

The Woodland Steward

Promoting the Wise Use of Indiana's Forest Resources

2020 Indiana Consulting Foresters Stumpage Timber Price Report

This stumpage report is provided annually and should be used in association with the Indiana Forest Products Price Report and Trend Analysis. Stumpage prices were obtained via a survey to all known professional consulting foresters operating in Indiana. Reported prices are for sealed bid timber sales only (not negotiated sales) between a motivated timber seller and a licensed Indiana timber buyer. The data represents approximately 10 to 15 percent of the total volume of stumpage purchased during the periods from April 16, 2019 through April 15, 2020. This report has been published since 2001.

The results of the stumpage price survey are not meant as a guarantee that amounts offered for your timber will reflect the range in prices reported in this survey. The results simply provide an additional source of information to gauge market conditions

Categories of Timber Reported

The prices reported are broken into three sale types; high quality, average quality, and low quality. A high quality sale has more than 50 percent of the volume in # 2 or better red oak, white oak, sugar maple, black cherry, or black walnut. The low quality sale has more than 70 percent of the volume in # 3 (pallet) grade or is cottonwood, beech, elm, sycamore, hackberry, pin oak, aspen, black gum, black locust, honey locust, catalpa, or sweet gum. The average sale is a sale that is not a low quality or a high quality sale as defined above.

In the 2008 report some minor adjustments were made in the categories from the previous surveys. White ash was previously included as a component of the high quality sales and hickory was previously in the low quality group. No changes have been made in the categories so the 2019-20 data should compare well with the data collected since 2008.

Decreases in Sales Activity and Volume Sold

The decline in the number of sales may be due to several factors including but not limited to: the negative impact of the tariffs on certain species particularly red oak, recommendations by some foresters to delay their sales until invasive species are controlled as the disturbances to the soil during the harvest exacerbates the their spread and increases the cost of their control, the decline in the ability to still salvage the ash mortality caused by the emerald ash borers, and more recently Covid-19's effect on the economy (although the reporting period ended on April 15, 2020).

There were 16 consulting firms that reported in 2020 which is an increase from the 15 that reported in 2019 (2018: 16 firms, 2015-2017: 18 firms). The main 14 firms have reported every year since 2011 although the configuration of several of the firms has changed due to retirements. The data from 14 firms has historically represented over 95 percent of the total sales reported making the data very consistent.

In 2019-20 there were 183 reported sales (plus 3 negotiated sale), down significantly from the last few years and the lowest total reported. In 2018-19 there were 230 sales (plus 6 negotiated sale), 2017-18 there were 212 sales (plus 8 negotiated sales), and in 2016-17 there were 310 sales (plus 16 negotiated sales). The number of sales has been declining for several years; 339 sales (plus 20 negotiated sales) in 2015-16, 368 sales (plus 12 negotiated) in 2014-15, and 330 sales (plus 14 negotiated) reported in 2013-2014.

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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.

Woman4theland educational online programs for women landowners and farmers. Visit www.women4theland.org for more information.

January 14

Invasive Species: Making a Plan and Finding Resources

January 28

Invasive Species Control Techniques: Starting with the Basics

February 11

Invasives: Control of Woody species

February 18

Invasives: Control of Grasses and Herbaceous Plants

March 27

Ohio Valley Woodland & Wildlife Workshop

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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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Stumpage Timber Price Report *Continued from page 1*

Decreases in Volume of Timber Sold

The total stumpage volume sold also decreased to 17,494,018 board feet (also 187,861 board feet – negotiated sales). These numbers are similar to levels seen during the recession years of 2009 (17,687,648 board feet) and 2010 (19,256,436 board feet). The numbers are down from 21,123,950 board feet (plus 710,410 bd. ft. in negotiated sales) reported in 2018-19 and 19,630,108 board feet (plus 642,774 bd. ft. - negotiated sales) in 2017-18. The decline has been observed for several years with higher volumes sold in 2016-17 (24,700,232 board feet plus 983,276 board feet, negotiated), 2015-16 (29,044,240 board feet plus an additional 1,257,863 board feet, negotiated), and the record reported in 2014-15 (reported of 36,773,866 board feet plus 683,235 board feet, negotiated). The historical average of volume sold has been approximately 25 million board feet.

The volume for the high quality sales also declined to levels seen during the recession in 2009 and 2010 with only 5,806,549 board feet sold, down from 2018-19 when 7,650,681 board feet were sold, and 2017-18 (6,819,117 board feet), 2016-2017 (8,089,611 board feet), 2015-16 (7,728,890). The highest total was reported in 2015 at 11,861,259 board feet. The volume reported between 2011 and 2014 was between 8.5 to 8.7 million board feet.

The medium quality sales also were at levels seen during the recession with a volume of 9,886,553 board feet sold in 2019-20 when around 10 million board feet were sold. Last year a total of 12,168,667 board feet were reported with 12,075,284 board feet reported in 2017-18 which are down from the 14,928,599 board feet reported in 2017, the 19,782,273 board feet reported in 2016 and less than half of the 22,606,525 board feet reported in 2015. An increase in ash on the market due to mortality or pending mortality caused by emerald ash borers likely influenced the high volumes sold in 2016 and 2015.

Lower quality sales also increased to 1,800,916 board feet up from 1,304,602 and 735,707 board feet from the last two years but more in line with the 1,682,002 and 1,533,077 board feet reported in 2017 and 2016 although down significantly from 2,486,082 board feet and 2,657,366 board feet in 2015 and 2014 respectively. Historically the volume of lower quality sales has generally been around 3 million board feet.

Volume is Down but the Overall Price is Stable

Total timber value sold in the 2019-20 reporting period dropped proportionately to the volume sold to \$11,315,225 which is down from 2018-19 (\$14,057,036) but similar to \$11,878,170 and \$12,272,227 reported in 2018 and 2017. The

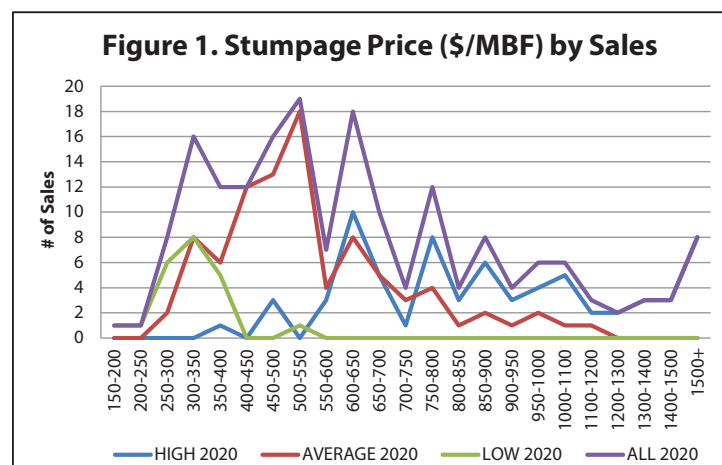
high quality sales brought \$5,431,134, the medium quality \$5,331,160, and the low quality \$552,931.

Interest in Sales Returns to more Historic Levels

The number of bids per sale decreased from the higher level of interest observed the last couple years to more historical levels. A total of 940 bids were received for the 183 timber sale for an average of 5.14 bids per sale down fairly significantly from 6.06 bids and 6.07 bids per sale the last two years but similar to the historical average of 5.09 bids per sale reported since 2000. The high quality sales received 6.41 bids per sale down from 6.93 bids and 7.85 bids per sale the last two years but similar to the historical average of 6.25 bids per sale. Medium quality sales received an average of 4.65 bids per sale down from 5.67 bids and 5.23 bids per sale reported in 2019 and 2018 but at the historical average of 4.64 bids per sale. The number of bidders on the low quality sales also decreased to 3.09 bids per sale down from 4.1 bids and 3.6 bids per sale the last two years also is similar to the historical average of 3.17 bids per sale.

Stumpage Prices (See figure 1)

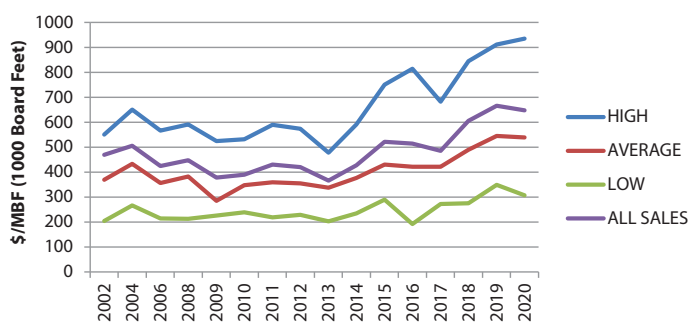
The sales reported are generally lump sum timber sales where the buyers bid on all the trees (standing trees) that are marked (stumpage) which includes a combination of many species and grades (quality). The trees or stumpage are sold as a single unit. The higher stumpage price the last several years have been driven in large part by the higher stumpage price paid for black walnut and white oak. The spikes in the graph showing the stumpage prices are primarily due to the walnut component and to some extent the white oak component in the sales. Without these influences the graphs should follow a more traditional bell curve or skewed bell curve with most stumpage prices paid falling within the curve.



Continued on page 5



Figure 2. Average Stumpage Price per Year



The average stumpage price for all sales was down slightly to \$647/MBF from last year's record of \$666/MBF which was the highest since the report began in 2001 for all the sales and all the categories of sales.

The mean stumpage price for high quality sales increased slightly to \$935/MBF (2019-20) from \$911/MBF (2018-19) with the median value also increasing slightly to \$865/MBF (2019-20) from \$856/MBF (2018-19). These reported averages are record highs.

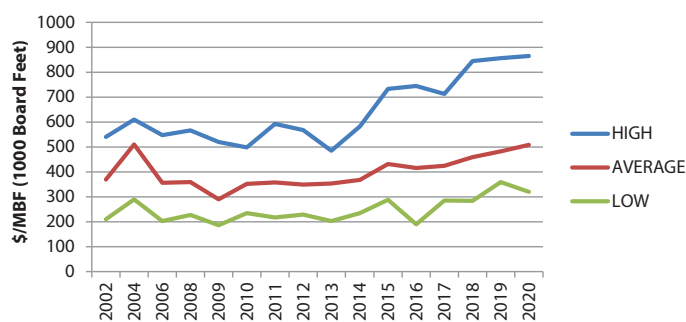
The mean stumpage price for the medium quality sales was down slightly to \$539/MBF (2019-20) from the record \$545/MBF reported in 2018-19. The median value was up slightly to \$509/MBF compared to \$483/MBF reported in 2018-19.

The mean stumpage value for the low quality category was down to \$307/MBF from a record \$349/MBF in 2018-19 with the median value also down to \$320/MBF from \$359/MBF.

This year there were 25 sales (13.7% of all sales) that brought over \$1.00 per board foot which is slightly less than in 2018-19 (15.2 % of all sales) and the same as in 2017-18 (13.7%). The previous three years 2014-17 had between 9 and 10 percent of the sales bringing over \$1.00 per board foot. This increase is primarily due to the high prices associated with black walnut and to a lesser degree the white oak prices with foresters and landowners trying to take advantage of those high prices. These very high value sales are generally outliers that distort the average stumpage value all the sales, which is why the median value is often the best indicator of value for most woods and sales. The highest stumpage price reported for a sale this period was over \$2,186/MBF or nearly \$2.20 per board foot. The lowest price was \$190/MBF or about 1/10 of the highest price. This indicates the significant difference in the value of each tree which make it very important to know what you have and are selling.

Landowners should keep in mind that markets are only one factor to consider when selling timber. The condition of the tree is the most important factor that determines when it is the right time to sell a specific tree (what is the

Figure 3. Median Stumpage Price per Year



trees potential, is the tree increasing in value (what rate is it increasing) or declining? – is the trees condition (health and vigor) going to decline, stay the same, or improve?). Trees should be sold based on their problems or lack of potential rather than their current value. Another factor to consider when selecting harvest trees is what impact that tree will have on the health, vigor, and resiliency of the future stand? (Is it competing with a better tree or will it benefit or negatively impact natural regeneration, etc?). The lower quality sales are generally improvement harvests (commercial weeding) and the opportunity cost in lost productivity of the forest by not conducting these sales can be significant. Do you leave your weeds in your agricultural fields or gardens, why leave them in the woods unless they provide other benefits – they may occupy a considerable amount of space. Ideally, you should sell your good trees when they have reached their peak or highest potential. You need to evaluate the risk of growing the tree forward and the potential reward (the return can often be over 10 % annually) and then decide is the reward worth the risk? It often is. If done properly the value per board foot should increase in subsequent sales along with the tree growth, quality, and financial productivity or value of the trees in the woods. Many of the sales reported in this report have come from woods that have been well managed for many years, through several harvests. This is likely part of the reason there are fewer low quality sales reported and part of the reason high prices are reported. Good forest management definitely provides higher returns.

Figure 1 shows the stumpage prices for all sales, high quality sales, medium quality sales, and low quality sales held between April 16, 2019 and April 15, 2020. The curve indicates the range in values that the sales fall into. The jagged line at the higher end of the high quality and all sales lines is evidence of the variations in value some trees, especially high value walnut can have on the price.

All sale types—low, medium, and high quality—can be affected by sales with potential veneer or by the presence of a few high value trees, particularly black walnut and white oak. It is important for landowners reading this report to realize



their timber typically will fall within the range of stumpage prices but probably will not fall into the outlying values. This makes it important to work with a professional who works for you when selling timber so that you know exactly what you have, an educated seller and an educated professional buyer generally results in a very successful sale.

The weighted average stumpage price by sale type (obtained from this survey in 2000, 2002, 2004, 2006, and 2008-20) is reported in Figure 2. The weighted average of the stumpage price is the total dollar value for each sales category. The median stumpage price per year for each sales category is reported in Figure 3. The median price is the amount where half of the sales are higher and half are lower. The price reported is per 1000 board feet (\$/MBF) for standing timber.

Comments

Tariffs are still part of most discussions at this time. Indiana exports a considerable amount of high value timber and China was the largest importer. Exported timber is generally higher quality and higher value, and therefore, some species (especially red oak and black cherry) have been impacted more than the lower quality timber (pallet) and timber that stays in the domestic market (staves, quarter sawn, sugar maple, etc.). Because of the uncertainty and the volatility of the market related to the tariffs it is even more important to work with a professional forester that is looking out for your long-term financial interests. Now that the election is over we anticipate there will be some reduction in the impact of the tariffs.

Coronavirus – Covid 19

The coronavirus has caused a significant disruption in the economy and has impacted the markets for hardwood timber. The data in this report only covers the very beginning of the pandemic up to April 15, 2020. Next year's data will show much more of the impact. We suspect the impacts on the market will reduce with the introduction of more effective treatments and a vaccine.

Standing timber prices (stumpage) often vary during the year and can change rapidly based on supply and demand. The prices are influenced by many factors including the tree species, the tree quality and size, your location in the state, the distance to various types of sawmills, the access to infrastructure, and the accessibility of the trees (steep slopes,

water crossings, drainage, etc.), the size of the harvest, the terms of the sale, etc.

This report and the comments below are merely a snapshot in time and the markets can change quickly, it is therefore very important to work with a forester to get an up to the minute view of the existing markets.

- Black walnut continues to be very good although it may have dropped slightly for the lower grades.
- Black walnut prices are very good but that does not mean you should harvest at this time. Walnut markets are generally good and are generally less volatile than most species, so if the tree is good quality, healthy, and growing vigorously, patience generally pays off. If the tree is marginal it may be a good time to sell, as it's kind of like grading on the curve, you are getting on bonus that may not be there in the future.
- Red oak species demand and prices are down. Much of the lumber has been redirected to ties, mats, pallets, and other industrial products that don't require higher grades.
- Red oak demand and prices have dropped considerably likely due to the tariffs with China, although there seems to have been some improvement (fall of 2020) but it is still not very good.
- Cherry markets appeared to be climbing out of a decade long slump last year (since the 2008 recession), but they have dropped back due the drop in exports.
- White oak, especially higher quality and larger trees, is in demand and bringing a good price for staves, quarter-sawn logs and veneer. White oak markets don't seem to be affected much by tariffs.
- Hickory prices have generally been good although the markets are fluctuating. A longer contract (2 years) tends to bring a better price as it lowers the risk for the timber company when markets are volatile.
- Poplar demand remains good and steady, especially for larger trees, although moderate in price paid. This species grows quickly and at higher densities and volumes per acre, therefore proper management can yield high returns.
- Sugar maple demand is good, especially for white wood although prices are volatile. Sugar (hard) maple has strong domestic markets.
- Low grade (pallet) demand was good but has been slowed considerably due to the coronavirus.



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The following are general comments.

- The wet weather the last couple years has caused major issues with timber harvesting. It is important to work with the timber companies to ensure the process works for everyone.
- Landowners need to have invasive species controlled prior to any harvesting. They are a slow moving wildfire that inflates (expands) rapidly after a disturbance such as a harvest.
- Quality timber continues to sell well and draws more interest and a much higher price from buyers. This further demonstrates that management pays large dividends.
- A few good trees can attract buyers to sales that are generally low quality or have small volumes making them possible to sell. Essentially you make money commercially weeding the woods.
- Whole tree harvesting machines or fellers are being used more often in the state. These machines are ideal when making openings and when salvaging storm damage. They can also be effectively used in single tree selection harvesting. However, in this situation it becomes critical to have a highly skilled operator. It is important to work closely with your professional forester.

General Comments on Forest Management

Several of these comments have been made in years past but they are still very true today.

- **Have a plan to manage your woods so you and your heirs know what you have and what to do, now and in the future.** Timber is a valuable asset that can appreciate rapidly and the income is deferred until the harvest and then it is taxed favorably as a capital gain (in most cases) so do your research and work with a professional

consulting forester. Grow quality it pays. Patience can be an extremely valuable attribute. Procrastination can be costly if there are problems that need to be addressed like invasive species – early detection allows for problems to be addressed quickly and cost effectively.

- Check with the local USDA – Natural Resource Conservation Service office in your county, technical and/or financial assistance may be available to help develop a detailed Forest Management Plan.
- Plan early and thoroughly if considering a harvest to allow for control of invasive species, timing the markets, and better access. Contact the forester early to allow him to schedule the work and provide guidance.
- **Access and terms are very important** when selling timber. Timber sales that had year round harvest access were in high demand and the buyers usually paid more for the convenience. Limitations to access such as “no harvesting during hunting season” and “no access when crops are in the field” will reduce bidders and result in lower bids. Give access strong consideration. In most cases the higher income from the timber will be more than the income lost from the acre or so of crops
- To receive a premium price for your timber provide timber purchaser plenty of time (possibly 2-2½ years) to remove timber (especially with wet sites and possibly with the unknown affects of tariffs). A good map drawing showing the woods; location(s) of marked timber, access, fences, fields, roads, creeks, and possible staging or yarding areas make the process go smoothly with fewer or no complications. This is always important as good communication and documentation always pays.

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Table 1. Statistical Summary for High, Average, and Low Quality Sealed Bid Timber Sales April 16, 2019 thru April 15, 2020.

	High (70 sales)				Medium (91 sales)				Low (22 sales)			
	BF ¹	Value	Bids	\$/MBF ²	BF	Value	Bids	\$/MBF	BF	Value	Bids	\$/MBF
Total	5,806,549	\$5,431,134	449	\$935	9,886,553	\$5,331,160	423	\$539	1,800,916	\$552,931	68	\$307
Low	8,409	\$9,876	2	\$398	5,223	\$4,500	1	\$272	11,931	\$4,641	1	\$190
High	376,500	\$543,900	14	\$2,186	2,171,562	\$1,061,188	12	\$1,110	263,521	\$81,202	7	\$530
Mean	82,951	\$77,588	6.4	\$935	108,643	\$58,584	4.65	\$539	81,860	\$25,133	3.1	\$307
Median	55,158	\$46,674	6	\$865	62,781	\$35,555	4	\$509	57,017	\$16,945	2.5	\$320

1BF = board feet, 2MBF = thousand board feet

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Woodland Management – Plan not Panic

By Dan Shaver

When walking through the woods as a Forester for The Nature Conservancy in Indiana my senses are being flooded by the forest; past, present and future. Details that may be lost to many but allow me to draw on the experience gained by walking 10 of thousands of acres in Indiana. Experience gained by reviewing hundreds of management plans from past foresters, seeing properties I manage, and my predecessors have managed, grow, respond and develop.

The past is remembered by noticing old fence lines, the condition and deterioration of old stumps, tops and logs, an old two-track road, old skidder trail or lack thereof, forest habitat, condition and structure transitions. These along with the biodiversity of the understory, overstory and midstory provide clues and evidence as to how the property has been managed and how it was used.

The present assaults my senses with bird songs and frog calls, butterflies, flowers, leaves, bark, twigs, buds, invasive plants, native plants, insects and disease signs and symptoms. All being identified and cataloged to feel and understand the forest. The feel of deep soil under boots and leaf litter condition. Moisture in the ground and air, dry ridge to deep cool ravine. Water in the creeks and condition of the streambanks and stream bed. Overwhelming at times and frustrating at others when a noticed song or flowering plant escapes my knowledge.

The future has many paths. Landowner goals and objectives, ecological health and resilience, forest conditions that can be achieved, maintained or developed and what management activities are required to make it happen. Future invasive plants and insects, trends in timber markets, forest health and even climate change.

In gathering all this information, I see trends and conditions that are repeated across the landscape and through time. Some are good and some are not so good. Fortunately, our forests are resilient and most problems of the past can be addressed with good planning and time.

Too often I see properties that are recovering from bad decisions in the past. Maybe all the high-quality trees have been harvested leaving a degraded forest condition to persist, but not meet needs of local birds, plants and wildlife. Altered composition and structure of the forest can make what looks like a natural forest not so natural, not so healthy and not so productive.

I often see landowners making tradeoffs. They believe cutting some trees is okay, but don't want an opening in the forest or only want a few trees cut per acre. By putting restrictions on the forest that pertain to how we feel instead of forest health and productivity we often leave the forest in a degraded condition. For example, harvesting 6-8 trees per acres sounds like less disturbance and better for the forest than harvesting more trees per acre. The number of trees per acre harvested should never be the goal as it is arbitrary and does not reflect the condition of the forest. To make harvesting a few trees per acre economical you must be the best trees per acre. That means no poor formed or damaged trees are removed. It is like leaving the weeds in your garden and harvesting the first and best vegetables and then walking away. You are happy in the short term, but your garden is not healthy or in good shape. The decision on what trees and how many to harvest should be made by a professional forester looking at individual trees and the condition of the forest to decide what is ready to harvest and what can grow, what trees are healthy and which ones are unhealthy and need to go. Sometimes an opening is the best thing you can do for a forest, to fix the problems of the past and define a bright future.

In high school economics I learned that if it is a good deal today, it will be a good deal tomorrow. This applies to selling timber. If someone offers you money for your trees, that offer should still be good if you take the time to hire a forester, mark a sustainable timber harvest and conduct a sealed bid sale knowing the number of trees, volume by

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Restore Prairie on Your Property to Protect History, Wildlife, and Humanity

By Zach Finn

Landowners in northwest and west-central Indiana have the opportunity to create significant real-world change on their properties. This can be done through the restoration of tallgrass prairie habitat in its historical range. But what exactly is special about tallgrass prairie?

Tallgrass prairie is defined as “a fire-dependent ecosystem distinguished by tall grasses (up to 10 feet tall), and deep, rich soils.”¹² “Fire-dependent” means that fire prevents conversion of prairie to forest or other habitat dominated by woody species. This habitat provides numerous benefits for humanity and the environment. These processes largely stem from the deep root systems of prairie plants.¹⁰ Said processes include: erosion control, rainfall and runoff filtration, invasive weed control, and carbon storage.¹⁰

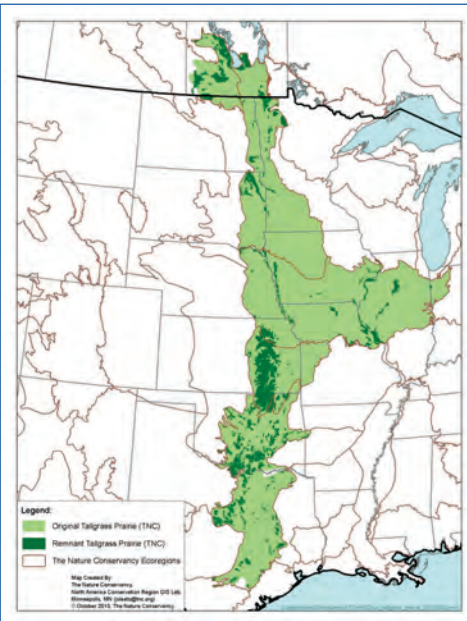


Figure 1. Current and historical distribution of the Tallgrass Prairie. Map courtesy of The Nature Conservancy, Minneapolis, MN.

Tallgrass prairie once covered 170 million acres of North America.⁴ It ranged north to south Manitoba, Canada, south to north Texas, west to central Oklahoma, and east to northwest and west-central Indiana (Figure 1)². Because of conversion to agricultural fields beginning around 150 years ago, less than 6.8 million acres remain

intact.^{4,5} That is an equivalent decrease in land cover of over 7 times the size of Indiana to only 3/10 of Indiana.

Most of what remains of this habitat is in the Kansas Flint Hills.⁵ In Indiana, our tallgrass prairies once covered 15% of the state, or about 3.5 million acres (Figure 2).¹

In 2009, there was only a few hundred acres of tallgrass prairie in Indiana.⁶ Today, there are over 22,500 acres in Indiana due to restoration efforts at Oak Ridge Prairie, Kankakee Sands, Willow Slough Fish & Wildlife Area, Beaver Lake Nature Preserve, Conrad Savanna Nature Preserve, Hoosier Prairie, and several smaller private land restorations.^{3,8,9} These restorations are fragmented and separated by many miles of agricultural, urban, and suburban land.

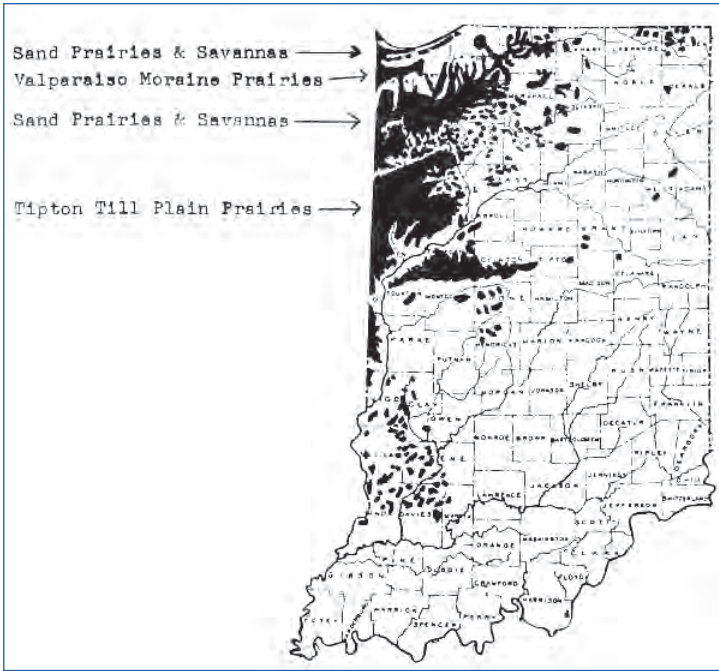


Figure 2. Distribution of major types of prairies and savannas in presettlement times. Source: Indiana Soils: Evaluation and Conservation Manual. Used with permission.

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American Bison. (Source: WikiMedia Commons)

The tallgrass prairie was also an ecosystem inhabited by many wildlife species. Larger animals including bison, wolves, elk, and deer once roamed these prairies. Moreover, so did smaller animals such as greater prairie-chicken and pocket gophers, to name a few.^{2,4} These animals have the potential to be reintroduced into our state.

As was alluded to earlier in this article, reintroduction is possible only by first restoring the tallgrass prairie habitat within its historical range. Hoosier landowners have the ability to facilitate the return of these animals and processes to their land. This would thereby help to restore and protect Indiana's natural heritage. Moreover, the restoration of tallgrass prairie could directly benefit humanity by increasing food security. This would be accomplished by providing habitat for pollinators (declining insect species that pollinate crops such as cranberries, apples, plums, and more)⁷, game species (such as the greater prairie-chicken, elk,), and "livestock" (i.e. American bison).

One method for landowners to restore tallgrass prairie is through a federal program that assists landowners in restoring prairie (and other) habitat on their own land. Said program is the Conservation Reserve Program (or CRP for short). According to the USDA Farm Service Agency's website, "CRP is a land conservation program" where "in exchange for a yearly rental payment, farmers [and landowners] enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality."¹¹

Alan Mathew, who is a professor in and head of the Department of Animal Sciences at Purdue University in West Lafayette, IN, landowner in northwest Indiana, and former farmer of about 20 years, is also an active participant in the CRP.

Mathew owns 4 properties totaling 320 acres in the highly-agricultural White County Indiana. "Most of the land is under crop production under cash rent leases ... with the remainder in prairie wildlife habitat, ponds, or woodlands." He enrolled 16 acres in CRP and CREP (Conservation Reserve Enhancement Program; another program that is part of the CRP). He has decided to keep 31 acres as wildlife habitat without participating in CRP. Twenty-one of these acres he keeps as tallgrass prairie and savanna – the transition from woodland to prairie – habitat.

As an avid hunter, he decided to enhance and restore wildlife habitat on his own properties. In 2011, he reached out to a local wildlife biologist for advice. The wildlife biologist told him about the CRP, the CREP, respective program benefits, as well as proper plant species and management tips. Since enhancing and restoring wildlife habitat in a land mostly devoted to crop and wind energy production, he noticed an increase in wildlife.

He has observed an increase in the number and species of songbirds and mammals. Moreover, he noticed a more consistent presence of ring-necked pheasant, northern bobwhite, and red fox. He also noticed more white-tailed deer in his plots that are amidst row crops and far from any

Continued on page 14



Greater Prairie-Chicken. (Source: WikiMedia Commons)

Yellowwood *Cladrastis kentukea* Restoration and Recovery at Yellowwood State Forest

By Michael Spalding

Yellowwood is the only tree species within the genus *Cladrastis* in the United States. It was discovered in March 1796 by Andre Michaux near Fleen's Creek, 12 miles from Fort Blount, which is on the north bank of the Cumberland River near the present town of Gainesboro, TN. Two Civilian Conservation Corps workers were the first to discover yellowwood in Indiana. The discovery was at the Brown County Game Preserve (Brown County State Park). Purdue University extension forester T.E. Shaw reported the discovery to Charles Deam, and the two of them collected specimens on August 18, 1933 (Deam 1934)

The southwestern most locations of yellowwood trees (stands 1 and 2) were the origin of the name for Yellowwood State Forest (Huffman 1984, 1986).

The Indiana populations of yellowwood are the northernmost in its entire range. While the entire range of Yellowwood consists of several disjunct areas, the Indiana population is quite small and separated from other larger areas, such as those found in the Ozarks, Kentucky, and Tennessee. A DNA study was conducted by the Hardwood Tree Improvement and Regeneration Center at Purdue University at the request of The Nature Conservancy. This study compared samples from Indiana, Missouri, Arkansas, and Kentucky. The results indicated that these populations are independent relicts, essentially ruling out the possibility that the Indiana population was somehow introduced by early settlers to Brown County from another area where yellowwood is

native. Even the separate stands of yellowwoods within the Brown County population were genetically different.

Yellowwood is a shade intolerant species and will seed into open areas when a seed crop is available and a good seed bed is near to the seed source. Yellowwoods develop extensive root systems and are prolific sprouters. The extensive root systems of seedlings and saplings, shade intolerance, and ability to sprout prolifically are all very similar to strategies used by oaks and hickories for regeneration and recruitment.

Table 1. 2019 *Cladrastis kentukea* Inventory Results

DBH	Stand 0	Stand 1	Stand 2	Stand 3	Stand 4	Stand 5	Stand 6	Stand 7	Totals
Acres	0.1	20.1	11.4	18.7	29.8	11.3	8.9	9.9	110.1
1	1	144	79	15	122	10	7	46	424
2	0	43	17	3	35	9	1	26	134
3	0	22	7	6	14	5	1	13	68
4	0	5	3	4	9	3	3	7	34
5	0	7	3	3	6	10	1	2	32
6	0	3	0	5	1	3	3	4	19
7	0	4	0	4	4	1	5	1	19
8	2	3	0	2	2	1	5	2	17
9	0	2	0	0	6	1	2	1	12
10	0	1	2	0	5	2	0	0	10
11	0	0	0	1	1	2	0	1	5
12	0	2	1	2	1	0	2	1	9
13	0	0	1	1	2	1	1	0	6
14	0	1	0	0	2	1	1	0	5
15	0	0	1	1	2	0	1	0	5
16	0	2	1	1	1	1	0	0	6
17	0	1	3	1	1	0	1	0	7
18	0	1	0	1	1	0	0	0	3
19	0	0	1	0	1	0	0	0	2
20	0	0	0	0	1	0	0	0	1
32	0	0	0	0	0	0	1	0	1
1983 Totals	N/A	58	28	20	59	34	62	N/A	261
2001 Totals*	N/A	22	13	30	38	23	40	12	178
2019 Totals	3	241	119	50	217	50	35	104	819

*2001 data includes trees 2" DBH and larger only



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Figure 1. 1981 through 1983 Inventory Diameter Distribution by Henry Harrison Huffman (Includes BCSP trees)

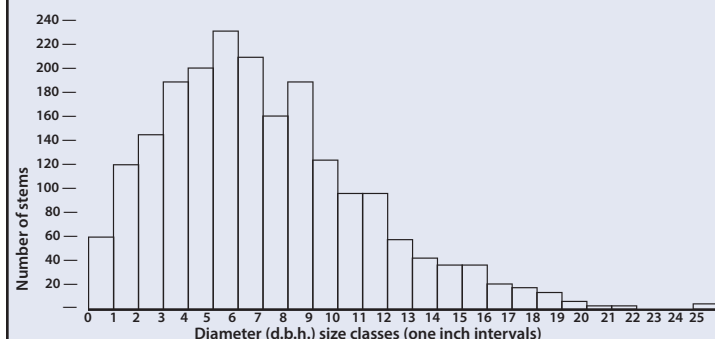
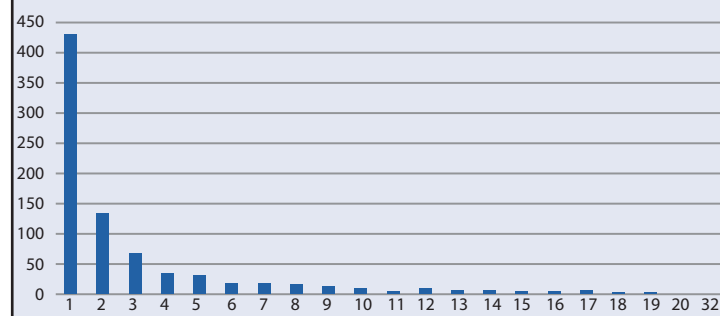


Figure 2 Diameter Distribution of YSF *Cladrastis kentukea* Population 2019 Inventory



Inventory

The current inventory of yellowwood trees was completed on September 10, 2019. This inventory attempted to locate, measure, and GPS every yellowwood tree known to exist at Yellowwood State Forest. It is entirely possible that some were missed inside inventoried areas and that others may exist outside these areas. An effort was made to search well outside the limits of the stands to ensure the extent of each stand was found. Future efforts will look to expand the search to other areas as well as continue to look for them during routine tract inventories and other work done in Compartment 3 of Yellowwood State Forest. A summary of the inventory results are located below.

Next Steps

Given that yellowwood trees develop extensive, deep root systems, are extensive sprouters, and require abundant sunlight, several techniques can be used to restore the yellowwood population at Yellowwood State Forest. The known growth habits of yellowwood in addition to observations from the field show that it performs well under the same conditions as oaks and hickories.

- Yellowwood trees 4" DBH and greater in mature stands should be released from competition on one to four sides immediately through forest stand improvement techniques to ensure adequate sunlight for both tree health and flower/seed production.
- Saplings and poles in mature forest settings should be immediately released on 2 to 4 sides. Nearly all of the trees

in this position are suppressed, primarily by beech but also sugar maple, red maple, et. al.

- Yellowwood sapling through pole sized trees present in non-native pine stands should immediately have all the competing trees in the understory and midstory removed. As time allows, the planted white pine overstory should be harvested to fully release the trees from competition and remove any risk of wind storms smashing the existing yellowwoods. Whether during a harvest or a wind event, the potential still exists for some of the trees to be damaged. If any are, they should be coppiced and allowed to sprout prolifically as they are prone to do. These areas will then need to be re-entered on approximately 10 year intervals to perform release work to ensure the trees remain free to grow.
- Single-tree and group selection harvesting should continue throughout the yellowwood stands as silviculturally appropriate for the many other native species in this compartment. During these harvests, opportunities should be taken to release all yellowwoods from competition to ensure vigorous growth and high flower/seed production. Yellowwoods, like oaks and hickories, are most likely to be successful in moderate to large regeneration openings, if advanced regeneration is present and periodic release work is performed to keep them competitive. In the case where regeneration openings are silviculturally appropriate for other reasons, but advanced yellowwood regeneration is not present, monitoring should continue during subsequent intermediate thinnings and release

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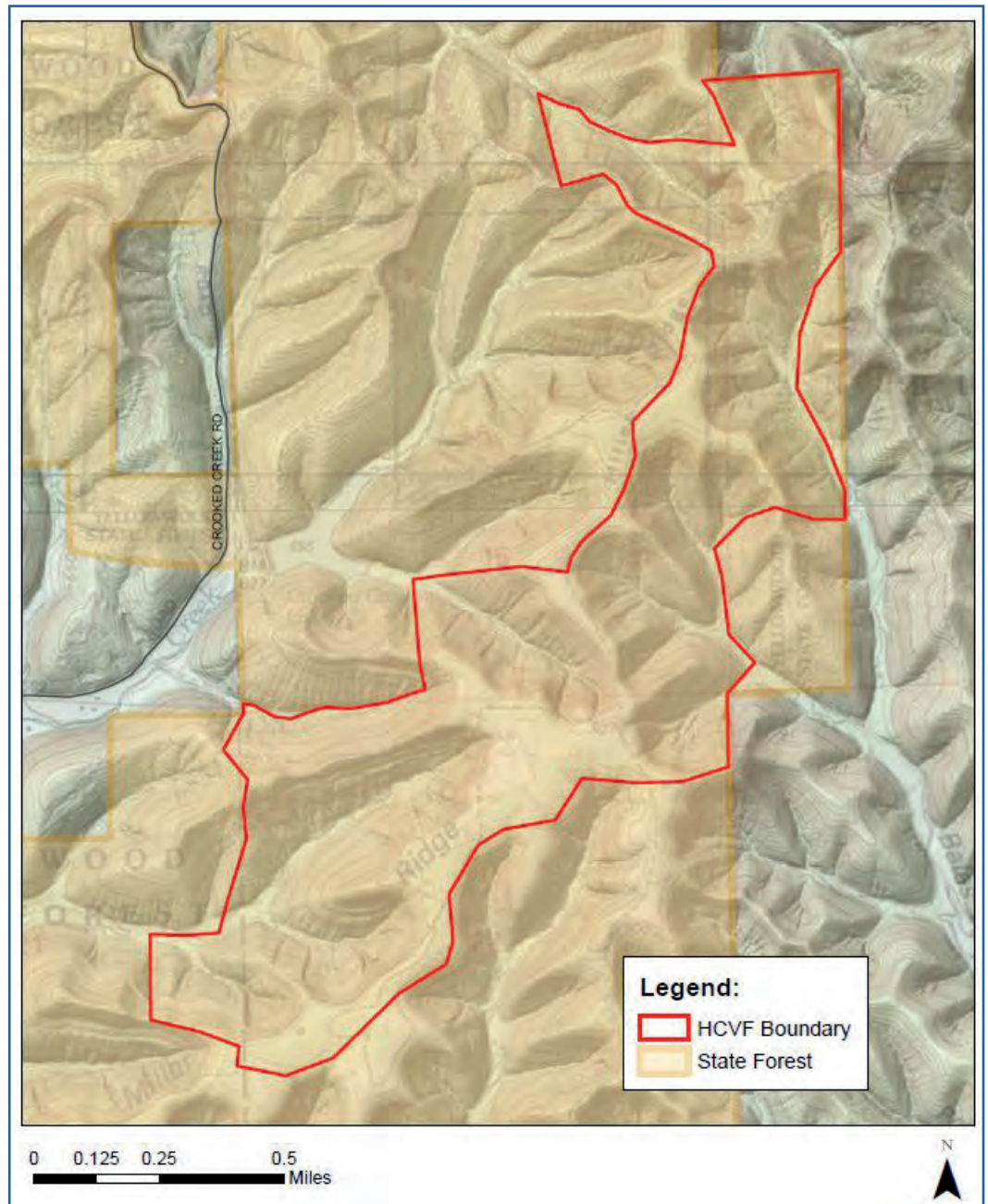
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Figure 3. Yellowwood Conservation Area at Yellowwood State Forest

- work in the openings to watch for any yellowwoods that may have grown in.
- Midstory and understory removal forest stand improvement should also be conducted in and around the stands of yellowwoods in order to begin developing new seedlings and saplings for future tree recruitment and expansion of the stands.
 - A shelterwood system that incorporates midstory and understory removal of competing vegetation, overstory thinnings, and eventual overstory removal should be used to benefit yellowwood trees as well as oaks and hickories.
 - While yellowwood is a thin-barked tree that can be injured by fire, prescribed fire could potentially be used a tool to assist with regeneration. Yellowwood seeds need mineral soil contact, and prescribed fire could be used to reduce leaf litter to assist with this. Also, as stated elsewhere in this guide, yellowwood trees tend to develop in the same way as oaks and hickories. Open understories maintained by fire would allow for these conditions. If prescribed fire is implemented as a tool for yellowwood regeneration, existing trees should have the leaves blown away from them to prevent damage from fire.
 - Connectivity of the stands is already occurring with many of the stands on the southern end of the yellowwoods; however, there is a large gap between the northern and southern stands. Collecting seeds from trees and growing seedlings for outplanting is an option. The trees have not been flowering or producing many seeds though due to heavy crown and shade competition from adjacent trees. This seed supply may become more available as the trees are released from competition and able to produce more seed. Transplanting existing seedlings is a possibility as well and should be considered in the future.



Regardless of the techniques employed, foresters now and through the future should be flexible and use adaptive management to apply the best known silviculture possible at the time to promote the yellowwood population and maximize the retention of those with healthy crowns through active management.

Michael Spaulding is a Resource Supervisor with the IDNR Division of Forestry.

Stumpage Report *Continued from page 6*

- Tenant farmers must be engaged and they must be cooperative for the harvest to run smoothly. Make sure they don't work the field after the crops are harvested. This makes the access difficult or impossible.
- Extreme weather conditions, primarily excessive wetness during the fall and winter have made it difficult for loggers the last couple years making it even more important to have everyone (landowner, forester, loggers, farmers, etc.) involved and willing to be flexible with the process. A return visit by the logging crew may be necessary when conditions improve to smooth trails and landings. It may be advantageous to improve or prepare old skid trails during the summer prior to logging when conditions are good.
- **Invasive plants** (especially bush honeysuckle, burning bush, wintercreeper, Oriental bittersweet, ailanthus and others) continue to spread. Too many stands are being cut without pre-harvest control (poor planning) and the stand is overrun within a year or two of the harvest, negatively impacting the long term health, productivity, and regeneration in the woods. Invasive species need to be controlled prior to any harvesting. Cost share assistance is likely available to control the invasive plants thru the local Natural Resource Conservation Service office.
- Invasive species control is also much more difficult and expensive after a timber harvest as the disturbance of the logging quickly magnifies the problem. Control the exotic invasive species first even if it means delaying the harvest for a couple years.

Consulting Foresters that have contributed to this report in alphabetical order include: Arbor Terra Consulting (Mike Warner and Jennifer Boyle Warner), Crowe Forest Management LLC (Tom Crowe and Jacob Hougham), Crusier Forestry (Brian Crusier), Christopher Egolf, Gandy Timber Management (Brian Gandy), Gregg Forestry Services (Mike Gregg), Habitat Solutions LLC (Dan McGuckin), Haubry Forestry Consulting (Rob Haubry), Multi-Resource Management, Inc. (Doug Brown and Anthony Mercer), Meisberger Woodland Management (Dan and Matt Meisberger), Quality Forest Management, Inc (Justin Herbaugh), Abe Bear, Stambaugh Forestry (John Stambaugh), Steinkraus Forest Management (Jeff Steinkraus), Turner Forestry, Inc. (Stewart Turner), and Rooted in Forestry (Mike Denman and Andrew Suseland).

Woodland Management *Continued from page 7*

species and grade of the timber you are selling. If someone is offering you cash for your trees and you don't know what they are worth, how much volume by species, quality of the timber or have an estimate of what those trees are worth, you are being taken.

Harvest timber for the future, not for today. In times of economic stress, like this pandemic, or personal or family economic stress landowners often turn to their woods for money. Trees take a long time to grow and develop. If we make a bad decision and harvest timber at the wrong time and don't get a fair price for the trees, we may never get a second chance. A bad timber harvest can degrade the forest for decades and limit the potential for future income from timber harvesting. Timber is a renewable resource if managed correctly. Done properly, landowners can have valuable and regular timber harvests that benefit their family and improves the health and quality of the forest.

The best and easiest way to ensure you are getting a fair price for your timber and managing for the future is to work with a professional forester to develop a management plan for your property. They will consider the past, present and future of your woodland. Inventory the trees and develop a plan that meets your goals and protects the forest. Having a plan and working with a forester is the best way to ensure that you are getting a fair price for your timber, making good decisions and sustainably managing the forest to fix the problems of the past, enjoy your woods in the present and look forward to future benefits. As a landowner a good place to start is with your Indiana Department of Natural Resources District Forester.

There is one for every county and you can find yours at <https://www.in.gov/dnr/forestry/4750.htm>. You can find professional foresters through the Indiana Forestry & Woodland Owners Association at <https://www.findindianaforester.org/>. Remember, plan not panic.

Dan Shaver is the Project Director for The Nature Conservancy's Brown County Hills Project and President of the Woodland Steward Institute in Indiana. He has a Forestry degree from Purdue University and is a licensed pesticide applicator.

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Restore Prairie Continued from page 9

other cover. Additionally, plants such as milkweed have established themselves in areas that he does not burn, mow, or spray. As a result, he has noted a greater variety of insects, including: monarch butterflies, praying mantis, and fireflies in those areas. Lastly, the presence of a vernal pond (present only during periods of heavy rainfall) and a permanent pond on two of his properties provided habitat for new populations of amphibians and aquatic turtles.

Mathew also explained some perceived pros and cons of participating in the CRP. His main pro was the return of wildlife. Other pros included consistent annual payments throughout the contract compared to uncertainties in crop production conditions and crop sale prices. He also said CRP payments are comparable to cash rent values in his area. Another pro was the optimization of income potential from what would have been marginal farmland.

Cons included potential lost profit during optimal farming years and/or on high quality farmland (compared to marginal farmland). Another con is the required maintenance. Such maintenance includes invasive plant species control by annual selective spraying, prescribed burning every few years, and occasional tilling and replanting as needed to maintain forb – non-woody, flowering plants that are not grass- or reed-like – populations. Regardless of these pros and cons, Mathew stated that the economic situation is unique to each landowner.

Mathew shared some advice for landowners interested in participating in the CRP. For maintenance, he recommended that landowners consider whether they will perform the maintenance themselves or hire others instead. Other advice included to consider one's own goals, type(s) of land owned. This would be in regards to which conservation program(s) they would qualify for and which land would have the greatest impact for wildlife, soil, and water conservation/enhancement. Finally, he recommended that aspiring CRP participants contact their local Soil and Water Conservation Service, county Extension office, wildlife biologist, and local active CRP participants for an abundance of free information and personal insights.

“Once you’ve made the decision, enrolled in and implemented the program: Enjoy the benefits, including a greater variety and number of wild animal and plant species, and the satisfaction of contributing to the conservation and biodiversity on your own land, as well as that of the surrounding area.” – Alan Mathew


Zach Finn is a graduate research assistant in Purdue University's Department of Forestry and Natural Resources.

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Ask the Steward

By Dan Ernst

Question: Foresters often talk about 'basal area', but I don't know what that means. Can you help?

Answer: Basal area is another one of those technical forestry terms that landowners should become familiar with as it often guides forest management decisions and explains much about how your woodland and timber is performing. Much like pastures and grazing lands can only support a certain number of cattle per acre, so do forests have a limit on the quantity or volume of trees and timber it can support. Similarly, croplands have ideal number of plants per acre to achieve desired production and ensure plant health. For grazing lands this is referred to as 'carrying capacity', for cropland it's 'plant population' and both are expressed on a per acre basis. For woodlands a measure used to determine stocking is 'basal area' and is expressed in square feet/acre.

When foresters assess the woodland health and growing conditions, they consider many factors, including soil types, topography, aspect, tree species and 'stocking'. And, only by evaluating basal area and number of trees/acre can you determine if your woodlands are over, under or adequately stocked. Or, to put it another way- is your woodland too thick with trees, too thin or just right to achieve your objectives. That said- just what does a basal area measurement mean? Simply put- if you cut down all the trees on one acre of your woods at 4 ½ feet above ground and sum up the cross section of all the stumps, the result is your basal area measurement for that acre. For example: the sum of the cross sections might indicate a basal area of 90 square feet/acre. By calculating the basal area across the entire woodland you can determine if the woodland is at, over or under its carrying capacity, or properly stocked to achieve the management goals.

Rather than cutting trees down to determine basal area, foresters use a variety of forest inventory and measurement tools and software to determine basal area, stocking levels, tree volumes and other data to help guide woodland management. They also take into account tree species mix, as each set of species may have different carrying capacities. A forestry prism, or angle gauge are common tools used to determine basal area and, with a bit of training, can be easily used by landowners.

In ballpark terms, a 'fully stocked' woods in Indiana would have a basal area in the range of 70-100 square feet/acre.

However, this depends greatly on the tree species mix and other factors. If interested in learning more, ask your forester for a demonstration or check out various YouTube videos on the web on how to determine basal area.



Question: Fun fact: What tree species was used for George Washington's wooden teeth?

Answer: Just as the story of George Washington cutting down a cherry tree is legend rather than fact, so is the myth of him having a set of wooden chompers. It is unclear where the story started, but it is pretty well known that George Washington had terrible teeth and by the time he was inaugurated in 1789 he only had 1 natural tooth remaining. Over the years he had crafted and wore several sets of dentures fashioned from various materials, including bone, ivory, human teeth and metal fasteners of gold bands, brass screws, and even lead- but not wood. The prevailing theory of the wood teeth story is that dentures of the time were very difficult to keep clean and hairline fractures in the ivory and bone allowed staining to seep into the cracks. This would have made the appearance of the teeth to have lines that could have resemble wood grain. This discoloration was worsened or accentuated by the dark red wine favored by Washington that tended to remove the polish of the ivory dentures. So, the legend began and is still common lore today. An interesting side note: as you can imagine, the dentures of the times were clumsy, bulky and quite uncomfortable, which likely attributed to the often dour look on Washington's face, including the famous 1796 Gilbert Stuart's painting of President Washington that appears on the one-dollar bill.

Dan Ernst is a professional forester and past Assistant State Forester with the Indiana Division of Forestry. He has authored 'Ask the Steward' since 1992 and can be reached at foresterdan@yahoo.com

Days Gone By

Farm in Tippecanoe County, circa 1931. A.B. Redmond is splitting out oak staves with a frow (left). Pig yard with the stave fence (right).



Photo credit: Roy C. Brundage

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