Kentucky Forest Sector
Economic Contribution Report
2017 - 2018

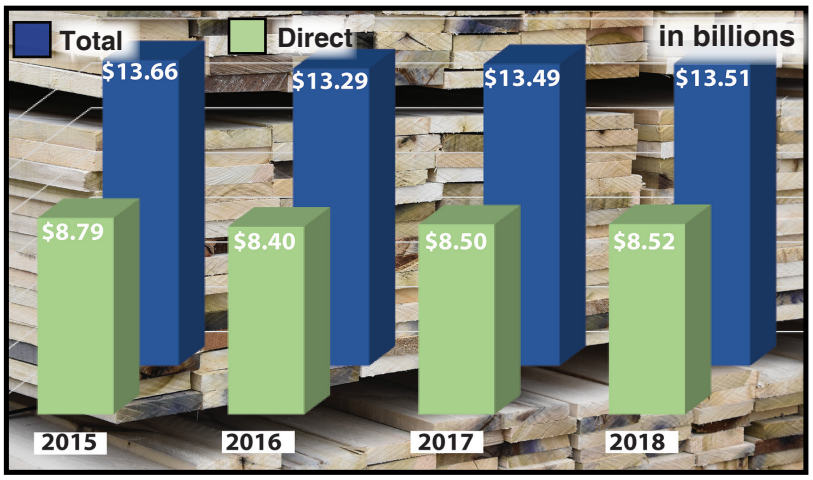
College of Agriculture,
Food and Environment

Forestry and Natural Resources Extension

Annual Forest Sector Economic Contribution Estimates

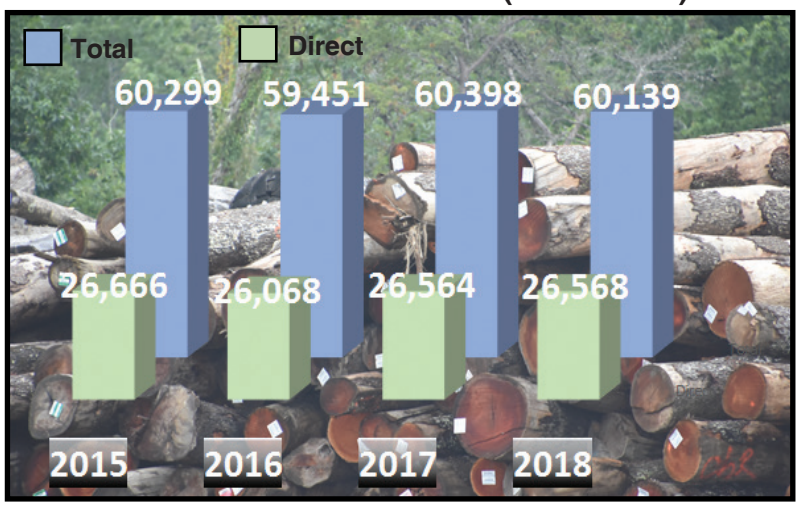
The forests of Kentucky provide countless ecosystem and economic benefits to the Commonwealth. This report estimates the economic contribution of the overall forest sector in both rural and urban areas. Since 2015, the overall Kentucky forest sector has remained stable ranging from $8.4 billion in direct contributions to an estimated $8.79 billion. In 2018 it was $8.52 billion (Figure 1). The total economic contribution ranged from $13.29 billion in total contributions to an estimated $13.66 billion, in 2018 it was $13.51 billion. More than 26,500 people are directly employed in Kentucky's forest sector (Figure 2). When indirect and induced employment is included the total employment numbers swell to over 60,000. Forest sector employees were paid an estimated $1.61 billion in labor wages during 2018.

Figure 1. Kentucky Forest Sector Direct and Total Economic Contribution (2015-2018)



Figures 1 and 2 source: IMPLAN Data for Kentucky and the Kentucky Forest Products Industry Directory

Figure 2. Kentucky Forest Sector Direct and Total Jobs (2015-2018)



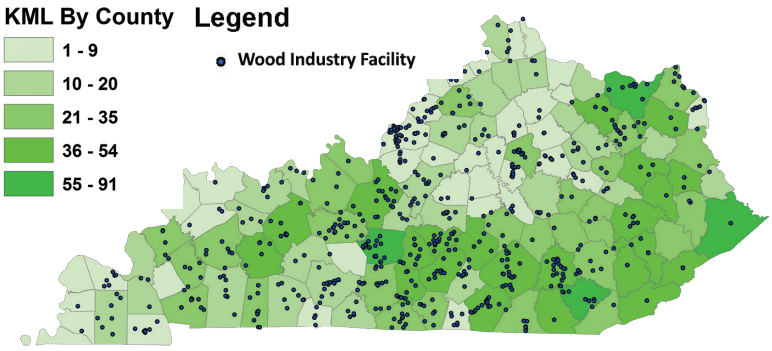
Data and Methodology

This report utilizes a wide variety of data sources to estimate the annual economic contribution of Kentucky's forest sector. Economic contribution estimates were derived from IMPLAN data (2015-2017) and software. IMPLAN is an input-output economic modeling software and data system widely used to estimate economic contributions and impacts. Direct economic contribution refers to the economic activity directly associated with an industry sector. Total economic contribution refers to the complete economic activity associated with an industry sector and includes direct, indirect, and induced effects. The 2017 IMPLAN data was adjusted to provide 2018 estimates based on annual employment from the Kentucky Forest Products Industry Directory maintained by the University of Kentucky, Department of Forestry and Natural Resources Extension and the Kentucky Division of Forestry (KDF). The availability of current employment data in the directory also allowed adjustments of other sources of information. Data from KDF through its Delivered Log and Product Prices is also essential for this report as is the Forest Inventory Analysis provided jointly by KDF and the USDA Forest Service. USDA Foreign Agricultural Service, Kentucky Master Logger Program, and Kentucky Forest Industries Association members also provided data used in this report. For more information please visit http://forestry.ca.uky.edu/economic-report.

2017 Forest Sector Economic Contribution Estimates

Timber harvested from Kentucky's privately-owned forests provide the wood resource that is processed into many useful products used throughout the state and across the world. The economic contribution comes from timber resources in all 120 counties which were harvested by more than 2,500 loggers. The wood was processed at 731 wood, paper, and paper converting manufacturing facilities located in 113 counties (Figure 3). The distribution of these facilities and the more than 26,000 Kentuckians they employ highlights how the $13 billion contribution is an important economic force for both rural and urban communities. Employment and economic contributions for each forest sub-sector are displayed in Figures 4 and 5.

Figure 3. Kentucky Wood Industries and Master Logger Distribution



Source: Kentucky Master Logger Database and Kentucky Forest Products Industry Directory

Direct Employment = 26,564
Total Employment = 60,398

Direct Contribution = $8.5 billion
Total Contribution = $13.5 billion

Figure 4. Direct Employment by Kentucky Forest Sub-Sectors

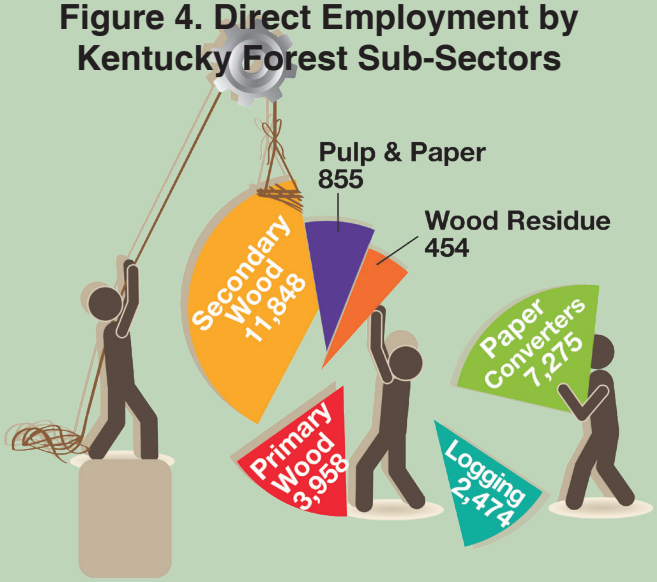
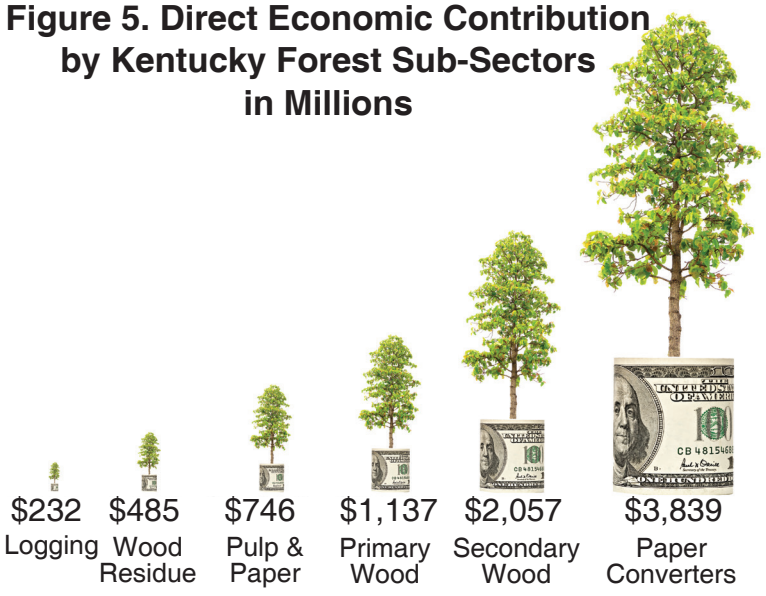


Figure 5. Direct Economic Contribution by Kentucky Forest Sub-Sectors in Millions



2018 Forest Sector Economic Contribution Estimates

To estimate economic contribution in 2018, the 2017 economic data was adjusted based on input from forest industry companies in Kentucky. The biggest estimated change from 2017 was a drop of over 5% for the primary wood manufacturing sub-sector (Table 1). This production drop is due to mills building inventories as a result of diminishing demand for red oak, ash, and other species for export. Exports were impacted by threats of tariffs, full warehouses, and a slowing Chinese economy. Wet weather impacted loggers, log supply, and sawmill output. The revived paper mill in west Kentucky should increase output and employment in the pulp and paper sector.

Table 1. 2018 Kentucky Forest Sector Direct Economic Contribution Estimates

Forest Sub-sector	Millions	% Change from 2017
Logging	$237	+2.16%
Primary Wood Mfg.	$1,075	-5.45%
Secondary Wood Mfg.	$2,098	+1.99%
Pulp and Paper	$746	0.00%
Paper Converters	$3,878	+1.02%
Wood Residue	$480	+.41%

Figures 4, 5 and Table 1 sources: IMPLAN Data for Kentucky and the Kentucky Forest Products Industry Directory

Timber Output and Prices

It is estimated that 731 million board feet of hardwood logs were harvested in Kentucky during 2018. This harvest volume represents a small decline from 2017 harvesting levels and remains less than half the volume grown. Overall, statewide timber prices decreased by approximately 3% for all grades and species combined. Table 2 shows the pricing of various commercially important species during 2018 and how those prices changed from the first half to the last half of the year.

Ash pricing for high quality sawlogs decreased 4.6% from the beginning of 2018 due to decreased export demand and difficulty in finding good ash undamaged by ambrosia beetles. **Cherry** logs dropped in value across all log qualities although occasional markets did pop up regionally with increased pricing. Statewide, high quality cherry sawlogs decreased in value 17.86%, and medium quality decreased 25%. **Chestnut oak** has experienced growing demand and pricing since the end of 2016. There was a statewide decrease of 7.08% for high quality logs from the beginning of 2018 to the end of 2018, medium quality chestnut oak sawlogs increased 8.54% and low quality sawlogs increased 34.51%. **Hickory** dropped in value across all log qualities. **Sugar maple** remained strong through 2018, with only minor price reductions in a few regions and larger reductions for lower grade sawlogs. **Red oak** experienced significant price decreases from the end of 2017 through 2018. Much of this is tied directly to decreased demand and pricing from Chinese export markets. High quality **red maple** logs held relatively firm, but medium and low quality log prices dropped 8-9%. **Walnut** log pricing was mixed with high quality steady, medium quality decreasing 19.4%, and low quality walnut logs prices nearly doubled. **White oak** continues to remain strong due to the multiple uses and demands of the species as well as strong stave and bourbon demand. High and medium quality **yellow-poplar** logs remained relatively flat but low quality logs dropped more than 10% in value.

Table 2. Kentucky Delivered Log Prices in 2018

Species	Quality	2018 1&2 Quarters	2018 3&4 Quarters	% Change
Ash	High	$664	$633	-4.60%
	Medium	$454	$439	-3.20%
	Low	$267	$265	-0.75%
Cherry	High	$840	$690	-17.86%
	Medium	$576	$432	-25.04%
	Low	$286	$249	-12.94%
Chestnut Oak	High	$1,121	$1,042	-7.08%
	Medium	$691	$750	8.54%
	Low	$283	$381	34.51%
Hickory	High	$552	$450	-18.57%
	Medium	$410	$335	-18.29%
	Low	$254	$213	-16.42%
Sugar Maple	High	$840	$816	-2.83%
	Medium	$557	$543	-2.37%
	Low	$295	$264	-10.75%
Red Oak	High	$827	$702	-15.15%
	Medium	$552	$507	-8.17%
	Low	$312	$263	-15.80%
Red Maple	High	$452	$451	-0.22%
	Medium	$368	$339	-7.82%
	Low	$213	$193	-9.41%
Walnut	High	$1,929	$1,925	-0.22%
	Medium	$1,255	$1,011	-19.43%
	Low	$435	$838	92.57%
White Oak	High	$1,183	$1,238	4.58%
	Medium	$691	$743	7.53%
	Low	$315	$320	1.59%
Yellow-poplar	High	$566	$548	-3.09%
	Medium	$377	$377	0%
	Low	$244	$217	-10.97

Staves and Railroad Tie Pricing

Barrel Stave Logs

Stave logs are generally high quality white oak logs that are used to make barrels for the distilling industry. Competition for these logs continues to grow, increasing the value of high and medium quality white oak logs as well. In order to meet this growing demand a number of new log yards have been established to receive stave logs. All markets are averaging over $1.30/bdft (Figure 6 & 7) with some logs worth much less and some worth much more. The market for white oak logs is expected to remain strong in 2019.

Figure 6. Delivered Stave Logs Prices in Kentucky 2011-2018 by Quarter ($/MBF)

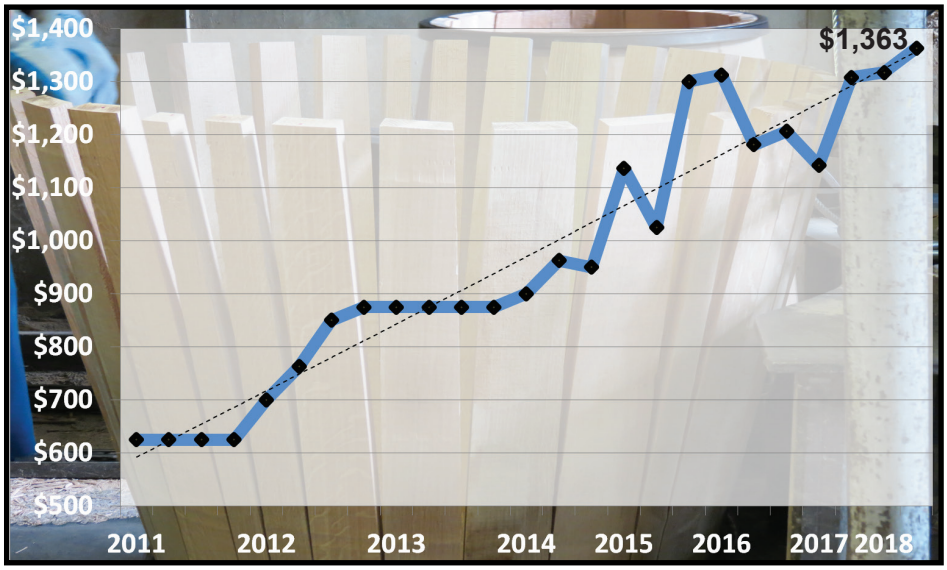
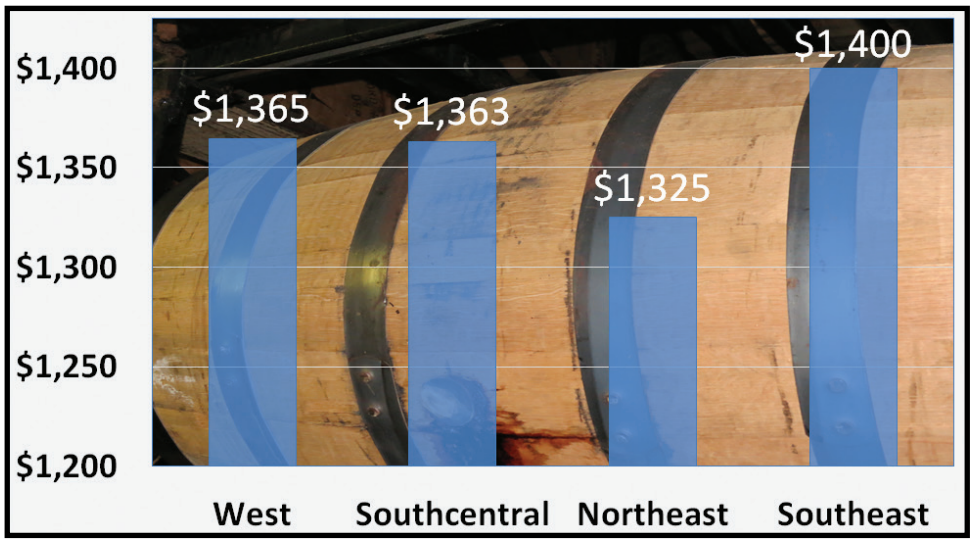


Figure 7. Average Delivered Stave Log Price by Region



Railroad Tie Logs

Railroad tie logs remain another important timber product in Kentucky. Hardwood railroad tie logs have experienced strong markets over the last year and a half. Statewide, oak tie logs have averaged a 12% increase in value from the end of 2017 to the end of 2018, and non-oak hardwood tie logs have averaged an 11% increase (Figure 8). The statewide average for oak tie logs is $451/MBF, and for non-oak tie logs it is $369/MBF. While there is a strong overall upward trend in prices, there has been significant variation across the state and from month to month. Normal maintenance and replacement of tie logs are ongoing, but an additional five million ties are currently being replaced. Tie log demand and strong pricing are anticipated through 2019 due to increased replacement of railroad ties.

Figure 8. Delivered Tie Logs Prices in Kentucky 2011-2018 by Quarter ($/MBF)

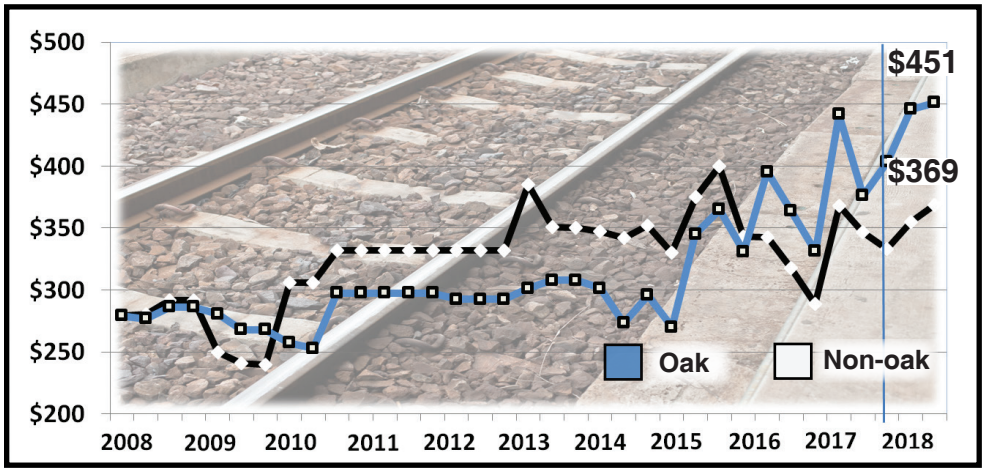


Figure 6, 7, 8 and Table 2 sources: Kentucky Division of Forestry's Delivered Log Price Data *(MBF = 1,000 board feet)*

Kentucky Forest Sector Exports

In 2018, Kentucky exported an estimated $379 million in wood-related exports which is a nine percent increase from 2017. Over the last five years, annual wood-related exports have increased by 79 percent (Figure 9).

Oak trees supply over half of the wood exported from Kentucky. About one third of wood-related exports were wood casks (barrels) made of white oak wood (Figure 10). Additionally, oak lumber was the second highest export further highlighting the overall importance of oak timber supplies to forest sector exports. Challenges with oak regeneration, growing demand for the wood, and its importance to wildlife all highlight the value of this species and emphasize the need to intensify forest management to ensure its continued presence in the forests of Kentucky.

Asia, the leading destination for Kentucky wood-related exports, imported more than $136 million (Figure 11). Countries in the European Union imported more than $119 million in Kentucky wood-related exports followed by North America (Canada and Mexico) at $99 million. Combined, the rest of the world imported approximately $24 million in wood-related products.

Figure 9. Kentucky Wood-Related Exports in $Millions (2013-2018)

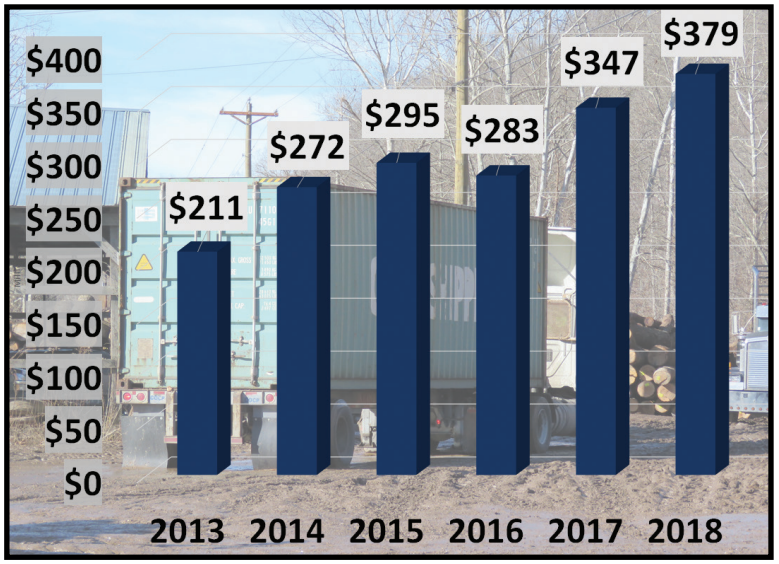


Figure 10. Top 5 Kentucky Wood-Related Exports in $Millions (2018)

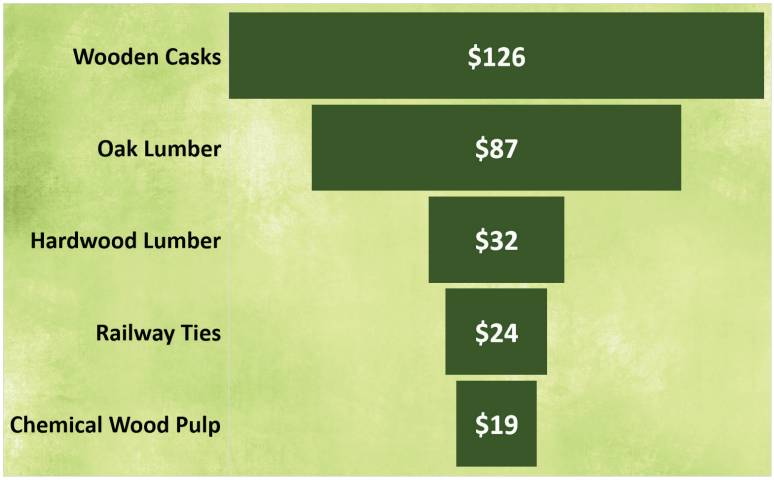
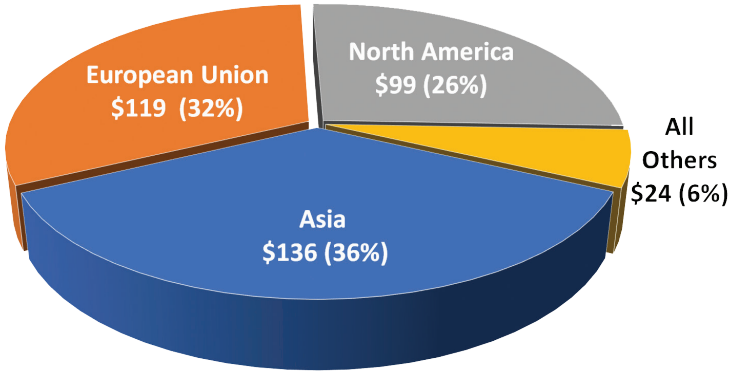


Figure 11. Kentucky Wood-Related Export Destinations in $Millions (2018)



Housing Starts and Kentucky's Forests

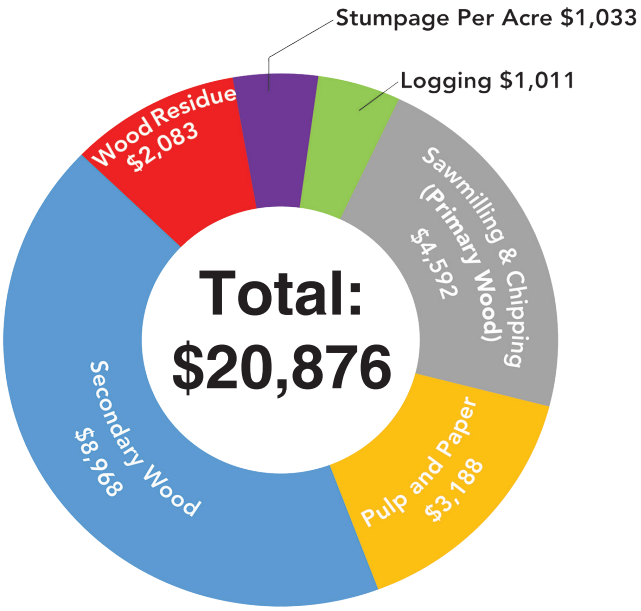
Housing starts are a major economic indicator (Figure 12) because they say a lot about the U.S. economy impacting many other sectors and the Kentucky forest sector is no different. Wood products from Kentucky can be found throughout our homes and those being constructed, examples include the floors, cabinets, moldings, and much more. The U.S. housing market has a major impact on the trees harvested from Kentucky's forests.

Figure 12. Housing Starts 2009-2018 (in thousands)

Economic Contribution of One Harvested Acre to Kentucky

The wood resources that support Kentucky's forest sector primarily come from Kentucky's forests. Each acre of harvested timber is estimated to contribute $20,876 to Kentucky's economy (Figure 13). This contribution starts with the woodland owner who receives, on average, $1,033 per acre for timber sold based on the statewide average of 3,563 board feet of timber harvested per acre at $0.29 per board foot. Remaining economic contributions are calculated by dividing the direct cash output of each forest sub-sector by the estimated number of acres harvested in 2018. Figure 14 shows how most of the harvested timber moves through the supply chain. Loggers harvest the timber and transport it to a mill for processing into primary products like lumber, crossties or paper. From there, secondary industries convert the wood to a final product for use. Virtually no wood is wasted in the supply chain as products such as sawdust, chips, and bark are sold or used in other industries. Each step along the way, from the woodlands to the final wood-using industry, contributes to the economy. The most value is added by the secondary industry which makes it important that as much as possible, our raw wood material is processed into a final product in the state. Woodland owners and logging are individually the smallest direct contributors; however, without woodlands and logging it would be extremely challenging for the rest of the Kentucky forest sector.

Figure 13. The VALUE of a Harvested Woodland Acre to Kentucky



Source: IMPLAN Data for Kentucky and the Kentucky Forest Products Industry Directory

Figure 14. The Flow of Harvested Wood in Kentucky

One Harvested Acre

The majority of Kentucky's woodlands are privately owned by families.

Logging

Logging firms are typically family operated small businesses and are a critical link in harvesting and transporting wood to sawmills.

Sawmill & Chipping

Kentucky's sawmills, also mostly family operated, process harvested wood into useful products such as lumber and crossties.

Pulp & Paper

Kentucky's paper industry uses wood chips to create high quality paper products.

Secondary

Kentucky's secondary wood industries add significant value to processed wood by creating cabinets, flooring, staves, and much more.

Residue

The wood residue industry creates useful products such as mulch and charcoal ensuring no harvested wood is wasted.

This conceptional model traces the flow of harvested wood through numerous forest industries in Kentucky. Woodland owners grow, manage, and protect their woodlands and are the foundation of the Kentucky forest sector. Logging firms harvest and transport the logs to sawmills where they are converted into products utilized by other wood industries, examples include: cabinet and flooring manufacturers, paper makers, and residue users. Nearly all of the wood harvested in Kentucky is transformed into useful products and energy.

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