2018 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, 2017 through April 15, 2018. This report has been published annually 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, 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 2018 data should compare well with the data collected since 2008.

Decline in sales activity: There were 16 consulting firms that reported in 2018 which is a decline from the 18 firms that reported since 2015. The 3 firms that did not report this year only represented 10 bid sales and 1 negotiated sale in 2017 and 18 bid sales and 4 negotiated sales in 2016. One new firm reported in 2018 and 1 firm split into 2 firms at the end of 2017. The main 14 firms have reported every year since 2011. The data from these 14 firms represents 95 percent of the total sales reported; therefore the data should be very consistent.

In 2017-18 there were 212 sales (plus 8 negotiated sales) which is a significant drop from the 310 sales (plus 16 negotiated sales) held in 2016-17. 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.

The decline in the number of sales may have been due to several factors including but not limited to recommendations by some foresters to delay their sales until invasive species are controlled as the disturbance created during the harvest tends to exacerbate the spread of the invasive species and increases the cost of their control, a decline in the number of sales in northern Indiana which may be due to a decline in the ability to still salvage the ash mortality (emerald ash borers).

Continued on page 3
Calendar of Events

October 13
Walnut Council Indiana chapter field day
Greene County
Contact 765-583-3501 or jackson@purdue.edu.

October 16
Women Woodland Owners Learning Circle and Field Tour
9 AM-3 PM
Brown County
Contact brown@iaswcd.org or 812-988-2211.

October 20
Cunningham Forest Field Day, Tippecanoe County
1-4 PM
Contact Ifarlee@purdue.edu or 765-494-2153.

October 20
Fall Forestry Field Day
Owen County
Contact Owen County SWCD at 812-829-2605 or andrea-oeeding@iaswcd.org

October 20
Learn-to-Burn: Grassland Management Workshop
Vermillion County
Contact 765-492-5330 or cox119@purdue.edu.

October 20
Woodland Owners Workshop
Delphi, Carroll County
1-4 PM
Contact Ifarlee@purdue.edu or 765-494-2153.

November 2-3
Annual Woodland Owner Conference
Brown County State Park
Friday field day, Saturday indoors.
See www.ifwoa.org/events for more information.

January – March 2019
Forest Management for the Private Woodland Owner
Purdue 8-week short course
Southern Indiana Purdue Ag Center, Dubois, IN.
Contact Ron Rathfon at 812-678-5049 or ronr@purdue.edu.

See www.ifwoa.org/events for the latest event information.

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www.inwoodlands.org
VOLUME of TIMBER SOLD: The total stumpage volume sold declined to 19,630,108 board feet (plus 642,774 board feet in negotiated sales) from 24,700,232 board feet (plus 983,276 board feet in negotiated sales) reported last year which was a drop from 29,044,240 board feet (plus an additional 1,257,863 board feet in negotiated sales) reported in 2016 and a drop from the record high reported of 36,773,866 board feet (plus 683,235 board feet in negotiated sale) reported in 2015. Historically the average amount sold each year has been around 25 million board feet (with the exception of the recession years in 2009 and 2010).

The volume for the high quality sale totaled 6,819,117 board feet which is down somewhat from the 8,089,611 board feet sold last year and the 7,728,890 board feet reported in 2016. The highest total occurred in 2015 when 11,861,259 board feet was reported. The volume sold between 2011 and 2014 was between 8.5 to 8.7 million board feet.

The medium quality sales totaled 12,075,284 board feet with is also down from the 14,928,599 board feet reported last year which was down significantly from the 19,782,273 board feet reported in 2016 and just over half of the 22,606,525 board feet reported in 2015. The volume sold between 2011 and 2014 was around 3 million board feet (with the exception of the recession years in 2009 and 2010).

Lower quality sales declined to 735,707 board feet from the 1,682,002 board feet reported last year and 1,533,077 board feet reported in 2016 and down significantly from 2,486,082 board feet and 2,657,366 board feet in 2015 and 2014 respectively. The volume of lower quality sales has generally been around 3 million board feet. The majority of the nearly 642,774 board feet sold in negotiated sales would be low quality / value sales which is why most were negotiated. Part of the decline may be the result of more ash being on the market due to mortality or pending mortality caused by emerald ash borers.

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VALUE of TIMBER SOLD: Total timber value sold in the 2018 reporting period declined slightly to $11,878,170 from $12,272,227 reported in 2017 and significantly from the $14,939,352 reported in 2016 and the record high of $19,207,898 reported in 2015. Although lower than 2015 and 2016 value is still nearly as high as any other value reported since the survey began in 2001. The high quality sales brought $5,758,719, the medium quality $5,917,214, and the low quality $202,237.

HIGH QUALITY SALES GET MORE INTEREST: In 2018, a total of 1,286 bids were received on the 212 sales for an average of 6.07 bids per sale up considerably from 4.83 bids per sale last year, 5.14 bids in 2016 and 4.62 bids per sale received in 2015 and 2014. The high quality sales received 7.85 bids up considerably from 6.3 and 6.4 the last two years, which was up from 5.82 and 5.85 bids in 2015 and 2014, respectively. The 5.23 bids for medium quality sales is also up considerably from 4.3 bids last year which has been very consistent the last several years. The number of bidders on the low quality sales also increased to 3.6 bids up from 2.8 bids per sale which has also been fairly consistent since 2014.

The high number of bids reflects the strong market for the all timber. It is also likely a reflection of the lower number of sales and volume of timber sold. In theory more competition also results in a higher stumpage price which is reflected in the data.

STUMPAGE PRICES (see Figure 1): The average stumpage price for the medium quality sales is the highest since the report began in 2001 for all the sales and for the high and medium categories of sales (Figure 1). The average stumpage price for all was $605/MBF for this reporting period, up considerably from $497/MBF in the 2017 report and $514/MBF in 2016. The highest previous price of $522/MBF was reported in 2015. The high quality sales increased to $844 (average and median value, Figures 1 & 2) from an average stumpage value of $682/MBF (median value of $713/MBF) reported in 2017 which was down from the 2016 record high value of $814/MBF (median value of $744/MBF). This year there were 17 sales (19 in 2017) that brought over $1.50 per board foot and 29 sales (29 in 2017) that brought over $1/board foot. Most of these sales reported a very high component (25% or more) of black walnut.

The average stumpage price for the medium quality sales is $490/MBF (median value $459) up from $422/MBF (median

### Table 1. Statistical Summary for High, Average, and Low Quality Sealed Bid Timber Sales April 16, 2017 thru April 15, 2018

<table>
<thead>
<tr>
<th>High (74 sales)</th>
<th>Medium (128 sales)</th>
<th>Low (10 sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF¹</td>
<td>Value</td>
<td>Bids</td>
</tr>
<tr>
<td>Total</td>
<td>6,819,117</td>
<td>$5,758,719</td>
</tr>
<tr>
<td>Low</td>
<td>1,924</td>
<td>$3,810</td>
</tr>
<tr>
<td>High</td>
<td>526,213</td>
<td>$438,601</td>
</tr>
<tr>
<td>Mean</td>
<td>92,150</td>
<td>$77,821</td>
</tr>
<tr>
<td>Median</td>
<td>58,448</td>
<td>$56,101</td>
</tr>
</tbody>
</table>

¹BF = board feet, ²MBF = thousand board feet
value of $424) in 2017 which was the same as in 2016 (median value $415/MBF). Previously the highest average stumpage price for the medium quality stumpage was $433 reported in 2004. The average stumpage value for the low quality category increased slightly to $275/MBF (median value $284/MBF) from $272/MBF (median value of $286/MBF) reported last year which was significantly higher than the value of $192/MBF (median value $190/MBF) reported in 2016. This value, however, is similar to the record value of $290/MBF reported in 2015. The range for the stumpage prices has generally been between $200-$230/MBF since 2001. The low number of low quality sales reported in 2016 along with a few larger, very low quality sales likely had a significant impact on the low value reported that year.

The weighted average stumpage price by sale type (obtained from this survey in 2000, 2002, 2004, 2006, and 2008-18) is reported in Figure 1. 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 2. 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.

This year there were 29 sales that accounted for 13.7% of all the sales compared to 29 sales accounting for only 9.4% of the sale last year that brought over $1.00 per board foot and 31 sales (9.2%) and 36 sales (9.8%) in 2016 and 2015, respectively. The percentage of higher value sales (13.7%) is up from the 9 to 10% conducted the last 3 years. The increase is due to the high prices associated with black walnut and foresters and landowners trying to take advantage of the high price of black walnut. The percentage of the high value sales since 2015 is likely higher than before 2014. This increase is largely attributed to the high prices associated with black walnut and to a lesser extent white oak. These very high value sales are generally outliers that may distort the average stumpage value for most woods, which is why the median value is likely the best indicator of value.

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 (is the tree increasing in value 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. Ideally, you should sell your good trees when they have reached their peak or highest potential. Another factor to consider is what impact that tree will have on the health, vigor, and resiliency of the future stand (e.g., is it competing with a better tree or will it benefit or negatively impact natural regeneration). The lower quality sales are generally improvement harvests (commercial weedings) and the opportunity cost in lost productivity of the forest by not conducting these sales can be significant. If done properly the value per board foot should increase in subsequent sales along with the financial productivity and quality of the trees in the woods.

The stumpage prices for all sales held between April 16, 2017 and April 15, 2018 generally have a typical bell curve (Figure 3). Most sales fall within the middle range of values for each sale type. The jagged line at the higher end of the high quality sales is evidence of the variations in value some trees, especially high value walnut can have on the price.
All sales; 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.

COMMENTS: Tariffs are part of most discussions at this time. However, there is little concrete information regarding what impact the pending tariffs or threats of tariffs will have on our markets. Indiana exports a considerable amount of high value timber and China is one of our largest importers. We expect to see an impact, but the extent of the impact and the length of time the markets will be impacted are unknown at this time. Exported timber which is generally higher quality will be impacted more than the lower quality timber that stays in the domestic market. 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.

Standing timber prices 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, where you are in the state, the distance to various types of sawmills, the access to infrastructure, the accessibility of the trees (steep slopes, water crossings, drainage, etc.), the size of the harvest, the terms of the sale, and more. At this time the threats of tariffs have the potential to dramatically impact the markets and the prices received for your timber. This report and the comments below are merely a snapshot in time with most made before the impacts of the tariffs are known. It is therefore important to work with a forester to get an up to the minute view of the existing markets.

Several consultants indicated, as the data shows, the markets this year have been some of the best they have seen with most but not all species doing well. The impact of the tariffs may be only a short-term blip, they may impact the market for the next 6 to 12 months, or we may see a significant long-term drop—no one knows and no one likes uncertainty.

- Black walnut continues to be very hot (numerous comments). Recent comment indicated they heard from a buyer that their orders recently dropped, especially for lower quality walnut.
- Red oak prices showed a big improvement at the end of 2017 and early 2018, especially for larger, higher quality trees, however, prices have recently dropped considerably. Part of the increase earlier this year may have been due to a buy up in anticipation of the tariffs (nearly 75% of exported red oak goes to China).
- Cherry market continued to come out the slump that occurred during the 2008 recession; however, they have recently contracted likely due to the tariffs.
- Ash prices have been very good; however, many of the better logs have been exported so the prices have recently dropped. If you are in an area that is being impacted by emerald ash borers you probably don’t have the luxury of holding your ash.

Continued on page 12
Conserving the Rare Cerulean Warbler in Indiana Forests

By Kamal Islam

The Cerulean Warbler was once considered a common migratory songbird and breeder in Indiana, primarily in the southern parts of the state. Currently, it is considered a ‘Species of Conservation Concern’ throughout its distribution in the USA. In the State of Indiana and in Canada, it is listed as ‘Endangered’. Based on Breeding Bird Surveys conducted annually since 1966, there has been a decline by 70% throughout its breeding distribution that includes the midwestern and eastern parts of the United States and southern Canada. It has the unfortunate distinction of being the fastest declining migratory warbler.

The Cerulean Warbler is 4.5 inches in length and weighs less than 2 nickels (Figure 1). It migrates each year from its wintering grounds on the slopes of the Andes in northern South America to its breeding grounds that include forests in southern Indiana. The Cerulean Warbler faces many challenges and threats to its survival on its annual migration, which encompasses thousands of miles, from loss of habitat and severe weather events, to collision with tall, lighted buildings and windows.

Once this songbird arrives in Indiana in mid- to late April, it establishes territories in structurally diverse mature forests characterized by large-sized trees interspersed with younger trees and with openings in the upper canopy. Research suggests that male Cerulean Warblers use these openings in the forest canopy to project their songs to attract females while defending territories against rival males. Historically, these openings resulted from wildfires and by wind storms and tree falls. However, the natural occurrences of many of these forest disturbances that allow canopies to open are prevented from the practice of fire suppression. More recently, openings were created from logging roads to extract timber along ridgetops.

Scientists that have conducted research on the breeding biology of Cerulean Warblers have documented a life history strategy that is self-limiting to its current survival. Unlike other songbirds that successfully produce 2 to 3 clutches per breeding season, the Cerulean Warbler is unusual in that it only produces one clutch of 3 or 4 eggs per breeding season unless the nest fails. We have observed females making up to three nesting attempts when earlier nests have failed. The female Cerulean Warbler gathers wild grapevine fibers and bark, and uses spider web to hold the nest materials together to construct a tiny cup-shaped nest. This nest is typically located 60 feet from the ground primarily in oaks and hickories. It is one of the earliest songbirds to leave southern Indiana departing by mid-to late July.

Cerulean Warbler research, conducted in various parts of its breeding range, has contributed to our basic understanding of Cerulean Warbler biology and habitat needs. However, there are some habitat differences between the various breeding grounds in North America. Informed decisions on forest management to maintain and improve Cerulean Warbler habitat should be location specific and based on scientific research conducted in the specific breeding ground. We were provided an opportunity to study the breeding biology and habitat needs of the Cerulean Warbler in Indiana through the Hardwood Ecosystem Experiment.

The Hardwood Ecosystem Experiment

The Hardwood Ecosystem Experiment (HEE), a 100-year study initiated in 2006, examines the effects of timber harvest and prescribed burns on plant and animal populations. The primary objective of this research is to develop even and un-even aged forestry systems that maintain oak dominated forest communities and landscapes. The HEE is a multi-disciplinary, collaborative project between the Indiana Department of Natural Resources, Division of Forestry, and scientists from a number of universities. Researchers study a variety of organisms that include moth, butterfly, beetle, and bird communities, small mammals, effects of prescribed burns on regeneration of oak seedlings, endangered Indiana bat, salamanders, eastern box turtles and timber rattlesnakes, and the state endangered Cerulean Warbler among other groups.

A total of 9 management units, 4 in Morgan-Monroe State Forest and 5 in Yellowwood State Forest in Morgan, Monroe, and Brown counties in southern Indiana were selected for the HEE. Three forest treatment sites received 8 small openings ranging in size from 1-5 acres where either single trees or groups of trees were removed; these areas will produce a future stand of trees of mixed or uneven-age. Another three treatment sites received two 10-acre clearcuts and two 10-acre shelterwood cuts to create a future stand of even-aged trees. And three sites will serve as controls where no harvest will occur for the duration of the 100-year study.
We started our research at the HEE in 2007 and obtained two years of pre-treatment data before the specific forest treatments were applied at the study sites in the fall and winter of 2008/2009. Our objectives examined 1) how Cerulean Warblers responded to different forest treatments across all management units, 2) if territory sizes changed depending on the treatment, 3) if canopy gaps were a preferred habitat characteristic of male Cerulean Warbler territories, 4) the effects of these different forest treatments on Cerulean Warbler reproduction and productivity, and 5) the species of trees that produced the most amount of caterpillars that were important prey items selected by the parents to feed to their young.

Key Findings
Based on our HEE research, relative abundance estimates of Cerulean Warblers changed between pre-treatment and post-treatment years but territory sizes remained the same. Our data on relative abundance estimates suggests that Cerulean Warblers were attracted to forest sites with even-aged treatments initially based on an increase in detection rates during 4-years post-harvest but have since started to decline in these units (Figure 2). In contrast, they appeared to respond negatively to uneven-aged treatment sites based on decreases in detection during point count surveys two years after harvest; however, there is much fluctuation in numbers of Cerulean Warblers across years. There was little change in detections at control sites from 2007-2017. Preliminary data suggests that Cerulean Warblers are declining in our study sites (black line in Figure 2). This decline in population may be a reflection of the overall decline of the species across its range wide distribution, rather than from timber harvesting.

We examined 83 male Cerulean Warbler territories for canopy gaps and found that 38 territories did not have a canopy gap, which we defined as > greater than 215 square feet. The remaining 54% of territories had canopy gaps that ranged from 216- to 5,167 square feet with a mean of 1,109 square feet, which is near the average size of a single tree-fall gap (753-1076ft²) created by a natural disturbance in mature forest systems. Therefore, emulating single tree fall canopy openings up to ~ 1076ft²/0.74acre (i.e. one large tree removed per average Cerulean Warbler territory size) would increase vegetative growth in the lower strata, and further increase the vertical vegetation density. However, it should be noted that this is not a long-term management approach to habitat conservation because oaks and hickories require sunlight to germinate and to out-compete more shade tolerant species.

Based on our studies of Cerulean Warbler reproduction, oaks (particular white oak), and hickories are the most important tree species.

Nests were found in all forest management types and in all of the nine HEE units except for one of the control units. More nests were found in even-aged units than in uneven-aged or control units, despite intensive searching in all management types. Between 2011 and 2015, 93 Cerulean Warbler nests were found at our study sites. Of these, nearly half were located in species of the white oak group (Quercus alba, Q. montana [prinus], or Q. muhlenbergii), with white oaks (Q. alba) comprising the vast majority of nest trees (n = 37). Smaller numbers of Cerulean Warbler nests were found in a variety of other tree species. The preference for white oaks by Cerulean is likely due to an association with high food availability in the canopy and the presence of grapevines in areas where white oaks are also found. Of 101 territories demarcated in 2011 alone, grapevines were present in 83% of territories. At our

Continued on page 12
The spring of 2018 saw several unusual announcements about forest management. First, the Cornell Laboratory of Ornithology published an article in *All About Birds* entitled, “Old-growth is great, but here’s why we need young-growth forests as well”, explaining why the lack of young forests may be negatively affecting songbird populations.

The second was an article that appeared in *Sierra*, the magazine of the national Sierra Club, with the headline, “Cutting Trees to Save the Birds” highlighting efforts in Maine to encourage forest management that will benefit breeding songbirds.

And finally, there was a press release from the American Forest Foundation and the paper company Domtar announcing a cooperative effort with the National Audubon Society’s New York and Pennsylvania programs to encourage forest landowners to manage their woods in a way that produces more birds.

This all seems so unexpected. Yet it makes sense.

- In the Central Hardwood Region the amount of early successional habitat and young forest (20 years old or less) has declined to only 5% of what it was in 1950.
- Young forest and shrub habitats are still declining at 3.3% per year in the eastern US.
- 70% of young forest/shrubland bird species have declined over the past 40 years.
- Many mature forest-nesting birds are declining as well, including the wood thrush, which has lost 59% of its population since 1970.

Those are striking statistics, but it is important to acknowledge one thing – in the early to mid-20th century we had too much young forest habitat in Indiana. A great amount of marginal farmland was being abandoned and naturally returning to young forest, and huge swathes of remaining forest had been cut over very hard. But now the pendulum appears to have swung too far in the other direction. In 2018 we need more young forest.

The Cornell Laboratory of Ornithology article put it this way, “Ornithologists have also recently discovered that early successional habitats can benefit the birds most closely associated with big, mature woodlands. Starting in the late 1990s, biologists began tracking where the chicks of deep-forest birds, such as Wood Thrushes and Ovenbirds, went after they left their nests. To their surprise, in the weeks and months before fall migration, the chicks and adults alike were moving into thickets, shrublands, and regeneration clear-cuts—the kind of “edge” habitat that was thought to be anathema to these birds, but that provides lots of food like the late-summer fruit essential for laying on premigratory fat.”

Audubon Vermont is so convinced that active forest management holds the key to better songbird conservation that they have initiated a program to assist both woodland owners and foresters. Called “Foresters for the Birds” this program has also been adopted by Audubon in Massachusetts.

One outgrowth of the Vermont Audubon’s forest management efforts is a program called the Bird Friendly Maple Project, designed to recognize maple syrup producers who intentionally integrate bird habitat into their stewardship plans. Those who do so can place a special label on their maple syrup. Their promotional material states, “Remember that maple sugarbushes are inherently good for birds, but forests that are intentionally managed with birds in mind are even better! Surely, the same thing can be said about managing hardwoods in Indiana.

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*Allen Pursell is the Southern Indiana Program Director for the Nature Conservancy in Indiana.*

**Vermont Audubon’s Bird-Friendly Maple Project label with sugar maple leaf and scarlet tanager** *(http://vt.audubon.org/conservation/working-lands/forest-bird-initiative-1)*
A shelterwood harvest intentionally leaves many of the largest and best trees in the woods as seed trees and future timber, while at the same time thinning heavily, even in the mid-story. One-third of the mature trees might be removed during harvest. This creates abundant space around the remaining trees and allows much sunlight to strike the ground, encouraging a new generation of trees to start.

While the shelterwood technique is still an uncommon method of managing hardwood timber, research has shown that a shelterwood can benefit some forest songbirds, including Cerulean Warbler, Hooded Warbler, Kentucky Warbler, and Eastern Towhee. Forest bats may benefit as well.

A recent grant from the Alcoa Foundation to The Nature Conservancy will promote the practice of shelterwood harvesting and enhance songbird conservation on properties managed by Nature Conservancy foresters in southern Indiana. For more information contact Dan Shaver at dshaver@tnc.org.
Thousand Cankers Disease: An Indiana Perspective

By Holly Wantuch and Matthew Ginzel

Thousand cankers disease (TCD) is a disease complex that has caused the widespread death of black walnut throughout the western U.S. and has recently been found within the native range of black walnut in the East. Since 2010, TCD has been found in 6 states in which black walnut is native: North Carolina, Virginia, Maryland, Ohio, Pennsylvania, and Tennessee. The disease is caused by a fungus, *Geosmithia morbida*, that is carried by the walnut twig beetle (WTB), *Pityophthorus juglandis*, which is native to the southwestern US. The disease is spread between trees when an adult beetle emerges from an infected black walnut, flies to a nearby uninfected tree, and bores into the bark of the new tree. There, it feeds on phloem, forms galleries and lays eggs. All walnut trees (*Juglans* spp.) are susceptible to TCD, but black walnut seems to be especially susceptible.

*Geosmithia morbida* forms a dark canker, or wound, beneath the bark of a tree surrounding the entrance hole of each WTB adult. When beetle pressure is high (in the thousands), these cankers coalesce, disrupting the flow of nutrient within the tree and causing symptoms indicative of TCD. These symptoms include yellowing and wilting of leaves as well as crown dieback. Once a tree begins to show TCD symptoms, it often succumbs to the disease within 3-5 years in the West. Rapid onset of tree mortality makes early TCD detection critical. However, accurate diagnosis may be complicated by generalized symptoms often attributed to common environmental stress factors, such as suboptimal temperature and moisture levels.

**Situation in Indiana**

In June 2014, *G. morbida* was detected on three individual *Stenomimus pallidus* weevils collected from two girdled study trees in Brown County, Indiana. This was the first time the pathogen was isolated from an insect other than WTB. The low frequency of detection of *G. morbida* on *S. pallidus* suggests that this beetle is not an effective vector of the fungus. Since that time, *G. morbida* has also been recovered from two species of ambrosia beetles (*Xylosandrus crassiusculus* and *Xyleborinus saxeseni*) collected from TDC-symptomatic walnut trees in Ohio. These ambrosia beetles may exacerbate the progression of TCD in areas of an active outbreak, but their role in the epidemiology of the disease requires further study.

The only detection of WTB in Indiana was from a trap and logs at a mill in Franklin County during the 2014 statewide survey. Follow up surveys in subsequent years did not capture any beetles. To date, WTB has NOT been detected in any standing walnut trees in Indiana, and state surveys have not identified any cankered trees. Thousand cankers disease is not currently killing walnut trees in Indiana and has not spread rapidly in other Eastern states where it has been found, so there is now less concern about widespread walnut decline due to TCD than a few years ago.

Trees under physiological stress are more susceptible to pests and pathogens and are more attractive to wood-boring beetles. As such, effort should be aimed at keeping trees healthy and monitoring closely for TCD and WTB. With these circumstances in mind, we suggest the following best management strategies for walnut growers in Indiana:

- **Continue TCD monitoring efforts**, especially at the sites most likely for introduction (e.g., mills, yard waste sites, land-clearing businesses, etc.).
- **Maintain tree health and vigor.**

**For plantations:**

- Establish trees only on well-suited sites.
- Manage weeds, especially in the early years.
- Maintain appropriate thinning practices and schedule, girdling non-crop trees in August or September.
- Monitor girdled trees for WTB.
- If WTB is found in your area, girdled trees should
be removed from the plantation and destroyed. (Do this only on days with temperatures below 50°F.)

- Maintain appropriate pruning practices.
- We do NOT suggest the pre-salvage harvest of walnut in Indiana at this time.

**For urban areas:**

- Plant black walnut only on suitable sites.
- Beware of changing soil grade or adding fill around walnut.
- During drought periods, provide trees supplemental water.

**Natural stands:**

- Use Timber Stand Improvement (TSI) techniques to maintain walnut health.
- Monitor crown condition of crop trees annually. If crown deterioration (increased dieback) is observed, contact state or consulting forester for assistance.

Currently TCD does not pose an imminent threat to black walnut production in Indiana. *Geosmithia morbida* is a weak fungal pathogen and mass attack by the beetle is required to introduce the amount of fungus necessary to kill a susceptible tree. Also, studies of TCD outbreaks in the eastern US suggest that the disease does not impact the trees in their native range as drastically as it has been seen to in the West. For instance, black walnut trees experiencing TCD-related decline in Tennessee and Virginia actually recovered from the disease – an outcome far different from that seen in the western US. Likewise, researchers at Purdue have also monitored the health of trees at TCD outbreaks in Ohio since 2015 and have observed no disease progression among those trees.

**Reporting Suspected TCD in Indiana**

If you see symptoms of TCD in Indiana, report it. There are two ways to report a suspected TCD infestation:

- Use the Great Lakes Early Detection Network app (available for Android and iPhone devices).
- Notify the IDNR Division of Entomology and Plant Pathology at 866-NO EXOTIC (866-663-9684) or depp@dnr.in.gov

Please include your contact information, a description of the symptoms you have observed, and the location of the suspected infected tree.

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**Dr. Holly Wantuch** is a post-doctoral researcher in the Entomology Department at Purdue University. Dr. Matthew Ginzel is an associate professor of forest entomology. Dr. Ginzel has a joint appointment with the Departments of Entomology and Forestry & Natural Resources at Purdue University. Both authors are part of a team of researchers with Hardwood Tree Improvement and Regeneration Center, [https://htirc.org/](https://htirc.org/). The mission of the HTIRC is to advance the science and application of tree improvement, management, and protection of hardwood forests.
Cerulean
Continued from page 7

sites, oak and hickory trees were found to contain a greater abundance of Lepidoptera (moths & butterflies) larva based on the amount of frass (caterpillar droppings) that was collected underneath the trees. Trees in the white oak group and hickories dropped nearly double the amount of frass compared to sugar maples. Based on follow-up studies of prey items delivered to nestlings and fledglings through intensive filming of prey delivery, lepidopteran larvae were the main food source for Cerulean Warbler nestlings.

Conclusions
Cerulean Warblers at our study sites showed a clear preference to nest in trees of the white oak group. In addition, lepidopteran larvae were more abundant on oaks and hickories in comparison with other tree species and were the principal food consumed by adults and fed to young. Historically, oaks and hickories were dominant species in the Indiana landscape prior to European settlement. Concurrent studies on the tree communities at our study sites indicate that the conversion of oak/hickory dominated stands to beech/maple dominated stands may be occurring as evidenced by the higher proportion of beech and maple saplings in the understory. This change may be detrimental to the nesting success of Cerulean Warblers in areas where this species historically relied upon oaks for nesting.

Cerulean Warblers may prefer characteristics (structurally complex forests with trees of multiple age) associated with uneven-aged timber harvests for their territories, but land managers and forest owners must balance this preference with the need to encourage regeneration of oak-hickory forests. Oaks are generally slow-growing, moderately shade-intolerant species, and the heavy reliance upon uneven-aged forest management frequently does not permit sufficient recruitment of oaks. Likewise, control areas (with no harvests or prescribed burns) may not undergo the level of disturbance needed for oak regeneration. Even-aged harvests such as small clearcuts and shelterwoods can potentially provide adequate habitat for mature forest breeders such as the Cerulean Warbler during the initial cuts while allowing oak regeneration for future nest trees and foraging habitat. Uneven-aged techniques that create larger openings, such as the patch cuts at the HEE, may also be valuable since over half of observed nests were found adjacent to canopy gaps. We found in our 2011 research that wild grapevine that was present in the majority of territories, is a forest component of great importance to Cerulean Warblers. The bark and fibers of grapevines are the main nesting materials that Cerulean Warblers use and substantiates the need to preserve wild grapevines in the forest.

Forest managers and woodland stewards are in a critical position to take actions that benefit these rare and beautiful birds so they can return and successfully breed in Indiana each year. A long-term forest management plan should take into consideration the habitat needs of the Cerulean Warbler that includes oak regeneration, maintenance of grapevines, mature forests, and canopy gaps on the landscape of its breeding grounds.

Kamal Islam is a Professor of Wildlife Biology at Ball State University. Since 2000, Dr. Islam and his lab has researched possible factors contributing to the rapid decline of Cerulean Warbler breeding populations in southern Indiana.

Stumpage Report
Continued from page 5

- Hickory supplies are high which has resulted in less demand and somewhat lower prices.

It is anticipated that the following species will not be affected as much by any tariffs.

- White oak remains strong with high demand most grades due to diverse markets including barrel staves and ties. Because of the diverse markets white oak will likely be affected less by tariffs.
- Poplar demand remains good and steady, especially for larger trees.
- Sugar maple demand is good, especially for white wood. Sugar (Hard) maple has strong domestic markets.
- Low grade (pallet) demand has been very good and is anticipated to stay strong as long as the economy stays strong.

The following are general comments.
- 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 which further demonstrates that management pays large dividends.
- A few good trees can attract buyers to sales that are generally low quality making them possible to sell.
- Sales with low volumes are hard to sell unless some high quality timber is present or access is desirable.

Consulting Foresters that have contributed to this report in alphabetically order include: Arbor Terra Consulting (Mike Warner), Crowe Forestry Management LLC (Tom Crowe and Jacob Hougham), Christopher Egolf, Jake Florine, Gandy Timber Management (Brian Gandy), Gregg Forestry Services (Mike Gregg), Habitat Solutions LLC (Dan McCuckin), Multi-Resource Management, Inc. (Thom Kinney and Doug Brown), Meisberger Woodland Management (Dan and Matt Meisberger), Quality Forest Management, Inc (Justin Herbaugh), Abe Bear, Stambaugh Forestry (John Stambaugh), Turner Forestry, Inc. (Stewart Turner), and Wakeland Forestry Consultants, Inc. (Bruce Wakeland) and Rooted in Forestry (Mike Denman and Andrew Suseland).
Ask the Steward

By Dan Ernst

**Question:** All the Ash trees in my woods died, but new seedlings are growing. Will they survive?

**Answer:** The Emerald Ash Borer has now spread to every county in Indiana and has left millions of ash trees dead in its wake. Yet there has been a very small percentage of ash that have escaped this killing wave. Whether they are resistant to the emerald ash borer (EAB) or just lucky misses is yet to be determined. In some cases the survivors have been vigorous, fast growing younger trees that may have been able to heal over EAB larval galleries. Those same trees at an older, less vigorous condition may not survive another attack. A second hope for long-term survival of the ash species is the new crop of ash trees that have sprouted up from seeds shed by mature ash trees before their death. As these trees increase in size and abundance and reach a critical carrying capacity a new round of EAB is anticipated to again knock out many of the new and missed ash from the last killing wave. It is hoped that natural controlling agents such as EAB parasites and Ash resistance will be manifested on the landscape and increase survival rates over time. This may take several regeneration cycles and many decades to balance out. Will your young new trees survive? Hard to tell—but, there is a glimmer of hope in the long run for the ash species. Landowners with large surviving ash in their woodlands after the passing of the 1st killing wave are encouraged to retain those trees. In fact DNR would like to know locations of such trees for possible inclusion in Tree Improvement efforts of the USDA Forest Service. Visit www.in.gov/dnr/entomolo/3443.htm

**Question:** Where does the phrase ‘knock on wood’ come from?

**Answer:** This idiom has been around for centuries in one form or another, and since the early 1900’s in modern America. As the story goes it may have originated through early pagan beliefs that trees and wood contained spirits or gods that could hear your talk and effect your luck. By knocking on trees you could let the spirits know your presence. Or, such knocking made your speech undiscernible to the spirits. The phrase has variations almost worldwide. In Australia, they use the phrase ‘touch wood’. In Egypt it’s ‘hold the wood’. Today we continue the long tradition and use the phrase in fun to acknowledge good luck or ward off bad luck, while often physically knocking wood at the same time. At least that’s the way I do it and hear knocking three times brings best luck. Knock-knock-knock!

Dan Ernst is an Assistant State Forester with the Indiana Division of Forestry. He oversees the state forests in Indiana and has authored the “Ask the Steward” column for years. Have a question for the column? Email Dan at dernst@dnr.in.gov.
A Foe, Insidious and Merciless is Advancing

By Jim Buchanan

This article relates warnings of the chestnut blight's approach on the front page of the Jackson County Journal in Jackson County, NC – how efforts to stop it failed in spite of efforts born of such warnings, and the hopes for the return of healthy chestnut forests.

We can't say we weren't warned.

And we can't say the warnings weren't heeded.

But in the case of the chestnut blight, warnings, vigilance and the best-laid plans proved to be no match for people in these mountains trying to protect a treasured cultural lodestone and economic engine.

The blight won.

Or at least it won the battle.

We're still fighting the war.

The front page of the Jackson County Journal laid out in stark detail what was heading our way in an article appearing August 24, 1923, headlined, “Real Danger Threatens Our Homeland: An Insidious and Merciless Foe is Approaching,” which reads as follows:

“A few years ago, there were brought to Central Park, in New York City, a few Japanese chestnut trees, which, without the knowledge of the park authorities, were affected with chestnut blight, a tree disease hitherto unknown in America. And thus, through carelessness, was brought to this country a foe that threatens us with real and appalling danger. From Central Park the disease spread until it has completely annihilated the chestnut timber throughout New England, and a large part of Pennsylvania, New York, Maryland, and West Virginia, and is gradually encroaching upon North Carolina, having recently made its appearance near Old Fort.

“As the wind blows from South to North in the path of the chestnut blight, it was at first thought that it would not reach North Carolina, but aside from the carrying of the fine dust spores, the disease is spread by birds, and is thus likely to break out in isolated places, as was the case near Old Fort, at most anytime.

“It is thought that the menace can be averted by concerted action of foresters, and people who live in the country, who are warned to be on the look-out for the blight, and immediately take steps to stamp it out, by cutting infected trees and burning them.

“Only by enlisting the aid of the people can this real menace to the happiness of our people, and to the beautiful handiwork of the Creator, be averted. The Champion Fiber Company is leading in organizing the

American chestnut fruit (Paul Wray, Iowa State University, Bugwood.org).

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timber and acid wood interests of this region in a fight to combat the disease, and has sent out letters to the Armour Leather Company, at Chicago, Sylva Tanning Company, Sylva, Union Tanning Company, Old Fort, Blackwood Lumber Company, East La Porte, W. M. Hitter and Company, Columbus, Ohio, International Shoe Company, Morgantown, Gennett Lumber Company, Asheve, and other industrial enterprises that are most vitally interested, calling for a meeting to organize the forces to wage the battle.

“It can be seen at a glance the real danger that confronts this region, and in Jackson County, where perhaps is left the greatest acreage of chestnut timber in the world, we are particularly and vitally concerned. With proper lumbering methods, the chestnut timber in this country will be an everlasting source of revenue and beauty, if we can keep the blight from upsetting all calculations that have been made for the future development of Jackson County. This disease is a menace that threatens every activity of our people. Every man and woman in this region is vitally concerned.

“And this paper calls upon all the people to keep on the watch for the blight, report it, and cut the trees that become affected. The next general assembly will be asked to enact legislation allowing an affecting tree to be cut on anybody’s land, anytime, anywhere, and to pass other legislation to assist in the fight. At present, we can only depend upon the good sense of the people, who, if aroused to the danger to their homeland, will turn the trick.”

It did not.

Despite efforts such as felling millions of tress in Pennsylvania and New York to create a firewall, the blight jumped ahead of efforts to contain it and spread at a rate of 50 or more miles a year. Within a generation all that remained of the vast chestnut forests that provided food, forage and highly valued timber were stands of ghostly sentinels.

Chestnut blight does kill the tree, but it doesn’t kill the roots. Trees will send up sprouts that survive until falling again to the blight.

The American Chestnut Foundation, based in Asheville, has been the tip of the spear in the ongoing war against blight through decades of research dedicated to finding blight-resistant cultivars. Test plots of blight-resistant trees have been planted in the area.

TACF volunteers send in over 2,000 leaf samples annually for testing and identification; volunteers help locate sprouts for entry into a database and help plant trees and monitor test sites. The Foundation also offers seedlings to boost the effort to reestablish his mountain treasure.

The battle to stop the spread of the blight in the 20th century was lost.

But the war is not over.

This article was originally published in the Journal of The American Chestnut Foundation and was reprinted with permission. Jim Buchanan served as editor of the Chashiers Crossroads Chronicle before putting in 29 years at the Asheville Citizen-Times, where he was on the editorial board for 20 years and editorial page editor his last eight. Currently, he is the editor of the Sylva Herald.
Days Gone By

A log hauling team from Clinton County, Indiana circa 1915. The photographer, E. Sherman Wright, was a teacher and self-taught photographer specializing in local people and subjects.

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