Volume 24, Number 2
Summer 2015

The *WOOD*land Steward

Promoting the Wise Use of Indiana's Forest Resources

2015 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, 2014 through April 15, 2015. This report has been published since 2001.

The results of this 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.

CATAGORIES OF TIMBER REPORTED: The prices reported are broken into three sale types; high quality, average quality, and low quality. A high quality sale is one where more than 50 percent of the volume is # 2 grade 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 sale or a high quality sale as defined above.

In the 2008 report some minor adjustments were made in the categories from previous surveys. White ash was previously included as a component of the high quality timber sales and hickory was previously in the low quality group. No additional changes in the groups have been made since, so the 2015 data should compare well with data collected from 2008 thru 2014.

SALE ACTIVITY CONTINUES TO INCREASE: In 2015 there were 368 sales (plus 12 negotiated sales) up from 330 sales (plus 14 negotiated sales) in 2014 and 289 sales and 290 sales (plus 13 negotiated sales) in 2013 and 2012, respectively (Table 1).

Eighteen consulting firms reported data in 2015, the same number as in 2014. From 2009-13, 16 to 21 firms reported data in a given year. Fourteen firms that have reported since 2011 showed an increase in the number of sales from 277 (2013) to 318 (2014) to 351 sales (2015) during the last 3-year period. All consultants that reported had sales in this reporting period.

cont'd on page 3

Students and professionals learn about managing forests for wildlife at a Hardwood Ecosystem Experiment training programing earlier this year.

In This Issue

This publication is funded in part by the Renewable Resources Extension Act (RREA)

visit us online at

www.inwoodlands.org

Calendar of Events

September 12
Nature Daze
Brown County
See www.bcnwp.org for details.

September 12 & 19
Urban Tree Steward Training
8:30-4:30 PM
Noblesville, Hamilton County
Contact 317-234-4386 for details.

September 14
Indiana Invasive Species Council public meeting
10 AM – 3 PM
West Lafayette, Tippecanoe County
Call 219-242-8558 for details.

September 17
Harrison-Crawford state forest open house
4-7 PM
Call 812-738-7694 for details.

September 19
Invasive Species field day
9-Noon
South Bend, St. Joseph County
Call 574-654-3155 for details.

September 21
IN Division of Forestry public input meeting
6:30-8:30 PM
Indiana State Museum 3rd floor conference room
Indianapolis

September 22
IN Division of Forestry public input meeting
6:30-8:30 PM
Honeywell Center Nixon Room
Wabash, Wabash County

September 23
IN Division of Forestry public input meeting
6:30-8:30 PM
Cool Springs Education Center
Huntingburg, Dubois County

September 24
Ferdinand/Pike State Forest open house
3-7 PM
Ferdinand, Dubois County
Call 812-367-1524 for details

October 3
Family Fun in the Forest field day
Bedford, Lawrence County
Contact forester@custom.net for details.

October 10
Fall Splendor Hike
Laura Hare Nature Preserve, Brown County
RSVP to 812-336-5382

October 13-14
Indiana Urban Forest Council annual conference
Indianapolis
Contact 317-517-9180 for details.

October 16
Lost River Watershed forestry field day
Orleans, Orange County.
Call 812-723-3311, Ext 3 for details.

October 17
Invasive Species field day
9-Noon
Pierceton, Kosciusko County
Call 574-267-7445 Ext 122 for details.

October 17
4 county forestry field day
St. Joseph County
Call 574-936-2024, ext 4 for details.

October 20
Domtar Paper mill tour
In Kentucky, near Perry County, IN
Contact emccleery26@comcast.net for details.

October 22
Marketing Hardwood Veneer Logs and Trees
-8 AM – 3:30 PM
Butlerville, Jennings County
Call 765-412-6844 for details or email bbarlow@purdue.edu.

October 28
Cutter I logger training
Morgan-Monroe State forest, Monroe County
Call 317-875-3660 for details.

November 6
Invasive Species Workshop for landowners
10 AM – 3:15 PM
Dubois, Dubois County
Call 765-583-3501 or online at www.ifwoa.org for details.

November 7
Annual Landowner Conference
9 AM – 4 PM
Jasper Inn, Dubois County.
Call 765-583-3501 or online at www.ifwoa.org for details.

December 9-10
Midwest Invasive Plant Network annual meeting
Hyatt Regency, Indianapolis
See www.mipn.org for details.

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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.

Member Organizations
Indiana Woodland Steward Institute

Price Report *(cont'd from page 1)*

Table 1. Number of sales by quality types during the 2012-15 reporting periods.

Reporting Period	Low Quality	Medium Quality	High Quality	Total
2015	38	208	122	368
2014	52	178	100	330
2013	43	167	80	289
2012	32	157	101	290

The increase in the number of sales the last two years is due to the strong timber markets and an increase in landowner awareness of forest health concerns, particularly emerald ash borers.

BIDDING STAYS CONSISTENT: In 2015, a total of 1,702 bids were received on the 368 sales for an average of 4.625 bids per sale which is nearly identical to the 4.62 bids per sale in 2014. This average per sale includes 5.82 for high quality (5.85 in 2014), 4.24 for medium quality (4.43 in 2014), and 2.89 for low quality (2.89 in 2014). The 13 year averages are 6.02, 4.56, and 3.14 bids per sale for the respective quality groups.

The reduction in bids the last couple years is likely due to an increase in the volume on the market and a higher number of lower and medium quality sales that typically draw less interest. The decline in the 13 year average is due to a decline in the number of sawmills and producers that were unable to survive the recent recession.

SALES VOLUME INCREASES: The total stumpage volume 36,773,866 board feet plus 683,235 bd.ft. negotiated is up considerably from 28,931,192 board feet (plus 1,323,866 bd.ft. negotiated) sold during the 2014 period, 2013 - 28,650,085 bd. ft., 2012 - 25,164,871 bd. ft., and 2011 - 24,367,251 bd. ft. This is up considerably from the volumes reported during bottom of the recession 17,687,648 bd. ft. in 2010 and 19,256,439 bd. ft. in 2009. The volume of timber reported is also up from the volume of around 25 million board feet sold in 2008 and 2006 (pre-recession).

The volume of high quality sales totaled 11,681,259 board feet which was higher than the 10 million board foot level reported before the recession in 2008. From 2011 thru 2014 the volume was between 8,583,450 board feet and 8,725,647 board feet.

Medium quality sales totaled 22,606,525 board feet up considerably from the 17,690,376 board feet reported in 2014. The volume of medium quality sales has been gradually increasing with a good part of that increase due to shifting the ash from the high quality to the average quality category and the hickory from the low quality category up to the medium quality category. The amount of ash on the market has also increased due to the spread of the emerald ash borers.

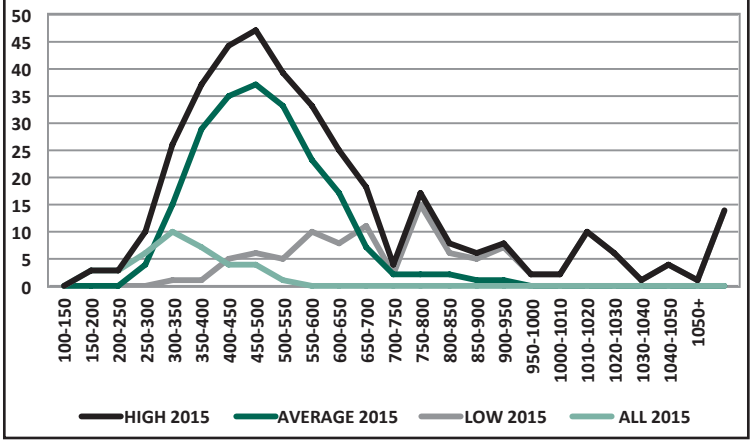
Lower quality sales dropped slightly with 2,486,082 compared to 2,657,366 board feet in 2014 and from the 2013 levels of 3,113,243 bd. ft. The volume included in the lower quality sales has generally been around 3 million feet including negotiated sales although it was lower during the recession.

VALUE INCREASES: Total timber value sold in the 2015 reporting period was $19,207,898 which is up considerably from $12,363,424 in 2014 period as well as the previous several years (2013 - $10,494,377; 2012 - $10,559,277; and 2011 - $10,678,849). Value sold in 2010 and 2009 ($6,889,190 and $7,278,302, respectively) were much lower. Total value by type was $8,760,973 for high quality (up 69.9% from 2014 but had been reasonably stable since 2011); $9,726,133 for medium quality sales (up 50.0% from the 2014 period and has gradually increased since 2011; and $720,792 for low quality sales (up 15.2%).

RECORD STUMPAGE PRICES: The average stumpage price for this period for the each category was the highest or close to the highest that we recorded in 2004. High quality was $750/MBF ($651/MBF in 2004), average quality was $430/MBF ($433/MBF in 2004), and was low quality $290/MBF ($266/MBF in 2004). The average for all sales was the highest recorded at $522/MBF ($506/MBF in 2004) and up considerable from 2014 - $427/MBF.

One exceptionally high sale this year selling for $6.66/board foot significantly affected the overall stumpage prices. The effect of that sale increased the average stumpage price for the High quality sales from $729/MBF to $750/MBF and the average stumpage price for all sales from $515/MBF to $522/MBF. The median stumpage prices for the high quality sales remained the same ($733/MBF). Even without this sale, prices in 2014 were considerably higher than the record prices reported in 2004.

Figure 1 Stumpage Price ($/MBF) by Sales



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Price Report *(cont'd from page 3)*

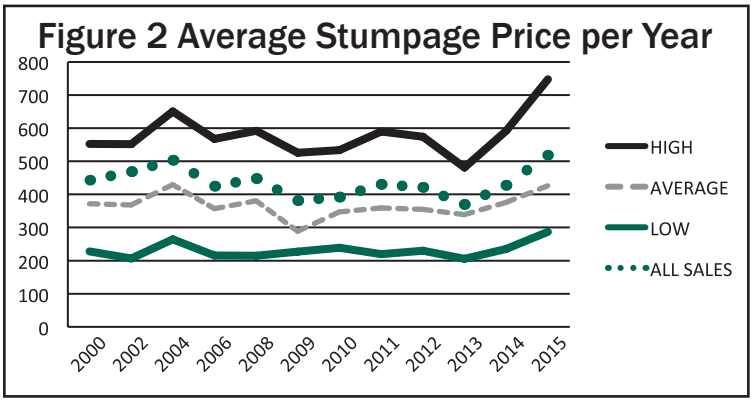
This year there were 36 sales (9.8%) that brought over $1.00 per board foot up considerably from 13 sales (3.9%) in the 2014 report, and the 3 sales (1%), the 16 sales (5.5%), and the 19 sales (7.0%) in 2013, 2012, and 2011 reports, respectively.

Landowners should keep in mind that markets are only one consideration. One of the most important factors on when to sell a specific tree is the condition of the tree (is the tree increasing in value or declining – is its condition (health and vigor) going to improve, decline, or stay the same) and what impact will that tree have on the future stand (is it competing with a better future crop tree or will it be a benefit or negatively impact natural regeneration).

STUMPAGE PRICES: Figure 1 shows the stumpage prices for all sales, high quality sales, average quality sales, and low quality sales held from April 16, 2014 thru April 15, 2015. The data shows a nice bell curve for low quality, average quality and all sales. High quality sales generally have a wide range of stumpage prices due to higher quality timber or potential veneer therefore the stumpage price fluctuates considerably. All sales, low, average and high quality can be affected by sales with a potential veneer component. It is important for landowners 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 when selling timber so that you know what you have. For example, a few walnut trees can greatly distort the value of a low quality improvement sale, dominated by pallet material.

High Quality Sales: The average stumpage price of high quality sales was $750 per 1000 board feet (MBF) up considerably from the stumpage price of $591 MBF in 2014 and higher than the highest price reported in 2004 ($651/MBF). The median stumpage price this year of $733/MBF which is considerably higher than the previous high reported in 2004 of $610/MBF.

Average Quality Sales: The average stumpage price for average quality sales was $430/MBF up significantly from



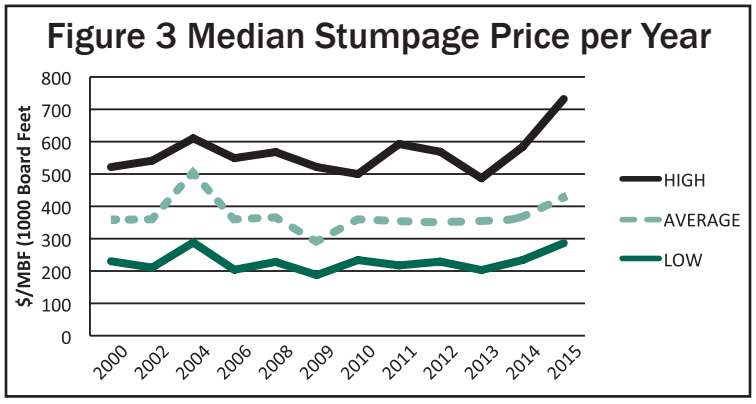
$377 from 2014 $338/MBF in 2013 and nearly as high as the peak level in 2004 ($433/MBF). The median price was $431/MBF also up from $354/MBF last year but considerably lower than the peak of $510/MBF in 2004. The large variation in the median value $510/MBF and the mean or average value $433/MBF in 2004 is a concern, unfortunately these numbers predate my data collection and are not available. This is the highest level since 2004 and the second highest reported.

Low Quality Sales: The average stumpage price for the low quality sales was $290/MBF which is the highest reported. The previous high reported was in 2004 - $266/MBF. The median price was $288/MBF which is very close to the previous high from 2004 of $290/MBF.

The weighted average stumpage price by sale type (obtained from this survey in 2000, 2002, 2004, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014) is reported in Figure 2. The weighted average of the stumpage price is the total value ($) for each sales group (high, average, low) divided by the total volume by sales group. The median stumpage price by sale type per year 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) of standing timber. To obtain a price per board foot, divide the price by 1000. An average price of $522 per thousand (MBF) is the same as 52.2 cents per board foot stumpage. Below is a statistical summary for all three sale types.

Table 2. Statistical Summary for High, Average, and Low Quality Sealed Bid Timber Sales April 16, 2014 thru April 15, 2015.

	High (122 sales)				Average (208 sales)				Low (38 sales)			
	BF	Price	Bids	$ MBF	BF	Price	Bids	$ MBF	BF	Price	Bids	$ MBF
Total	11,681,259	$8,760,973	710	$750	22,606,525	$9,726,133	882	$430	2,486,082	$720,792	110	$290
Low	3,884	$7,105	1	$271	6,912	$1,890	1	$227	9,079	$3,000	1	$127
High	549,115	$356,300	13	$6,661	1,382,221	$608,600	11	$862	186,275	$68	7	$454
Mean	95,748	$71,811	5.82	$750	108,685	$46,760	4.24	$430	65,423	$8,968	2.89	$290
Median	80,143	$51,234	6	$733	69,773	$30,717	4	$431	57,801	$14,175	3	$288



SUMMARY:

Timber Markets: This year's data indicates that overall markets are very positive. Prices for many species have returned to the levels prior to the recession and even surpassing the highest level reported in 2004. This has resulted in more timber going on the market which may in turn lead to an oversupply and a decrease in the price. The larger trees and better quality timber, as usual, have the most demand and are generally in the least supply, and therefore, they have the highest price. Demand for some species, such as black walnut and white oak, was extremely strong; hickory and sugar – hard maple was strong. Red oak was in more demand and the prices improved but are still volatile. Good "white" soft maple continues to do well. Even though emerald ash borers continued to spread across the state with mortality visible in most areas, demand and prices were strong, especially if the trees were still alive. Black cherry markets are still down from historical highs. Pallet markets were especially strong in some areas of the state.

World Market: Fortunately much of the timber from Indiana is high quality and in demand throughout the world and Indiana's forest industry has positioned itself well to compete in the global marketplace.

Lower Quality Sales: Demand for low quality timber has been very strong this year, particularly if the timber is near a pallet mill or if good access is provided. It is important to remember that low quality sales are generally improvement cuts where trees are harvested that are impeding the growth of future higher value crop trees, therefore the opportunity costs of leaving the trees may cost more in lost productivity, so it often is not advantageous to delay selling lower quality if the price is reasonable.

Larger Inventories and Equipment Upgrades: More stability with the economy shows industry carrying a larger stumpage and log inventories than they had the last few years, although it is still not as large as the inventory prior to the recession. With the strong market most logging jobs are still being cut fairly rapidly although the poor weather conditions have caused delays. Trucking has been especially difficult with the weather. There appear to be more equipment upgrades in the field with more grapple skidders and whole tree harvesting machines. This should increase the productivity of the logging crews. There continues to be a shortage of new loggers.

Forest Health Concerns: In today's global economy we continue to be impacted by new, often exotic pathogens that threaten the forests. Emerald ash borers, Asian long horned beetle, and thousand canker disease are potential threats that could or are causing significant problems. It is important to be aware of threats but understand that these threats may or may not be imminent. Forest health issues make professional advice even more important to get an unbiased update on the current status of each threat as it relates to your property.

The comment section below is offered to our readers by the consulting foresters who participated in this survey:

Black walnut markets were extremely good thru the winter but appear to have dropped this spring. Optimistic they will return as strong this fall. Walnut was in high demand over the winter months and the spring of 2015, but Walnut lumber demand has softened. Big walnut and big walnut veneer is still prized.

Ash markets are strong even though they continue to be impacted by the spread of emerald ash borers throughout the state. The markets depend on how long trees have been infested and the size and the quality of the trees. The value tends to drop drastically when the bark sloughs from the tree. Just now seeing infestation for first time so we are selling ash due to impending EAB infestation down our way (southern Indiana). Poplar and ash are easy to move, mills want them.

White oak demand still strong, especially for quality or larger quarter sawn logs. Big White oak is highly sought after and is generally easy to sell. There are several good markets for the whole tree. There is still a good demand for stave white oak.

Sugar / Hard Maple the market for sugar maple is good if clean and in areas that tend to produce white wood. Sugar maple has been weakening some but the rotary market is good.

Soft maple continues to move well, especially if white.

Black cherry markets are still not where they were. Cherry markets may never return to as high of level because of innovations and substitutions by industry to

cont'd on page 6

Price Report *(cont'd from page 5)*

mimic Cherry wood with stained soft maple and exotic hardwoods.

Red oak has is still volatile, moving very well at times then slowly. Markets for larger trees and quality have been more stable. Red oak markets are softening, and especially, Black oak

Tulip (poplar) Poplar (tulip) and ash are easy to move, mills want them, especially the larger sizes.

Hickory markets are good, especially if large clean trees but demand has weakened some. Flooring markets are currently oversupplied.

Low grade / Pallet demand was very strong, especially if close to the mill. The price has leveled off, even declined somewhat but still very high. It is still an excellent time to move your lower quality timber in many areas of the state.

Pine is easy to sell in most instances (south). It goes into pallet and a lot is being chipped. There are a few niche markets for grade pine. I have found that certification is beneficial where the pine is suitable for chipping.

GENERAL MARKET COMMENTS:

- Overall we had a very good sales year, but our opinion is that it may be time to back off on timber sales for a few months except dying ash, due to a glut of hardwood lumber and logs at the sawmills. I've heard from buyers who agree and disagree with that opinion, but the market report seems to indicate a downward price trend for the last three months leading into the summer on all species except ash and tulip.
- The standing timber prices are staying strong especially if the sales contain white oak, good ash and poplar in them. Just recently, the red oak and sugar maple lumber markets have almost crashed. Everyone I talk to is finding it hard to sell red oak, black oak and sugar maple logs and I think the sawmills are finding an even harder time to sell the lumber. The stave log market in southern Indiana is keeping sales with good white oak in them selling strong.
- The timber market is very strong at the present time. Landowners who have been holding off on selling trees should give serious thought to getting some Professional advice during this high price market.
- Timber price have remained very strong for the last 3 years.
- Mills are optimistic about the next year, most anticipate good prices to remain.
- Higher quality sales with larger timber continue to draw more interest as usual.
- Better access and terms continue to result in higher stumpage prices.

GENERAL MANAGEMENT COMMENTS:

- **First, manage your woodland - have a plan, know what you have,** and what you need to do, timber is valuable, and taxes are low; second, grow quality; third, if you want the best price and want to leave timber for the future, then hire a consulting forester; and fourth, don't blacktop the access road and expect to get your timber out of the log yard to the county road.
- **Access and terms are very important** when selling timber.
- **Invasive plants** (bush honeysuckle, ailanthus) 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 and productivity of the woods. Invasive species need to be controlled prior to any harvesting. Cost share assistance may be available to control the invasive plants thru the local Natural Resource Conservation Service office.
- Seeing a lot more **high graded** woods with **young walnuts** cut **prematurely**.
- Seeing too many diameter limit harvests with trees cut too early. Tree size is not a reason to harvest the tree and trees mature at different sizes on different sites.
- **Woodland clearing** (converting to cropland) is slowing down with the decline in crop prices but still happening way too often, especially on marginal soils.

Consulting Foresters that have contributed to this report in alphabetically order include: Arbor Terra Consulting (Mike Warner), Crowe Forest Management LLC (Tom Crowe and Jacob Hougham), Christopher Egolf, Gandy Timber Management (Brian Gandy), Glen Summers, Gregg Forestry Services (Mike Gregg), Habitat Solutions LLC (Dan McGuckin), Haney Forestry, LLC (Stu Haney), Multi-Resource Management, Inc. (Thom Kinney and Doug Brown), Meisberger Woodland Management (Dan Meisberger), Pyle Timber Sales and Management (David Pyle), Quality Forest Management, Inc (Justin Herbaugh), Ratts Forestry (Chuck Ratts), Schuerman Forestry and Bear Forestry (Joe Schuerman and Abe Bear), Stambaugh Forestry (John Stambaugh), Steinkraus Forest Management, LLC (Jeff Steinkraus), Turner Forestry, Inc. (Stewart Turner), and Wakeland Forestry Consultants, Inc. (Bruce Wakeland, Mike Denman, Andrew Suseland).

Thinning Mixed Hardwood Plantings

By Bruce Wakeland ACF, CF

The Conservation Reserve Program (CRP) became available in the spring of 1987 for planting hardwood trees on erosive crop land. The financial incentives offered by the CRP for tree planting were very good, which resulted in millions of hardwood trees being planted across Indiana. The best years were 1987 through 2007, during which time my business, Wakeland Forestry Consultants, planted over 500,000 trees nearly every year. All of that planting has resulted in a lot of acres of trees that are due for, or will at some time need, thinning.

The first benefit of a tree thinning is to improve the timber quality of a stand by favoring the better trees and ensuring that they will be the winners. This can greatly increase the future value of a stand of timber. The second benefit of a thinning is to allow those released trees to grow at a faster rate thereby shortening the years until harvest.

Nearly all of the tree plantings we do are on an 8 by 8 foot spacing. After access lanes and other obstacles are allowed for, the average number of trees planted per acre is 600. We only have room to grow about 40 crop trees per acre to economic maturity. So why plant 600 trees to get just 40? We need the closer spacings to create crown closure as soon as possible to help convert the site from an old field environment to a cool moist woodland environment, which improves tree growth rates. Closer spacings allows us to mix four to eight different tree species together, giving us the best chance of having the right species planted, even though soils are variable across the site. A mix of tree species gives us some protection from insect and disease problems, as well as changes in future timber markets and ownership objectives. The larger number of trees per acre also allows for competition among trees that forces them to grow straight, tall, and clear of lower branches. All of these advantages have to be balanced against the cost of thinning, and the need for the crop trees to have room to grow at a fast rate.

The timing of a thinning is important. If we wait too long, the growth rate of the crop trees slows way down. Trees with small crowns become stressed and more vulnerable to attack by insect and diseases. The higher value trees, such as walnut, can become so overtopped by less desirable trees that we might lose them as possible crop trees. If thinning is overdue, possible crop trees can become tall and spindly; then when they are released, they cannot support their own top, and they droop over and become useless as crop trees. If thinning is done too soon, it is hard to determine which will become the best crop trees, the cost of management is increased by creating an unnecessary thinning, and the benefits derived from the closer spacing in a young planting are reduced. We do the first thinning in most of the plantings we work with between ages twelve and fifteen. This is what we call a pre-commercial thinning, meaning we cannot sell the trees we are killing.

For pre-commercial thinning, trees selected for removal are killed by cutting them down or by ringing them with a chainsaw and squirting a small amount of undiluted glyphosate in the cut, the latter is usually less costly. We

Figure 1. Young mixed hardwood plantation (photo by Lenny Farlee). The pines are planted in alternate rows and will be cut out in a thinning.

Figure 2. Older mixed hardwood stand (photo by Ron Rathfon).

cont'd on page 8

Thinning Mixed Hardwood Plantings *(cont'd from page 7)*

leave all dead trees where they lie to reduce costs, to slow down deer movements, to reduce damage to crop trees, and to contribute to nutrient recycling.

We have done several thousand acres of these thinnings over the last 15 years, and I have found that there is a lot of variability from one planting to the next, which is why I thin using crop tree release as my guiding principle. I look for a good crop tree on what would average out to a 20 by 20 foot spacing and kill trees to make sure the crop tree has room to grow its crown on three sides. That works out to 100 released crop trees per acre. A planting with 100 crop trees per acre is ready for an income producing commercial thinning when the crop trees average 14" DBH, which takes about 32 to 35 years on most sites in northern Indiana.

By the time of the second precommercial thinning these mixed hardwood plantings have mostly lost their plantation like nature and have an understory of native woodland plants and natural regeneration. We manage them with the idea that we have a forest and will not need or want to have a clear-cut type harvest and start over like they do in some timber types. We try to design tree plantings so that there is need for only one precommercial thinning, but it is common to need two precommercial thinnings because we do not have pulp, pole, or chip markets in our work area.

Over the years we have planted many hardwood and white pine mixtures, using the pine as a nurse crop. In most cases the pine are overtopped by the hardwoods by year 20 and do not need to be thinned from the stand. Sometimes, usually the result of deer browse, the pine will overtop more desirable hardwoods and need to be thinned from the planting.

Thinning often includes dealing with many naturally regenerated trees along with the planted trees. We sometimes select these trees as crop trees. Knowing which trees to select as crop trees requires a strong knowledge of the site, local timber markets, ownership objectives, silviculture, and some good guess work about future markets and risk factors to trees.

Figure 3. This plantation has been thinned, as evidenced by the gaps between trees, but is in need of additional thinning.

Bruce Wakeland is a consultant forester with 43 years of professional experience in Indiana

When Smoke Gets in Their Eyes!

By Mike Warner

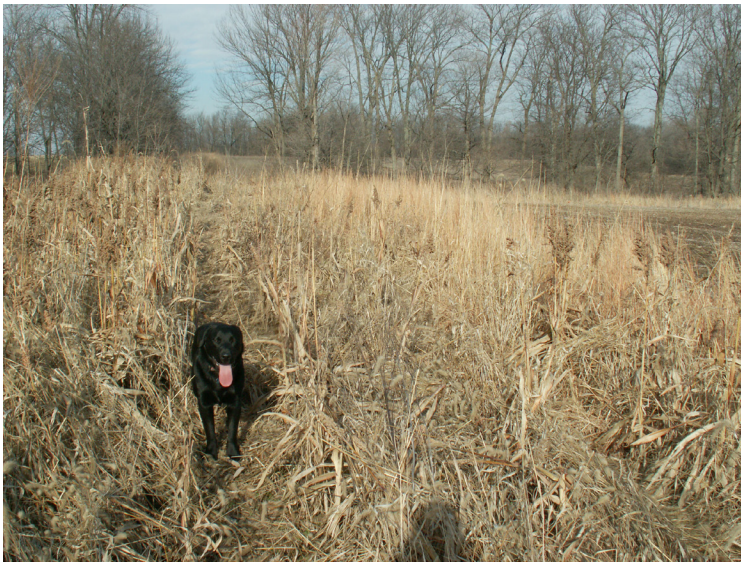
Every spring beginning in April my phone begins to ring with requests from applicators and from landowners both to help them evaluate impacts from herbicide drift on offsite trees and shrubs. In most cases everyone involved are not happy people. I want to share with you some of my first hand consulting experiences as examples of offsite damages and situations. Second, will provide some tips you might consider doing before work begins this spring to reduce the opportunity of offsite damages and suggestions to help minimize exposure risks.

Impacts to trees and shrubs from exposure to 2,4-D and or dicamba is a situation I run across. Some common symptoms I see are:

- Young seedlings or stressed trees are particularly vulnerable and die off.
- Larger established trees are rarely killed.
- Aborts fruit and nut set.
- New bud set and maturation is interrupted. This can carry over into the next year depending on timing.
- Shortens internodal growth.
- Reduces aesthetic values.
- Contributes to, or accelerates, decline of already stressed trees.
- Reduces annual growth of timber trees?

The value of these impacts depends on which side of the fence you are sitting on! Words like fairness, retribution, payback, penalties, apologies, be realistic, and more begin to be bantered about. Most of my calls are related to situations where 2,4-D or dicamba has volatilized (changed from a liquid to a gas) and has moved off site. You can visualize a volatilized herbicide like "Second Hand Smoke!" Volatilized herbicides are:

- Easily Moved By Wind in many directions
- Trapped by inversions (calm winds, Hazy skies, Very red sunsets)
- Follows air drainage patterns
- Can be deflected/directed by obstacles (buffer strips, windbreaks, closed ventilation systems)



Like second hand smoke many people just do not like the smell or exposure to it. They react! New products on the horizon will mean a more widespread use of dicamba and 2,4-D products further into the growing season. They may mean greater impacts to non-target trees and shrubs and shortened recovery time as well.

There are several things you can do this growing season and future seasons. Like many problems a little prevention now can save a lot of heartache later. Be proactive and meet with neighbors and discuss what you are doing to minimize exposure risks. Identify high risk crops nearby. Drfitwatch.org is an online registry tool to help pesticide applicators and specialty crop growers communicate more effectively to help prevent and manage drift effects. You can also invest in an anemometer for your spray rig so you can measure wind speed. Plan and install warm season grass buffers adjacent to woodlands and other high risk crops nearby. Lastly, quit smoking and consider other less volatile pest management products.

Mike Warner is a Certified Forester, ACF. He is also the president of ArborTerra Consulting Inc. based in Lizton, Indiana.

Reducing Your Risk: The Firewood Factor

By Liz Jackson

One of the biggest risks to our Indiana woodlands is the threat of invasive forest pests and diseases. This is not a new problem – you know the story of the once great American chestnut and Elm decimated by disease. But with increasing global trade and travel, the number of new forest pest introductions continues to rise. Since 2003 alone, 28 new tree-killing pests have been detected in the country.[1] Figure 1 shows that Indiana is at the higher range of the pest problem.

What is the cost of these pests to our woodlands? Wood-boring insects impose the highest costs. Estimates include $1.7 billion per year in local government expenditures for tree removal and replacement. Property owners also incur $1.5 billion per year in losses for removing trees and reductions in residential property value, not to mention the billions in losses of timber value to the wood products industry.[1, 2] Just as important is the cost to the environment, affecting wildlife, water, recreation and other benefits.

Firewood is Transportation

There are an alarming number of insects that reside within dead and live wood. In a study in Michigan travelers crossing the Mackinac Island Bridge were asked to surrender their firewood and it was inspected by researchers for the presence of bark- and wood-boring insects. Of the 1,045 pieces of firewood examined, live borers were found on 23% of the pieces and another 41% had evidence of previous borer infestation from seven different insect families.[3]

The Michigan study reminds us that there is one important way that people can minimize the risk of introducing pests – DON"T MOVE FIREWOOD. This is a critical means that wood boring insects travel the country. New infestations are more often tied to human movement of wood than any other factor.

"Buy It Where You Burn It"

Indiana Department of Natural Resources (DNR) has implemented firewood rules to minimize the threat to our public lands. You can bring firewood into a state park, reservoir, state forest or state fish and wildlife area if: [4]

- It is kiln-dried scrap lumber.
- It is from your home or other location in Indiana and has the bark removed. (Ideally, 1/2 inch of sapwood beneath the bark will also be removed.)
- It is purchased from a department store, grocery store, gas station, etc. and bears a USDA compliance stamp.
- It is purchased from a local firewood vendor outside the property and has a state compliance stamp with it. To find a list of the vendors who have a state compliance agreement, see http://www.in.gov/dnr/entomolo/files/ep-CA_firewood.pdf.
- It is purchased from the property campstore or on-site firewood vendor and has a state compliance stamp.

If you have questions about the state's firewood rules, contact firewood@dnr.IN.gov.

What About Private Property?

There are no universal state or federal regulations governing the movement of firewood on private property but quarantines exist for specific pests. In Indiana due to Emerald Ash Borer hardwood firewood cannot be moved from quarantined areas to non-quarantined areas, but can be moved within quarantined areas. Other pests in other states have led to firewood restrictions there as well. But firewood quarantines are ever-changing and hard to keep up with. For the sake of our public and private woodlands it is in our best interest to adopt practices to reduce our risk.

DONTMOVEFIREWOOD.org

The website www.dontmovefirewood.org has recommendations:

- Buy firewood near where you will burn it- a good rule of thumb is only using wood that was cut within 50 miles of where you'll have your fire.
- Wood that looks clean and healthy can still have tiny insect eggs, or microscopic fungi spores, that will start a new and deadly infestation. Always leave it at home, even if you think the firewood looks fine.
- Aged or seasoned wood is still not safe. Just because it is dry doesn't mean that bugs can't crawl onto it!
- Tell your friends not to bring wood with them- everyone needs to know that they should not move firewood.

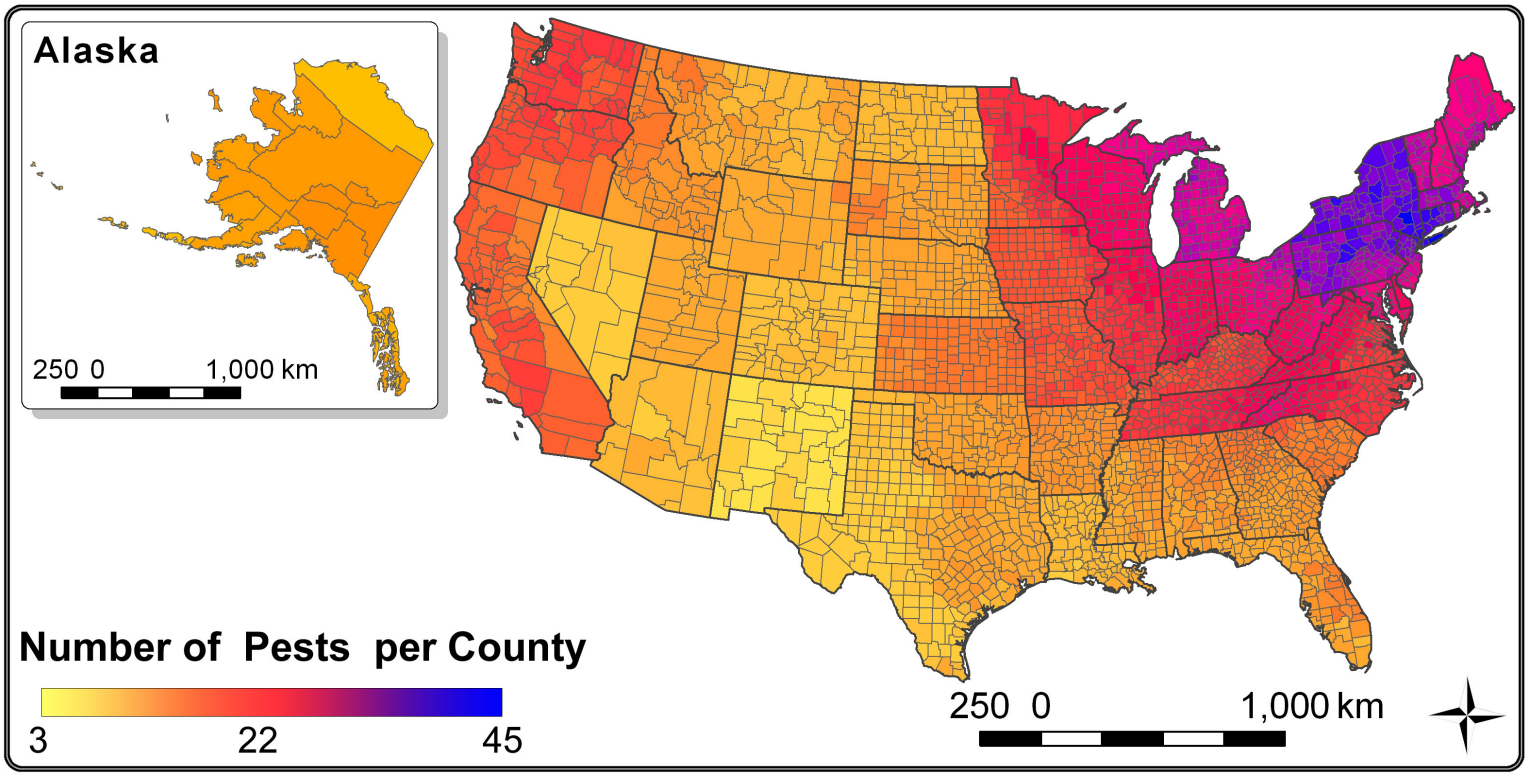


Figure 1. Number of non-native pests found by county (reprinted with permission from A. Liebhold). [5]

The Future

Some of the most concerning pests have not yet reached Indiana. For example, Gold spotted oak borer and sudden oak death are causing widespread oak mortality on the West coast and would devastate our oak-dominated Hoosier forests.

Asian long horned beetle (ALB), currently in the Cincinnati area, feeds on over 30 species, including maple. ALB control efforts are extreme and require cutting down all host trees within vicinity of the pest. Clermont County, Ohio alone has removed over 49,000 trees to date.

As quarantines are regularly changing and to minimize the risk to your woodlands of "the next pest" your best bet is to not move firewood to or from your own property, or at a minimum not beyond your township or county. See www.dontmovefirewood.org for more resources.

1. Fading Forest III: American Forests What Choice Will We Make? FT Campbell, SE Schlarbaum, May 2014. http://www.nature.org/ourinitiatives/habitats/forests/fading-forests-3-complete-report.pdf

2. Aukema, J.E., et al. 2011. Economic impacts of non-native forest insects in the continental United States. PLoS One 6(9):e24587.

3. Haack, R.A., et al. Incidence of Bark- and Wood-Boring Insects in Firewood: A Survey at Michigan's Mackinac Bridge. Journal of Economic Entomology 103(5):1682-92.

4. Indiana DNR Firewood Rules, http://www.in.gov/dnr/entomolo/6413.htm. Accessed June 5, 2015.

5. Liebhold, A.M., et al. 2013. A highly aggregated geographical distribution of forest pest invasions in the USA. Diversity and Distributions. (2013) 1-9.

Liz Jackson is the Executive Director of the Indiana Forestry & Woodland Owners Association. IFWOA, www.ifwoa.org, is a nonprofit organization with the goal of promoting good stewardship of Indiana woodlands.

Thousand Cankers Disease and Black Walnut in Indiana

Matthew Ginzel and Bridget Blood, Purdue University

Thousand cankers disease (TCD) is a pest complex that was first detected in New Mexico in 2001 and has caused the widespread death of walnut trees (*Juglans* spp.) throughout the western United States. This disease is caused by a fungus, *Geosmithia morbida*, vectored by a bark beetle, the walnut twig beetle (WTB), *Pityophthorus juglandis*. The pest complex has been detected in Tennessee, Virginia, Pennsylvania, North Carolina, Ohio and Maryland, and threatens black walnut (*Juglans nigra*) in its native range throughout the midwestern and eastern U.S. Although WTB and *G. morbida* have been individually detected in Indiana, neither has been detected in a black walnut tree and no symptomatic tree has been detected and confirmed with TCD in the state. Nevertheless, this disease rapidly spread throughout the western U.S. and its widespread establishment within the native range of black walnut would have serious environmental and economic consequences.

Black walnut plays significant ecological roles in the Eastern deciduous forest as wildlife feed upon the nutrient-rich nutmeat of the walnuts, and the polyphenol-rich leaves serve as a controlling ecological force within soil ecosystems. Black walnut is also valued for timber, veneer, nuts, nursery stock production and ecosystem services. There is approximately 3.4 billion cubic feet of black walnut growing on timber land in the eastern US, with an estimated value of over a half trillion dollars. In Indiana alone, nearly

Figure 1: Canker caused by Geosmithia morbida on black walnut (Photo by T. Stewart)

Figure 2: The weevil species, Stenomimus pallidus (Boheman) from which G. morbida was recovered. Length: 1.5 mm. (Photos kindly provided by G. Powell, West Columbia, SC).

31.5 million walnuts provide ~17.7 million board feet of lumber and veneer each year at a value of $21.4 million.

The walnut twig beetle is the primary vector of *G. morbida* and TCD affects all members of the genus *Juglans*, but black walnut is considered especially susceptible. This pathogen is not systemic and requires a vector to become established. It appears that a high population density of the vector is necessary for *G. morbida* to kill its hosts. In fact, trees often succumb to the disease only after thousands of beetles have colonized them. In the early stages of the disease, small cankers develop around the galleries of colonizing beetles. There are few outward signs of infection apart from the small entrance holes made as colonizing beetles bore through the bark. At this stage, the fungus is often restricted to the cambium, but as the disease progresses, cankers expand into the phloem and outer bark. In the more advanced stages, cankers become more diffuse, causing the tissues to become dark-colored and macerated (Fig. 1). These thousands of cankers under the bark destroy the tree's ability to transport water and nutrients; gradually killing the tree. Trees infected with TCD show signs of general decline including yellowing, wilted or tufted leaves and crown dieback.

In the West, black walnuts are typically killed within two to three years after symptoms (e.g., yellowing and thinning of the leaves) appear, and smaller trees and those growing on poor sites decline more rapidly. Although TCD rapidly spread throughout the West, it is unclear how this disease

will affect forest health in the East. Observations of TCD-affected trees within the native range of black walnut suggest that there may be regional differences in the progression and severity of the disease. In fact, a three-year study conducted in Tennessee and Virginia found that some TCD-symptomatic trees could remain in a quiescent state and even recover from the disease. The progression of the disease appears to be closely linked with environmental stressors; in drought years TCD-symptomatic trees showed symptoms of decline, whereas in years of high precipitation these same trees had new foliage and growth. Purdue University and U. S. Forest Service researchers are currently further assessing the etiology and progression of this disease within the native range of black walnut.

Detection efforts of TCD in the eastern U.S. primarily rely on visual surveys of symptomatic trees and trapping for WTB using a commercially available pheromone lure. In 2011, the U.S. Forest Service, in cooperation with scientists from the University of Missouri and Purdue University, conducted a trap tree survey in Missouri and Indiana. Although no WTB were recovered from Indiana, 435 adults of the weevil, *Stenomimus pallidus* (Fig. 2), were obtained from the main stem samples from 12 sites in Indiana. *G. morbida* was recovered from three individual *S. pallidus* that emerged from two trees growing in a black walnut plantation at Yellowwood State Forest in Brown County, Indiana. The fungus was not detected on any other wood-boring beetles reared from this site or on any beetles from other sites in Indiana. This is the first report of *G. morbida* from Indiana, and the first report of the fungus from an insect other than WTB. Although the pathogen responsible for TCD is present at the site, the trees are asymptomatic at this time. Moreover, the low frequency of occurrence of *G. morbida* on *S. pallidus* suggests at least a very casual relationship between the fungus and this beetle. Moreover, the low population density of *S. pallidus* suggests that it may not be capable of vectoring enough of the pathogen to affect tree health.

In response to these findings, the DNR Division of Entomology & Plant Pathology intensified surveillance for WTB and *G. morbida* across Indiana and in counties bordering Butler County, Ohio, where TCD has been recently detected. As a result of this effort, WTB was detected in a pheromone-baited trap placed at a sawmill in Franklin County. Additional adult beetles were also discovered upon further inspection of walnut logs and lumber at the site. It is important to note, however, that there are no symptomatic or infested walnut trees at the sawmill or anywhere in the county. Walnut material on the property was destroyed to prevent any movement of WTB from the site, and State Entomologist Phil Marshall ordered the mill to be quarantined. Franklin County is not under quarantine and additional surveys around the sawmill and county are ongoing this summer. Also, movement of walnut logs, lumber and other walnut material within Indiana is not restricted; however, there is an external quarantine in place that restricts the transportation of black walnut material into and out of Indiana.

Forest landowners should not harvest their black walnut trees as a result of this detection or the detection of *G. morbida* in Brown County. If you notice a suspicious decline in black walnut trees or otherwise suspect an infestation of TCD, call the DNR toll-free at 1-866-663-9684. If approached by someone offering to remove black walnut trees because of the disease, notify the DNR or a consulting forester to have the tree evaluated.

Ask the Steward

By Dan Ernst

Question: Many years ago I planted Autumn olive as a recommended wildlife shrub. Now it has spread and I'm told it is an undesirable invasive species. Which is correct?

Answer: You are correct on both counts. In the 1970's Autumn olive was touted as both a great wildlife shrub and a plant that could improve soil fertility because of its' nitrogen fixing characteristics. It was recommended by several governmental agencies, conservation and wildlife groups due to its hardiness, heavy flowering and fruit that could serve as an important food source for a variety of wildlife species. The shrub also added structural diversity and habitat benefits. It was not uncommon to see the shrub planted along highways as green corridors that also supplied wildlife benefits. However, by the 1990's it was evident that Autumn olive was prone to spread as seed was dispersed by birds and mammals which had consumed the fruit. Spread first showed up along fence lines and power lines, and then across open fields. Overtime, the shrub has spread to woodland openings, displacing native plants and to a degree affecting tree regeneration.

Today's recommendations are to avoid the planting of Autumn olive and all non-native species. Instead, look at species options that are native to Indiana, and better yet, endemic to your area of the State. As for the removal and control of Autumn olive: It is much easier to deal with the problem when populations are small. Young seedlings can be pulled with some ease in early spring when ground conditions are moist. Larger plants require different methods of control, including 'cut-stump' and 'basal spray' treatments. The cut stump treatment involves cutting near the ground line and then treating the stump with an appropriate herbicide to kill the root system to prevent re-sprouting of the shrub. Foliar spraying can also be effective, but should be applied with care to avoid damage to non-target plants.

Heavy populations in field environments may be best dealt with heavy equipment, such as brush cutters, or small dozer. If at a loss of where to start, I suggest answering these 2 questions: Where is Autumn olive preventing me from achieving by property goals? Where is Autumn olive invading my natural woodlands- especially my priority natural areas?

Good herbicide and control references can be found at http://mnfi.anr.msu.edu/invasive-species/AutumnOliveBCP.pdf , and www.in.gov/dnr/files/Autumn_Olive.pdf

Landowners should take steps to control autumn olive and other invasive plants when they are detected. A few plants now can become a difficult to control infestation similar to this picture. Photo by Chris Evans, Illinois Wildlife Action Plan, Bugwood.org.

Question: I am looking for a friendly seed mix to establish cover on my logging trails and log landing this fall. The simpler-the better. Any suggestions?

Answer: Your timing is pretty good! Late- August to mid-September generally present good fall seeding conditions. The cooler fall temperatures and typically higher soil moisture levels are conducive to good seed germination and will help newly cast seed get a good footing. The key is to get the seed spread, rooted and growing before frosts reduce opportunity for success. Typically the seeding needs to be completed with 4-8 weeks left in the growing season.

The simplest seeding would be to broadcast 2-4 bushels of winter wheat per acre. Use the higher rate if simply broadcasting the seed on top of the soil. However, for improved success press the seed into the ground or cover lightly. A home-made drag behind an ATV or a small cultipacker works well.

There are also good seed mixtures. Here's a simple one for 1 year coverage: Two bushels each of Winter wheat and cereal rye and 15 pounds of annual ryegrass; Add in 15 pounds of perennial ryegrass for a multi-year coverage component.

If wildlife habitat improvement is also a concern and there is at least partial sun, try this mixture: six pounds orchard grass, 4 pounds timothy, 2 pounds alsike clover and 6 pounds red clover. Different parts of this mixture will perform better than others depending on your actual site conditions, but include all the species to be most effective. To improve success, some seeds need to be pressed into the soil.

The rates quoted for these mixtures should be enough to seed 1 acre. A layer of straw mulch may be warranted on sloping ground where there is significant ground disturbance. Fall is just around the corner- get that seeder out and tuned up!

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.

Days Gone By

Farm in southern Indiana circa 1931 (photo by Roy C. Brundage).

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