Partners News

July 2017

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Have you paid your PIF dues?

Inside this issue:

Wintergreen 2

Tree Planting on the Upper Wisconsin River Legacy Forest 3

Only Bury Your Tree After It's Dead 6

Pinus Banksiana - Jack Pine 7

Tips for Landowners 12

Impact of Deer Herbivory on Forest Regeneration and General Health 14

Member Profile - Hans Schmitt 16

Wintergreen (Gaultheria procumbens)

(Several sources of information were used by PIF for this report)

Wintergreen is also called teaberry, checkerberry, and mountain-tea — is abundant in the northwoods, and especially on the Upper Wisconsin River Legacy Forest. It is a common and hardy plant, native to North America and is found in Canada from the Maritime Provinces to Manitoba and throughout the eastern half of the US as far south as Alabama.

Tea Berry was once a common gum and wintergreen is still used for flavoring. Simply bend down and snap off a wintergreen leaf, break it up and smash it with your fingers as you release the essential oils to enjoy the aroma. Or, as I often do, chew the leaf as a breath freshener.

Wintergreen is a small member of the heath (Ericaceae) family as it grows just three to perhaps six inches tall. It favors acidic and somewhat sandy soils, especially common in much of our jackpine areas. It is shade-tolerant, but may not obtain fruit in the absence of sun. Wintergreen's leathery little oblong leaves are green in summer however, even with its name, the plant often turns red in fall and through winter. Small white or even pink flowers add a nice touch when they occur. The flowers often hang on for significant time before making fruit. Bright red berries appear in the fall and often remain on the plant through the winter.

People do consume wintergreen. It is commonly taken as a trail snack, if one looks past the possible contamination from dogs or other critters. Most, however, simply make a tea from the leaves.

Besides the use for herbal teas and trail chewing, wintergreen is known to contain medicinal features. As is rich in white willow bark, wintergreen leaves contain methyl salicylate, which is a common primary ingredient in pain-relief ointments. Native Americans would use wintergreen leaves in poultices and broths to relieve pain. Salicylates are known to be a protective agent to plants. Some theorize that modern commercial agriculture prevents plants from forming many of their protective agents, to the detriment of our health as we miss a natural part of the vegetables protection.

Animals also feed on wintergreen plants. Deer, bear, foxes, turkeys and other birds and even rodents, include the berries as a part of their diet.

Being much more hardy than they appear, Wintergreen plants make a creeping carpet of vegetation, by sending out runners as well as by underground rhizome. An attractive base layer in natural forest setting is thus created. This is gaining popularity as a ground cover in garden beds as well as landscaping, giving us yet another alternative to non-native species.

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TREE PLANTING

ON THE UPPER WISCONSIN RIVER LEGACY FOREST

BY JOE HOVEL

Good Friday 2017, with traces of snow remaining, while 33,000 trees were planted on the Upper Wisconsin River Legacy Forest on just under 40 acres. The 2015 harvest was closer to 100 acres but some areas regenerated vibrantly with aspen, as well as 17 acres of the 100 was a red pine thinning. The area in need of planting was primarily over mature jack pine, some dying and leaving a thick grass-shrub layer.

In the summer of 2016 we spent extensive time with a small crawler-loader (dozer tracks) in site preparation; piling the large dead wood and matting down the harvested tops, hopefully releasing some seed from those. In early November a large disc trencher came in and made the furrow type rows for the trees. Shortly after in November, I ordered the trees through the WDNR Nursery. 16,000 2 year jack pine, 8,000 1 year jack pine, 3,000 each white and red pine in 2 year as well as 3,000 3 year white spruce. In mid winter I lined up Northwoods Forestry Services to conduct the planting.

On Thursday afternoon we picked up the trees at the Trout Lake Ranger Station and took them to 4 different spots in the planting zone. Bright and early on Friday morning Mark and I began the root pruning, to shortly after be joined by Mary, Rod Remme and faithful PIF stalwart Rod Sharka. The tree planting crew of 10 migrant workers arrived at 10 AM as scheduled. Between root pruning and locating the trees for the crew we had such a busy day that lunch was ignored. A little past 5 PM all the trees were in the ground and amazingly all the area prepped was planted. This was an incredible point I continue to ponder, the correct amount of trees for the area and the area was covered. Perhaps a good conservation effort on Good Friday was favorably viewed.

The day following was clean up day for Mary and I, and the rain started by mid afternoon helping to settle the soil near the new plantings. This was a memorable project on which the timing worked out very well. I am grateful for the good crew and especially the help of our prep crew and more. NRCS Conservationist Tom Melarnik came by later Friday afternoon for an inspection and helped with root pruning until the end. This project was assisted and made much better by the financial help we received through NRCS, for the site preparation and the tree planting. The Regional Conservation Partnership Program (RCPP) recognized the importance of these young forests being established for bird habitat. Which I am constantly reminded of when I see spruce grouse on the legacy forest. Spruce grouse thrive in this habitat of black spruce swamps and adjoining jack pine, fir and spruce. They do best in the cover the younger stands provide, up to about 35 years. Much of the adjoining acreage in the legacy forest is jack pine now just over 30 years old, thus I was excited to help provide some new future habitat.

In his portion of our January 2017 presentation in Land O Lakes, Ron Eckstein explained very well of the importance of this jack pine habitat. Lending me the idea to do the January 2017 presentation was a short chat last fall with a neighbor to the legacy forest. She walked into the site planting area as we were loading equipment and nicely asked what was going on. I replied we are preparing for spring tree planting. Her reply was “I hope you will not plant any more of that ugly jack pine.” Comparatively at least, jack pine does not exhibit the beauty of the stately red and white pine, but is well suited to the barren soils and our management objectives prioritize spruce grouse habitat. Young jack pine also provide habitat for the Kirtland Warbler.

The planting crew was 8 Guatemalans and 2 Mexicans, one of whom was the foreman and spoke fluent English. One of the Guatemalans asked me with his limited English "Trump build wall, who plant trees?" "Certainly not his golf buddies", I replied.

I was happy to support the State Nursery in this era of privatization; however I see some potential complications going forward. Our last remaining nursery is in Boscobel, in far southern Wisconsin. A great distance from our northern forests, which with the climate difference over 250 miles north-south, may necessitate pulling trees much earlier than we are prepared for here. What if the snow had not receded enough by Good Friday, or what if the planting crew was not available for a couple weeks? Simply the trees in the south start with their new growth earlier than here and have a limited life as bare roots in the cooler.

Certainly a great deal of stress over the logistics in the planning stages proved to be unwarranted this round, however next planting time we may not be as fortunate.

With all the stresses we realize in forestry, and especially conservation efforts, planting trees at least gives us a glimmer of hope.

Photo credit: Mark Hovel

Disc trencher on the Legacy Forest, November 2016

On Stormy Hill and in the Springfield Bluffs we tried something new for planting trees. In late February we began to stratify some white pine seed by placing them in refrigeration for 60 days after soaking for 24 hours. For the stratification period we mixed the seed with perlite. At the end of April we sowed the seed mixed with a little potting soil, on some freshly disturbed ground. At the end of June the results are beginning to show!

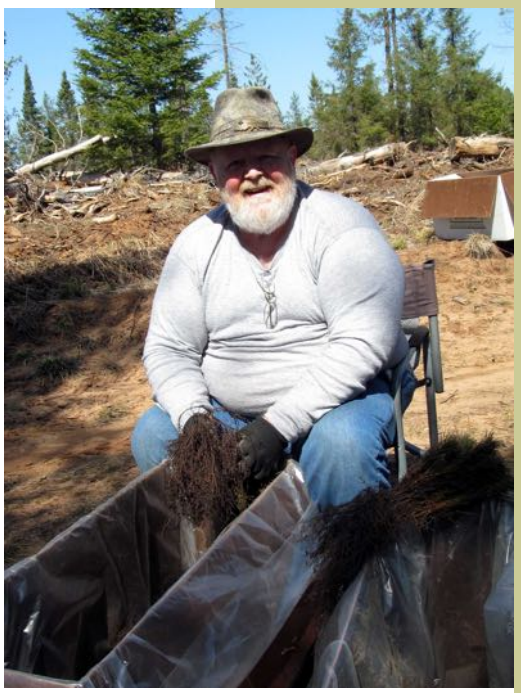
Photo credit: Mark Hovel

All photos on this page credit: Rod Sharka

A freshly planted 2 year old jack pine on the Legacy Forest

Central American tree planters on the Legacy Forest on Good Friday

Root pruning



In a demonstration of good solid partnerships, Rod Remme appreciates deer hunting on our lands and we appreciated the help with root pruning.
Rod's son Jamie is our DNR Forester-ranger out of Eagle River.

ONLY BURY YOUR TREE AFTER IT'S DEAD

Paul Hetzler

In springtime, driving around on weekends makes me sad. Invariably I'll pass someone out in their yard, shovel in hand, maybe with their kids or spouse, and they have a cute little tree from the garden center on one side of them, and a wicked deep hole in the ground on the other. If I wasn't so shy, I'd stop and offer my condolences, because clearly they are having a funeral for the tree.

Here's an arborist joke: What do you call a three-foot deep planting hole for a tree? Its grave. Tree root systems are broad—three times the branch length, barring an impediment—and shallow. Ninety percent of tree roots are in the top ten inches of soil, and 98% are in the top eighteen inches. Tree roots are shallow because they like to breathe on a regular basis. I think we can all relate to that.

Soil pores allow roots to get oxygen, which ultimately comes from the soil surface. Oxygen levels drop with soil depth, ultimately reaching zero at some point. In silty, clay or loam soils, that point is less than three feet down. To make matters worse, adding compost or manure to a deep planting hole ensures the roots will suffocate, because the microbes that break down organic matter will use up all available oxygen.

Every tree comes with planting instructions, even if there is no tag. To read these directions, find the spot near the base where the trunk widens out and the roots begin. This is called the trunk flare, and is the depth gauge. The trunk flare should be just visible at the soil surface. With a very small specimen, especially a small grafted tree, this can be tricky. Basically find the uppermost root and park it about an inch below the surface.

Not all trees planted too deeply die, but they all suffer a lot, and even in the best cases, it will take them years to catch up with a similar tree planted correctly. In general, smaller trees fare better than larger ones. Sometimes a little tree can survive by sending out fibrous (adventitious) roots from its stem just below the soil surface. Larger trees do this too, but the scrawny new roots will not support a large top.

Occasionally you may come across planting instructions that suggest a deep hole, but you can literally search the world over, and you will never hear such nonsense from a research-based source. Get your trees from a garden center, but your planting advice from an evidence-based institution.

There is an old saying, "dig a fifty-dollar hole for a five-dollar tree." It may need to be adjusted for inflation but the idea still has currency. The planting hole should be saucer-shaped and 2-3 times the diameter of the root system, but no deeper—ever. Otherwise the Planting Police will ticket you. Not really, but if an arborist happens to come along, they may scowl ominously at you.

Before backfilling, remove all burlap and twine. Wire cages on ball-and-burlap trees should be cut away once the tree is positioned in the hole. Container-grown tree root systems may have circling roots that must be teased out straight, or they will become girdling roots years later and choke the trunk.

Adding loads of organic matter to the backfill likely dates back to ancient times, when folks might grab an arborist, if one was handy, and throw them in the planting hole. Possibly in response to this, arborists now recommend little or no additional organic matter in many cases.

In very sandy or heavy clay soils, moderate (up to 30%) amounts of peat moss, compost or other amendments can be used in the backfill. Do not add sand to clay, though—that is how bricks are made, and most plants do not grow real well in bricks. Adding more organic matter than one-third by volume can cause a "teacup effect," and roots could suffocate. Fertilizer is stressful on new transplants, so wait at least a year on that. In healthy native soils, a tree may never need commercial fertilizer.

Water thoroughly as you backfill, and prod the soil with a stick or shovel handle to eliminate air pockets. Unless the site is very windy it's best not to stake the tree—movement is needed for a strong trunk to develop. Two to four inches of mulch over the planting area (but not touching the trunk) will help conserve moisture and suppress weeds. It's almost impossible to over-water a new transplant, but it does happen. Throughout the first season, check the soil every few days to be sure it's moist but not waterlogged.

Have fun landscaping, but please wait until after your tree dies to inter it.

PINUS BANKSIANA.
JACK PINE

Pinaceae -- Pine family

Submitted by Joe Hovel
(Several sources of information were used by PIF for this report)

Jack pine *(Pinus banksiana),* also called scrub pine, Banksian pine, is a small-to medium-sized coniferous tree of the northern forests of the United States and Canada, where it is an important source of pulpwood, lumber, and round timber. It grows farther north than any other American pine and is the most widely distributed pine species in Canada. It is a pioneer species in succession and invades areas where mineral soil has been exposed by major disturbances such as fires. It usually grows in even-aged pure or mixed stands on less fertile and drier soils than those required by other native species in its range.

Habitat- Native Range: The major portion of the jack pine range is in Canada where its northern boundary extends eastward from the Mackenzie River in the Northwest Territories across the country to Cape Breton Island, NS. The range then extends southwest through Maine, New Hampshire, northern New York, central Quebec and northern Ontario, Michigan, extreme northwest Indiana, northeast Illinois, then northwest through Wisconsin, Minnesota, Manitoba, Saskatchewan, central Alberta, to extreme northeast British Columbia. Within its range, jack pine is widely but not continuously distributed. In Canada it is most abundant in Ontario, and in the United States, the largest acreages are in Minnesota, Wisconsin, and Michigan.

Climate-In the eastern part of its range, jack pine grows in a maritime climate but elsewhere it is found in diverse continental climates characterized by short, warm to cool summers, very cold winters, and low rainfall. The average January and July temperatures range from -20° to 25° F and from 55° to 72° F, respectively. Average annual maximum temperatures range from 85° to 100° F, and average annual minimum temperatures are from -5° to -50° F. Mean annual temperatures range between 23° and 40 F.. The northern limits of the range closely parallel the 85° F mean annual maximum isotherm. Frost may occur in some areas during any month and in the Northwest the range extends into the permafrost zone.

Average annual precipitation ranges from 10 to 55 in. but 15 to 35 in. are more usual. The average warm season precipitation ranges from 6 to 25 in. Annual snowfall is from 30 to 200 in, but over much of the range it is between 40 to 100 in. Summer droughts are common in the south-central and western portions of the range.

The average date of the last killing spring frost ranges from April 30 to about July 1; and the average date of the first killing fall frost ranges from about August 10 to October 20. The frost-free period averages from 50 to 173 days but is usually from 80 to 120 days. Generally, temperature, rainfall, and frost-free period increase from the northwestern toward the southeastern part of the range.

Soils and Topography-Jack pine is usually found on sandy soils. It also grows on loamy soils, on thin soils over the granites and metamorphosed rocks of the Canadian Shield, over limestones, on peats, and on soil over permafrost. Jack pine can grow on very dry sandy or gravelly soils where other species can scarcely survive, but it grows best on well drained loamy sands where the midsummer water table is from 4 to 6 ft below the surface. Jack pine does not grow naturally where the surface soil is alkaline, but it does grow on soils overlying limestone. In well stocked stands in central Wisconsin, available moisture-holding capacity in the upper 12 in ranges from 3 to 17 percent by weight. Site index improves with an increase in fine sand, silt and clay in the upper soil layer, an increase in water-holding capacity (up to a point after which it levels off). Similar relations between these soil factors and site index were found for plantations in Wisconsin. In the Lake States jack pine is found chiefly at elevations between 1,000 and 1,600 ft, with a maximum of about 2,000 ft above sea level. In the East, jack pine grows on a variety of sandy sites from near sea level up to about 2,000 ft, with an outlier in New Hampshire at 2,500 ft.

Associated Forest Cover-The Jack Pine forest cover type typically originates after forest fires. It is found in pure, even-aged stands or as a majority of the stocking over vast areas of Canada and to a much lesser extent in the Lake States and the northeastern United States. In the boreal forest jack pine is also a component of three other forest cover types-Black Spruce, Paper Birch, and Aspen. In the northern forest region it is a component of two forest cover types-Red Pine and Northern Pin Oak. Outliers near southern fringes of the species' range are found in various types of hardwood forest.

Associated tree species, listed in order of presence on dry to mesic sites, include northern pin oak, bur oak, red pine, big tooth aspen, quaking aspen, paper birch, northern red oak, eastern white pine, red maple, balsam fir, white spruce, black spruce, tamarack, and balsam poplar. In the boreal forest the most common associates are quaking aspen, paper birch, balsam fir, and black spruce. In the northern forest they are northern pin oak, red pine, quaking aspen, paper birch, and balsam fir. Associates are nearly always subordinate to jack pine except for aspen, paper birch, and red pine which may be coordinate. Subtypes, as such, are not recognized in the Lake States. There are, however, certain variants of the type, including jack pine-black spruce, jack pine-red pine, and northern pin oak-jack pine.

Life History-Flowering and Fruiting- Jack pine is a monoecious species. Ovulate cones are usually borne on primary and secondary branches in the upper tree crown and staminate cones are usually borne on tertiary branches lower in the crown. Ovulate cones are modified long shoots and staminate cones are modified dwarf shoots.

In northeastern Wisconsin, bud initiation for the following year's shoot systems begins in late June or early July. Staminate cone primordia are initiated in early or mid-July but ovulate primordia are not initiated until August. By early September the staminate cone primordia are about 1 mm (0.04 in) long and remain that size until spring. Then they elongate to about 5 mm (0.2 in) by the middle of May and early June just before pollen is shed. Rapid elongation up to several more millimeters

occurs as the pollen is shed. Time of pollen shedding (anthesis) varies greatly from year to year depending on the weather.

Fertilization occurs about 13 months after pollination when the female cone is approaching its maximum size. Jack pine is normally a wind-pollinated, cross-fertilizing species.

Cones mature and the seeds ripen late in the growing season of the year after pollination. Various cone and seed characteristics, including cone color, volume, fresh and dry weight, specific gravity, scale color, seed color, and embryo length, can aid in determining seed ripeness. In northeastern Wisconsin the best indicators of cone and seed ripeness are cone color, 75 percent brown; insides of the cone scales, reddish brown; seeds, dark brown or black; and cone moisture content, less than 45 percent of fresh weight. These indicators of cone and seed ripeness coincide with the beginning of cone harvesting by squirrels about September 10. Because specific gravity of the serotinous cones usually remains above 1.0 at least until February, flotation techniques cannot be used to evaluate cone and seed ripeness in jack pine.

Seed Production and Dissemination- Jack pine trees, particularly under good early growing conditions, begin to flower at a younger age than most other pine species. Under near optimum growing conditions in the greenhouse and nursery, female flowering can be induced in a small percentage of seedlings as early as 12 months from seed sowing. Male flowering under these conditions usually does not begin until the fourth year.

In naturally regenerated stands, jack pine typically begins to flower at 5 to 10 years under open-grown conditions but not until later in closed stands. Once cone production in jack pine begins, it is fairly regular and increases until crown competition becomes a factor. Seed production differs from year to year but some seed is usually produced every year and total crop failures are rare.

The melting temperature of the resinous bonding material of the cone scales is 50° C (122° F), but it is likely that the bonding resin softens at lower temperatures in the nonserotinous types in the southern portion of the species' range. The mechanism of cone opening in both serotinous and nonserotinous cones is hygroscopic. Once the bonding material of the cone scales is broken, the quantity of water in the scales is the limiting factor in scale movement and flexing outward under drying condition.

Jack pine cones open most readily during dry weather when the temperature is at least 80° F, although many of them remain closed until they are exposed to fire or high temperatures near the ground after wind breakage or logging. Over most of its range where serotinous cones are common, up to 50 percent may open on the sunny part of the crown. Cones may also open in very cold winters when the temperature is -50° F or colder.

Seedling Development- Jack pine seed usually germinates within 15 to 60 days under favorable conditions, but some seeds require more than 100 days to germinate. Delayed germination of direct seeding increased stocking between the first and third year after sowing the seed.

Under forest conditions with adequate moisture, seeds germinate when air temperatures reach 64° F, but light also influences germination. Germination was markedly reduced at all temperatures when light was excluded. The shade cast by slash and snags on burned-over or cut-over areas to reduce surface temperature and drying undoubtedly contributes substantially to the good germination often observed on such areas.

Type of seedbed is an important factor affecting jack pine seed germination. In northeastern Wisconsin, germination under clearcut and partially cut jack pine stands averaged 60 percent on mineral soil, 49 percent on burned duff, 47 percent on scarified and shaded duff, and 17 percent on undisturbed duff. The poor germination on litter and humus is caused by poor moisture conditions and it can be satisfactory in years of above normal precipitation. Germination may be delayed by spring drought.

Most of the older jack pine stands appear to have been established following fires. Although jack pine seed usually germinates following fire, most of the seedlings die unless the organic matter left on the soil is less than ½ inch thick. Most germination occurs the first and second season following fire, with most mortality between the first and second growing season. Unless conditions for germination and early survival are favorable, good regeneration does not necessarily follow burns.

Young seedlings grow tallest in full sunlight, although under stands their initial abundance may be greatest in light intensities of 11 to 30 percent of full sunlight, but no seedlings are found at 60 percent and higher crown cover.

Under forest conditions, seedling growth is slow in the first 3 years but increases rapidly beginning in the fourth and fifth years. If favorable moisture conditions prevail in late summer, jack pine frequently has a second period of shoot elongation and produces lammas and proleptic shoots.

Sapling and Pole Stages to Maturity - In well-stocked stands, jack pine develops into a short to medium-tall, slender tree with a narrow, open crown covering 30 to 45 percent of the stem. Crown ratios from 10 to 20 percent are not uncommon in dense stands. Open-grown jack pine develops a stocky stem of poor form and a wide, spreading crown with persistent branches, often to the ground. Overstocked stands produce weak, spindly stems that are susceptible to breakage by wind, ice, and snow.

Growth and Yield- During the first 20 years, jack pine in its native range is the fastest growing conifer other than tamarack. Normally, mature trees are about 55 to 65 ft tall and 8 to 10 in d.b.h., although some trees have attained much more. Jack pine stands disintegrate after 80 years on the best sites and after 60 years on the poorest sites, however the oldest tree reported- 230 years old- was found east of Lake Nipigon in Ontario. Rotation age of 40 to 50 years is recommended to produce pulpwood and 60 to 70 years is recommended to produce poles and sawtimber.

Reaction to Competition- Jack pine is one of the most shade-intolerant trees in its native range. It is the least tolerant of its associated pine species and is slightly more tolerant than aspen, birch, and tamarack Jack pine is a pioneer species on burns or other exposed sites. In the absence of fire or

other catastrophes, jack pine is succeeded by more tolerant species, but on the poorest, driest sites it may persist and form climax.

Damaging Agents- Jack pine is subject to many agents that cause damage or mortality. Young jack pines are especially susceptible to early spring fires. Severe drought may kill many seedlings, particularly on coarse soils. *Heavy populations of white-tailed deer can kill young jack pines up to 7 ft tall, retard total height growth to half its potential, and deform most trees so they have little future value for timber products.* Porcupines can cause extensive damage in older stands (74).

Numerous insects affect the survival and growth of jack pine seedlings. The jack pine tip beetle causes extensive shoot tip mortality, preferring sapling-size trees. Several sawflies attack jack pine. The jack pine budworm is the most important defoliator of jack pine in the northeastern United States.

Special Uses-The most notable special use for jack pine is as a breeding area for the Kirtland's warbler, a rare and endangered species. The Kirtland's warbler requires homogeneous stands of jack pine between 5 to 20 ft tall (about 7 to 20 years old); stands are preferably larger than 80 acres. Accompanying black spruce, white spruce and fir along with jack pine provides spruce grouse habitat up to 30 or more years.

In summary, jack pine provides great wildlife habitat in the region. It wants full sun to grow and is short lived relative to our other pines. It also needs the site disturbance to expose soil for regeneration. Jack pine is the dominant tree type on the Upper Wisconsin River Legacy Forest and management objectives will continue to recognize its importance there.

Photo credit: Rachel Hovel

Spruce Grouse in the jack pine on the Legacy Forest

Tips for Landowners

You know that oak trees provide important food for animals, like the squirrels who hide acorns ahead of winter. But did you know that oaks trees are also an important food source for butterflies and moths? Immature larvae (caterpillars) of both butterflies and moths feast on the leaves of oak trees, which support more than 530 species! And birds are the main predator of those caterpillars, making oaks just as important for them.

Do you have oaks on your land? Learn what activities you can do to take care of them.

Considering planting oaks? A local forester can help you determine if oaks would be right for your land and what you can do to regenerate them.

Pour Me Another
Oak are also important to the bourbon industry, where Kentucky distillers use the trees to age their bourbon. Only large white oak logs of a high quality can be used to create the barrels, which are then used once in the bourbon making process before being sold off to distillers of Scotch whisky and tequila. Interested in learning more about the process that goes from growing white oaks to creating an aged bourbon, check out the Summer 2016 issue of Woodland magazine.

May the forest be with you!
Caroline Kuebler
MyLandPlan.org

Log into your MyLandPlan.org account. Or request a new password for your MyLandPlan.org account.

Join the thousands of landowners across the US using the tools and resources on MyLandPlan.org. Sign Up Today!

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BITS AND PIECES

From a member:
RE; Antlerless deer permits. Check the article by Tim Eisele on page 1 of the June 16,2017 issue of Wisconsin Outdoor News. Apparently wildlife damage permits are being issued for damage to forest reproduction.
And from DNR: Yes, a committee is now in place to determine what metrics and parameters are needed to issue permits in a standardized fashion. The permit that has been issued on industrial forests had extensive browse plot data to help show a need.

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

- **Napoleon wood stoves**
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- **grass seed for trails**
- **Tool handles, replacement handles**

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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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Impact of Deer Herbivory on Forest Regeneration and General Health

by Rod Sharka

Every responsible woodlot owner or forest manager should understand that a forest is more than just a population of trees. It is a complex, interconnected community of flora and fauna, all interdependent on each other as well as on the physical environment in which they exist. As for flora species alone, a healthy, well balanced forest should consist of an average of 8% tree species and 91% herbs and shrubs. Yet, in many of our northern forests, one finds that ratio essentially reversed. In addition, fauna diversity is very dependent on existing flora diversity. Without their required plant species, the associated animal species cannot exist. And by animal species, I don't just mean the usual squirrels and deer, but the whole range of mammals, birds, insects, amphibians, and on and on.

In the never ending controversy between sustainable forest management and deer herd management or deer lovers, arguments abound on either side of the issue regarding the impact of deer browsing on forest regeneration and biodiversity. Until recently, little hard, scientific data has been available to conclusively support either side of the argument.

Recently, I had the privilege to be able to attend a presentation at the Ottawa Visitor Center in Watersmeet, MI given by Dr. Walter P. Carson (Department of Biological Sciences, University of Pittsburg). Dr. Carson described his compelling, 2 decade long research findings on this topic. In a nutshell, his research shows that chronic over-browsing by abnormally large deer herds not only impacts forest regeneration, but also results in total biodiversity collapse of the forest understory that may be irreversible even if deer populations are brought under control and historic disturbance regimes of fire and canopy gap formation are restored. The bottom line is that once understory species diversity has been eliminated, there is no parent stock to spread and re-establish populations. One may ask: "How do we know what the historic forest understory was like if there are no records to look at?" Dr. Carson's then described his most recent, yet to be published research in the Huron Mountain Club forests northwest of Marquette, MI. Here, although the very depauperate understory populations at ground level consist entirely of just one or two browse resistant species and very little if any desirable tree regeneration, his team has discovered small but highly diverse populations of understory species, including desirable tree seedlings and very browse sensitive shrubs such as Canada Yew, growing in abundance on top of very large boulders where they are inaccessible to deer.

Upon speaking with him after his presentation, Dr. Carson graciously provided PIF with a number of scientific papers he co-authored detailing studies on the impact of excessive deer browse on forest health. Several of these papers have been posted on the PIF website for your review. The abstract of one of the papers is re-printed below. Read the paper in its entirety on the PIF website.

Note that Dr. Carson is very interested in locating other areas in the northwoods of Wisconsin and the U.P. where additional, very large boulders or rock outcrops may serve as refugia for historic ground flora populations. If you know of any areas like this, he asks that you contact him with GPS coordinates or detailed directions at: walt@pitt.edu. Or, if you prefer, you may send the info to me at: resharka@gmail.com and I will pass it on.

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Historic disturbance regimes promote tree diversity only under low browsing regimes in eastern deciduous forest

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Abstract. Eastern deciduous forests are changing in species composition and diversity outside of classical successional trajectories. Three disturbance mechanisms appear central to this phenomenon: fire frequency is reduced, canopy gaps are smaller, and browsers are more abundant. Which factor is most responsible is a matter of great debate and remains unclear, at least partly because few studies have simultaneously investigated more than one process. We conducted a large-scale experiment in mesophytic forests of West Virginia, USA, to test three key hypotheses: (1) the fire hypothesis (fire suppression limits diversity to few shade-tolerant, fire-intolerant species that replace and suppress many fire-tolerant species); (2) the gap hypothesis (small gaps typical of today's forests promote dominance of a few shade-tolerant species); and (3) the browsing hypothesis (overbrowsing by deer limits diversity to a few unpalatable species). We tested these hypotheses using a factorial experiment that manipulated surface fire, large canopy gap formation (gap size ;255 m^2), and browsing by deer, and we followed the fates of .28 000 seedlings and saplings for five years. Understory tree communities in control plots were dominated (up to 90%) by Fagus grandifolia, averaging little more than two species, whereas overstories were diverse, with 10–15 species. Fire, large canopy gaps, and browsing all dramatically affected understory composition. However, our findings challenge views that fire and large canopy gaps can maintain or promote diversity, because browsers reduced the benefits of gaps and created depauperate understories following fire. Consequently, two major disturbances that once promoted tree diversity no longer do so because of browsing. Our findings appear to reconcile equivocal views on the role of fire and gaps. If browsers are abundant, these two disturbances either depress diversity or are less effective. Alternatively, with browsers absent, these disturbances promote diversity (three- to fivefold). Our results apply to large portions of eastern North America where deer are overabundant, and we provide compelling experimental evidence that historical disturbance regimes in combination with low browsing regimes typical of pre-European settlement forests could maintain high tree species diversity. However, restoring disturbances without controlling browsing may be counterproductive.

MEMBER PROFILE

HANS SCHMITT, SCHMITT FORESTRY

Hans standing guard at Cty Q and G

A chat with Joe and Hans

PIF: For over a year now you have been strictly a consultant forester, after a career in industry procurement dealing primarily in high value hardwood logs. I appreciated you forestry back in the last decade when we dealt with you on an oak timber sale. You and I shared philosophical common ground in allowing these trees to grow to potential. With your career in industry as a guide, in this era of certification and better education available to landowners, have we turned to better practices as a rule, and away from the short sighted high-grading and diameter cutting so prevalent years ago?

Hans: Generally speaking the answer is yes. Landowner educational opportunities have increased and landowners have taken advantage. I do believe this has resulted in a wiser segment of the landowning population doing a better job managing their properties to attain their long term objectives. That being said, there are still numerous landowners who simply look at the dollar. That will always be the case, it's just population dynamics. Keep in mind that people own forest land for different objectives and one of them is economic return and as landowners they have the right to do what they want, within the law.

PIF: I often say that the best 'value-added' forestry begins with the stumpage. What can we as PIF do to further educate landowners on growing these saw timber stands to the full potential of value? Feel free to give several examples.

Hans: Landowners, loggers and foresters need to better understand quality and grade; furthermore the concept of economic maturity comes into play. Studies have found that some trees attain economic maturity as soon as they possess 1 stick of pulp, while other better grade trees will attain economic (not biologic) maturity at about 18-20 inches DBH. At that point the tree is no longer jumping in grade or merchantable height. Growing the tree past this point results in a net return of about 2% per year, (annual growth) however, there is a caveat. If the market for that particular species and grade goes up 6%, then you earn 8%. Not a bad rate of return. Keep in mind the market swings both ways, your potential 8% could turn into a minus 4% or more. Lumber is a fashion industry, over the years people have asked me what species they should grow, my answer is always "tell me what the housewives of America want in their kitchens 20-40 years from now and I'll tell you what to grow". Don't get me wrong, I'm not advocating you go and cut every tree over 20", these are just the economics; there may be plenty of reasons to hold that tree. Also keep in mind that while there are some basic standards for sawlogs, each and every mill determines the grade for their mill based on test runs to determine what their break evens are for any species and grade subject to their markets. After 35 years in the biz, the one thing I can say with great confidence is that the veneer markets will change faster than you can change underwear.

PIF: In growing high value hardwood is periodic thinning the very most critical factor in optimizing growth?

Hans: Yes, regardless of if a landowner chooses to go with all-aged or even-aged management, periodic thinnings are essential for forest health and growth. Think about growing carrots in the garden. You plant a row of carrots and 800 carrots come up. You need to thin them. Once they are edible size, you consume the product but continue thinning until you have 200 nice carrots.

PIF: Were the greatest challenges in industry the huge fluctuations in economic factors? I recall well how dire the hardwood outlook was about a decade ago as the economy collapsed.

Hans: None of us can control the economy and that is what dictates the marketplace. Working in the forest products industry is an extreme challenge. As Foresters, we have all the responsibility and no control. We are responsible to our clients, maintain inventory at the mill but cannot control the weather, markets, or workforce.

PIF: You have been a friend of PIF for a long time. You and your Kretz colleagues participated in our Northwoods Forestry Summit in 2005 at Trees for Tomorrow. You invited me to speak to your group on forest fragmentation back in Sept. 2008. That presentation is available on the website and I still use data from that talk. We have sincerely enjoyed our collaboration with you. Last year, as you started on your own, you joined PIF at a great time as I was in need of an MFL plan. Although PIF has a number of forester members, you are the only Certified Plan Writer (CPW) in our ranks. I was committed to the spirit of coop, so my choice was clear. Please tell us a bit about writing MFL plans.
What does it take to become a CPW?
If a landowner is interested in MFL what should their first steps be?
How much input does the landowner have in the creation of their MFL plan?

Hans: My typical procedure is have the landowner sign an agreement with me to write the plan, which I need to have on file to access databases within the bowls of the DNR (Maxwell Smart kind of stuff). Then I gather information concerning soils, existing plans, air photos and forest types. Subsequently, I conduct a physical inventory of the property. At that point I look to the landowner to provide some critical information and documents. In particular, and most importantly, I need a concise statement of goals and objectives which identifies what is important, how you use the property and where you want it to go going forward. In addition, I need a recorded copy of the deed and last years tax bill showing the parcel ID number. At that point I develop the plan, which has to conform with and be acceptable by the DNR. There is a $30, non-refundable, application fee which will need to be submitted to me along with a signed application form. I take it from there. To become a CPW you must be a DNR Cooperating Forester, endure 3 days of training and 10 hours of continuing education per year.
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Landowners have the right to establish their objectives as long as it is silviculturally sound. There are a number of modifiers to which the DNR has agreed. Things that involve wildlife habitat, extended rotations, aesthetic consideration and such are all permissible, provided they are silviculturally sound practices.

PIF: With all the changes to MFL that became relevant just last year, perhaps you and I can commit to writing a further review of the program. Hopefully we can enlist help from Paul Stearns and Jamie Remme. I think it is fair to say the program is so much different these days, that landowners should fully understand the pros and cons of entry. There are also cost sharing programs we need to expose.
What do you think the biggest challenges or concerns we as forest owners face these days?

Hans: I think one of the bigger challenges facing forest landowners is the issue of deer population and forest regeneration. In some parts of the state this is not an issue; in other parts of the state it is severe. In parts of Marathon, Shawano, Waupaca Counties it is impossible to regenerate the forest without exclosures (there is cost sharing available for exclosures). There has been much talk about the effect of global warming on the state of forests. During my lifetime, we were going into nuclear war with Russia...didn't happen; we were going into a global ice age...didn't happen; acid rain was going to kill the forests...didn't happen. We live in a changing environment, nature will find a way...it always has.

PIF: What other forestry advice would you care to offer to your fellow members who are woodland owners?

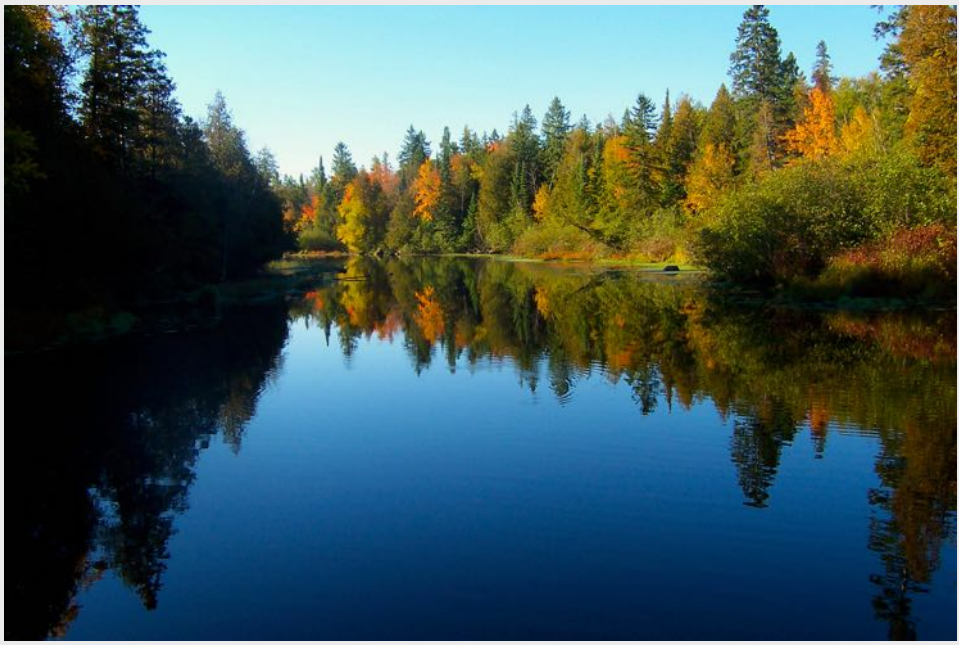
Hans: BE EDUCATED....GET EDUCATED....BE INVOLVED! The more you know and are involved, the happier you will be with the project and so will those of us who serve you.

PIF: You are known also for your photography. Tell us about the subjects you like to photograph.
What other outdoor interests excite you?

Hans: I was a US Army school trained photographer for 6 years, fulfilling a wide variety of missions and assignments. My father taught art, aviation and photography for 36 years at Shawano High School. This is where I developed (no pun intended) my love of the photographic arts. I have continued my photographic endeavors ever since and recently held a show at the WOW space in Wittenberg. I photograph anything that catches my eye; landscapes, people, situations and architecture.

Hans can be reached at schmitt.forestry@gmail.com

Photos credit: Hans Schmitt



Plover River in Marathon County, Wisconsin

Central Wisconsin Farm Country

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