Preston shares his protagonists' passion for tall trees, as he masters the techniques of tall-tree climbing in order to tell the story in *The Wild Trees* - the story of the fate of the world's most magnificent and splendid forests as well as the imperiled biosphere as a whole.

Anyone with an interest in specialized tree climbing techniques, rare, old-growth forests, descriptions of mysterious and unique ecosystems in the redwood canopy consisting of vertical Edens filled with mosses, lichens, spotted salamanders, hanging gardens of ferns, and thickets of huckleberry bushes, all growing well over 300 feet in the air, or who has ever experienced a humbling sense of awe from giant, old growth trees, will be fascinated by this book written by a best-selling author.

Preston, Richard, The Wild Trees, 2007, Random House.

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As a service to PIF members, contact Joe for special pricing in your needs for:

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Some interesting points about our White Pine (sources were numerous)!

Eastern White Pine, also called Northern White Pine, Pinus strobus, is prized in our area and is a true icon of the northwoods. It prefers well-drained soil and cool, humid climates, but can also grow in boggy areas and rocky highlands. In mixed forests, this dominant tree towers over all others, including the large broadleaf hardwoods. It provides food and shelter for numerous forest birds and wildlife.

Eastern white pine forests originally covered much of northeastern North America. Only one percent of the old-growth forests remained after the extensive logging operations that existed from the 18th century into the early 20th century.

Old-growth forests, are revered in our area in well known places like the Huron Mountains, Estivant Pines, Porcupine Mountains State Park, and the Sylvania Wilderness Area in the Upper Peninsula of Michigan; the Menominee Indian Reservation in northeastern Wisconsin, as well as many other pockets in public forests.

Like all members of the white pine group, *Pinus* subgenus *Strobus*, the leaves ('needles') are in fascicles (bundles) of five (rarely 3 or 4), with a deciduous sheath. They are flexible, bluish-green, finely serrated, and 5–13 cm (2.0–5.1 in) long, and persist for 18 months, i.e. from the spring of one season to the autumn of the next, when they are shed by abscission.

The cones are slender, 8–16 cm (3.1–6.3 in) long (rarely longer than that) and 4–5 cm (1.6–2.0 in) broad when open, and have scales with a rounded apex and slightly reflexed tip. The seeds are 4–5 mm (0.16–0.20 in) long, with a slender 15–20 mm (0.59–0.79 in) wing, and are wind-dispersed. Cone production peaks every 3 to 5 years. While eastern white pine is self-fertile, seeds produced this way tend to result in weak, stunted, malformed seedlings.

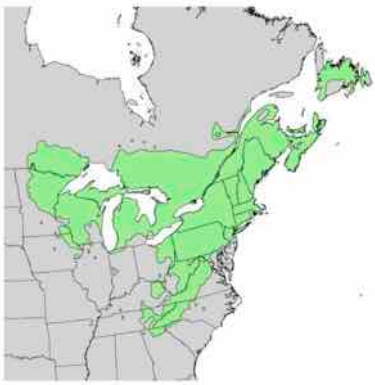
Mature trees can easily be 250 years old. Trees in both Wisconsin and Michigan have approached 500 years in age. The eastern white pine, *Pinus strobus*, has the distinction of being the tallest tree in eastern North America. In natural pre-colonial stands it is reported to have grown to as tall as 70 m (230 ft). *Pinus strobus* commonly grows approximately 1 m (3.3 ft) per year between the ages of 15 and 45 years on good sites, with slower height increments before and after that age range. Unconfirmed reports from the colonial era gave diameters of virgin white pines of up to 2.4 m (8 ft).

Because the eastern white pine tree is somewhat resistant to fire, mature survivors are able to re-seed burned areas. The white pine weevil (*Pissodes strobi*) and white pine blister rust (*Cronartium ribicola*), an introduced fungus, can damage or kill these trees.

In the 19th century, the harvesting of Midwestern white pine forests played a major role in America's westward expansion through the Great Plains. A quarter million white pines, it is said, were harvested and sent to lumber yards in Chicago in a single year.

Freshly cut eastern white pine is creamy white or a pale straw color but pine wood which has aged many years tends to darken to a deep rich golden tan. Occasionally one can find light brown pine boards with unusual yellowish-golden or reddish-brown hues. This is the famous "pumpkin pine". It is generally thought that slow growing pines in old-growth forests accumulate colored products in the heartwood, but genetic factors and soil conditions may also play a role in rich color development.

Eastern white pine needles contain five times the amount of Vitamin C (by weight) of lemons and make an excellent herbal tea. The cambium is edible. It is also a source of resveratrol. White pine is the provincial tree of Ontario, Canada; and the state tree of Michigan. Its "pine cone and tassel" is the state flower of Maine.



Partial distribution map of *Pinus strobus* in North America.

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