The Woodland Steward

Promoting the Wise Use of Indiana's Forest Resources

Woodland Owner Supply Chains

My family has never discussed supply chains, but at the start of this pandemic when toilet paper was scarce supply chains became a major topic of conversation. Demand was high, and supply was constant thanks to forest industry but difficult to ramp up to meet excessive demand – in this case due to hoarding.

Woodland owners in Indiana do not contribute to toilet paper supply chains. It is mainly softwood pulp from other parts of the US and Canada. Woodland owners in Indiana are an important part of a more durable hardwood timber supply chain that creates furniture, flooring, cabinets, high-quality veneer and many other products. We are still very much a wood-based society and we use thousands of products every day that are wood or made from wood. This will not and should not change.

Trees are a renewable resource when managed correctly and make amazing contributions to our society. Trees growing in a natural or plantation setting provide not only wood, but also wildlife habitat, clean water, fresh air, pollinator habitat, carbon capture, recreation opportunities, solace and many other benefits. Most woodland owners recognize these benefits and witness them every day. Demand for Indiana timber is strong, local and global.

The demand for wood products is not going away. In Indiana we harvest timber on both public and private land to supply the base component in the hardwood timber supply chain, hardwood logs. Large scale timber mills are expensive to build and operate. Timber buyers must continually seek out timber to buy, and loggers cut the trees, pull them from the woods and deliver them to the mills. Trees cut from one landowner's property may be delivered to several different mills based on quality, species, diameter and demand. If Indiana cannot supply the needed logs for a mill, then timber buyers will reach out further and further until economics makes it infeasible.

Some of our wood products like veneer oak, walnut and cherry are so valuable they can be sent around the world in log form or cut veneer. Finished wood products from Indiana circumnavigate the globe. The supply of high-quality timber in Indiana is strong and US Forest Service data suggests we are sustaining our growing timber stocks. If we do not

The Woodland Steward Institute will continue to provide woodland owners with up to date information on timber markets, invasive species, insects and disease, wildlife and water quality. If you appreciate the information you receive from the Woodland Steward Newsletter, consider giving back using the enclosed donation envelope. We appreciate you, the forest resources you manage and your support. Be well, be kind and stay safe during these trying times.

Dan Shaver Woodland Steward Institute President harvest timber in any one specific location, the demand for logs is simply driven to another location. For example, if we stop cutting timber on our State Forests, that supply would have to be made up with more harvesting on private land where there may be less oversight and no guarantee of sustainable forest management like exists on public land.

Producing sustainably managed timber on both public and private land in Indiana is critical to hardwood supply chains. Woodland owners and public land managers should be proud of the role they play in supporting sustainable forest management in Indiana. Hardwood markets will be impacted by this pandemic and the subsequent impact on our economy. Indiana's supply of timber is strong, renewable and resilient thanks to careful management by people like you.

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Calendar of Events

Due to the Covid-19 virus, some live events previously scheduled may be cancelled or postponed. Please check back with meeting organizers about the status of events.

Upcoming local invasive species management events in your area: See https://www.entm.purdue.edu/iisc/ for times, locations, contact info.

September 17

Facebook Live Ask the Expert: Planning and Resources for Conservation Tree Planting. See https://www.facebook.com/PurdueFNR/ events/ for program details.

November 6-7 Annual Woodland Owner Virtual Conference

See www.ifwoa.org/events for details.

November 14

Indiana Native Plant Society Annual Conference See <u>www.indiananativeplants.org</u> for details.

Did you know the

FaceBook Live Ask the Expert Series Available for Viewing on Thursdays at 3 PM eastern Some past programs available for viewing include:

Wildlife Mythbusters Birdwatching and Backyard Birds Improving Your Property for Fish and Wildlife What's Buzzing about Pollinators The Woodland Steward Newsletter is published by the Woodland Steward Institute, Inc.

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The opinions expressed by the authors do not necessarily reflect those of the Woodland Steward Institute. The objectives of the newsletter are to provide general and technical natural resource information to woodland owners of Indiana, improve information distribution and build support for responsible forest resource management.

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Volume 29, Number 1

version at:

Preventing Deer Damage to Trees

By Jameson Pierce

White-tailed deer have been labeled "keystone" herbivores, which means they have the ability to shift the composition and structure of plant communities. For forest landowners this can be painfully apparent in the heavy browse of planted seedlings, especially oaks. Some level of deer browsing actually promotes plant diversity because browsing can reduce growth of fast-growing plants and release plants with a slower growth ability. However, in the recent decades across the eastern United States, deer browsing has often been at high enough levels that it is ecologically and economically damaging. Deer browsing is a landscape-level process and depends on many factors including deer density, the composition of landcover in the surrounding area, and the structure and age of forest habitat. There can be time lags between severe deer browsing and the resulting negative impacts. There can also be time lags between the reduction or removal of deer and recovery of plant communities. In some cases, recovery may not occur without additional human management. Despite the large scale and long term nature of deer herbivory, there are still a few signs you can look for in your individual property/woodlot that can give you an idea of the level of deer browse in your immediate area. This will allow you to see if you need to take action and increase deer harvests and with continual monitoring you can track browsing pressure over time to see if it changes and make necessary adjustments.

One way is to look at direct evidence of deer browse on woody plants. Deer browsing on woody plants leaves a



Figure 1 (left). A twig browsed by a rabbit with a clean, 45° cut. Figure 2 (right). A twig browsed by a deer with characteristic rough edges from the deer tearing the twig rather than biting cleanly through like a rabbit.



Figure 3. Native strawberry bush showing a "bonsai" appearance from heavy repeated browsing giving a thick, shrubby appearance.

rough tear, as contrasted to a rabbit that leaves a clean cut at a 45° angle (Figures 1 & 2). Also, it is important to remember the heights at which deer browsing which occurs usually ranges from about 6 - 70 inches above the ground. Oak seedlings can be one of the first signs to note for deer browsing. Deer highly prefer oak seedlings so if you observe oak seedlings with little to no browse, deer are probably not at high densities. However, if oak seedlings are heavily browsed this does not necessarily mean deer are at high, damaging densities since oak is highly preferred. A better way to observe the overall browsing pressure in your woods is to look at an intermediately preferred species, such as such as sugar maple, white or green ash, or sassafras. If several branches on each seedling are browsed throughout your woodlot, you likely have a high level of deer browsing. When browsing in an area is severe, woody plants take a shrubby "bonsai" appearance with closely spaced, short branches from repeated browsing (Figure 3). If only a few branches are browsed and some seedlings have no browse, deer browsing is likely not preventing healthy seedling growth and survival. Woody browse surveys can be done both when plants are flushed and growing in the summer, or when they are dormant in winter, which is when deer rely most on woody browse as a food source.

Continued on page 5

Supply Chain By Ray Moistner

Every trend in hardwood manufacturing, especially at the primary manufacturing level, points to fewer players and increased efficiencies in the supply chain.

Hardwoods take a long time to grow and are a difficult resource to procure, and a great deal of the costs involved in its production are in the harvesting and transportation of the raw material. Therefore, a huge priority must be placed on locating the manufacturing facility as close as possible to the resource. But, it's not the only consideration. Attention must be paid to local demand, competition for the resource; the infrastructure required for transportation, and a regulatory climate that does make it difficult to do business or supports anti-forestry causes.

Also, with more countries and companies demanding certified wood from verified sustainable forests, the supply chain can be complicated by strict (and sometimes expensive) requirements including annual audits and chain-of-custody tracing. Indiana has addressed that issue by some degree by offering limited certified wood from our state forests and from private landowners enrolled in the Classified Forest and Wildlands program.

Hardwood product consumers desire such a broad range of products that we are able to utilize all grades of timber. From lumber to veneer, to furniture, flooring, animal bedding, pallets, railroad ties, paper, and so much more, there are markets for our wood.

Over a couple of centuries, and especially with the reforestation of Indiana for the last 90 years, our state could not be MORE perfectly positioned for supply chain efficiency. To illustrate the point, let's first take a look at the players in the hardwood supply chain.

Forest Landowners

You can check this box. Over 20% of Indiana's land base is currently in forests, and 85 percent of that potential



commercial timber supply is in the hand of private landowners. Most of the rest is in state or federal ownership, only a small fraction of which can be managed for timber production. But make no mistake. Indiana has an abundant and sustainable timber resource, with a broad range of species and grades available.

Loggers

We've got plenty of those too, but the reality is that the median age of our loggers is getting older, and its increasingly difficult for new, young loggers to enter the business, unless they were born into it or have significant financial resources at the start. It's deadly and dangerous work, for relatively low pay, with crappy hours and weather unpredictability. Mechanized harvesting is slowly replacing traditional logging, but for supply chain purposes, we have the workforce to extract the raw materials once the timber sale has been completed.

Primary Manufacturing

Although the numbers of operations decline, manufacturing capacity for lumber and veneer remains very high in Indiana. With most mills still being relatively small, family-owned independent businesses, the purchasing and production decisions are still done company-by-company, leading to inevitable volatility in price, and an increased emphasis on balancing stumpage prices with lumber prices. As we move toward fewer, bigger companies, analytics and economies of scale will create a more disciplined, predictable and numbers-driven purchasing environment, and real-time data will replace surveys of mills for driving final timber price decisions. Species demand and competition for logs will still rule the day, and it's important that we manage forests to protect that diversity.

Distributors

Distributors still play a key role in consolidating lumber produced from so many smaller sources and reselling it along to the secondary markets. The drying, sorting, and quantityaccumulating capability creates predictability of supply and price for those secondary markets who are making furniture, cabinets, flooring and more. Without huge parcels of land and large-scale timber sales, they are a collection point for many small quantities of lumber coming from both public and private lands via the primary manufacturers.

Secondary Manufacturing

We have them in abundance in Indiana as well. Cabinets, office furniture, stave mills, casket manufacturers, recreational vehicles, and pallet manufacturers are among those who comprise a vertically-integrated link of companies who keep demand high for a wide variety of grades and species. *Continued on page 13*

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Preventing Deer Damage Continued from page 3

Another option to quantify deer browsing pressure is to examine herbaceous species in spring and summer. An herbaceous plant that deer prefer is white trillium (Figure 4). Research has documented that the average height of white trillium in an area during spring is a good indicator of deer densities. If you commonly white trilliums around 6-7 inches tall or less throughout your woodlot, deer browsing may be at a high level. This is likely because continuous deer browse has kept trillium heights at or below the typical height of plants that deer browse. If you observe taller trilliums distributed throughout your woodlot that are greater than 6-7 inches in height deer browsing is probably not at a harmful level. Whether looking at woody browse or trillium heights, be sure to space out your observations throughout your woodlot and to take a systematic approach (for example walk a few 100-200 foot segments in straight lines and observe as you walk). Following a deer trail and looking for browse may bias your observations and not represent your entire woodlot. For small woodlots (< 10 acres) 2 to 3 segments would appropriate and for very large woodlots such as 500 acres, somewhere between 15 to 20 segments would be better. If your woodlot size is in between these sizes, you can adjust accordingly. In any situation, the more observations you can make the better understanding you will have.

The composition of herbaceous plants as a whole can also be used as a clue for long-term deer herbivory information from the past. Areas that have been subjected to long time periods of severe deer browse are often covered in grasses and ferns which are either resistant or avoidant to deer browse. That is not to say anytime ferns or grasses are present that deer are a problem. However, if large swaths of your woodlot are almost exclusively ferns and grasses, deer herbivory has likely been at a damaging level in the past and may still be. It is also important to note that other factors, such as invasive species can also change the herbaceous composition of forests so be mindful of the forest



Figure 4. A picture of white trillium, which is an herb preferred for browse by deer.

conditions in which you are investigating for clues of deer browsing.

While deer can reduce herbaceous cover and diversity and harm tree regeneration, a low to moderate amount of deer browse will not negatively impact forests. Hopefully, these tips can help you evaluate deer herbivory in your own woods and help you be more informed about the condition of your woodlot as it relates to deer browsing. Knowing the level of deer browsing pressure will help you determine if corrective actions such as increasing deer harvest or protecting critical plants such as oak regeneration or tree plantings with fencing are worth the investment. Continual monitoring of the plant community in your woods over time can evaluate the effectiveness of deer management, although it likely will take years to observe differences.

Jameson Pierce is a Graduate Research Assistant in the Department of Forestry and Natural Resources at Purdue University. Jameson is studying how landscape context influences the effects of white-tailed deer on forest vegetation communities.



How to Select and Get Out Merchantable Walnut Stumps

Prepared by The American Walnut Manufacturers' Association

If any industry is to prosper or even exist today, it must rid itself of every waste that makes an economic loss. This law of business applies equally to producer, manufacturer, and consumer. One of the causes of serious loss to the Walnut industry is the digging, transportation and disposal of worth less stumps and root wads. Competition for markets among cabinet woods is so keen that anything that increases the cost of merchantable Walnut material endangers the life of the industry. It is the purpose of this circular to put before timber buyers and loggers the facts that will make it possible for them to avoid unprofitable production. This kind of material is unprofitable to them because the cost of digging and shipping junk must come out of the usable material that reaches the mill. Leave the junk in the woods. You will save the cost and get more for the rest of it.

It Saves Money to do it Right

It pays both the producer and the mill man to leave the worthless stumps and root wads in the woods. The producer gets just as much for his merchant able material and saves all the costs and labor that he is now spending uselessly. His net profit is greater. The mill man saves the cost of freight and of disposal of waste. His net cost is lower. Figure No. 1 shows the kind of trees that are worth grubbing and how the stumps should look.

What Is a Good Stump?

Size—20 inches and up inside the bark, 3 feet above ground. Shape—Should be symmetrically bellshaped. Figure—Lower 18 inches shoudl be rippled (nubbles). See Figure 2. Clear around the stump

Clear around the stump. Stumps without figure even if large make veneer of low value.

Defects—Hollow or dote is a serious defect as such defects occur at the base and it is this part of the



Figure 2. The Bell-Shaped Stump Notice the regular bell edge at base. No root spurs or frost cracks. Bark has been peeled to show "nubbles" or ripples that denote figure to height of 22 inches. This is the kind of stump that is worth digging.



Figure 1. This is the way walnut logs with stumps should look when they are ready to haul and ship.



Figure 3. A mixed lot of logs showing five with stumps attached but minus the root wad. No. 1 is a good stump, No. 2 is too small and has bad spur crack. No. 3 too irregular. No. 4 not quite so bad. No. 5 shape all right but too small.

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Figure 4. A Very Poor Stump—Too many spur roots, a dead spur and evidence of hollow. Little or no figure and not belt-shaped. Cut this kind close to the ground and leave the stump.



Figure 5. Grubbing a Walnut Tree—Showing a good method of preparing the ground for trimming and felling.



Figure 6. Shows how to trim back the big spur roots before felling a tree with the stump. Dotted line shows where to cut off the root wad.



Figure 7. The Bone Yard—Worthless stumps, root wads and cull logs not worth cutting. Acres of this stuff reduce the profits of log producer and mill man.



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Timber Inventory ~ Resource Plans ~ Timber Marking ~ Timber Stand Improvement



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Fire in the Forest: Part 1 Mike R. Saunders and David Mann

For many, the phrase "forest fire" will invoke images of large conflagrations in western North America or other parts of the world. Depending on one's age, one may recall Yellowstone National Park in flames during 1988, parts of Los Alamos lost to the Cerro Grande Fire in 2000, the destruction of Paradise, California to the Camp Fire in 2018, and most recently, the massive bushfires that swept through Australia (i.e., the Black Summer) last year and earlier this year. Tragic for destroying human lives and property, these fires remind us that forests and fire are intractably linked and that our efforts over the past several decades to suppress fire (i.e., the "Smoky Bear era") have only made those forests more susceptible to wildfire and/or increased the size and intensity of any fire that starts. In fact, periodic, lower intensity fires can promote ecological resilience of these forested ecosystems, making them much more resistant to wildfire.

Eastern deciduous forests are no different and are promoted by periodic fire. Our oak-hickory forests, for example, were borne of surface fires (Figure 1a), generally returning every 3-15 years, that would keep understories open, kill many



Figure 1a: Low-intensity prescribed surface fire in an Indiana oak-dominated forest.

fire intolerant competitors, and overall, maintain their composition and structure. Over the past 50+ years, fire has been excluded from many of these forests, leading to sustained lack of oak regeneration throughout forests in the eastern U.S. Forests are becoming "maple-ized" as shadetolerant, mesic species build up in the understory (Figure 1b). Ecologists and forest scientists warn that there is a landscape-level forest conversion to maple-beech dominated forests currently underway throughout Indiana and surrounding states.

Some public land managers, therefore, are becoming more interested in the use of prescribed fire to maintain oak forests. For example, the Hoosier National Forest now burns between three and five thousand acres per year, with plans to double that amount in upcoming years. This interest, however, is not ubiquitous; some public agencies and many private landowners are quite hesitant to use prescribed fire in mature oak forests. Reasons cited range from logistical and legal constraints to human health concerns (e.g., smoke) to environmental impacts.

Timber damage

Most silvicultural treatments that a forester may apply to the stand have benefits as well as drawbacks. Fire is no different; if misapplied, it has the potential to cause significant financial loss to the landowner through loss of timber quality and economic value of the stand. Reeves



Figure 1b: Without fire, many oak-dominated forest will succeed to maple over time.





Figure 2. Example of wounds commonly caused by prescribed fire: left catface, center oval (closed) and right seams.

and Stringer (2011) reported, for example, that fire caused average volume losses of 38% and value losses of 47% in oak forests of Kentucky. Earlier studies suggested that value losses could approach 70% in some drier oak forest systems (Burns 1955). However, these and most other research in hardwood-dominated forests quantified wildfire impacts on timber quality and value, not prescribed fire. Prescribed fire, particularly if done to promote oak regeneration, is managed at a significantly lower intensity than wildfire; target flame heights are much lower, typically three feet or less. Prescribed fire is often applied in the fall after leaf-drop or in the spring before canopies develop on the overstory trees; most growing season burning is either impossible because of wet conditions or simply avoided because fires are difficult to control in droughty conditions.

Methods

So what is the impact of prescribed fire on timber quality and economic value of oak-dominated hardwood stands? Over the past four years, graduate students in my lab has been quantifying the amount of timber damage stands received from past prescribed fires on several National Forests across the Midwest. We inventoried 111 stands that had received one to six prescribed fires over the past 25 years, and inventoried an additional 28 stands that had no history of prescribed fire (i.e., to estimate the background incidence of timber damage). For several trees within each stand, we quantified size, species, and merchantable sawlog height. We measured the size of all wounds on each tree below breast height (i.e., 4.5 feet), determining if each was caused by fire or from other factors through characteristics of the wound (e.g., presence of char or shape of the wound; Figure 2). We also graded each tree with two USFS hardwood tree grades

(Hanks 1976), one considering all wounds and the other ignoring those wounds caused by fire (following Loomis 2008). In total, over 8,000 trees were measured.

For each tree, we calculated 1) gross tree volume and gross tree stumpage value, which ignored volume losses and grade defects due to prescribed fire damage; and 2) net tree volume and net tree stumpage value, which reflected observed volume and grade that included prescribed fire damage. Stumpage values used regional averages from 2014-2018 for the various species groups and USFS tree grades. Tree-level statistics were then summarized to the stand-level and relative losses for both volumes and stumpage value calculated (i.e., relative volume loss = (absolute – net)/ absolute). See Stanis et al. (2019) and Mann et al. (2020) for more details on these inventory methods and calculations.

Results and Discussion

There are several key findings from this research. First, although a significant number of trees will be wounded from fire, most wounds will be very minor, leading to little stumpage volume loss and a very low incidence of grade reduction. Averaged all national forests and burned study sites, approximately 25.1% of trees were wounded and 5.7% of trees had grade reduction from prescribed fire. Both wounding and grade reduction increased with more prescribed fire on a site, from 24% wounding and <8% grade reduction on site that burned two times or less to >40% and >11%, respectively, on sites with three or more applications of fire. Regardless, most individual prescribed fire wounds reduced scaled volume by less than 5 bd ft, although we rarely observed some wounds, particularly more open wounds such as catfaces and ovals, reducing tree-level volumes significantly more, by up to 340 bd ft. Almost all



Figure 3. Observed stand-level losses in value due to repeated prescribed fires, both in absolute (red) and relative (blue) amounts. Boxes show the mean plus and minus the standard error of the observations: the whisker lines show the entire range of observed values for each burn category. Both values are based only on the 16-ft butt log for each tree.

wounds were within a single face of the butt log; therefore, USFS tree grade was often unaffected. Furthermore, given that almost all prescribed fire-caused wounds are within the first few feet of height, we argue that a vast majority of these minor wounds would be removed during milling while squaring up the butt log, so we may be over-estimating the actual volume of defect in these trees.

Second, prescribed fire has only minor effects on stand level timber yields and stumpage value, but the effects increased roughly proportionally with repeated burning. In absolute terms, we observed a total volume loss between 0 and 2,269 bd ft per ac (International ¼" scale) across all our burn sites, with 70% or more of the volume loss occurring in the 16-ft butt logs of the trees. Losses in stand stumpage values mirrored the observed volume losses (Figure 3), largely because of the low proportion of trees with grade reductions. These losses, however, represented a small fraction of the estimated stumpage volume and value of stands, generally less than 10% (Figure 3).

Location does matter, however. Although we observed only minor effects of aspect (i.e., south-facing vs. north-facing

slopes) on fire damage, there were pronounced differences between national forests. The Mark Twain National Forest in Missouri had 6 to 15 times greater damage and volume loss than the Hoosier (Indiana), Wayne (Ohio) and Daniel Boone (Kentucky) National Forests. For example, one could expect 15.5% stumpage value loss in Missouri forests as opposed to <3% farther east. Obviously drier average conditions and different species mixtures contribute to these differences. but there likely are differences between use of fire in Missouri forests and those sites farther east. For example, woodland creation and promotion of shortleaf pine regeneration all require higher fire intensities (and resulting higher damage) than use of fire strictly for oak regeneration.









stumpage value loss, on a per acre basis, is

given in parentheses for each group.

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Lastly, we observed differences among species in their susceptibility to damage from prescribed fire (Figure 4). Surprisingly, tulip poplar was most resistant to damage and value loss. However, this was a function of the size of the tulip poplar; all stems surveyed exceeded 20 inches in diameter. At this size, tulip poplar has very thick bark and is resistant to fire. We presume smaller tulip poplar stems, with much thinner bark, at our sites had been killed by past prescribed fires. Of the remaining species, hickories and white oak were most resistant, depending on metric. Hickory was least wounded, while white oak had lower grade change and overall relative value loss. White oak's resistance to fire damage, in particular, is well known; the species has very thick bark at most sizes and is superior at compartmentalizing and healing wounds. The most susceptible group to prescribed fire damage was the red oaks. All were easily wounded, had high grade loss and high relative stumpage value loss (Figure 4).

Recommendations

Our observations indicate that, in most circumstances, prescribed fire has a minor deleterious effect on timber quality in Indiana and surrounding states, and that only repeated burning is likely to cause major damage to timber. Overstory trees, particularly white oak, have thick bark that insulates the tree from damage and, if damage does occur, can quickly compartimentalize the wound, preventing the spread of decay, and heal over the injury. However, we do warn that more intense fires applied to dramatically reduce midstory densities or kill overstory trees, as would be prescribed for woodland creation, would likely cause more significant damage that we observed in our sites (i.e., similar or exceeding what we observed in the Missouri stands). Target flame height of 3 ft or less in a prescribed burn is likely to achieve many of the goals needed for oak regeneration prior to overstory removal on many sites; exceeding that threshold would likely induce higher levels of damage.

Still, we caution use of prescribed fire on sites with very high quality trees, such as prime and veneer grades, as the USFS tree grades used in our survey do not adequately capture these grades (Stanis et al. 2019). Grade degradation of a few, or even a single, trees per acre in these grades could quickly accumulate to high losses in stumpage value of a stand. For these very high-quality individuals, consider raking litter and duff away from the base of the tree (3-4 ft is generally adequate) and remove any branches or other large pieces of deadwood that are leaning against the stem.

While damage to timber does occur from prescribed fire, in many cases the benefits of the practice outweigh the costs in terms of loss to timber quality and value. In future articles, we will address these benefits on oak regeneration, wildlife populations and habitat diversity.

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Bob Burke Serves Society of American Foresters for 50 Years!

Bob Burke joined the Society of American Foresters in 1968. He remembers being elected as secretary-treasurer at his first meeting, and then served from 1968-1971. Three years later he was elected to be the Section Chair. In those days, he explains they were the Central States Section which included Indiana, Illinois, and Ohio. At some point, the national office sent word that the Central States Section was to dissolve, and they were to reform as individual state chapters. He said the upside of the time as the Central States Chapter was the great contacts and friends he made with foresters in Illinois and Ohio.

Burke served two years in the US Army before going to work with the Pierson Hollowell Veneer Company where he served as their lead forester for 33 years. In 1979 he established his own consulting company focused on walnut plantations, which he ran for 15 years. He became a certified forester early in his career with a number of CF 108.

There are a few things Burke is understandably proud of. He worked with the Forest Service many years ago on a research project to plant walnut seedlings on their company land. Forest Service researchers did their studies on the company lands and Burke was proud to have played in part in improving walnut trees.

Walnut trees have always been his passion, leading to him co-founding the Walnut Council in 1970. He also spoke fondly of his relationship with Senator Richard Lugar. He was his private forester for many years and worked with Lugar planting walnut on his private lands. The two men became friends.

Burke related a story from the Hoosier National Forest controversy in the 1980s. Burke said he was one of the few from the timber industry who was working with the environmentalists to get a better compromise on the Hoosier Plan. But in the end, the alternative that the Environmentalist preferred and that the legislators came out in favor of was selected. Burke explained how he had gone to his friend and asked the Senator the legislators had made that choice. Senator Lugar said because the environmentalist had come to him and asked for help.



Forest industry and conservationists had never asked. Burke realized then that foresters could never make that mistake again. They needed to take their message to the politicians. One tangible symbol of that was a walnut Burke planted on the Capitol grounds in Washington DC from the Indiana Walnut Council.

Another thing he is proud of, is the Tree Improvement Center at Purdue University. He said years ago he got word that Carbondale had closed their research unit on walnut. About that same time, he took a trip to Europe to look at an 11-country initiative on forestry. When he got back, he went to see Senator Lugar. He told the Senator all about what he'd seen, and how impressed he was with what they were doing and how they could replicate much of it in Indiana. At the end of his visit Senator Lugar promised him a ¹/₂ million dollars and told Burke to find a place for his new research center. Not long after, Burke went to an SAF meeting and talked to Dennis LeMaster (Dean of Natural Resources at Purdue) over dinner. He told LeMaster the same story about the potential of his vision and they called Lugar back, said they were committed, and asked for more money. Burke said LeMaster made it happen and he's found that "if it's a worthwhile project, the money will come" and the Tree Improvement Center at Purdue was born and has thrived ever since.

LeMaster reflected that he had always been impressed with Burke's unrelenting passion for forestry and his leadership abilities and strength of character. In a letter Le Master said Burke was a man who loved forestry, got things done, and stood for something. Well said. Our profession is better for Bob Burke's efforts to get things done. Burke received a Sagamore of the Wabash Award in 2014. In his letter of support Senator Richard Lugar wrote of the remarkable contributions his friend Bob Burke had made through his scholarship, active participation, and leadership in forestry in both Indiana and in other countries in the world.

Burke has received many honors. In 1986 Indiana honored its first two members as Fellows of SAF, Bob Burke was one of those first Indiana SAF Fellows. In May 2010, Burke received an honorary doctorate from Purdue University and in 2013 he received a Certificate of Distinction, the highest honor given by the Agricultural Alumni Association.

Indiana joined the National Tree Farm Association in 1956. Burke joined the new organization in 1960. In 1968 he became the chairman of the Indiana Tree Farm. Fifty years later, Burke is still Chair, having held the office for five decades! In 2019 however, he is passing the mantle of leadership to Lenny Farlee.

Burke also served six years as Chair of the Forestry Committee of the National Association of Conservation Districts, and co-founded the Hoosier Heartland RC&D, serving as its Vice Chair. He also served as supervisor for the Morgan County SWCD for 30 years.

Until the last few years Burke has always been active in SAF but has found in recent years he had less time and focused more on Tree Farm and other activities but still values his SAF ties.

Burke advises young foresters to get involved. He suggests they should join their professional organization and get involved with forestry organizations and meet other people who are enthused about the profession. "Someone will take you under their wing and help you out," he noted. In over 50 years of forestry, Burke has certainly helped his share of young foresters.

Burke and his wife have two daughters and two grandchildren. Burke proudly notes that both his daughters attended Purdue University.

Supply Chain Continued from page 4 End Users

Homeowners need furniture, flooring, cabinets, mulch, paper goods and wood trim. Farmers need animal bedding, and bourbon makers need barrels. Railroads need ties, distributors need pallets. Indiana is within a day's drive of 75% of the U.S. population, and we are sitting on a reserve of renewable forestland that can be shipped to consumers around the globe. Check the last box in the supply chain to drive home the point that we are perfectly positioned to be a world leader in hardwoods.

So, bottom line – the supply chain is going to get more efficient, faster, more agile and more customizable with advances in technology and sizes of operations, but as long as we understand the roles of both private and public forestland management, Indiana can always remain an ideal place to grow and sell timber. What could threaten such a no-brainer of a sustainable economic driver?

Like any chain, the threat to our supply chain would be its weakest link. The loss of any one of its links would be felt throughout the entire chain. COVID-19 has caused a disruption in our economy, but it can be used to illustrate the point.

Economic uncertainty, and job losses affect the housing markets. Banks don't lend money to those without jobs, and stock market losses make consumers gun-shy about spending. Reduced demand for wood results in lower timber prices to private landowners. While private landowners wait for better selling markets, the timber that comes off our state forest and national forest land and timber bought before the economic downturn can help augment supplies and balance species mixes at the distributor level as markets recover, keeping the chain from breaking.

Indiana is perfectly positioned to maintain an efficient hardwood supply chain. Woodland owners are the foundation, public lands support and diversify hardwood supplies and the forest products industry is continuing to develop efficiencies and technological advances to keep the hardwood supply chain in Indiana resilient and viable into the future.

Ray Moistner is executive director of the Indiana Hardwood Lumbermen's Association. The IHLA Works to ensure a sustainable, affordable supply of quality North American hardwoods for the public good.



Walnut Stumps Continued from page 7

veneer that must be matched. Deep frost cracks, ring hearts, rotten spurs are serious defects.Stumps with evidence of iron are risky. Stumps made irregular by high root spurs should stay in the ground. Trees that are plain almost to the ground line should not be grubbed.

Root Wads

If a stump is of merchantable size and quality, its value is not in the root horns, dirt and stones that may be attached. This mess, usually known as a "root wad," is of no earthly value. Leave as much in the ground as you can and cut off the rest after the tree is felled.

Cutting Off Root Wads

If the stump comes out of the ground looking like Figure No. 6, cutting off the wad is not a serious problem. If it comes out with plenty of horns, cutting it off will be more of a job. To do it most economically the crosscut saw must be swedged wide. When cutting off root wads the cut should be made through the center of the lowest side root so that the butt end is square cut.

Walnut Stump Veneers

Stumps are used for veneers because many stumps contain a curly figure in the lower half. Also, because they are bellshaped at the base they produce a grain figure. The good stump veneer usually shows both types of figure. The stump that has no curly figure is scarcely more than a short piece of plain veneer. Figure No. 9 shows a good piece of stump veneer. Figure No. 10 shows a poor piece of stump veneer.

Editor's Note: Material is from the files of Roy Brundage, Professor, Department of Forestry and Natural Resources, Purdue University 1930 to 1971. Roy was a Wood Products Marketing Specialist and also Secretary-Treasurer of the Indiana Harwood Lumbermen's Association. These files were passed by Roy to Dan Cassens, Professor Emeritus, Department of Forestry and Natural Resources, Purdue University, about 40 years ago. They are in the process of being transferred to Purdue Archives. Professor Brundage's photo collection was transferred earlier.

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Figure 9. A piece of beautifully figured stump veneer. Notice that it is figured and the freedom from defect.





Figure 10. A piece of plain stump wood, even when free from defects, will not bring what it cost. This tree should have been cut off near the ground.

Figure 11. A piece of matched veneer obtained by joining sections of veneer similar to those shown in Figure 9.

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Ask the Steward

By Dan Ernst

Question: My pine tree drops a lot of pine cones and I'd like to grow some new trees from their seed. Do I just plant the whole cone?

Answer: While the cone is the fruiting body of the pine tree it is not actually the seed. The cone is made up of several parts and the most obvious are the scales that make up the bulk of the cone and protect the seeds while they develop and mature. Under each of the scales there will usually be 2 small winged seeds. As the cone and seed matures, the cones dry and begin to peel back to expose the seeds, which are dislodged and dispersed by wind and natural elements. Wildlife, such as squirrels, can also disperse seed as they break apart cones in search of food. While several pine species are grown in Indiana, there are only 2 pine species native to the state- White pine and Virginia pine. Both can be grown from seed, but you'll need to obtain the seed from the cones after they have matured and before the good seed has blown away or been carried off. Look for cones in late summer that are beginning to dry and the scales beginning to peel back. Place the cones in a paper bag and let them dry further. As they dry the seeds will fall out into the bag and can be easily collected.

To sort out good seed from bad, place the seeds in a container of water and let soak overnight. Discard any seed that floats as its embryo is probably dead. Drain the seed and pat dry and then place the seed in a freezer bag with moistened perlite and refrigerate for 60-90 days. Check the mixture periodically and moisten as needed to prevent drying out. After this period of stratification the seed is ready to plant. Plant ¼ inch deep in a good potting soil mix and keep uniformly moist during germination and early growth period. Germination should begin to occur in two to six weeks. Transplant the seedlings when they are 6-10" tall. This is a great activity to include the next generation of woodland owners. You can find more detailed information on the web.

Question: My forester talks about a 'site index' number for my woods. What does that mean?

Answer: 'Site Index' is one of those measurements that every serious, and even not so serious, woodland owner should know about their property. Site index is the most commonly used method of assessing site quality in North America

and is defined as the average height of a certain number of dominants and codominant trees in the stand at an index age- usually 50 years.

Or, to put more simply it is a measure of site productivity reflected by how tall the dominant, healthy trees in your woods can be expected to grow in 50 years. For example, a site index of 85 for Red Oak means Red Oak trees that are unsuppressed and free to grow can be expected to attain a height of 85 feet at 50 years of age. Similarly, a site index of 70 for Red Oak would yield trees only 70 feet tall at age 50. Obviously, a site index of 85, yielding taller trees, is much more productive than a site than can only grow trees 70 feet in height during the same period.

To add some confusion, not all tree species grow the same rate on the same site. For example: a wooded area with and index of 85 for Red Oak, may also have a site index of 100 for Tulip poplar. Why- Tulip trees on good sites will grow faster, taller and quicker than Red Oak or other species on certain sites. So, when stating a 'site index' you must always identify the reference tree species to have full understanding. While the measure is relatively simple, there are many underlying factors and natural processes which add complexity

Across your woodland property you are likely to have a variety of soils, topography and slope aspects, with varying degrees of productivity. Each of these will also vary in site index. You may have intuitively noticed certain areas of your woodland grows taller or shorter trees, and areas where certain tree species perform better than others.

You can roughly approximate site index on your property by aging a few medium aged (35-60 years old) dominant trees, measuring their height and then extrapolating what it's height would likely be at age 50. More accurate determination requires the use of develop site index curves and other methods. Indiana soils surveys also list average site index for many of Indiana's soil types. What's your site index?



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