



Kentucky Forest Sector

Economic Contribution
Report 2018 - 2019



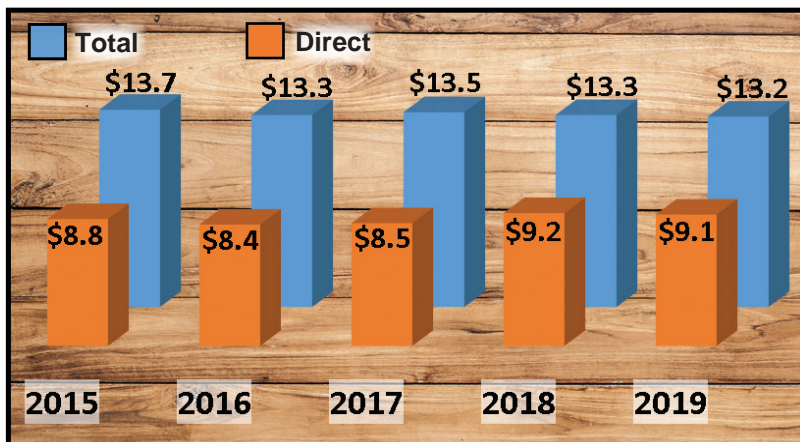
 College of Agriculture,
Food and Environment

Forestry and Natural Resources Extension

Annual Forest Sector Economic Contribution Estimates

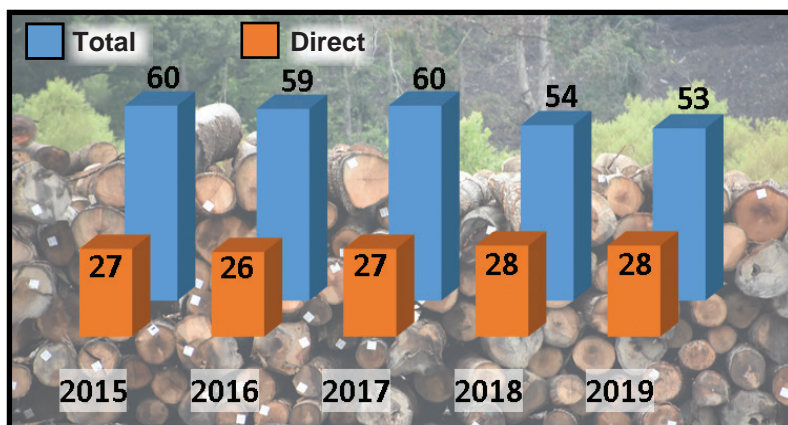
Kentucky's forests continue to support a large forest industry while also providing countless ecosystem benefits to the state. This report estimates the economic contribution of the overall forest sector in rural and urban areas. Since 2015, the overall Kentucky forest sector has remained fairly stable ranging from \$8.4 billion in direct contributions to an estimated \$9.2 billion in 2018. We estimate that the direct economic contribution of the Kentucky forest sector in 2019 was \$9.1 billion while the total economic contribution was \$13.2 billion (Figure 1). The Kentucky forest sector also directly employed nearly 28,000 people in 2019. When indirect and induced employment are also included the total employment numbers are more than 53,000 (Figure 2). The direct labor wages for the Kentucky forest sector were \$1.7 billion in 2019 with total labor wages reaching nearly \$3 billion. The COVID-19 pandemic has created many hardships in 2020 for numerous industries including the Kentucky forest industry. While some economists anticipate a quick recovery much uncertainty remains.

Figure 1. Kentucky Forest Sector Direct and Total Economic Contribution (2015-2019) in Billions



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 (2015-2019) in Thousands



Data and Methodology

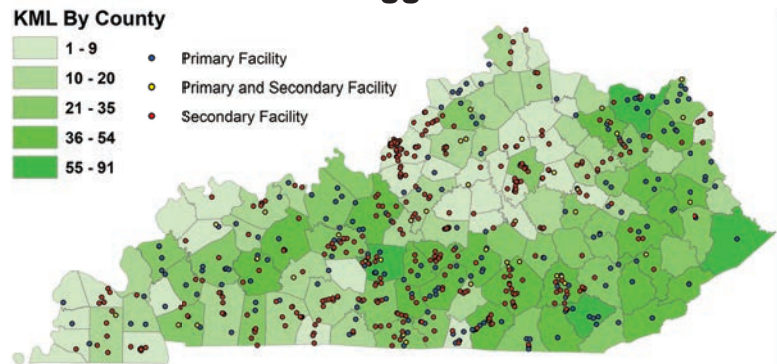
The estimates of the annual economic contribution of Kentucky's forest sector in this report come from a variety of data sources. Economic contribution estimates were derived from IMPLAN data (2015-2018) and software. IMPLAN is an input-output economic modeling software and data system widely used to 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 2015-2017 estimates were calculated using matrix-inversion approach (Henderson and Evans 2017), while 2018 contribution were assessed using input-output model customization within IMPLAN (Parajuli et al. 2018). More details about the analysis method can be found at: <https://bit.ly/2LajYIL>. The 2018 IMPLAN data was adjusted to provide 2019 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>.

2018 Forest Sector Economic Contribution Estimates

Kentucky's privately-owned forests provide the majority of the timber for the Kentucky forest sector which process it into many useful products used throughout the state and around the world. The economic contribution comes from timber resources in all 120 counties which were harvested by more than 2,600 loggers. The wood was processed at 671 wood, paper, and paper converting manufacturing facilities located in 112 counties (Figure 3). The distribution of these facilities and the more than 28,000 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 Kentucky 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 = 28,386
Total Employment = 54,266

Direct Contribution = \$9.2 Billion
Total Contribution = \$13.3 Billion

Figure 4. Direct Employment by Kentucky Forest Sub-Sectors

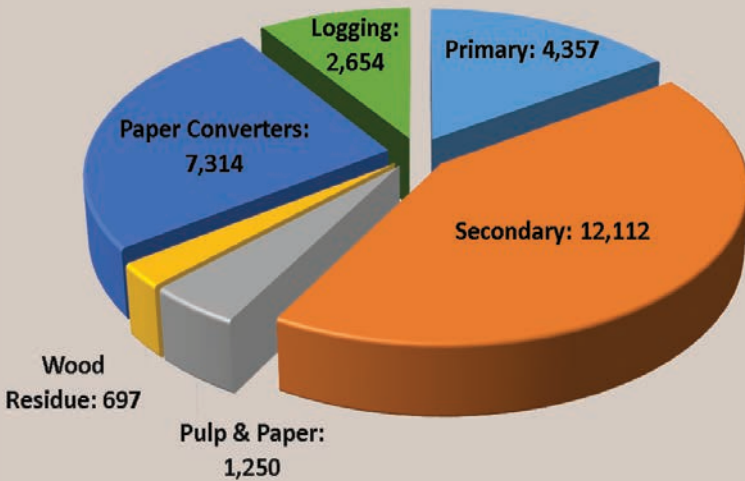
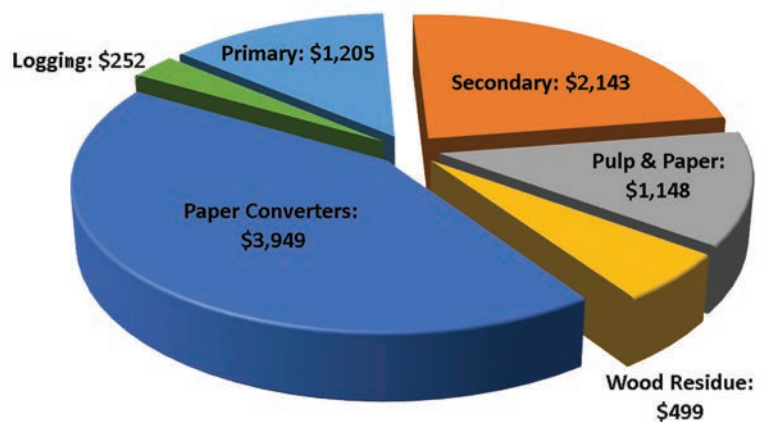


Figure 5. Direct Economic Contribution by Kentucky Forest Sub-Sectors in Millions



2019 Forest Sector Economic Contribution Estimates

To estimate economic contribution in 2019, the 2018 economic data was adjusted based on input from forest industry companies in Kentucky. Three sub-sectors experienced major changes in 2019 (Table 1). Logging and primary wood manufacturing were negatively impacted by a diminishing demand for red oak and other species for export and a slowing Chinese economy. The pulp & paper sub-sector saw increases of over 5.5% from 2018 as additional capacity came online with the opening of the paper facility in western Kentucky.

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

Table 1. 2019 Kentucky Forest Sector Direct Economic Contribution Estimates

Forest Sub-sector	Millions	% Change from 2018
Logging	\$240	-5%
Primary Wood Mfg.	\$1,084	-10%
Secondary Wood Mfg.	\$2,153	+0.47%
Pulp and Paper	\$1,211	+5.50%
Paper Converters	\$3,949	+0.00%
Wood Residue	\$492	-1.39%

Timber Output and Prices

It is estimated that 684 million board feet of hardwood logs were harvested in Kentucky during 2019. This harvest volume represents a 50 million board feet decline from 2018 harvesting levels and remains less than half the volume grown. Slow markets, regional weather issues, and uncertainty made 2019 a tough year for many logging operations and sawmills. Overall, statewide delivered log prices decreased by approximately 10.4% for all grades and species combined. The main drivers for this overall trend was a weak domestic market for many species coupled with a softening of the Asian export market. These two factors were off-set by poor weather conditions for logging at the beginning of the year that limited supply during parts of 2019, otherwise the price loss likely would have been more dramatic for some species. Table 2 shows the delivered prices for factory lumber logs of various commercially important species across Kentucky during 2019 and how those prices changed from the first half to the last half of the year.

ASH – Prices for high quality sawlogs decreased 21.7% in 2019 due to decreased export demand that had supported prices over the last several years. Further, secondary degrade caused by ambrosia beetles of trees killed by the emerald ash borer has reduced the abundance of lumber quality standing timber resulting in increased risk associated with stumpage purchases and a decrease in stumpage values.

CHERRY – Cherry logs were subjected to the largest percentage decrease in value across log grades compared to other commercial species in 2019, although occasional local spikes in pricing occurred. Statewide high quality cherry sawlogs decreased in value 25.7%, and medium quality decreased 25%.

HICKORY – While previous years found favorable prices for hickory, prices dropped 5.6% to 15.1% across log qualities in 2019 with the largest decrease associated with high quality logs.

MAPLES – Maples in general experienced less of a reduction in prices compared to many species. Hard maple prices decreased through 2019, with a 6.8% price reduction for low quality logs and a larger reduction (12.9 percent) for higher grade logs. Soft maple (typically red maple) logs held relatively well with only a drop of 7.5% for high quality logs, while medium and low quality log prices remaining relatively flat.

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Table 2. Kentucky Delivered Log Prices in 2019

Species	Quality	2019 1&2 Quarters	2019 3&4 Quarters	% Change
Ash	High	\$675	\$528	-21.7%
	Medium	\$433	\$393	-9.1%
	Low	\$274	\$268	-2.3%
Cherry	High	\$745	\$553	-25.7%
	Medium	\$525	\$392	-25.4%
	Low	\$302	\$269	-11.1%
Hickory	High	\$514	\$436	-15.1%
	Medium	\$407	\$361	-11.3%
	Low	\$272	\$257	-5.6%
Sugar Maple	High	\$858	\$747	-12.9%
	Medium	\$545	\$486	-10.9%
	Low	\$316	\$294	-6.8%
Red Oak	High	\$685	\$553	-19.3%
	Medium	\$460	\$420	-8.6%
	Low	\$288	\$295	2.4%
Red Maple	High	\$536	\$496	-7.5%
	Medium	\$368	\$369	0.01%
	Low	\$265	\$263	-0.07%
Black Walnut	High	\$2,046	\$1,964	-0.22%
	Medium	\$1,231	\$1,036	-19.43%
	Low	\$589	\$443	-24.7%
White Oak	High	\$1,127	\$1,014	-10.0%
	Medium	\$604	\$553	-8.4%
	Low	\$327	\$319	-2.4%
Yellow-poplar	High	\$592	\$548	-7.4%
	Medium	\$423	\$398	-5.9%
	Low	\$283	\$254	-10.2%

RED OAK – Red oak continued to experience significant price decreases that initiated in 2017. An additional loss of 19.3% for high quality logs occurred in 2019. Fortunately, low quality log prices were nearly flat, with a small reduction of 2.4% that corresponded to relatively stable prices in the railroad tie and industrial cant markets, and hardwood flooring to a lesser degree. Much of the red oak pricing drop for higher quality logs was tied directly to decreased demand and pricing from Chinese export markets which is optimistically believed to improve in 2020.

WHITE OAK – Log price continues to remain strong due to the multiple uses and demands for the species across all qualities, with an especially strong demand for high quality stave logs associated with elevated bourbon whiskey production.

Periods of dry weather through portions of the state with significant white oak growing stocks coupled with historically relatively high prices resulted in ample supplies of white oak in 2019 and a slight short-term softening of the market with decreased values from 2 to 10%.

BLACK WALNUT – While log pricing overall was down in 2019, high quality logs were off by only 4% from the start of 2019 and prices paid for high quality logs are still historically high resulting in continued sellers’ market for this grade and species. Losses were more significant for medium quality 15.9%, and low quality walnut logs dropping 24.7%.

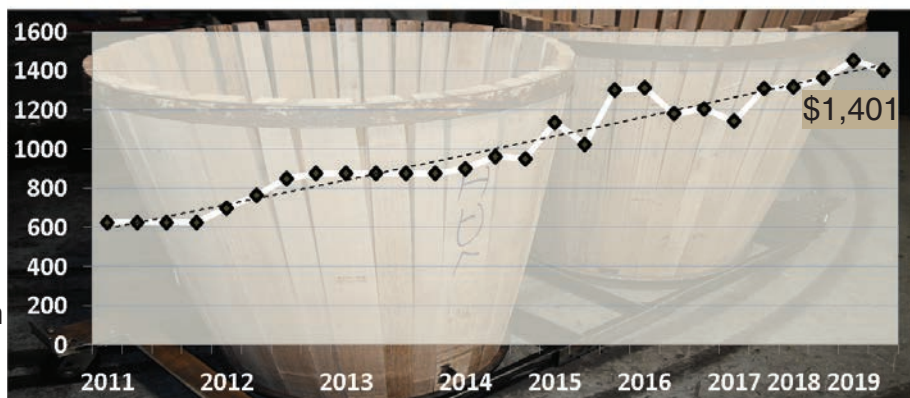
YELLOW-POPLAR – High and medium quality yellow-poplar logs lost between 6-7.4%, but low quality logs dropped more than 10% in value.

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 \$1.40/bdft (Figure 6) with some logs worth much less and some worth much more. The market for white oak logs is expected to remain strong in 2020. As mentioned previously, extended dry weather periods in 2019 allowed for stave log inventories to rebuild, causing short term price decreases.

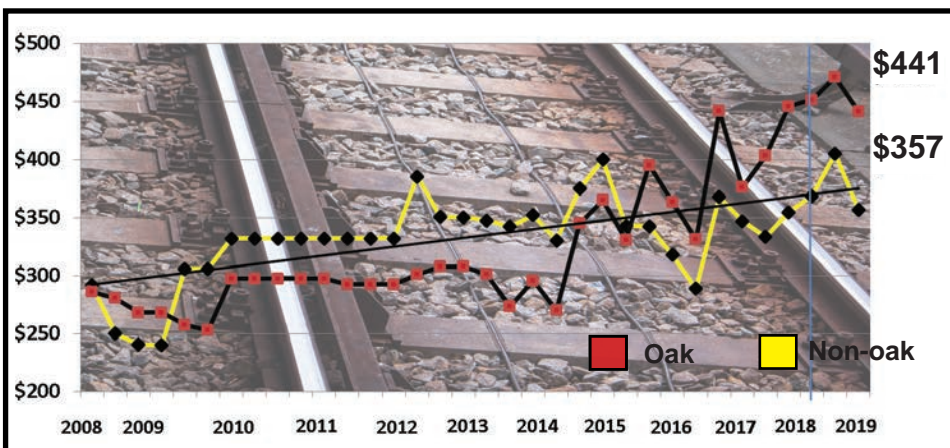
Figure 6. Delivered Stave Logs Prices in Kentucky 2011-2019 by Quarter (\$/MBF)



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 an 11% increase in value from the end of 2017 to the end of 2019, and non-oak hardwood tie logs have averaged a 10% increase (Figure 7). The statewide average for oak tie logs is \$441/MBF, and for non-oak tie logs it is \$357/MBF.

Figure 7. Delivered Tie Logs Prices in Kentucky 2008-2019 by Quarter (\$/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 2020 due to increased replacement of railroad ties.

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

Kentucky Forest Sector Exports

In 2019, Kentucky exported an estimated \$336 million in wood-related exports which is a \$43 million decrease from 2018. This decrease is largely attributed to the trade wars coupled with a reduction in red oak demand in China as their economy slows (Figure 8). Kentucky's oak trees supply over half of the wood exported from the state (Figure 9). The demand for oak barrels continues to grow around the world with more than \$134 million in exports in 2019. 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. The White Oak Initiative (www.whiteoakinitiative.org) was established for these same reasons. Europe was the leading destination for Kentucky wood-related exports in 2019 at more than \$129 million (Figure 10). North America (Canada and Mexico) represented the second largest importer of Kentucky wood products at \$93 million. Exports to Asia fell to \$89 million in 2019. Combined, the rest of the world imported approximately \$25 million in wood-related products.

Figure 8. Kentucky Wood-Related Exports in Millions (2014-2019)

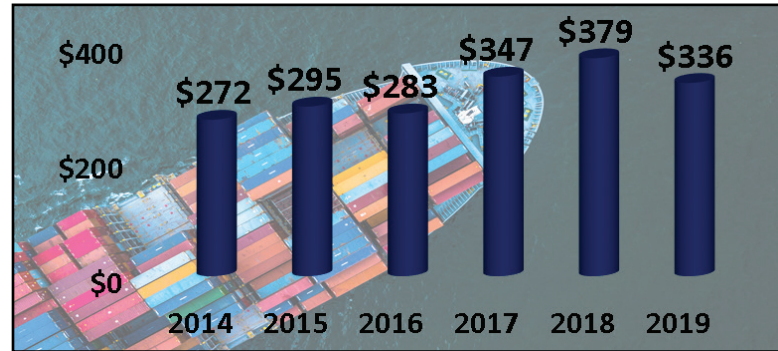


Figure 9. Top 5 Kentucky Wood-Related Exports in Millions (2019)

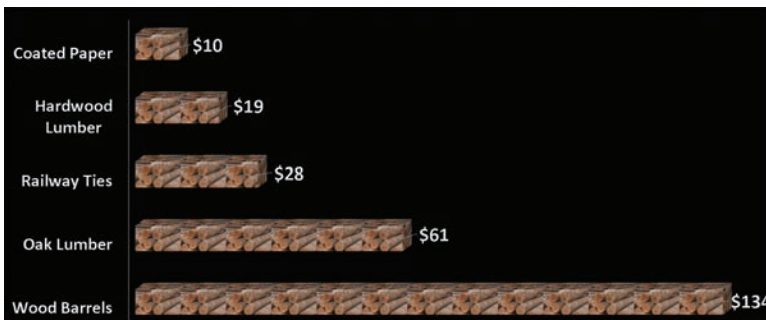
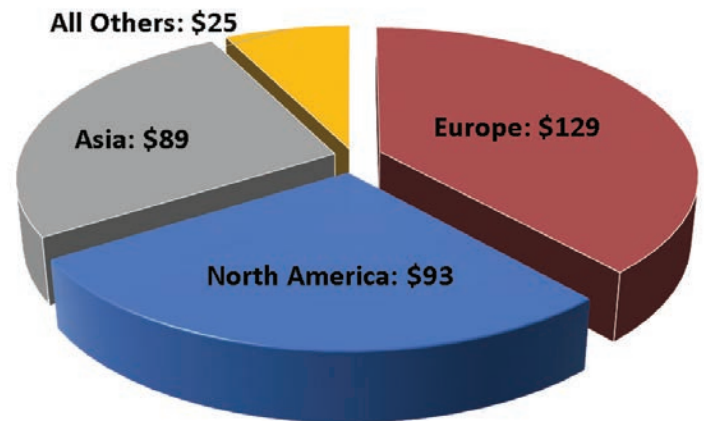


Figure 10. Kentucky Wood-Related Export Destinations in Millions (2019)



Housing Starts and Kentucky's Forests

Historically, housing starts have been a major economic indicator (Figure 11) because they provide an important snapshot of the U.S. economy and because of their impact on 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 floors, cabinets, moldings, and much more. The U.S. housing market reached more than 15 million in 2019 which is more than double the amount of housing starts in 2010.

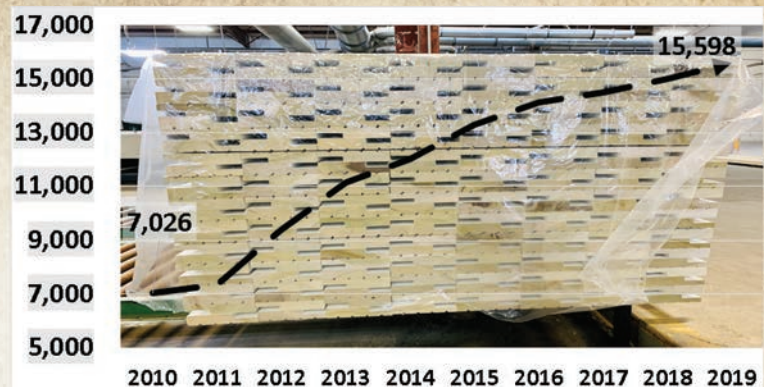
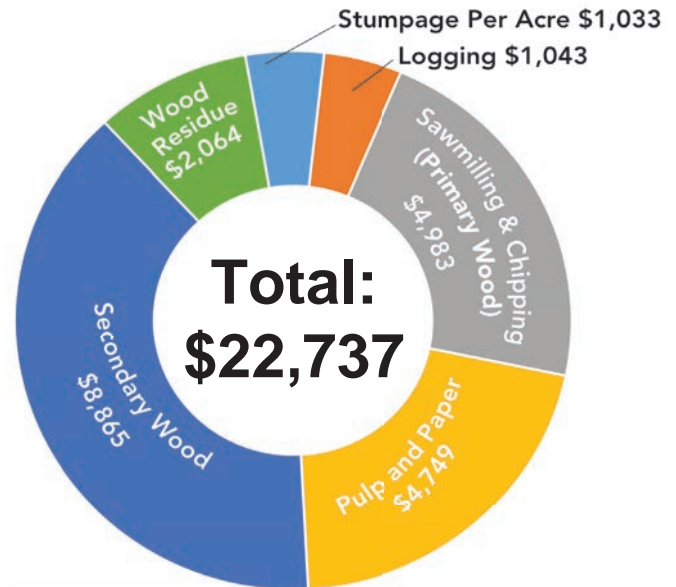


Figure 11. Housing Starts 2010-2019 (in thousands)

Economic Contribution of One Harvested Acre to Kentucky

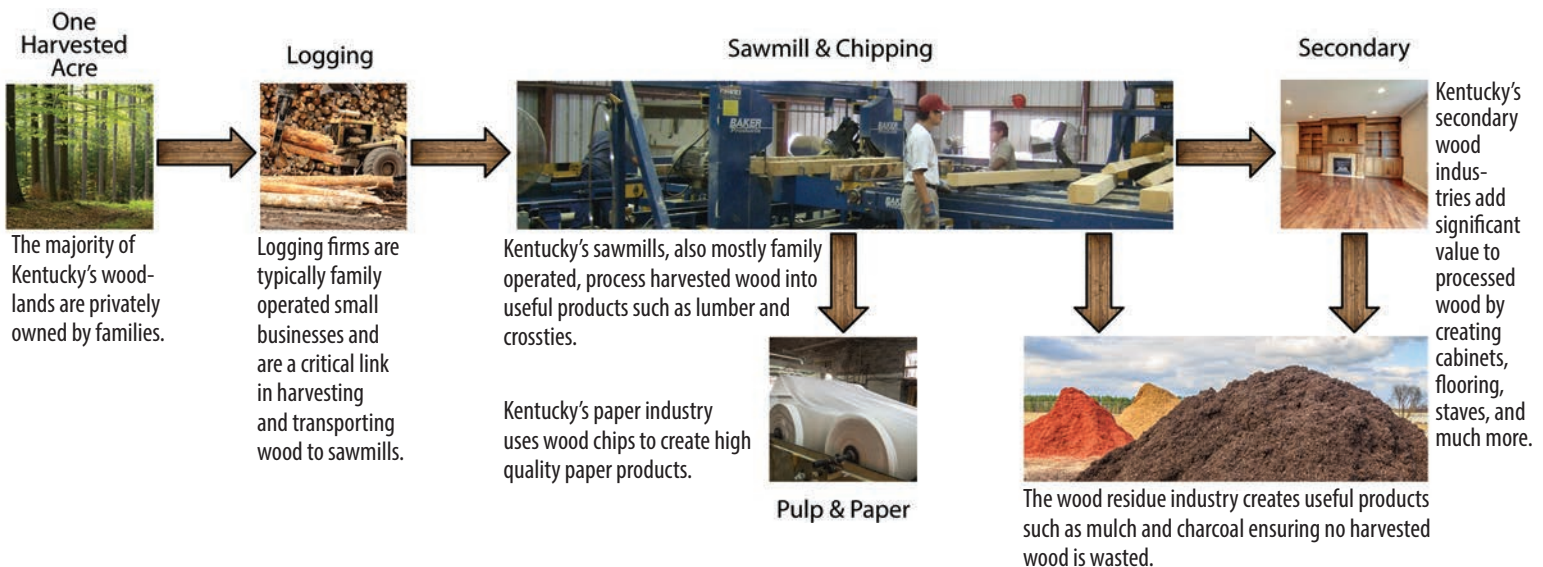
The wood resources that support Kentucky's forest sector come primarily from Kentucky's forests. Each acre of harvested timber is estimated to contribute \$22,737 to Kentucky's economy (Figure 12). This contribution starts with the woodland owner who receives, on average, \$1,033 per acre for timber 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 2019. Figure 13 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 the Kentucky forest sector could not operate as it currently does.

Figure 12. The VALUE of a Harvested Woodland Acre to Kentucky



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

Figure 13. The Flow of Harvested Wood in Kentucky



This conceptual 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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