

The Woodland Steward

Promoting the Wise Use of Indiana's Forest Resources

2018 Indiana Forest Products Price Report and Trend Analysis

By Jeffrey Settle and Chris Gonso

Survey Procedures and Response

Data are collected twice a year, but log prices change constantly. Standard appraisal techniques by those familiar with local market conditions should be used to obtain estimates of current market values for stands of timber or lots of logs. Please note, because of the small number of mills reporting logging costs, “stumpage prices” estimated by deducting the average logging and hauling costs from delivered log prices must be interpreted with extreme caution and are meant to only serve as a guide. Actual stumpage values you may be offered depend on many variables, such as access, terrain, time of year, etc.

Data for this survey were obtained by a direct mail and email survey to a variety of forest-product industries, including sawmills, veneer mills, concentration yards, and independent log buyers. Only firms operating in Indiana were included. The survey was conducted and analyzed by the Indiana DNR Division of Forestry (DoF). The prices reported are for logs delivered to the log yards of the reporting mills or concentration yards. Thus, prices reported may include logs shipped from other states (e.g., black cherry veneer logs from Pennsylvania and New York).

The survey was mailed to 17 firms and emailed to 31 firms. It is estimated these companies produce close to 90% of the state's roundwood production. Electronic reminders, follow-up phone calls and additional mailings encouraged responses.

A total of 21 firms reported some useful data. Five mills reported production of 5 MMBF or greater. Total board-foot production reported for 2017 was 57 MMBF compared to 70 MMBF for 2016, and 42 MMBF for 2015. The largest single-mill production reported was 21 MMBF. These annual levels are not comparable because they do not represent a statistical estimate of total production.

The price statistics by species and grade don't include data from small custom mills, because most do not purchase logs, or they pay a fixed price for all species and grades of pallet-grade logs. They are, however, the primary source of data on the cost of custom sawing and pallet logs. The custom sawing costs reported do not reflect the operating cost of large mills.

This report can be used as an indication of price trends for logs of defined species and qualities. It should not be used for the appraisal of logs or standing timber (stumpage). Stumpage price averages are reported by the Indiana Association of Consulting Foresters in the previous issue of the Indiana Woodland Steward.

Delivered Sawlog Prices

The number of mills reporting delivered sawlog prices was slightly higher than those who reported in the 2017 spring report (Table 1). Sawlog prices for the premium

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Calendar of Events

February 12- April 8

Forest Management for the Private Woodland Owner
Purdue 8-week short course
Muscatatuck National Wildlife Refuge, Jennings County.
Contact 812-689-6511 or osbornda@purdue.edu.

February 12, 2019

Tree Planting Workshop
1-4 PM EST
Rochester, Fulton County
Call 219-843-4827 for details.

February 18 – April 8

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.

February 19

Breakfast with a Forester
8 AM EST
American Table Restaurant, Warsaw

March 7- April 25

Forest Management for the Private Woodland Owner
Purdue 8-week short course
Vermillion County Fairgrounds
Contact Lenny Farlee at 765-494-2153 or lfarlee@purdue.edu.

March 19

Breakfast with a Forester
8 AM EST
Christos Family Dining, Plymouth

March 30

Tristate Woodland Conference
Clifty Falls State Park, Jefferson County
Contact macgowan@purdue.edu or 765-647-3538.

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

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

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Price Report

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species (specifically black walnut and white oak) were up significantly from the 2017 spring report. Black walnut prices were up across all grades by 37%. White oak log prices were up as well by 18% compared to the 2017 spring report. From an overall standpoint, prices were up for every species except softwood (pine and cedar). Overall, across all species and grades, prices were up 19% from the 2017 spring price report.

Premium Species

White oak sawlog prices were up across all grades. Grades #1 and 2 saw the biggest jump, with prices 28% and 20% higher, respectively. Prime log prices were up 14%, while #3 grade logs experienced the smallest increase at almost 4%. White oak sawlog prices were down across all grades. Prime sawlog prices were off 3.5%, grades 1-3 white oak sawlogs were down an average of almost 5%. Demand from overseas buyers for white oak logs is extremely strong. Stave log demand, while steady, is not quite what it was a year ago.

Demand for black walnut sawlogs is strong for the export markets, while demand is steady from domestic buyers. #2 and 3 grade walnut logs saw the largest increase at 38% and 53%, respectively. Overall, walnut log prices across all grades were 37% higher.

Red oak sawlog prices were higher across all grades, compared to the 2017 spring report. Prime sawlog prices were 18% higher while grade #1 and 2 sawlog prices averaged 24% higher. Grade #3 sawlog prices saw the lowest increase of 3%.

Black cherry sawlog prices have probably made the largest turnaround of any hardwood species. This is primarily due to what seems like an unsatisfied demand from China as well as increased demand domestically. Cherry sawlog prices were up across all grades by almost 34%. Grade #2 sawlogs saw the largest increase, at 40%, while #1 grade sawlog prices were 37% higher than what was reported in the 2017 spring report.

Hard maple sawlog prices followed the same trend as the rest of the hardwood species. Prices were higher across all grades by 24%. Prime hard maple logs saw the largest increase at 42%, while the grade sawlog increases were more moderate.

Soft maple sawlog prices were higher across all grades by almost 20%. Prime soft maple logs had the largest increase of 28.5% compared to the 2017 spring report. Grades #1-3 sawlog prices averaged just over 16% higher.

Other Hardwood Species

The emerald ash borer continues its path of destruction across Indiana. Many experts say that within five years there will be few to no ash trees left. Landowners are trying to

Table 1. Prices paid for delivered sawlogs by Indiana sawmills, March 2018.

Species	18-Mar Range (\$/MBF)	No. Responses		Mean		Median		Change (%)	
		17 Mar	18 Mar	17 Mar	18 Mar	17 Mar	18 Mar	Mean	Median
White Ash									
Prime	550-800	5	5	600	700	600	700	16.7	16.7
No. 1	350-710	6	8	420	529	450	550	26	22.2
No. 2	250-440	6	8	314	364	300	400	15.9	33.3
No. 3	150-300	7	7	263	261	275	275	-0.8	0
Beech									
Prime	300-350	6	5	283	318	300	300	12.4	0
No. 1	300-340	4	7	300	306	300	300	2	0
No. 2	250-380	4	8	267	303	300	300	13.5	0
No. 3	250-380	6	8	267	293	300	288	9.7	-4
Cherry									
Prime	600-1000	6	6	650	850	700	850	30.8	21.4
No. 1	500-970	7	9	533	730	500	750	37	50
No. 2	400-610	7	9	370	518	350	500	40	42.9
No. 3	250-400	7	8	250	319	250	300	27.6	20
Hickory									
Prime	450-650	6	6	483	567	500		17.4	-100
No. 1	300-600	7	9	385	451	355		17.1	-100
No. 2	250-550	7	9	294	365	300		24.1	-100
No. 3	150-450	7	8	263	291	275		10.6	-100
Hard Maple									
Prime	550-900	6	6	550	779	600		41.6	-100
No. 1	400-810	7	9	508	618	550		21.7	-100
No. 2	300-600	7	9	375	441	400		17.6	-100
No. 3	200-450	7	8	263	307	275		16.7	-100
Soft Maple									
Prime	400-700	6	6	383	492	400	475	28.5	18.8
No. 1	300-640	7	9	358	418	325	400	16.8	23.1
No. 2	200-400	7	9	270	331	300	350	22.6	16.7
No. 3	150-380	7	8	250	276	275	288	10.4	4.7
White Oak									
Prime	600-1250	6	5	917	1050	900	1200	14.5	33.3
No. 1	500-1040	7	8	617	793	600	800	28.5	33.3
No. 2	350-800	7	8	430	541	450	538	25.8	19.6
No. 3	250-600	7	7	338	350	350	300	3.6	-14.3
Red Oak									
Prime	600-900	6	6	650	767	650	750	18	15.4
No. 1	500-860	7	9	492	631	500	550	28.3	10
No. 2	350-700	7	9	395	476	375	440	20.5	17.3
No. 3	250-500	7	8	325	335	325	313	3.1	-3.7
Tulip Poplar									
Prime	450-550	6	6	517	504	500	500	-2.5	0
No. 1	275-500	7	9	414	414	400	400	0	0
No. 2	230-400	7	8	300	323	300	300	7.7	0
No. 3	200-300	7	7	263	261	275	250	-0.8	-9.1
Black Walnut									
Prime	1200-3000	6	7	1533	1964	1500	2000	28.1	33.3
No. 1	1000-2500	7	9	1125	1434	1100	1400	27.5	27.3
No. 2	450-2250	7	9	775	1072	750	900	38.3	20
No. 3	250-2250	7	8	463	709	500	500	53.1	0
Softwood									
Pine	230-300	6	3	277	260	300	250	-6.1	-16.7
Red cedar	250-600	5	3	650	383	650	300	-41.1	-53.8

Table 2. Prices paid for delivered veneer logs by Indiana mills, March 2018.

Species Grade Log Diam.	18-Mar Range (\$/MBF)	No. Responses		Mean		Median		Change (%)	
		17-Mar	18-Mar	17-Mar	18-Mar	17-Mar	18-Mar	Mean	Median
Black Walnut									
Prime									
12-13	800-5750	3	7	3,333	3,864	3,500	4,000	15.9	14.3
14-15	1200-6000	5	8	4,200	5,056	4,000	5,500	20.4	37.5
16-17	1200-8250	5	8	5,700	6,488	6,000	7,000	13.8	16.7
18-20	2000-10000	4	8	7,875	7,563	8,250	7,750	-4.0	-6.1
21-23	3000-10500	3	5	8,500	8,400	9,000	10,000	-1.2	11.1
24-28	3000-9500	2	2	10,500	6,250	10,500	6,250	-40.5	-40.5
>28	4000-9500	2	2	11,500	6,750	11,500	6,750	-41.3	-41.3
Select									
12-13	500-3500	2	5	2,350	2,600	2,350	3,000	10.6	27.7
14-15	1000-5500	1	5	3,000	3,900	3,000	4,500	30.0	50.0
16-17	1200-7000	1	7	5,000	4,779	5,000	5,500	-4.4	10.0
18-20	1500-9000	1	7	6,000	6,000	6,000	7,000	0.0	16.7
21-23	2000-8000	1	3	7,000	4,833	7,000	4,500	-31.0	-35.7
24-28	3000-9000	1	2	12,000	6,000	12,000	6,000	-50.0	-50.0
>28	4000-9000	1	2	12,000	6,500	12,000	6,500	-45.8	-45.8
White Oak									
Prime									
13-14	350-2600	4	6	1,700	1,933	1,650		13.7	-100.0
15-17	500-3000	7	7	2,557	2,279	2,500		-10.9	-100.0
18-20	600-4500	7	7	2,993	2,950	3,000		-1.4	-100.0
21-23	4000-4500	5	3	3,400	4,167	3,500		22.6	-100.0
24-28	3750-5250	5	4	3,900	4,625	4,000		18.6	-100.0
>28	6000	3	1	4,167	6,000	4,500		44.0	-100.0
Select									
13-14	350-2000	2	3	1,900	1,183	1,900	1,200	-37.7	-36.8
15-17	350-2450	2	3	2,250	1,433	2,250	1,500	-36.3	-33.3
18-20	500-3000	2	3	2,350	1,700	2,350	1,600	-27.7	-31.9
21-23	3500	2	1	2,875	3,500	2,875	3,500	21.7	21.7
24-28	4750	1	1	3,000	4,750	3,000	4,750	58.3	58.3
>28	5500	1	1	3,500	5,500	3,500	5,500	57.1	57.1
Black Cherry									
Prime									
12-13	400-3000	1	2	1,000	1,700	1,000	1,700	70.0	70.0
14-15	400-3500	4	2	3,000	1,950	2,750	1,950	-35.0	-29.1
16-17	600	4	1	3,250	600	2,750	600	-18.5	-78.2
18-20	600	4	1	3,500	600	3,000	600	-83.9	-80.0
21-23	600	2	1	2,400	600	2,400	600	-75.0	-75.0
24-28	0	2	0	2,500	-	2,500	-	-100.0	-100.0
>28	0	1	0	2,000	-	2,000	-	-100.0	-100.0
Select									
12-13	350	1	1	1,000	350	1,000	350	-65.0	-65.0
14-15	350	1	1	1,000	350	1,000	350	-65.0	-65.0
16-17	400	1	1	1,000	400	1,000	400	-60.0	-60.0
18-20	400	1	1	1,000	400	1,000	400	-60.0	-60.0
21-23	400	1	1	1,000	400	1,000	400	-60.0	-60.0
24-28	0	1	0	1,000	-	1,000	-	-100.0	-100.0
>28	0	1	0	1,000	-	1,000	-	-100.0	-100.0
Red Oak									
Prime									
16-17	450-1750	6	4	1,167	1,325	1,150	1,550	13.5	34.8
18-20	600-2000	7	5	1,229	1,490	1,300	1,600	21.2	23.1
21-23	1500-1750	6	2	1,233	1,625	1,300	1,625	31.8	25.0
24-28	1500-1800	3	3	1,100	1,683	1,000	1,750	53.0	75.0
>28	1750	1	1	1,800	1,750	1,800	1,750	-2.8	-2.8
Select									
16-17	300-3250	3	4	1,900	1,663	1,400	1,550	-12.5	10.7
18-20	4550-1600	3	3	2,067	1,183	1,400	1,500	-42.8	7.1
21-23	1500-1600	2	2	1,150	1,550	1,150	1,550	34.8	34.8
24-28	1500-1600	1	2	1,000	1,550	1,000	1,550	55.0	55.0
>28	1600	1	1	1,200	1,600	1,200	1,600	33.3	33.3
Hard Maple									
Prime									
16-20	500-3250	5	5	2,160	2,420	2,000	2,600	12.0	30.0
>20	2500-4000	5	2	2,360	3,250	2,300	3,250	37.7	41.3
Select									
16-20	400	1	1	2,000	400	2,000	400	-80.0	-80.0
>20	0	1	0	2,000	-	2,000	-	-100.0	-100.0
Yellow Poplar									
Prime									
16-20	320-1000	2	4	1,000	668	1,000	675	-33.2	-32.5
>20	320-1000	2	3	1,000	623	1,000	550	-37.7	-45.0
Select									
16-20	2500-3000	0	2	-	2,750	-	2,750	-	-
>20	3000-3250	0	2	-	3,250	-	3,250	-	-

harvest their ash before the quality deteriorates. The export market for ash is still good. Several exporters are looking for 150-plus containers per months to meet their demand. Sawlog prices across all grades averaged 14% higher than during the spring of 2017. Grade #1 sawlogs had the largest increase, 26%. Grade #3 sawlogs were one of only three items that had a price decrease.

Tulip poplar sawlog prices were almost identical to those was reported during the 2017 spring report. Prices were up across all grades by only 1%. Prime and #3 grade sawlog prices were down by 2.5% and 1%, respectfully.

Softwood Logs

The price of pine sawlogs decreased by 6% to \$260 MBF, while red cedar prices were off by a reported 41%. It should be noted that only three producers reported pine and cedar pricing.

Veneer Log Prices

The number of mills reporting veneer-log prices increased slightly from the 2017 spring pricing report (Table 2). Prices were reported by both veneer mills and sawmills. Sawmills resell their veneer-quality logs to veneer mills, exporters, overseas importers and manufacturers. On occasion, sawmills may produce specialty cuts like quarter sawn with the marginal veneer logs. The variation in veneer log pricing is due to mix-veneer mills, sawmills and loggers reporting their values. This difference in values could be reduced if prices were only from veneer manufacturers.

Overall, market comments seem positive. Walnut and white oak continue to be highly sought after, primarily due to a very strong export market. Many veneer-log producers are sold out of both of these species. Whether you support or oppose log exporting, it is a large segment of the log sales. Current more-stringent phytosanitary requirements as well as increased enforcement of those existing rules in China have slowed the log exports, but most in the industry feel this situation will not be drawn out, long term. However, it remains to be seen how China will react to President Trump's tariffs being imposed on China. Pricing remains very competitive from the export (especially China) side. Overseas veneer companies continue to process North American veneer logs. Wood lookalikes of plastic and vinyl as well as the ability to use high-quality 3D images continues to be a major concern for the veneer business. Most consumers would have a hard time distinguishing between the lookalikes and real wood. Those manufacturers can make the plastic and vinyl look exactly like wood but with a cheaper price.

Black walnut and white oak veneer remain in steady to strong demand both domestically and internationally. In addition to the demand from the veneer markets, white oak is still sought after by stave log buyers. Black walnut veneer log prices were

higher for the prime smaller diameter logs. Larger diameter prime veneer-log prices were off as much as 40%. Overall, prices for prime black walnut were 5% lower. The same trend followed for the walnut select-veneer logs. Smaller-diameter veneer-log prices were higher, while the larger diameter log prices were reported to be lower than what was reported in the 2017 spring report. Black walnut veneer-log prices (prime and select) were 9% lower than in the spring of 2017.

White oak prime veneer-log pricing was higher for this report. Prime white oak veneer-log pricing across all diameters was 14% higher, while select white oak veneer log pricing was almost 6% higher. With white oak, the larger diameter prime and select veneer-log pricing saw the biggest increases. Prime white oak veneer logs >28" saw a 44% increase in pricing, while select white oak veneer logs from 21 inches d.b.h. and higher averaged 45% higher than reported in the spring of 2017.

Cherry veneer log markets continue to be very slow. The lion's share of demand for cherry is for common-grade lumber, with China as the main destination, so cherry veneer logs are just not in high demand. Prime cherry veneer log pricing was off by 57%, and the select cherry veneer log pricing was down almost 73%. It is worth noting, however, that only one of two producers provided pricing information for cherry.

Red oak prime veneer-log prices rebounded significantly from those in the 2017 spring report. Prime red oak veneer-log pricing was 17% higher across all diameters, while select red oak veneer log prices were up 13.5% across all diameters. Prime red oak logs in the 24-28 d.b.h. class saw the biggest increase, 53%. Select red oak veneer logs between 24-28 d.b.h. were up 55% from the 2017 spring price report.

Veneer mills again reported significantly lower prices for hard maple. Prime veneer hard maple pricing was down an average 32%. Again, please note that only one to two producers reported pricing for hard maple veneer logs.

Miscellaneous Products

The change in prices paid for or received for various raw-wood products between the spring 2017 report and the current report are shown in Table 3. These are lower-quality and sometimes smaller logs purchased in batches of random

Table 3. Prices of miscellaneous products reported by Indiana mills, March 2018, free on board (fob) the producing mill.

	No. Responses	Range 18-Mar	Mean 17-Mar	Mean 18-Mar	Median 17-Mar	Median 18-Mar
Pallet logs, \$/MBF	9	250-430	291	324	290	320
Pallet logs, \$/ton	4	45-400	36	211	36	200
Pulpwood, \$/ton	3	13-40	0	31	0	40
Pulp chips, \$/ton	6	12-60	23	31	22.5	29
Sawdust, \$/ton	3	4-20	16	11	15.6	10
Sawdust, \$/cu. yd.	3	5-12	6	8	4.3	6
Bark, \$/ton	1	6	8	6	8	6
Bark, \$/cu. yd.	5	3-22	9	9	9	6
Mixed, \$/ton	0	0	-	0	-	0
Mixed, \$/cu. yd.	1	4	-	4	-	4

species to be sawn into cants or chipped. The cants are re-sawn into boards used for pallets, blocking, railroad ties or other industrial applications that have a strong market. Some mills restrict purchases to specific species or exclude specific species, depending on the markets they sell to. Low-grade or industrial markets have increased significantly since mid-to late 2017 to the present, and demand for these products is very good. It has been said many times that the pulse of the hardwood market can be measured by the low-grade/ industrial markets. The price for pallet and cant logs per MBF increased by 10%. Only one producer reported pulpwood pricing, \$31/ton. Chip pricing per ton was up 26% from the 2017 spring report's figure, while sawdust pricing per ton was lower. Bark pricing per ton was \$2 lower for this report.

Until about the 1970s, sawdust, chips and bark would have been burned or landfilled by many mills. They now have many more uses. Sawdust can be used to make fuel pellets, burned as a heating source, or used as animal bedding. Wood chips are produced primarily from slabs sawn off of debarked logs and are used in mulch, wood pellets, hog fuel, and animal bedding. The decline in the pulp and paper industry threatens this market. Bark used for landscape mulch is now a large market. In some facilities, all or some portion of these byproducts are used to fire efficient low-emission boilers to heat dry kilns year-round and heat facilities in the winter. Attempts have been made to cogenerate electricity at mills, standalone generating plants, and biofuel facilities. Success has been limited by the low cost of electricity purchased off of the grid, the below-cost price received if sold into the grid, and the high cost to produce biofuels.



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Table 4. Custom costs reported by Indiana mills, March 2018.

	No. Responses	Range 18-Mar	Mean		Median	
			17-Mar	18-Mar	17-Mar	18-Mar
Sawing (\$/MBF)	3	250-350	286	300	275	300
Sawing (\$/hour)	0	0	-	0	-	0
Logging (\$/MBF)	2	250-1500	-	875	-	875
Hauling (\$/MBF)	3	50-250	-	127	-	80
Distance (miles)	4	25-100	40	63	40	63
\$/MBF/mile	0	0	-	0	-	0

Custom Costs

Costs of custom services increased from the spring report in the area of sawing (per/MBF). The high cost of diesel fuel usually plays a large role in logging costs as well as sale layout, topography, access, and costs to close out sales implementing Best Management Practices (BMPs) (Table 4). Custom-sawing costs were reported to be \$300/MBF, an increase from \$286 in the spring of 2017. There were very few surveys returned with logging and hauling costs, and there was a very wide range of pricing that appeared to skew average pricing. That being said, we feel those costs are generally around \$200-\$275 MBF, based on the items first mentioned in this section.

Timber Price Index

The delivered log prices collected in the Indiana Forest Products Price Survey are used to calculate the delivered log

value of typical stands of timber. This provides trend-line information that can be used to monitor long-term prices for timber. The species and log-quality weights used to calculate the index are described in previous editions of this report. The weights are based primarily on the 1967 Forest Survey of Indiana, with changes made to remove basswood, cottonwood, elm, black oak and sycamore in 2014.

The nominal (not deflated) price is a weighted average of the delivered log prices reported in the price survey. The real prices are the nominal prices deflated by the producer price index for finished goods, with 1982 as the base year. The real price series represents the purchasing power of dollars based on a 1982 market basket of finished producer goods. It is this real-price trend that is important for evaluating long-term investments like timber and the log input cost of mills. Receiving a rate of return less than the inflation rate means that the timber owner is losing purchasing power, a negative real rate of return.

Note that each year the previous year's number is recalculated using the producer price index for finished goods for the entire year. The price index used for the current year is the last one reported for the month when the analysis is conducted: April 2018. The index increased slightly from 1.91 for 2017 to 2.00 as of April 2018. Inflation in the 1 to 2 percent range is generally

Continued on page 9

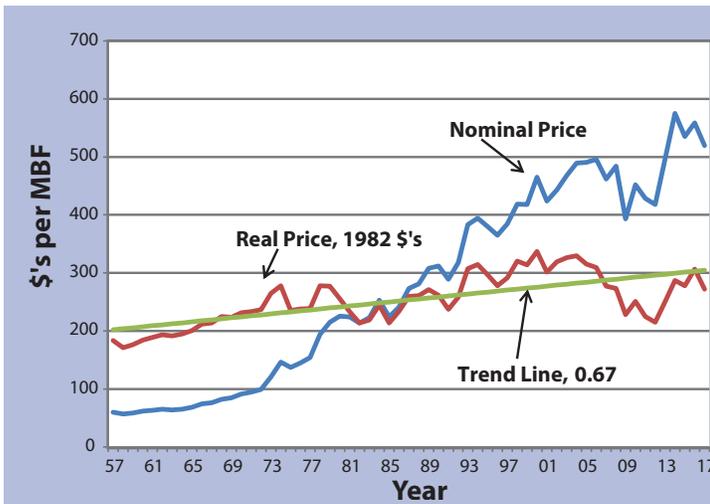


Figure 1. Average stand of timber: nominal, deflated, and trend-line price series, 1957-2018.

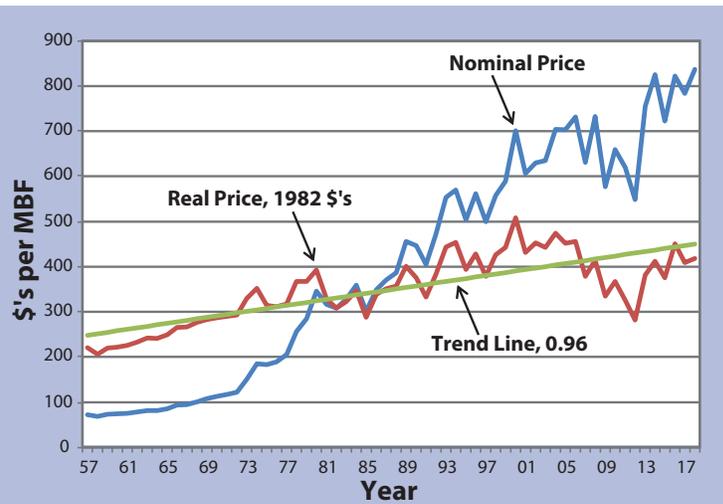


Figure 2. Quality stand of timber: nominal, deflated, and trend-line price series 1957-2018.

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APPLE – Not Just a Fruit Anymore

Fall in Indiana brings many anticipated things—cooler weather, beautiful scenery filled with bright tree leaves, and, best of all, gamebird hunting. Gamebird hunting remains one of Indiana sportsmen's and women's most anticipated adventures. Northern bobwhite quail, ring-necked pheasant, and American woodcock are some of the most prized gamebirds in the United States, and they all call Indiana home. However, due to the loss of grasslands in Indiana, these birds are becoming hard to find. Finding locations that provide opportunities to hunt these prized gamebirds can be even harder.

The DNR Division of Fish & Wildlife offers a new program called Access Program Providing Land Enhancements (or APPLE) to help increase gamebird hunting access. APPLE provides hunting-access opportunities for Northern bobwhite quail, ring-necked pheasant, and American woodcock across five focal regions throughout Indiana (Figure 1). The five focal regions were strategically selected based on areas that have both the greatest need for grassland and pollinator habitats, and the most potential for improvement of grassland habitats and populations of bird species that depend upon them.

Gamebird hunting opportunities are limited and in high demand in Indiana. For example, in 2015, 3,444 individuals applied for special pheasant reserved draw hunts on DNR managed lands in northwest Indiana; however, only 333 hunting opportunities existed for hunters. That equates to a 9.7 percent chance of being selected. Gaining access to private land to hunt gamebirds is often just as difficult.

The APPLE program uses monies collected from the sale of the Indiana Gamebird Habitat Stamp, which hunters must purchase to legally pursue gamebirds in Indiana. Gamebird Habitat Stamp money is then used to provide landowners incentive payments to maintain gamebird habitat and allow access for limited-use gamebird hunting on their property. Ideally, landowners will work with a wildlife biologist to develop a management plan as well as obtain financial assistance to create or enhance habitat on their property. Landowners will then

have the ability to enroll some or all of those acres into APPLE for additional funding after the habitat has been created. For landowners who already possess lands with quality gamebird



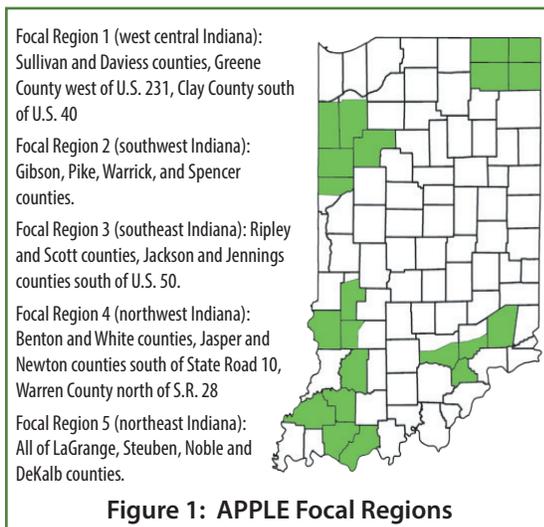
habitat, enrollment in APPLE may be possible before or as further habitat maintenance occurs.

The incentive payments for landowners wanting to enroll property in APPLE

ranges from \$8 an acre to \$25 an acre. Properties intensively managed for gamebirds will receive the higher payment. Biologists will work with landowners to decide hunt dates, designated parking locations, hunter numbers, what portions of the property will be hunted, and any other specifications landowners may have for the property. Liability for all activities on APPLE tracts of land is covered under the state of Indiana Agro-tourism Law (IC 34-31-9). Participating landowners can still hunt and lease their land for species other than those targeted by APPLE. For target species, landowners must forego hunting until after the last reserved hunt date has passed. The minimum acreage size to enroll is 20 acres. Each area enrolled in APPLE will be easily identifiable and posted with an APPLE sign at the designated parking location.

Access to APPLE properties is reserved solely for successfully drawn participants and their hunting partners (up to two) during the specified APPLE hunt dates. Hunters will use the reserve hunt system to apply. All participating hunters must sign a liability waiver before participating in the APPLE hunt, follow all laws and APPLE regulations, and obtain all necessary permits and licenses. All hunters will be restricted to foot traffic only. Hunting hours will be from 9 a.m. – 3 p.m. ET on APPLE hunt dates.

Private lands are important resources for wildlife populations. Since Indiana's land is 96% privately owned, it is private landowners like you who can positively affect gamebird species and help preserve our hunting heritage. If you are interested in learning more about improving wildlife habitat on your property through the APPLE program please contact Jason Wade, North Region Landscape Biologist or Erin Basiger, South Region Landscape Biologist. More information can be found at wildlife.IN.gov/9572.htm.





A Few Beneficial Forest Management Practices (BFMPs) for Bats

By Andrew King

Most people might be surprised to learn that about 20 percent of all mammals in the world are bats (over 1,300 bat species). In the eastern United States, most bats are dependent upon forests for roosting habitat, foraging habitat and reproduction. Despite their success in spreading out across the globe, bats are in trouble locally. Over the past decade, white-nose syndrome (WNS), an introduced fungal disease, has killed millions of bats across the eastern United States and Canada including thousands of bats in Indiana. While the long-term effects of the severe WNS-related population declines remain uncertain, scientists are concerned about potential reductions the roles bats play in insect and pest reduction, as well as nutrient cycling.

What can you do to help? Woodland owners can do several things on their property to maintain and improve habitat for bats and give them a fighting chance. While no individual property is the answer, collectively private woodland owners can make a big difference especially since most of the woods in Indiana are owned by private individuals. The BFMPs outlined below can be performed in almost any woodlot or forest. Together, they will help bats in your area to meet their shelter, food and water needs while benefiting other species of wildlife that call your woodlands home.

- Shelter/Snag management
 - When bats emerge from hibernation each spring, several different species seek shelter for themselves and their pups by roosting under loose pieces of bark and in hollows on standing dead and dying trees (i.e., snags) throughout the summer and into early fall. In addition to snags, live trees with naturally exfoliating bark (e.g., shagbark and shellbark hickory) provide important roosting habitat for



bat as do trees with splits and hollows. Larger snags (>9” dbh) that receive a lot of direct sunlight tend to form the most valuable roost sites for maternity colonies (i.e., large groups of female bats and their pups), which collectively may use dozens of different trees over the course of a summer. For these reasons, woodland owners can benefit bats by leaving high-quality snags (i.e., those most likely to be used by bats) standing for as long as possible or until most of their bark has fallen off. If a snag(s) needs to be felled for firewood or safety reasons, the best time to avoid potential injury to roosting bats would be during the winter months (e.g., Oct. – Mar.) when bats are hibernating in caves and mines. Otherwise, try to avoid felling snags and other potential roost trees during June and July when the mother bats are giving birth to their pups, which can’t fly until a month old.



- Food/Non-native invasive species (NNIS) Management
 - There are many good reasons to control NNIS plants (and insects) in your woods and removing them to benefit bats is just one more. All of the bats in Indiana eat insects as they fly above and below the canopy of forests and woodlands at night. Left uncontrolled, some NNIS plants, such as bush honeysuckle (*Lonicera* spp.), can quickly clutter the understory of a woods, suppress native tree regeneration and physically reduce the amount of unobstructed subcanopy space where many bats prefer

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to forage. Removing NNIS can benefit bats by providing more open/uncluttered foraging habitat and increasing the diversity and abundance of insects (i.e., bat food).



- **Water** – In addition to food and shelter, bats need access to water. In areas lacking nearby streams or ponds (e.g., dry ridgetops), woodland owners can benefit bats and other wildlife by creating a water source such as a pond or ephemeral wetland (see Biebighauser 2003). A small pond can provide a drinking source of water for bats (they drink by skimming the surface of the water while flying) and can benefit them by increasing insect (prey) availability as well. Even a relatively small road rut along a woodland road can provide a source of drinking water for bats.

For additional information...

Beneficial Forest Management Practices for WNS-affected Bats: Voluntary Guidance for Land Managers and Woodland Owners in the Eastern United States.

<https://www.whitenosesyndrome.org/mmedia-education/beneficial-forest-management-practices-for-wns-affected-bats-voluntary-guidance-for-land-managers-and-woodland-owners-in-the-eastern-united-states>

Biebighauser, T.R. 2003. A Guide to Creating Vernal Ponds, USDA Forest Service. 33pp. Accessed on 12/11/2018 at <http://herpcenter.ipfw.edu/outreach/vernalponds/vernalpondguide.pdf>

White-Nose Syndrome – <https://www.whitenosesyndrome.org>

Andy King is an endangered species biologist in the U.S. Fish and Wildlife Service's Indiana Ecological Services Field Office in Bloomington, Indiana. He began working with endangered species over 25 years ago as an environmental consultant conducting and subsequently overseeing field surveys and radio-telemetry studies of federally endangered bats across the eastern U.S.

Price Report

Continued from page 6

considered a sign of a healthy, growing economy. The change from 2017 to 2018 is about 2 percent.

Average Stand

The nominal weighted average price for a stand of average quality increased from \$519.7 in 2017 to \$605.8 this year. Again, this series is based on delivered log prices, not stumpage prices. The deflated, or real price increased from \$271.70 in 2017 to \$302.90 this year. The average annual compound rate of interest required to take the linear trend line from \$201 in 1957 to \$302.90 in 2017 is 0.67 percent (Figure 1).

Quality Stand

The nominal weighted average price for a high-quality stand increased from \$783.3 in 2017 to \$837.2 this year. The average real price series for a high-quality stand increased from \$409.5 in 2017 to \$418.6 this year. The average annual compound rate of increase for the trend line is 0.96% per year (Figure 2).

Implications

The extent to which holding a stand of timber increases purchasing power depends on when you take ownership and when you liquidate. The 62-year period used in this analysis is much longer than the typical length of ownership. The rate of increase in the trend line doesn't include the return resulting from increase in volume per acre by physical growth, nor the potential increase in unit price as trees get larger in diameter and increase in quality. Maximizing these increases in value requires timber management.

Jeffrey Settle is a Forest Resource Information specialist with the Indiana Division of Forestry. Chris Gonso is a Hardwoods Program Manager with the Indiana State Department of Agriculture.

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Wintertime Invasive Plant Attack

By Dan Shaver

As winter sets in across Indiana there are many things that you can do in your woods like cutting firewood, forest stand improvement or even marking boundary lines. An often-overlooked project is controlling invasive plants. Wintertime is a fantastic time to control invasive plants and there are certain ones that are easy to find and control.

Woody Vines:

Photo: T. Bodner, Bugwood.org



Japanese Honeysuckle (*Lonicera japonica*) is a perennial, evergreen vine that can be found climbing over other vegetation or trailing out through the woods. The leaves are opposite, pubescent and oval. It invades into disturbed areas, edges and even forest floors. In the winter, if the temperature climbs up over 50 degrees Fahrenheit you can apply glyphosate at 1.5%

to 3% v/v with ¼ - ½ % non-ionic surfactant if the herbicide does not already contain surfactant and will do an excellent job killing Japanese honeysuckle. This is a wonderful time of year to treat Japanese honeysuckle since it often climbs over native plants which are dormant and not impacted by glyphosate in the winter.

Periwinkle (*Vinca minor*) is an evergreen, somewhat woody, trailing vine that tends to form a dense groundcover. The leaves are opposite, lanceolate and waxy green. The plant can form dense mats and infest open areas and does extremely well in the understory of heavily shaded forests. Vines tend to root at nodes making it hard to pull up by hand. On warm winter days over 50 degrees Fahrenheit you can spray Periwinkle with at 3% v/v mix of glyphosate and water. The leaves are very waxy so make sure the glyphosate you use



Chris Evans, University of Illinois, Bugwood.org

has a surfactant included. If not add ¼ to ½% non-ionic surfactant to help spread out the water and penetrate the waxy surface of the leaf. Garlon 4 (Triclopyr) at 3% v/v can also be used with a surfactant and constant agitation of your backpack sprayer.



Photo: James H. Miller, USDA Forest Service, Bugwood.org

Winter Creeper (*Euonymus fortunei*) is an evergreen shrub and climbing vine that forms a dense groundcover and quickly climbs trees and rocks with clinging aerial roots. The leaves are opposite, thick, dark green or green-white variegated on green stems. This plant can be treated in the winter when the temperature is over 50 degrees Fahrenheit with a 3% v/v solution of glyphosate and water with ¼ to ½% non-ionic surfactant if surfactant is not included in the herbicide. Garlon 4 (Triclopyr) at 3% v/v can also be used with a surfactant and constant agitation of your backpack sprayer. With the waxy leaf the surfactant is critical in getting the herbicide into the leaf. For large vines climbing up trees, you can cut and treat the cut surface with a 50% v/v solution of glyphosate and water.



Photo: Brian MacGowan, Purdue

Woody Shrubs:

If you can identify invasive woody shrubs in the winter it is a great time to kill them. Shrubs such as Bush Honeysuckle (*Lonicera spp.*), Autumn Olive (*Elaeagnus unbellata*), Privet (*Ligustrum japonicum*) and Burning bush (*Euonymus alatus*) are all good targets in the winter especially if you want to try your hand at a basal bark application of herbicide. You can apply Garlon 4 (Triclopyr) at 20% mixed with a basal oil and apply it directly to the lower 8-12 inches of the stem all the way around and down to the root collar. Do not flood the ground around the stem. Start up high and let it run down the stem and spread around. Triclopyr is often sold as Garlon 4 or you can buy Pathfinder II which is a premixed triclopyr and a basal oil. Search the web for these products. Basal bark application of herbicide can be done throughout the winter, even below freezing if there is no snow on the ground.

Controlling some invasive plants in the winter can be enjoyable work without the added stress of the heat and humidity, and spiders and ticks to bug you. Make sure you always read and follow the herbicide label directions and be able to identify your target plants or speak to a local professional before treating the species listed above. Treating these invasive plants in the winter when most of our native plants are dormant is a great way to reduce potential damage to surrounding native plants and start getting a handle on the invasive plants on your property.

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

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Find Out More

You can find more information on the Indiana Chapter of the Association of Consulting Foresters, including membership contact information, answers to FAQs and more at the new website, <http://www.indiana-acf.org/>.



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Winter Tree Identification

By The Nature Conservancy

Learn how all your senses are needed when identifying trees in the winter months.

Regardless of the season or state of the tree's life, basic tree identification usually begins with the easiest question to answer. Is it deciduous or a conifer? Deciduous trees lose their leaves in the fall and grow them back every spring. Conifers, also known as evergreens, maintain their leaves and colors all year round. In the winter, it is obvious which trees are evergreens and which ones are not.

Leaves are by far the easiest way to identify trees. Each category and species of tree has a unique shape and look to their leaves, making it a simple way to identify trees. When using the leaves to identify trees, you have to consider their arrangement on the stem, whether they are simple (a single leaf) or compound (several leaves attached to a midrib) and the overall shape of the leaf. Shape characteristics include: the edges (or margins) and if they are smooth, toothed, or lobed; the length of stems, or petioles; the shape of the tips and bases of leaf; and the surface details - all important in distinguishing a leaf from one species to another.

However, when deciduous trees lose their leaves as winter draws near, this way is no longer an option. When it comes to winter tree identification, knowing the placement of buds, the texture of the bark, and the shape and size of the twigs are the best ways to identify the tree. Your other senses – smell, touch and even taste – may also come into play.

Identifying Deciduous Trees in the Winter

Tree identification always requires a little detective work. In the winter months, identifying trees takes a bit more scrutinizing. Since there are no leaves – on the deciduous trees, that is - it's best to study the twigs, buds, and bark. The following is what to look for:

- Twig markings, such as the bundle and leaf scars, offers information as to how leaves are arranged when present. They can also tell you where the buds grow. Virginia Tech has a great Twig Key that takes you step-by-step in determining what tree your twig came from.
- The shape, size, color, and texture of the buds vary from species to species. Buds bloom into flowers and leaves. Flower buds form in various places and are often much larger than leaf buds. Leaves form as either terminal buds –found at the ends of twigs, or lateral buds - along the sides of twigs. Most buds have protective scales that enclose the leaf tissue. If no scales exist, the buds are

considered “naked.” The number and arrangement of the buds on the twigs are also important.

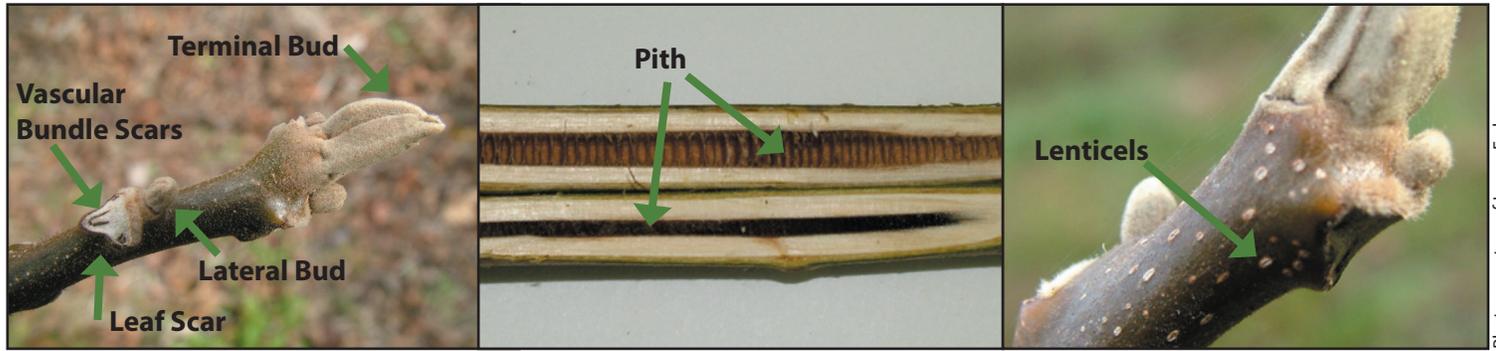
- Look to the branches! All trees have either opposite or alternate branching. Alternate branching means that the twigs and buds grow off a main branch one at a time. Opposite branching is when twigs and buds grow off a main branch in pairs. Ashes, dogwoods, and maples are examples of opposite branching. Examples of alternate branching would be birches, sycamores, and tulip trees.
- Those who are more experienced when it comes to identifying trees may find the answers in the bark. While the bark of a tree changes as it matures and varies by geographical region or growing conditions, it can be an easy way to determine the species of tree. All species' bark has a difference in color, thickness, texture, and pattern. Another way to identify bark types is by feeling the bark with your hands. This will help you remember the bark more quickly than remembering its visual pattern. Feel for hardness and scaliness. Some species tend to peel their bark. For example, shagbark hickory peels vertically in large, thick, curving strips while the paper birch peels horizontally in large strips.

Scratch & sniff! The smell of the inner bark can also help you decipher the tree's identity. In fact, the identity of certain trees can be found just by scratching off a bit of the outer bark and giving it a whiff. For example, the yellow birch smells like wintergreen which is useful when determining what kind of birch you are identifying. Other trees with distinctive scents are Sassafras, which smells spicy and can be quite strong, and wild cherry has a bitter almond scent.

Before setting out in the cold, make sure to bring along a good field guide to assist you in figuring out what is what. There are several guides out there to choose from whether you are a beginner or an experienced forester. Marion T. Jackson's 101 Trees of Indiana is a great guide as is Trees of Indiana Field Guide by Stan Tekiela.

Conifer Tree Identification

Conifer trees are easy to spot in the winter months. Yet, the similar green needles or scale-like leaves found on the various species can be tricky to identify. One way is to feel its foliage; are the needles thin and soft or are they thick and sharp? Noticing how they are bundled is a good clue as well. Cones are another indication. If present, the shape and size will help distinguish from one species to another.



Photos courtesy of Lenny Fairlee

Conifer trees in Indiana include bald cypress, cedar, Douglas-fir, fir, hemlock, juniper, larch, pine, and spruce.

Understanding the Twig

In the winter, the twigs of a tree can hold a lot of answers when identifying trees. Twigs are arranged the same way the leaves are arranged - either opposite from each other or alternately.

- Terminal buds - buds that are found on the tips of a stem or branch.
- Lateral buds - buds that grow on the sides of a twig or branch.
- Bud scales - small leaves that grow around outside of the bud. If there are no scales, the bud is considered “naked.”
- Bud scale scars - tiny dots that can be seen inside the leaf scar after the leaf falls.
- Leaf scars - scars left on the twig after the leaf falls.
- Lenticels - small, lighter colored spots on the back of the twig. They are tiny openings the allow air in & gas out.
- Nodes - leaf bearing joints of the twig
- Pith - the spongy center tissue of the twig.
- Vascular bundle scars - where the xylem entered the leaf and phloem entered the twig.

Get out there and try it!

Below you will find some of our preserves that are perfect for putting your winter tree identification skills to the test! Visit our winter hiking page for additional preserves to hike in the winter and tips for braving the cold.

Big Walnut - This preserve boasts the top-ranked trail in Indiana on trails.com, and you don't have to wait until

summertime to find out why. Its large forest area provides perfect habitat for all kinds of plants and animals. The trail is well-maintained so you don't need to worry about getting lost in the 2,700-acre area. We can't wait to see you out there!

Hitz-Rhodehamel Woods - Imagine experiencing the beauty of Brown County without the crowd. When you visit our Hitz-Rhodehamel Woods preserve, you can enjoy all the things this Southern Indiana woodland has to offer—oaks, pines, eagles, ospreys—peacefully and quietly.

Portland Arch - Portland Arch is the perfect preserve for winter hiking because it offers a rich variety of landscapes—forests, cliffs, open prairies, and spring-seep wetlands. You won't want to miss how beautiful all of these look under a layer of snow and ice. Bring a camera, some snacks, and a few layers. We think you'll want to stay a while.

Pine Hills - This preserve was our chapter's very first project. From the start, we realized just how special it is. As you explore the preserve and all of its woodland glory, be sure to watch your step! The overhanging cliffs and steep backbones are both exquisitely beautiful and potentially dangerous. Come see for yourself why we made this tract of land our first priority over 40 years ago.

Shooting Star Cliffs - Recognized as “the Hoosier Appalachia,” this preserve features a rugged landscape that mesmerizes its visitors. Identifying the various types of flora found in the preserve will surely occupy your mind as you wind through the trail, passing sandstone rock shelters and intermittent creeks. Don't forget to grab a hiking stick- this hilly preserve is not the average flat terrain of Indiana!

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Snags and Cavity Trees

By Dan Shaver and Brian MacGowan

Snags are a valuable component of the forest and play a vital role in the ecosystem. Snags are dead or dying trees, cavity trees are alive or dead trees with open cavities in them. Snags are created naturally in a forest and can range in size from a few inches in diameter to the very largest trees in a woodland. All snags serve a purpose, but larger snags tend to provide more benefits over a longer period. Cavities in live trees occur naturally from broken limbs, defects or damage to a tree. Certain animal species enhance natural cavities for the benefit of themselves and then other species later in the life of a cavity. A live tree with an open active cavity used by wildlife can be a tremendous resource to the forest for many years.

Whether snags are created naturally or through the process of forest management they benefit mammals, birds, amphibians, reptiles, insects, plants, fungi, lichens and bacteria that are all important parts of forest biodiversity. The creation and retention of snags is a key component of any good forest management plan. When scheduling forest management activities such as timber stand improvement, timber harvests or firewood cutting, remember that leaving some cull trees, cavity trees and downed trees or tops on the forest floor will produce many wildlife benefits within your forest. Growing some parts of your forest for longer rotations will encourage the natural development of snags. When creating openings in your forest leave some larger trees within the opening to be deadened to create snags or left alive to produce snags in the future.

How many Snags and Cavity trees do you need?

In many publications you will find a reference to leaving three to eight larger snags (greater than 10 inches diameter at breast height (DBH)) per acre. This number may vary based on the type of forest, condition of the forest, age of the forest or landscape setting. Leaving snags or live cavity trees greater than 20 inches DBH can have increased benefits for many species including bats and owls. Leaving 3 snags per acre is roughly one snag over 10 inches DBH every 120 feet by 120 feet. Ten snags per acre would represent one snag every 66 feet by 66 feet.

When creating snags in your own forest consider the size of the tree, quality, species and location before you create a snag. Snags can be created a number of different ways. If using cutting alone, the key is cutting completely through the cambium layer in each cut. Many landowners do this with a chainsaw, cutting around the tree twice several inches apart (i.e., double girdling) and being sure that the ends of each ring connect. In a similar fashion, an axe can be used to cut a single ring that is several inches wide. Alternatively, you can frill cut the bark with a hatchet and apply an approved herbicide in the wound. The hatchet cuts are made at a downward angle to make a cuplike incision, and spaced several inches apart around the tree. In any of the methods, the tree is weakened at the location of the wound so you can expect the snags to remain standing 2-5 years.

The size of snags should be 10 inches DBH or larger to increase the benefits for wildlife. Don't hesitate to create smaller snags if the work benefits other healthy trees that you want to release and grow. The quality of snag is often viewed more in terms of the quality of the trees. If a tree has natural defects, poor form, or is growing offsite it may have higher value as a snag than as a future timber tree. Certain types of trees will persist as a snag or lose bark slower. These tend to be oaks, hickories, cherry and beeches. Shorter lived species such as aspen, sassafras, elm and maple tend to fall apart quicker and lose their bark sooner. Snags should not be created near homes, building or adjacent to trails where falling branches or trees might injure someone. Snags left in clumps, along edges, or in riparian areas are good choices. Creating some snags that are alone and isolated and some that are in clumps is another way to increase the wildlife diversity using your snags.

Once you have done the work to create 3-10 snags per acre in your woods, take the time to enjoy the wildlife that benefits from your work. A walk in the winter with a pair of binoculars or early spring will reveal many species nesting, foraging, perching, hunting, excavating and enjoying the presence of dead and dying trees in your woods.

Some of the content of this story was adapted from the following resources:
• Kochenderfer, J.D., J.N. Kochenderfer, and G.W. Miller. 2011. Manual Herbicide Application Methods for Managing Vegetation in Appalachian Hardwood Forests. United States Department of Agriculture, Forest Service, Northern Research Station, General Technical Report NRS-96. https://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs96.pdf
• Missouri Department of Conservation. 1985. Management of Snag and Cavity Trees. Habitat Management Series, No. 2.

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Ask the Steward

By Dan Ernst

Question: On a cold, but sunny January day I heard a loud crack in my woods- someone told me it was a tree frost cracking. Is this damaging?

Answer: There is nothing quite like the rifle shot sound of a ‘frost crack’ echoing through the woods on a warming winter day. This cracking most commonly occurs on cold, but sunny winter days. The warm sun heats the bark and wood directly under the bark causing them to expand. Meanwhile the wood deeper in the tree does not expand at the same rate and POW! The tree splits and frost cracking occurs- or reoccurs. Oddly enough the frost and cold does not initiate the initial tree cracking- this usually originates from an old tree wound or poorly healed branch stub. Once a crack occurs it may open and close several times during the year, or even heal over after many years of callus tissue growth. You may have noticed this in your woods. A frost crack appears as a long vertical seam- often on the south or southwest side of the tree- sometimes with a raised strip of callus or scar tissue along the seam. These cracks can allow an entry point for wood decaying fungi, but generally do not require any treatment in a wooded setting.



Question: The logging job on my property just finished up in early December. I'd like to get an early start seeding the log landings this spring. Any suggestions?

Answer: While winter is now upon us, the warming spring is just around the corner and prime seeding season is really not far off. Fresh forest roads, trails, and log landings should

be high on your priority list for stabilization and potential habitat development. Timing, soil chemistry, seed mixtures and seed bed preparation are keys to successful spring plantings—and mother nature’s frost-freeze cycle does much of the work preparing a good seed bed. However, success requires good seed contact with exposed soil. Fifty percent bare soil is a good threshold. While exact timing depends on seed mix and local conditions a good rule of thumb for spring seeding in Indiana is March 15 through May 15. A soil test is recommended to determine lime and fertilization needs. When testing is not practical, but poor fertility is expected a common fall back is 2 tons of agricultural lime and 1,000 pounds of 6-12-12 fertilizer per acre treated. Selecting the desired seeds mix can send your head spinning due to the many choices available. Rule #1: plant nothing invasive. Rule #2: select a mixture to meet your objectives.

While soil stabilization is of primary concern, many plantings can double up and provide good habitat and wildlife forage. A simple annual grass mix of cool season grasses such as annual ryegrass, wheat and oats may be all you need. This temporary cover allows naturally occurring forbs and grasses to grow in after the planted annuals fade. Other options include pollinator mixes, or mixtures more designed for deer and other game species. A web search for ‘conservation cover planting’ will give you many choices and further guidance to meet your objectives. As the spring wanes it may be necessary to lightly cultivate the area prior to planting to insure good conditions for seedling germination and survival.

Whatever your situation and preferences, winter is the time to set your plans in motion. Spring is on the way!

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.

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