

The Woodland Steward

Promoting the Wise Use of Indiana's Forest Resources

2017 Indiana Forest Products Price Report and Trend Analysis

By Jeffrey Settle, Chris Gonso, and Mike Seidl

Survey Procedures and Response

Data is 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 is 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 was obtained by a direct mail survey to a variety of forest product industry 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 Division of Forestry. 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 in from other states (e.g. black cherry veneer logs from Pennsylvania and New York).

The survey was mailed to 21 firms and emailed to 32 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.

Seventeen firms reported some useful data. Eight mills reported producing 1 million board feet (MMBF) or more. Four mills reported production of 5 MMBF or greater. Total board foot production reported for 2016 was 70 MMBF compared to 42 MMBF for 2015, and 64 MMBF for 2014. The largest single mill production reported was 20 MMBF. These annual levels are not comparable since 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 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 Indiana Woodland Steward, <http://www.inwoodlands.org/>.

Delivered Sawlog Prices

The number of mills reporting delivered sawlog prices (Table 1) was about 8% lower than those who reported in the 2016 spring report. Sawlog prices for the premium species (specifically black walnut and white oak) were down slightly from the 2016 spring report. Black walnut prices were down across all sawlog grades 3% while white oak sawlogs were down 4.5%. From an overall standpoint, prices were down for most every other species with

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Calendar of Events

March 1 – April 19

Forest Management for the Private Woodland Owner

6:00 pm – @ 9:00 pm
Johnson Co Extension Office, Franklin
Contact Lenny Farlee: 765 494-2153

March 14

Conservation Happenings in Southern Indiana

9:00 am – 3:00 pm
Muscatatuck National Wildlife Refuge, Seymour
RSVP to 812-522-4352.

March 16 – March 17

Indiana Tree Farm Landowners Field Tour and Clinic

Field tour will be in Montgomery County 1-4 pm, March 16. Clinic at the John S. Wright Forestry Center in Tippecanoe County from 9am-4pm, March 17. Contact kingwalnut@sbcglobal.net.

March 17

2018 Ohio River Valley Woodland and Wildlife Workshop

9:00 am – 3:00 pm
Oasis Conference Center, Loveland, OH
<https://woodlandstewards.osu.edu/>

April 14

Forestry field day

Kosciusko County
Contact Walnut Council at 812-381-3711.

April 14

Family Nature Fest

9:00 am – 12:30 pm
Ferdinand State Forest, Ferdinand

April 14

2018 Annual Wildflower Hike

10:30 am and 12:30 pm starts
Heltonville Elementary School Outdoor Lab, Heltonville
Call 812-203-3033 to register.

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

Continued from page 1

ash, hard maple and soft maple taking the biggest hits. Tulip poplar log prices were very comparable to the spring 2016 data while red oak prices were 5% lower.

Premium Species

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 for stave logs while still good is not what it was a year ago.

Demand for black walnut sawlogs is steady. Overall walnut log pricing decreased 3% from the 2016 spring report. Prime logs showed the largest decrease of 8%.

Black cherry sawlog prices are down around 10% across all log grades although prime and grade 1 log prices were combined to be only about 4% lower while lower grade cherry logs were off an average of 15%. Consumer demand for the darker finished wood continues to hurt the cherry markets. However, there are reports of increased domestic demand for lumber and China continues to buy good volumes of lumber.

Hard maple sawlog prices were down across all grades with prime hard maple logs taking the brunt of the hit at 31%. Grade sawlog prices were off around 10%. Recent reports though point to increased interest in hard maple. The upcoming summer months are usually not a friend of hard maple due to sticker stain concerns. If demand for lumber continues to be good, this combined with seasonally lower production, log prices may see some increases.

Soft maple markets have lost a little luster compared to 2016. Overall, soft maple log prices were off 14% from the spring report. Similar to hard maple, mills may bump up production to be potential stain. Most feel that even with increased production, supply and demand will remain in good balance.

Other Hardwood Species

Landowners continue to have most of their ash marked for harvest to try and stay ahead of the Emerald Ash Borer. Although lumber prices are slightly higher, log prices have decreased just over 14% across all grades since the 2016

Table 1. Prices paid for delivered sawlogs by Indiana sawmills, March 2017.

Species /Grade	No. Responses		Mean (s.e.) ¹		Median		Change (%)	
	17-Mar Range (\$/MBF)	16-Mar	17-Mar	16-Mar	17-Mar	16-Mar	17-Mar	Mean Median
White Ash								
Prime	600	4	3	688	600	700	600	-12.8 -14.3
No. 1	270-500	7	6	486	420	500	450	-13.6 -10
No. 2	220-400	6	5	375	314	375	300	-16.3 -20
No. 3	200-300	5	4	308	263	300	275	-14.6 -8.3
Beech								
Prime	250-300	3	3	333	283	300	300	-15 0
No. 1	300-400	5	5	320	300	300	300	-6.3 0
No. 2	250-400	4	3	313	267	300	300	-14.7 0
No. 3	200-400	5	3	278	267	300	300	-4 0
Cherry								
Prime	550-700	4	3	675	650	650	700	-3.7 7.7
No. 1	400-750	7	6	557	533	550	500	-4.3 -9.1
No. 2	260-600	6	5	427	370	400	350	-13.3 -12.5
No. 3	240-400	5	3	308	250	300	250	-18.8 -16.7
Hickory								
Prime	450-500	4	3	550	483	550	500	-12.2 -9.1
No. 1	350-500	7	6	409	385	400	355	-5.9 -11.3
No. 2	250-320	6	5	337	294	335	300	-12.8 -10.4
No. 3	200-300	5	4	288	263	300	275	-8.7 -8.3
Hard Maple								
Prime	350-700	4	3	800	550	800	600	-31.3 -25
No. 1	400-600	7	6	579	508	550	550	-12.3 0
No. 2	250-450	6	5	425	375	400	400	-11.8 0
No. 3	200-300	5	4	308	263	300	275	-14.6 -8.3
Soft Maple								
Prime	300-450	4	3	513	383	500	400	-25.3 -20
No. 1	300-500	7	6	393	358	350	325	-8.9 -7.1
No. 2	200-300	6	5	317	270	300	300	-14.8 0
No. 3	150 - 300	5	4	276	250	250	275	-9.4 10
White Oak								
Prime	750-1100	4	3	950	917	1000	900	-3.5 -10
No. 1	500-800	7	6	657	617	600	600	-6.1 0
No. 2	300-600	6	5	467	430	450	450	-7.9 0
No. 3	250-400	5	4	340	338	300	350	-0.6 16.7
Red Oak								
Prime	700	4	3	700	650	700	650	-7.1 -7.1
No. 1	425-550	7	6	514	492	500	500	-4.3 0
No. 2	350-450	6	5	404	395	375	375	-2.2 0
No. 3	250-400	5	4	348	325	300	325	-6.6 8.3
Tulip Poplar								
Prime	500-550	4	3	513	517	500	500	0.8 0
No. 1	350-520	7	5	386	414	400	400	7.3 0
No. 2	250-350	6	4	317	300	352	300	-5.4 -7.7
No. 3	200-300	5	4	266	263	250	275	-1.1 10
Black Walnut								
Prime	1500-1600	3	3	1667	1533	1500	1500	-8 0
No. 1	1000-1300	6	6	1133	1125	1100	1100	-0.7 0
No. 2	600-1000	5	6	790	775	800	750	-1.9 -6.3
No. 3	350-500	4	4	475	463	425	500	-2.5 17.6
Softwood								
Pine	230-300	3	3	283	277	300	300	-2.1 0
Red cedar	300-1000	2	2	400	650	400	650	62.5 62.5

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report. Tulip poplar was the only species NOT in the red but not by much. Overall log prices were less than 1% higher from the 2016 spring report.

Softwood Logs

The price of pine sawlogs decreased very little (3%) to \$277 MBF. Red cedar prices showed a significant gain of over 62% to \$650 MBF. It should be noted however that only three producers reported pine sawlog prices and two producers reported red cedar prices.

Veneer Log Prices

The number of mills reporting veneer log prices decreased slightly from the 2016 spring 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 manufactures. On occasion sawmills may produce specialty cuts like quarter sawn with the marginal veneer logs. The variation in veneer log pricing is due to a mix of veneer mills, sawmills and loggers reporting their values. This difference in values could be reduced if prices were only from veneer manufactures.

Market comments seem to be a mixed bag this spring as several report a really up and down marketplace. Walnut and white oak continue to experience good demand. Pricing remains very competitive from the export (especially China) side. The export log market has put a great deal of pressure on veneer mills as the international buyers are paying good prices for veneer logs. Several overseas companies are now buying North American veneer not being manufactured in the US but from companies processing US logs. The increased market share that wood lookalikes of plastic and vinyl is a major concern for the veneer business. Those manufactures can make the plastic and vinyl look exactly like wood with a cheaper price tag.

Black walnut and white oak veneer remain in demand both domestically and internationally. Black walnut veneer log prices were generally higher, especially prime in the larger diameter logs (24" +) which were around 12% higher than in the spring of 2016. Most all of the "select" grade walnut prices were higher. Keep in mind however that there were varied responses for the select grade logs.

White oak prime veneer log pricing was very close to what prices were in the spring of 2016. Prime grade white oak logs with a small end diameter of 15-20 showed the largest increase (almost 7%). Select white oak veneer logs were up significantly across all diameters.

Cherry veneer log markets are very slow and pricing reflected the sluggish markets with prices down significantly. Red oak veneer log prices were down an average of 13%, conversely, red oak select veneer logs were up an average of

Table 2. Prices paid for delivered veneer logs by Indiana mills (March 2017).

Species Grade Log Diam.	17-Mar Range (\$/MBF)	No. Responses		Mean (\$/MBF)		Median (\$/MBF)		Change (%)	
		16-Mar	17-Mar	16-Mar	17-Mar	16-Mar	17-Mar	Mean	Median
Black Walnut									
Prime									
12-13	3000-3500	6	3	3,542	3,333	3,750	3,500	-5.9	-99.1
14-15	3000-6000	6	5	4,333	4,200	4,000	4,000	-3.1	0
16-17	3000-8000	6	5	5,792	5,700	5,750	6,000	-1.6	4.3
18-20	5000-10000	6	4	7,417	7,875	7,250	8,250	6.2	13.8
21-23	4500-12000	5	3	9,300	8,500	10,000	9,000	-8.6	-10
24-28	6000-15000	2	2	9,500	10,500	9,500	10,500	10.5	10.5
>28	8000-15000	2	2	10,000	11,500	10,000	11,500	15	15
Select									
12-13	2200-2500	2	2	2,000	2,350	2,000	2,350	17.5	17.5
14-15	3000	2	1	3,500	3,000	3,500	3,000	-14.3	-14.3
16-17	5000	2	1	4,500	5,000	4,500	5,000	11.1	11.1
18-20	6000	3	1	5,067	6,000	6,000	6,000	18.4	0
21-23	7000	3	1	5,167	7,000	6,000	7,000	35.5	16.7
24-28	12000	3	1	5,667	12,000	6,500	12,000	111.8	84.6
>28	12000	2	1	6,500	12,000	6,500	12,000	84.6	84.6
White Oak									
Prime									
13-14	1200-2300	4	4	1,925	1,700	1,850	2,650	-11.7	-10.8
15-17	2000-3250	4	7	2,400	2,557	2,400	2,500	6.5	4.2
18-20	2000-4000	4	7	2,800	2,993	2,750	3,000	6.9	9.1
21-23	2250-4250	3	5	3,500	3,400	3,500	3,500	-2.9	0
24-28	2500-4500	3	5	4,000	3,900	4,000	4,000	-2.5	0
>28	3000-5000	2	3	4,000	4,167	4,000	4,500	4.2	12.5
Select									
13-14	1200-2600	2	2	1,400	1,900	1,400	1,900	35.7	35.7
15-17	1800-2700	2	2	1,800	2,250	1,800	2,250	25	25
18-20	2000-2700	2	2	2,000	2,350	2,000	2,350	17.5	17.5
21-23	2500-3250	2	2	2,500	2,875	2,500	2,875	15	15
24-28	3000	2	1	2,750	3,000	2,750	3,000	9.1	9.1
>28	3500	2	1	2,750	3,500	2,750	3,500	27.3	27.3
Black Cherry									
Prime									
12-13	1000	2	1	3,000	1,000	3,000	1,000	-66.7	-66.7
14-15	1000-5500	2	4	3,500	3,000	3,500	2,750	-14.3	-21.4
16-17	1000-6500	2	4	4,000	3,250	4,000	2,750	-18.8	-31.3
18-20	1000-7000	2	4	4,500	3,500	4,500	3,000	-22.2	-33.3
21-23	1800-3000	2	2	4,500	2,400	4,500	2,400	-46.7	-46.7
24-28	2000-3000	2	2	5,000	2,500	5,000	2,500	-50	-50
>28	2000	2	1	5,000	2,000	5,000	2,000	-60	-60
Select									
12-13	1000	2	1	2,000	1,000	2,000	1,000	-50	-50
14-15	1000	2	1	2,500	1,000	2,500	1,000	-60	-60
16-17	1000	2	1	3,000	1,000	3,000	1,000	-66.7	-66.7
18-20	1000	2	1	2,500	1,000	3,000	1,000	-60	-66.7
21-23	1000	2	1	3,000	1,000	3,000	1,000	-66.7	-66.7
24-28	1000	2	1	3,000	1,000	3,000	1,000	-66.7	-66.7
>28	1000	2	1	3,000	1,000	3,000	1,000	-66.7	-66.7
Red Oak									
Prime									
16-17	800-1500	5	6	1,460	1,167	1,500	1,150	-20.1	-23.3
18-20	800-1600	5	7	1,460	1,229	1,500	1,300	-15.8	-13.3
21-23	800-1600	4	6	1,450	1,233	1,500	1,300	-15	-13.3
24-28	800-1500	3	3	1,467	1,100	1,600	1,000	-25	-37.5
>28	1800	2	1	1,600	1,800	1,600	1,800	12.5	12.5
Select									
16-17	800-3500	2	3	1,300	1,900	1,300	1,400	46.2	7.7
18-20	800-4000	2	3	1,300	2,067	1,300	1,400	59	7.7
21-23	900-1400	2	2	1,300	1,150	1,300	1,150	-11.5	-11.5
24-28	1000	2	1	1,300	1,000	1,300	1,000	-23.1	-23.1
>28	1200	2	1	1,300	1,200	1,300	1,200	-7.7	-7.7
Hard Maple									
Prime									
16-20	2000-2500	5	5	3,050	2,160	3,250	2,000	-29.2	-38.5
>20	2000-3000	4	5	3,613	2,360	3,850	2,300	-34.7	-40.3
Select									
16-20	2000	2	1	3,000	2,000	3,000	2,000	-33.3	-33.3
>20	2000	2	1	3,500	2,000	3,500	2,000	-42.9	-42.9
Yellow Poplar									
Prime									
16-20	1000	3	2	733	1,000	650	1,000	83.33	0.00
>20	1000	4	2	733	1,000	650	1,000	83.33	0.00
Select									
16-20	N/A	0	0	-	-	-	-	-	-
>20	N/A	0	0	-	-	-	-	-	-

13%. Veneer mills reported significantly lower prices for hard maple. Prime veneer hard maple logs were off almost 32% while select veneer logs were down an average of 27%.

Miscellaneous Products

The change in prices paid for or received for various raw-wood products between the spring 2016 report and the current report. (Table 3). These are lower quality and sometimes smaller logs purchased in batches of random 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. The price for pallet and cant logs increased slightly. Bark prices were consistent with the 2016 spring report while sawdust prices were lower.

Until about the 1970's 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. The decline in the pulp and paper industry is a threat to 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. Success has been limited by the low cost of electricity purchased off of the grid, below cost price received if sold into the grid, and the high cost to produce biofuels.

Table 3. Prices of miscellaneous products reported by Indiana mills, March 2017, free on board (fob) the producing mill.

	No. Responses	Range 17-Mar	Mean		Median	
			16-Mar	17-Mar	16-Mar	17-Mar
Pallet logs, \$/MBF	6	200-390	285	291	300	290
Pallet logs, \$/ton	2	35-37	43	36	43	36
Pulpwood, \$/ton	0	0	35	0	35	0
Pulp chips, \$/ton	6	12-34.4	26	23	27	22.5
Sawdust, \$/ton	4	8-25	22	16	23.7	15.6
Sawdust, \$/cu. yd.	4	2.5-13	10	6	10	4.3
Bark, \$/ton	2	6-10	6	8	6.25	8
Bark, \$/cu. yd.	7	3-23	11	9	5	9
Mixed, \$/ton	0	-	-	-	-	-
Mixed, \$/cu. yd.	0	-	-	-	-	-

Table 4. Custom costs reported by Indiana mills, March 2017.

	No. Responses	Range 17-Mar	Mean		Median	
			16-Mar	17-Mar	16-Mar	17-Mar
Sawing (\$/MBF)	4	195-400	313	286	300	275
Sawing (\$/hour)	0	-	150	-	150	-
Logging (\$/MBF)	0	-	209	-	212	-
Hauling (\$/MBF)	0	-	55	-	55	-
Distance (miles)	2	30-50	50	40	50	40
\$/MBF/mile	0	-	-	-	-	-

Custom Costs

Costs of custom services increased from the spring report in the areas of sawing and logging (per/MBF). The high cost of diesel fuel usually plays a large role in logging costs as well as sale layout and costs to close out sales implementing Best Management Practices (BMPs) (Table 4). There were no surveys returned with logging and hauling costs. However, we feel those costs are generally around \$200-220 MBF.

Indiana 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: March this year. The index increased slightly from 1.83 for 2016 to 1.91 as of March 2017. Inflation in the 1 to 2 percent range is



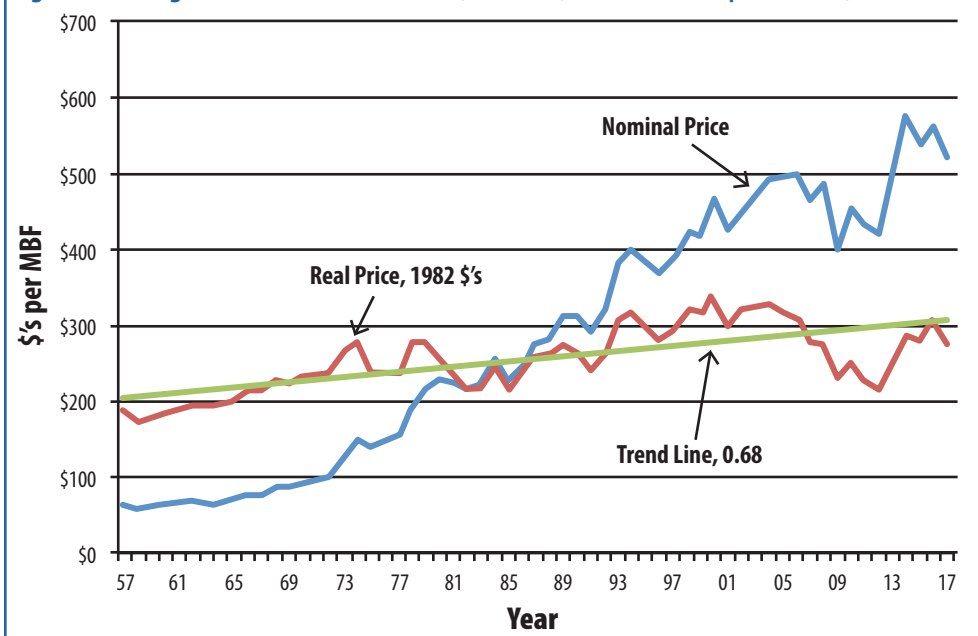
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Figure 1. Average stand of timber: nominal, deflated, and trend-line price series, 1957-2017.



generally considered a sign of a healthy, growing economy. The change from 2016 to 2017 is about 2 percent.

Average Stand

The nominal weighted average price for a stand of average quality decreased from \$559.0 in 2016 to \$519.7 this year. Again, this series is based on delivered log prices, not stumpage prices. The deflated, or real price decreased from \$306.5 in 2016 to \$271.69 this year. The average annual compound rate of interest required to take the linear trend line from \$201 in 1957 to \$271.69 in 2017 is .68 percent; compare the green trend line with the red real price line in Figure 1.

Quality Stand

The nominal weighted average price for a high-quality stand decreased from \$822.7 in 2016 to \$783.3 this year. The average real price series for a high-quality stand decreased from \$451.0 in 2016 to \$409.5 this year. The average annual compound rate of increase for the trend line is 0.98 percent per year (Figure 2).

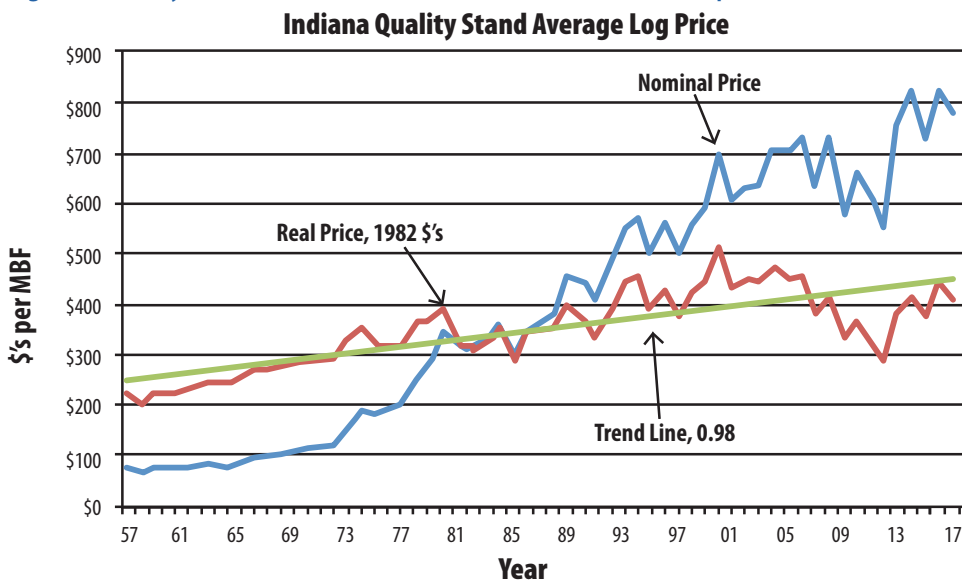
Implications

The extent to which holding a stand of timber increases purchasing power depends on when you take ownership and when you liquidate. The 61-year period used in this analysis is much longer than the typical length of ownership. The rate of increase in the trend line does not 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.

The complete 2016 Indiana Forest Products Price Report and Trend Analysis can be read in its entirety at: <http://www.in.gov/dnr/forestry/>. Previous reports are available online through the Purdue University Library, www.lib.purdue.edu.

Jeffrey Settle, Forest Resource Information (FRI); Chris Gonso, Ecosystem Services Specialist for the Indiana Department of Natural Resources, Division of Forestry; and Mike Seidl, Hardwoods Program Manager for the Indiana State Department of Agriculture

Figure 2. Quality stand of timber: nominal, deflated, and trend-line price series 1957-2017.



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Bourbon – Kentucky’s Aged Spirit

By Chris Will

Kentucky has recently made national headlines for increasingly rare and hard-to-find bottles of bourbon, mysterious whiskey heists and alleged shortages of white oak wood used to make barrels. All this attention has been good for bourbon distillers and the state’s economy. According to the Kentucky Distillers Association, production of bourbon has exceeded one million barrels annually for the past four years, reaching its highest peak since 1970. Record bourbon sales, expansion of bourbon production and a Kentucky bourbon tourism boom have helped the Bluegrass state recover from the economic recession of 2007.

It is the abundance of limestone spring water, high in calcium, that is credited with making Kentucky the premier location for producing aged spirits. The limestone soils and calcified water known for producing superior thoroughbred horses is also why Kentucky produces nearly 95 percent of all bourbon produced.

However, bourbon also benefits from generations of distilling expertise and a unique relationship with the American oak cask in which the spirit is aged. In fact, the freshly distilled whiskey, or “white dog,” is completely clear when it enters the barrel. It emerges as an amber liquid with flavors of caramel and butterscotch as a result of aging in the charred oak barrel for years.

As set forth in a resolution adopted by Congress on May 4, 1964, only whiskey produced in the United States and distilled to no more than 80 percent alcohol by volume (160 proof) from a fermented mash containing a minimum of 51 percent corn and entered into the barrel at not more than 62.5 percent alcohol by volume (125 proof) in charred, new oak containers may be rightfully labeled bourbon. Bourbon has no age requirement, but to be labeled straight bourbon it must be aged two years; in addition, any bourbon aged less than four years must include an age statement on the label.

The recent rise in popularity of bourbon is due to changes adopted by the industry over the past 25 years emphasizing high-quality, small-batch, single-barrel and premium products now commonly produced by the distillers. Back in the mid-1970s, bourbon was having a difficult time competing with the new popularity of wine and “white spirits” such as vodka. Consolidations and corporate takeovers of family-owned distilleries occurred, the emphasis on quality faded and some bourbon distilleries closed down. In the early 1990s, in an attempt to recover its former status among spirits, the bourbon industry updated its marketing strategies, developed premium offerings and incorporated tourism to sell the bourbon experience. However, it was a small, little known brand with a passion for quality that sparked a cult following.

In 1992, the premium bourbon business had been depressed nearly 20 years when Julian Van Winkle III, the grandson of Julian “Pappy” Van Winkle, began releasing his 12 and 15-year-old bourbons under the Old Rip Van Winkle label. In 1995, Julian bottled the first 20-year-old bourbon and named it for his grandfather: Pappy Van Winkle’s Family Reserve. Of the five bourbons and one rye produced by the Van Winkles, the 20-year-old bourbon is considered the best. It has a rating of 99 out of 100, the highest rating ever given to a whiskey by the Beverage Tasting Institute at its World Spirits Championships. Today, a bottle of Pappy can’t be purchased at a local liquor store. Sales are limited to large liquor retailers, and the few bottles that arrive are sold by lottery or prearrangement. The Van Winkle Family




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entered into an agreement with Buffalo Trace to produce the Van Winkle bourbon and rye on May 1, 2002, in order to maintain the principles of the brand and ensure continued production.

By extending the aging period for premium bourbons, distillers are taking advantage of the unique relationship between whiskey and wood that improves the color, aroma and taste of the bourbon in your glass. All distillers agree that the white oak barrel – its construction, position in the warehouse and the amount of time the spirit spends in the barrel – most heavily influences the bourbon. White oak, *Quercus alba*, and Chinkapin oak, *Quercus muehlenbergii*, are the two species most commonly used in tight cooperage or the building of a whiskey barrel. The cells of these white oaks contain tyloses, which are outgrowths on parenchyma cells of the tree's xylem. These cells “dam” up the vascular tissue and it is these clogged pores that prevent a white oak barrel from leaking.

The American White Oak Barrel

The coopering process begins when newly sawn staves are air dried for six months to one year. Some machining, heating and bending is required to fit the 31 to 33 staves into the rings that temporarily hold the barrel together as it is being built. Bourbon barrels are charred on the inside surface according to the distiller's specification. The heat produced during the charring process creates a caramelized layer from the natural sugars present in the wood. These layers are responsible for bourbon's reddish color and caramel and butterscotch flavors. The barrel is finished with hoops hammered into place and heads that seal the bottom and top of the cask. The bung hole is drilled and the barrel is checked for leaks by filling with water. The water-tight barrel is held together without nails, fasteners or glue. As the bourbon ages in the barrel it is absorbed and released into the oak with changes in temperature. The bourbon industry has experienced some growing pains as it has tried to expand its production capacity to meet the rising demand. Over the past several years, articles have begun appearing in *The Wall Street Journal* about a shortage of white oak for making whiskey barrels. Accounts of higher prices for American white oak barrels and claims of unfilled barrel orders have been reported.

The White Oak Supply Chain

As sales of bourbon, rye whiskey and Tennessee whiskey – all products that use new American white oak barrels – increased 35 percent from 2010 to 2014, there was a proportional increase in the demand for white oak stave logs. A stave log is a white oak log of sufficiently high quality to produce clear, fine-grained, quarter sawn planks, called staves, used to make 53 gallon barrels. Log buyers for veneer, stave and lumber logs all compete for a similar quality white oak log. Although the highest quality logs are used in hardwood face veneers and the

lower quality logs are used in appearance grade lumber, there is some overlap that creates competition. Both the grade and price of these logs can vary as demand rises and falls.

White oak stave logs represent a small amount of the total timber harvested in any one timber sale. It is generally less than 10 percent on average in oak-hickory stands. In Kentucky, grade sawtimber used to manufacture appearance lumber for furniture, flooring and millwork still uses the lion's share of the logs produced from the sale of hardwood timber. When housing starts crashed during the recession of 2007, there was virtually no market for 90 percent of the timber on a tract. In fact, hardwood lumber production was at a 50-year low. Although stave log prices remained high, timber was not being sold because overall markets didn't justify the sale.

From 2010 to 2014, there was a significant increase in demand for all forest products. In the short-term, this outpaced the logging industry's ability to respond and caused log price increases for most forest products until supply and demand returned to a balanced state. Cooperage plants and stave mills have upgraded equipment and added additional manufacturing capacity to increase production yields, reduce transportation expenses and minimize overall procurement costs. The shortages experienced are characteristic of adjustments to the supply chain structure for raw materials and less about a shortage of white oak trees.

The USDA Forest Service Forest Inventory and Analysis Unit has deemed white oak an extremely important resource in the forests of Kentucky. Not only does white oak have the greatest volume of all tree species within the state, Kentucky contains 14 percent of the entire white oak resource located within all Southern states. The large volume and large acreage of white oak present on private land makes white oak an extremely valuable forest resource, contributing significantly to the Kentucky economy. In fact, according to the 2015 Kentucky Forestry Economic Impact Report, published by the University of Kentucky Forestry Extension, Kentucky's leading forest product export is white oak barrels, followed by lumber comprised mostly of white oak.

While current inventory numbers look encouraging, concern is developing about the declining quality of the white oak resource. The proportion of select white oak volume found in grade 1 logs has declined from 15 percent in 2004 to 10 percent in 2012, while the volume in belowgrade logs has increased the same amount, from 9 percent to 14 percent. From this data, foresters in the state are speculating that current logging practices and market conditions are encouraging exploitative logging practices which remove only the most valuable trees during the harvest and leave lower grade trees in the woods. Through landowner education efforts, state and extension foresters are encouraging landowners to consult with a

professional forester before harvesting and invest in a forest management plan to improve long-term forest productivity.

Oak Shelterwood Used to Improve Oak Advanced Regeneration

Developing high quality oak forests requires the presence of well-developed oak seedlings and saplings in the forest prior to harvesting the mature timber. In oak dominated stands acorns germinate and oak root systems produce sprouts that are referred to as advanced reproduction. Because they are relatively shade-tolerant at this point in their lives, white oak seedlings and saplings can persist on the forest floor for long periods of time without developing the size or vigor required to become future crop trees. Oak stands on intermediate and high quality sites commonly have well-developed midstories comprised of shade-tolerant species such as sugar maple, American beech and red maple. These conditions lead to light levels on the forest floor that are not sufficient for the development of advanced oak reproduction. If the stand is harvested under these conditions, the small, under-developed oak seedlings and sprouts quickly become over-topped by the other species. By applying the oak shelterwood method and reducing the midstory competition, advanced oak reproduction grows and develops into high quality saplings capable of developing into crop trees.

Specific conditions must be present for this silvicultural practice to be successful. When conducting forest inventories for forest management plans, identify stands that are well suited to apply the oak shelterwood method.

To be a good candidate for this procedure, the stand's site index should be intermediate to high, typically greater than 65 feet for upland oak at age 50. When site indices drop below 65 feet, oaks are capable of natural regeneration without assistance. The forest canopy should be comprised of dominant and codominant oaks and the stand should be within 10 to 15 years of maturity. In addition, oak seedlings must be present on the forest floor. A white oak forest will accumulate oak regeneration over time from acorn germination and root sprouting. This advanced reproduction will occur in patches and the seedlings and saplings will be present in different stages of development. If oak seedlings are not present in sufficient numbers, scarification to improve acorn germination prior to midstory removal is required. If oak reproduction

is present in the stand with 50 to 100 stems per acre, four feet in height or greater, the stand already contains sufficient advanced oak reproduction and the oak shelterwood method is not required. Research is being conducted on supplementing natural reproduction with planted stock to improve the odds of successful regeneration when adequate natural reproduction can't be obtained in time.

Assessing the condition of the oak seedlings prior to midstory removal is important and requires some practice. The vigor of the advanced oak reproduction describes the seedlings' ability to respond quickly to release and is typically expressed in height, stem diameter and form of the seedling. If a bumper crop of acorns has generated a large number of seedlings that still have apical dominance, then the oak shelterwood method should be applied as soon as possible. If the number of oak seedlings is low or they are extremely small and have lost apical dominance, delay implementing the oak shelterwood practice until the number and vigor of seedlings improve. If germination fails after a mast crop is produced, consider soil scarification or burning the leaf litter. Scarification works best if it is implemented just after a bumper crop of acorns has fallen to the ground and before the leaves fall. Once adequate oak reproduction is present, implement the midstory removal.

The objective of the practice is to remove the competing midstory and understory to provide improved light conditions for advanced oak reproduction and build oak seedling vigor relative to the other competing vegetation. The desired condition is a filtered or diffuse light produced by a tall overstory canopy and few midstory stems that cast dense shade. Typically, this requires removal of approximately 20 percent of the stand's basal area. Begin by treating the smallest stems that can be practically removed and then moving up to larger diameter stems. It is important to leave the dominant and codominant trees in place because too much light can cause negative outcomes. Concentrate on removing overtopped, suppressed and intermediate shade-tolerant trees. Always make the decision to remove trees based on how the absence of that tree will impact the type of light on the forest floor.

Using a herbicide is the most effective way to remove these trees. Cutting shade-tolerant trees without using a herbicide will

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Wild Pigs: Nature's Unwanted House Guest!

By Lee Humberg

A Little Bit of History

We have all seen the movies of horrible roommates or relatives that make life miserable and overstay their welcome. They end up destroying a house, terrorizing friends and family, or worse yet, refuse to leave. Meet the real-world wildlife equivalent. The wild pig (*Sus scrofa*; also referred to as feral swine, wild hog, razorback, Russian boar, and a variety other names) is an extremely destructive invasive species. With an estimated 6 million pigs inhabiting more than 35 states, the damage they inflict can be staggering. Conservative estimates place damage and control costs at 2.5 billion dollars annually.

Unlike the collared peccary (aka javelina, which is not a member of the pig family; Suidae), wild pigs are not native to North America. Wild pigs were originally brought to the continent by explorers as early as the 1500s to serve as a food source for new settlements, many of which were located in the southeastern United States. Over the centuries these pigs escaped or were managed as free-range and multiplied, establishing populations of wild pigs. As more people settled the United States they brought with them domesticated pigs and other native pigs, most notably Eurasian wild pigs (also called Russian Boars). In many parts of the country the Eurasian pigs and wild semi-domesticated populations hybridized and led to more pigs of differing size, shape, and color. This occurred to varying degrees throughout much of the Southeast, Texas and West Coast.

However, during the late 1900's and early 2000's wild pigs began appearing in more northern states (i.e., the Midwest and Northeast). While pig populations had slowly grown and expanded over several centuries in the South and West, many of these more recent pig populations appeared hundreds of miles from nearest known populations. This recent, significant expansion of their range is largely attributed to translocation of animals for recreational hunting interests and escapes from fenced farming/shooting operations, which has been corroborated through multiple legal cases as well as genetic studies.

With the majority of states incurring varying degrees of damage from wild pigs, the need to manage this non-native species was elevated to a national level. Funding to implement a collaborative, national feral swine damage management program came in the form of the 2014 Farm Bill. The overarching goal of the National Feral Swine Damage Management Program is to protect agricultural and natural resources, property, animal health, and human health and safety by managing damage caused by feral swine in the United States and its territories. The national program is led by the United States Department of Agriculture's Animal and Plant Health Inspection Service; however, this is a cooperative effort with other agency partners, tribes, organizations, and local entities that share a common interest in reducing or eliminating problems caused by wild pigs.

The Threats

Wild pigs are known to carry at least 30 viral and bacterial pathogens and many different parasites that can cause disease in humans, pets, livestock, and wildlife. Disease transmission can occur through direct contact with wild pigs, their feces and bodily fluids, contact with contaminated food or water, and the consumption of undercooked, infected wild pig meat.

Pseudorabies (PRV) is one example of a highly impactful disease that could be devastating to domestic livestock should it be transmitted from wild pigs, which are considered the reservoir for this disease in the U.S. Thankfully, the U.S. domestic swine industry is considered PRV free. Similar concern exists for other diseases though. Fortunately, our livestock industries do a good job of preventing the spread of disease, but wildlife and humans are equally susceptible to many diseases carried by wild pigs. Therefore, monitoring and testing of wild pigs for a myriad of diseases is crucial to knowing what threats are out there.

The impact wild pigs have on agricultural crops, natural resources, and property is devastating. Wild pigs could be described as miniature bulldozers. They are built tough, have

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Bourbon – Continued from page 9

lead to sprouting and may create a greater shade problem. Also, herbicides ensure better control over competing vegetation by diminishing their seed banks over time. An injection application has been found to be the most effective and cost-efficient method of removal.

Triclopyr, a herbicide manufactured by Dow under the name of Garlon 3A or Element 3A, is a non-soil active product used in a one-to-one ratio in water and applied at a rate of one injection per one inch of tree diameter measured at DBH. The injection is commonly made with a machete or hatchet and the injection needs only to penetrate the bark and enter the actively growing cambium of the tree. Make the injections at a comfortable height and apply the herbicide to the open injection site. Garlon 3A and Element 3A both carry a label warning that the chemical can cause irreversible eye damage if it gets into the eyes. My preference is to use a machete and spray bottle to avoid chemical splash.

Imazapyr, a herbicide manufactured by BASF and sold under the name of Arsenal Applicators Concentrate (AC), is a foliar and soil active chemical that is absorbed by foliage and translocated into roots, preventing most resprouting. Use an application rate of one injection per three inches of tree diameter measured at DBH. The herbicide mixture for this application is 20 percent in water. Arsenal AC requires less total herbicide, allows faster application rates and the ability to reduce resprouting. Although applicators should always wear personal protective equipment (PPE) regardless of the herbicide applied, Arsenal does not have the same eye damage concerns. Arsenal must be used with care by experienced applicators because overapplication or spills will result in death or damage to non-target trees. Damage to dominant and codominant oak trees has occurred when strict adherence to application requirements was not followed.

Once the midstory competition is eliminated, the oak seedlings grow larger and their root systems gain strength. As the advanced oak reproduction obtains height growth of four to six feet, the large overstory trees are removed in a regeneration harvest. These oak seedlings are now free to grow and a new oak forest has been regenerated.

The Future Of The White Oak and Bourbon Industry

Can Kentucky's forests continue to meet the increasing demand for white oak products? Lately this has become a common topic of discussion whenever Kentucky foresters get together. State government, the distillery industry and

the general public want to know what must be done so Kentucky doesn't exhaust its supply of white oak timber. Although that is an unlikely outcome, this uncommon attention toward the forest products industry may not be all that bad. In fact, it is an opportunity to discuss forestry with a new audience that is suddenly interested in the subject.

Recent forest industry and forestry field tours have included state legislators, distillers and woodland owners with a new appreciation of forest management. The Brown-Forman Corporation is a leading manufacturer of both bourbon and Tennessee whiskey and the only bourbon distiller that makes its own barrels. In their Corporate Responsibility Report, Brown-Forman aims to protect the health of the forests they depend on, particularly the white oak resources used to make barrels in which their spirits are aged.

The interest isn't all local, either. Kentucky is a leading exporter of both new and used white oak barrels to the world's aged spirit industry. Two of the world's most popular aged spirits, Scotch and Irish whiskey, require used bourbon barrels for aging. Recently, consulting forester Patrick Purser of Purser, Tarleton Russell Ltd. Conducted a fact-finding mission in Kentucky for his client, Irish Distillers, Pernod Ricard.

"Irish whiskey production has increased significantly in recent years, leading to concerns about the American white oak pipeline for used bourbon casks. A careful assessment of the American white oak forest resource is necessary to determine its long-term sustainability and to aid in developing solutions where needed," said Purser. "Irish Distillers recognize their responsibility to minimize their environmental impact and are participating in an initiative to lead and contribute to a sustainable food and drink industry in Ireland." Purser attended a white oak sustainability conference, met with a Kentucky barrel stave producer and toured non-industrial private woodlands whose owners are currently applying oak regeneration practices on their forestlands.

The rising popularity of aged-spirits worldwide has presented foresters an interesting opportunity to discuss forest management, white oak and solutions for long-term sustainability of forest products.

Chris Will, ACF, is President of Central Kentucky Forest Management, Inc. The company specializes in forest management plans, timber sales, timber appraisals, expert witness testimony and large scale forest inventories.

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Management of Indiana State Forests— A Letter to Governor Holcomb

By George R. Parker, PhD and Harmon P. Weeks, Jr., PhD

We recently reviewed a letter that you received from several PhDs concerning the Division of Forestry's management of Indiana state forestlands. We have over 30 years of experience doing research on Indiana's forests, including old growth and response of forest biota to timber harvest. The content of their letter provides a distorted view of forest management, and it is disturbing that so many Indiana scientists signed it without thoroughly reviewing the science. Much of what they state is not supported by sound research or is contrary to published research. Let us provide some evidence to support our objections to their letter.

First, we provide a brief history of forest disturbance over the past 200+ years. In 1800 there were about 20 million acres of forest in Indiana. By 1902, of the 3.8 million acres of forest remaining, only 250,080 acres were considered first grade timber. These were forests that probably were being grazed by domestic livestock and burned annually to maintain open under-stories for pasture, but retained a good stand of trees. The remaining second and third grade timber lands were in various stages of recovery from agricultural disturbance. For example, Brown County had 897 acres of first grade timber land out of 48,233 acres of forest remaining in 1902. See the Indiana Department of Statistics, 1901-1902 for county-by-county data.

By 2000, over 5 million acres were in forest across the state, mostly the result of farmland abandonment and transfer to Federal and State agencies for management. Brown County had 179,459 acres of non-farm land, mostly in recovering forest ecosystems. These forests are currently rich in biota and in much better condition than they were in the early 1900s.

This brief history is a testament to the resiliency of eastern hardwood forests after severe disturbance. The recovery of these forests and the reduced fragmentation of the landscape has allowed recovery of many species, such as the white-tailed deer, bobcat, river otter and many others.

Now, let us discuss the points made in their letter. We agree that Indiana forests are composed of a rich mixture of species that provide services to the people of Indiana. Forests are dynamic, responding to a variety of disturbances, but the conditions described due to disease, insects, wind and fire are also present across the forest lands managed with the silvicultural prescriptions currently used by the Division of Forestry. Single tree selection and group selection create

openings for increased sunlight to the forest floor while allowing for standing dead trees and fallen logs. On a reentry interval of 20+ years into managed stands, many trees that die are never harvested. Forests managed for trees 100 to 200 years of age have the same biota as forests not managed.

We agree that the current acres of old-growth are small, because of the extensive forest clearing in the 1800s, but even these stands are not free from past disturbance from livestock and fire. An examination of old-growth forest acreage on public lands, under current management practices, indicates old forests will increase dramatically over the next 50 years. Most of these acres are located within the south-central region of the state where land in state parks, state forests, and the Hoosier National Forest occurs, providing a mixture of different management systems, including areas with no timber harvest. The management programs within the state forests and the Hoosier National Forest are sustainable without devoting more acres to old-growth condition, since biota found in old-growth forests are also present in older managed forests.

Ephemeral openings resulting from timber harvest are not important in forest fragmentation, but are important in providing habitat conditions that allow a broader array of biota to survive across a forested landscape. Long-term survival of Indiana's biota would be better insured by placing more emphasis on maintaining or increasing landscapes with large areas of connected forest.

Many plant species require periodic disturbance to maintain populations across forested landscapes. Plant species present in forest openings respond to the variety of microsites created by the disturbance and include a mix of species from those needing full sunlight to those found in closed canopies. Full sunlight species gradually decline as new tree seedlings and sprouts regrow creating a closed canopy within 5 to 10 years. The closed canopy species present before the harvest remain.

There are two features on the relationships of vertebrates to forests that particularly concern us in their statement. First, several terms are used interchangeably to describe forests – old growth, mature, interior – that are quite different relative to their relationships to species and disturbance factors and lead to inappropriate generalizations. Secondly, practically all of the species comments are flawed and are based on species/

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Contribution Agreements – A New Way to Fight Invasive Plants

By Ray Chattin

About 75 years ago, our nation faced the greatest natural disaster in our history, the “Dust Bowl”. The magnitude and severity of the human and environmental consequences were unprecedented and the national response was massive. In 1937, roughly 17 % of the federal budget was devoted to conservation and the beginnings of our present day conservation partnership was born. The Natural Resources Conservation Service (NRCS), the Indiana Division of Soil Conservation and local Soil and Water Conservation Districts (SWCDs) today constitute one of the greatest and most successful creations of government in our history and has created a legacy that has radically transformed Indiana’s landscape.

I am convinced that Indiana currently faces another natural disaster in the form of non-native invasive plants. In some respects, it promises to have an even more devastating consequence than the Dust Bowl, particularly in terms of our ecology. Biodiversity is the canary in the coal mine for the health of our planet and invasive plants will have a profoundly negative impact due to the displacement of native plant communities on an unprecedented scale. What is at stake is not only the viability and loss of our forests and wood products industry, but the survival of many rare, endangered and even commonplace species of native flora and fauna. The greatest challenge that we, as concerned environmentalists face, is that the presence of this threat is virtually invisible to the untrained eye and the full consequences will not be obvious until it is too late.

The recently inked contribution agreement between SICIM (Southern Indiana Cooperative Invasive Management) and NRCS represents a watershed event and a tremendous opportunity to meaningfully reverse direction in Indiana for the first time. The leadership of NRCS is to be applauded. What Jane Hardisty and her team realize, is that the conservation delivery system now in place, is the

perfect vehicle to effectively begin to address invasive species. It was built on the kind of local leadership, credibility and partnerships that have defined SWCDs and “locally led” incentive-based conservation for generations.

SWCDs can provide the infrastructure and some basic staff support to allow local Cooperative Invasive Species Management Areas (CISMAs) to function. SICIM, through this agreement, can provide the guidance, expertise and limited funding to help get new CISMAs off the ground. Unfortunately, SWCDs are among the most overburdened and underfunded units of local government and what neither they nor SICIM can furnish are the participants, leaders and dollars to provide education, carry out the work load, raise funds, perform landowner assessments, write management plans, hire local resource specialists and simply keep the effort afloat and thriving for the next 75 years. That is where you, the reader, enters the picture.

Over the next 5 years, there will be CISMAs coming to a county near you. They will be asking for public participation and support. If healthy forests, wetlands and wildlife that are diverse and sustainable are consistent with your vision for Indiana’s natural resources, action will be required.

Natural resource stewardship has always been a source of meaning and value in our culture. It is a reflection of the

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habitat relationships from science of 30 years ago. Unlike the “mature forests without disturbance is required for bird species survival” mantra of the 1980’s, research since that time has refined relationships and suggests that a matrix of forest stands of various ages best serves the overall bird community.

In considering forest age in the lower Midwest, it is useless to posit the values of old-growth. Essentially none exists in Indiana or surrounding states, and it all disappeared before any scientific evaluation occurred. Any species dependent on old-growth are no longer extant in the state. Similarly, “interior” is also a term that can be applied to forests of any age and almost any size. Thus, “mature forests” is a state to which we ought to direct our attention/concern. Their vertebrate examples reflect either an ignorance of relationships or a purposeful misrepresentation. We will not offer case-by-case evaluations, but examples including woodpeckers, which do well in highly fragmented landscapes, salamanders that have highly restricted distributions because of specialized habitat requirements, gray foxes, which use variously aged woodlands but feed mainly on cottontails (a brushland species), and Indiana bats, which have been shown to forage around openings and heavily use forest-edges for maternity colonies, likely because of increased thermal options.

The concerns expressed regarding limiting anthropogenic disturbance (logging of any type) are based on a premise that existence of species requiring mature woods is threatened by these disturbances. Early concerns about fragmentation of mature forests revolved around these mature-woods species and subsequent management of public lands featured minimizing fragmentation of mature forests. The resulting minimization of harvesting on federal lands (and to some degree state lands) has had unintended consequences – mature woods related bird species have for the most part done well, but bird species adapted to early successional woodlands (brushlands) have been seriously negatively impacted in much of the eastern U.S., including Indiana. We have two major data sets that give us a picture of bird population changes in Indiana over time – the Breeding Bird Survey (BBS; counts of territorial birds made under the auspices of USFWS) and the Indiana Atlas Program (1/6 of the state was surveyed for breeding species twice, from 1985-1990 and 2005-2011).

Therefore, changes in species abundance over time can be assessed and tested for statistical significance. Atlas data show that for mature woodland species, 1 species (9.1%) significantly declined between the 2 periods, while 5 (55.6%) increased; BBS demonstrated similar trends. For early successional woodland species, 10 (41.7%) declined significantly and 3 (12.5%) increased; again BBS showed similar trends. These Indiana results reflect the pattern in the whole eastern U.S. – the mature woods species are doing well (with a few exceptions – e.g., cerulean warbler), while early successional woodland species are declining substantially. This pattern is almost surely the result of reduced disturbance on forested landscapes.

One further bird example begs to be considered. Numerous studies have demonstrated that species that nest in a mature woods invariably move their fledglings to disturbed areas (usually clearcuts) immediately post-fledging, where they presumably benefit from increased predator protection from dense vegetation, while foraging on the large insect biomass produced by that vegetation. This was first demonstrated for wood thrushes about 20 years ago (as radio transmitters became small enough for these birds to carry). Current research on the HEE (Hardwood Ecosystem Experiment) Project in southern Indiana has documented this phenomenon for several mature-forest nesting species, with the influx of some species reaching the phenomenal category – over 400 worm-eating warblers captured in clearcuts in 1 year.

In summary, we believe great progress has been made in the recovery of Indiana’s forests and current public management programs will insure this recovery continues. The current programs to maintain and increase forest lands that improve connectivity of forested landscapes are very important for the long-term survival of Indiana’s biological diversity.


Sincerely,

George R. Parker, Professor Emeritus of Forest Ecology at Purdue University, and Harmon P. Weeks, Jr., Professor Emeritus of Wildlife Ecology at Purdue University

Editor’s Note: This letter was sent to Governor Holcomb on December 10, 2017. It is published here with permission of the authors. Many letters and information about timber harvesting at Yellowwood State Forests are located at www.in.gov/dnr/forestry/9658.htm.

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Wild Pigs – *Continued from page 10*

a lot of power, are designed to tear up the ground, and are just plain hard to stop. Wild pigs will systematically root up freshly planted seeds, overturn pastures and lawns, damage expensive nursery stock, and overturn woodland soil in search of nature's finest delicacies. While the monetary loss of some of these damages may be calculated, it's the ecological damage that is hard to assign a dollar value to, especially when it may take years or decades for a resource to recover. Natural wetlands, one of our rarest habitats, are preferred locations for wild pigs to create deep wallows, damage streams, and lead to long-term erosion issues. All these impacts have a profound influence on the ecosystem and the other wildlife inhabiting those ecosystems.

What Can Be Done

Fortunately, we have identified the damaging agent (the wild pig) and we know how we got to this point (human interests). The challenge is fixing the problem. We need to remember a few things: 1.) they are a non-native species; 2.) they pose a lot of threats to people, animals, and the environment and; 3.) because of their distribution and population size, especially in

their historical range, it will take a committed effort over a long period of time to get to a manageable level.

In many states the population of wild pigs is relatively low, and the chance for removing them from the landscape is favorable. Several states with wild pigs just 5-10 years ago are now wild pig free with monitoring programs in place to detect any new occurrences. As the range and population levels of wild pigs are reduced, so in turn should their impact (i.e., damage) on other resources. The advantage of having a national program is that resources can be shared and redistributed once states eliminate their respective pig populations.

Additional information about wild pigs and the National Feral Swine Damage Management Program can be found at: <https://www.aphis.usda.gov/aphis/resources/pests-diseases/feral-swine>. If you see signs or hear reports of wild pigs, please call the Indiana Wild Pig Report Hotline at 1-855-386-0370.

Lee Humberg is the Indiana State Director for USDA-APHIS Wildlife Services. The mission of Wildlife Services is to provide Federal leadership and expertise to resolve wildlife conflicts to allow people and wildlife to coexist.

Invasive Plants – *Continued from page 13*

functionality and depth of a people's relationship to the world they inhabit. The collective "we" that makes up present day America still has the opportunity to shape our destiny. Our country has always been able to produce men and women like John Muir, Hugh Hammond Bennet, Aldo Leopold and Rachel Carson who have communicated their natural resource vision in a way that activated, motivated and inspired a sufficient number of individuals to truly make a difference. It is my hope that that spirit can be rekindled.

There are three ways you can help. First you can become an activist and volunteer through your local CISMA. Secondly, you can start educating elected officials at all levels so that the people of Indiana through state and local government can become financial stakeholders. Third, you can provide financial help to SICIM and/or your local CISMA. To get started contact your local Soil and Water Conservation District and ask them how you can get involved. You can find your local Soil and Water Conservation district at <http://wordpress.iaswcd.org/>.

The Contribution Agreement that is in place between NRCS and SICIM will provide \$900,000 to local CISMAs to establish and promote the control of invasive species with educational events, technical assistance to landowners

and promotional and informational publications. These funds will be disbursed over the 5 year life of the agreement. SICIM will need to match the funds provided by NRCS. To our credit, we have thus far received commitments of \$300,000 from the Indiana State Soil Conservation Board using Clean Water Indiana funding, and \$50,000 from the Indiana Association of Soil and Water Conservation Districts. The leadership of SICIM, which is currently all volunteer, have many doors to knock on, and we will. If you can open a door for us, it would be appreciated. If you could open your checkbook for us, it would be a game changer. The clock on this agreement is ticking, and it is vital that we get the revenue pump primed as soon as possible to get key positions outlined in the agreement on the job creating results and building momentum. SICIM's goal is to not leave one dollar of NRCS funding on the table.

This historic agreement was born out of a conviction not only that this was an idea whose time had come, but whose time could not wait any longer. This agreement can be historic in a triumphant way or a tragic way, depending on the response of individuals like yourselves. Hoping that someone else will care is not a viable option. Doing your part is.

Ray Chattin is a SICIM Steering Committee Member.



Soil and Water Conservation District

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Thank you to all the supporting SWCD's. Without your support, many landowners in Indiana would not receive the Woodland Steward Newsletter.

Landowners – If you have not stopped by to visit your local SWCD lately it is well worth the trip. SWCD's can provide you with a wealth of information about invasive species, conservation programs through the Farm Bill, wildlife, soil conservation and many other natural resource related topics. Besides all this information, they are wonderful people that work locally in your county to bring a critical environmental perspective to land use and economic development issue and help develop local solutions to natural resource related problems. Stop in and visit.



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