

# Resource Analysis For Crosstie Producers

## A Deeper Look At Northern Arkansas

By J. William Griffin

In our last installment<sup>1</sup> of this series, we investigated several data points from the U.S. Forest Service's Forest Inventory and Analysis National Program (USFS FIA) that are relative to crosstie producers in Northern Arkansas. We also explained many of the terms and phrases associated with FIA data, which may be relevant to the reader of this article. The three figures we presented and discussed were the current sawtimber volumes for all hardwood sawtimber, the current pulpwood volume for all hardwood pulpwood, and the growth-to-drain ratios for red and white oak sawtimber.

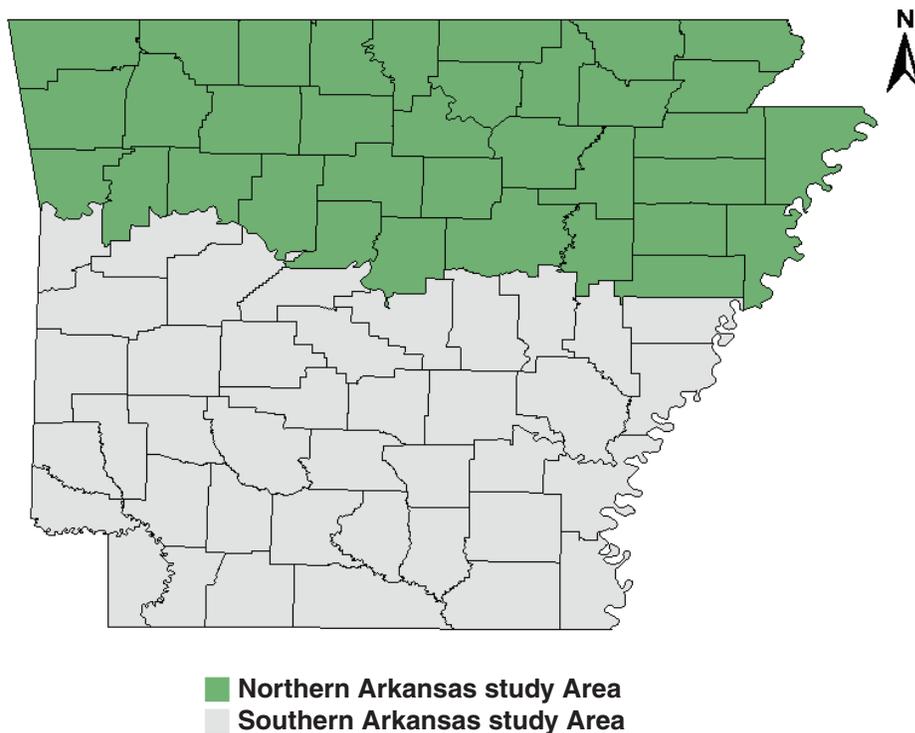
While this data is useful, we quickly learned from two FIA data experts, Dr. Jim Rosson and Dr. Matthew Pelkki, that there are other metrics by which an area's timber supply could be more deeply evaluated. According to these experts, trends in measures such as timber volume and timber removals over the long term can be far more telling than a "snapshot" measure such as growth-to-drain (which only considers the two most recent inventories of that area's timberland). In the case of growth-to-drain ratios, a few plots having extremely high removal values for one measurement period could significantly change the growth-to-drain ratio when it is not truly something to be concerned about. Put more simply, the nature of how growth-to-drain ratios are calculated causes them to be far more susceptible to outliers than volume removals over time.

Therefore, the focus of this article is timber removal and growth data and the changes in these values over time. It is our hope that this analysis will shed even more light on the crosstie feedstock supply and aggregate hardwood timber market conditions in the Northern Arkansas study area (**Figure 1**).

### Oak Sawtimber Removals

Before we can discuss the removals figures for Arkansas, we must first delve into the sampling design used by the FIA program.

**Figure 1.** Study areas in Arkansas for the Resource Analysis series.



Because national forest inventory is conducted on a statewide basis, and resources for the inventorying agencies are limited, only a portion of the inventory plots are visited annually. Most states in the Southeast are on a five-year "cycle," which means that every plot in the state should theoretically be visited within a five-year period. Thus, annually published data is only impacted by the plots that were visited in the most recent year. Therefore, annual data for a state that is on a five-year cycle will be impacted by only one-fifth of the permanent measurement plots in that state since those are the plots with updated measurements.

All of this said, it is still useful to analyze this annually posted data because large shifts in removal trends are observable. It is helpful to think of this data as a moving average rather than a total. More information regarding sampling techniques and frequencies can be found on the FIA program's website,

[www.fia.fs.fed.us](http://www.fia.fs.fed.us).

**Figure 2** shows the average annual harvest removals of both red and white oak sawtimber of all species in Northern Arkansas since 2000 (note: data was not available for 2001).

**Figure 3** presents a map that shows the estimated volume of oak sawtimber harvested from each county since 2000. This number is a good indicator of hardwood forest industry activity within and between counties in the study area.

Perhaps the most interesting thing to note about the oak removals over time can be found in **Figure 2**. Notice that there is not a sharp downturn in harvest volumes during 2007-2008 as one might expect. Undoubtedly, many hardwood mills throughout the Southeast were forced to permanently close their gates during this time period, yet the data indicates that these hard economic times did not affect the production

of timber—and consequently of crossties. A forestry professor at the University of Tennessee and a team of scientists at the USDA Forest Service’s Southern Research Station investigated the effects of the recession on the forest products industry in the Southeast in a 2011 article published in the *Forest Products Journal*.<sup>2</sup> They concluded that the recession greatly impacted the capacity of the forest products industry in the South and also noted that the FIA data may not completely reflect the losses in capacity because of the nature of the data collection (as we discussed earlier in this section).

### Data Correlating With Oak Sawtimber Removals

In an effort to evaluate the figures provided by the FIA database, the data has been graphed with metrics that are key to those in the hardwood industry. First, we attempted to spot any correlation between the crosstie industry’s performance and hardwood sawtimber removals using Railway Tie Association member-provided data that is freely available at <https://rtax.memberclicks.net/monthly-trends>. This data is presented in **Figure 4**.

Pearson’s correlation coefficient measures the degree of correlation between the change in one variable as compared to a second variable. A result of -1 indicates a perfect negative correlation, a result of 0 indicates no correlation at all, and a result of 1 is indicative of a perfect correlation. The correlation coefficient was calculated for average annual oak removals and tie purchases, and the result was 0.315. The result for correlation between average annual oak removals and tie production was 0.280. Results like these are generally considered to be indicative of non-correlating data, however the two datasets are similar in that neither value plummets during the recession, like one may expect. Figure 4 demonstrates that little or no correlation can be visually observed.

The second correlation tested was the average annual hardwood removal volume versus the average West Texas Intermediate (WTI) price for oil (**Figure 5**). The correlation coefficient for this pairing was 0.688, which indicates that these two items are more closely related than the pairs previ-

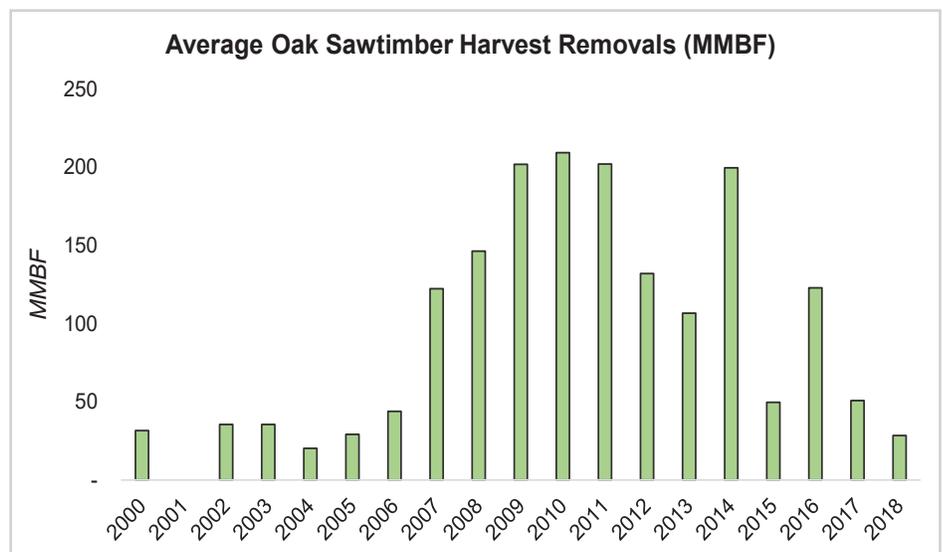
ously described. It is possible that this correlation is simply due to coincidence, but we should also keep in mind the following two things. First, oil prices affect diesel prices, which dramatically affect the hardwood forest industry’s supply chain. Secondly, crane mats and other industrial hardwood products are used in oil production, therefore, as local oil production increased, one could expect hardwood production to increase. Forest industry research firm Forest2Market recently published a blog post<sup>3</sup> that reviewed oil

prices and their correlation with the timber prices. Comments and analysis completed in this post further detail this phenomenon.

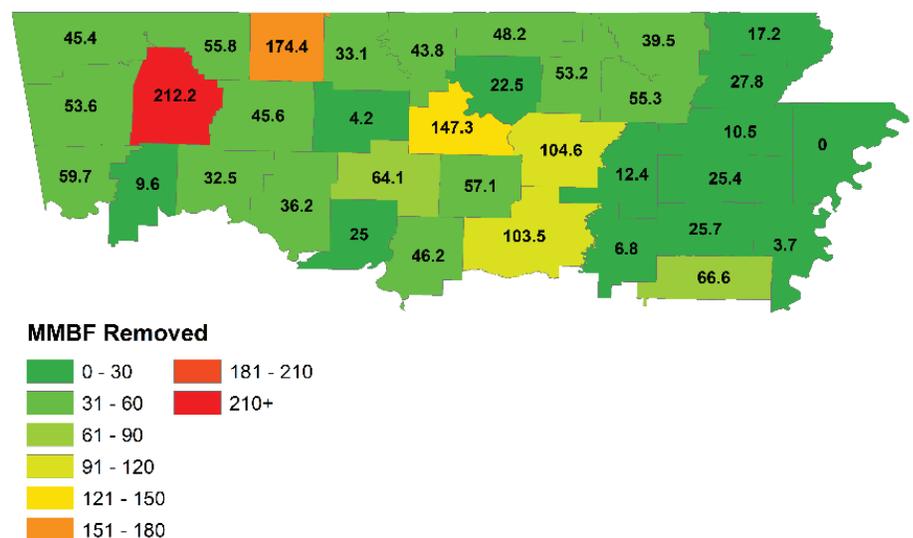
### Conclusion

It is clear that this type of FIA data tells a more complete story than that which we discussed and viewed previously. Viewing long-term trends of timber supply conditions is more telling than simple one-time “snapshots” and helps us more deeply understand the overall timber market conditions for a

**Figure 2.** Average annual harvest removals of oak sawtimber in Northern Arkansas in million board feet (international one-quarter-inch rule).



**Figure 3.** Estimated oak sawtimber harvest volumes in million board feet (International 1/4-inch rule) since 2000.



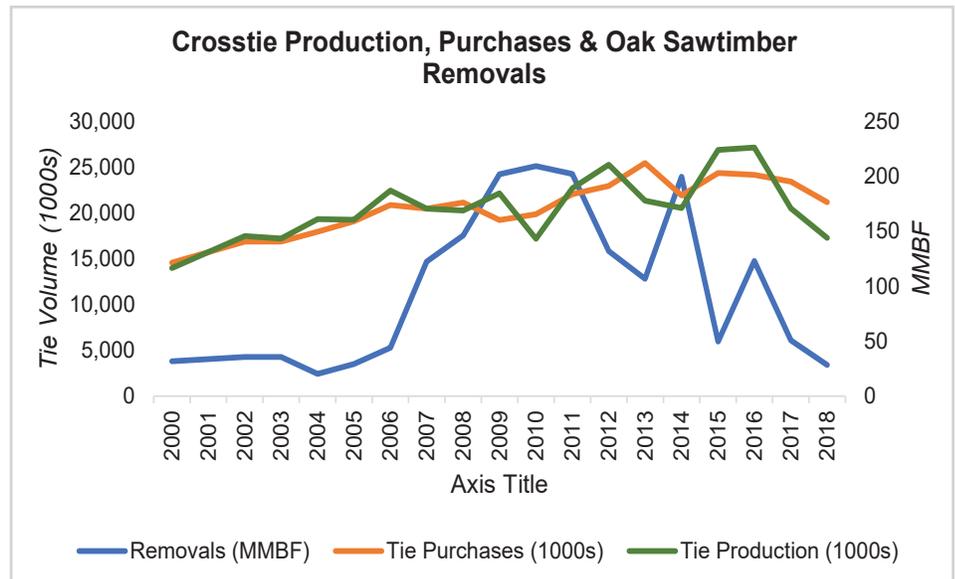
given region. Additionally, this type of data can be easily contrasted with other types of time-series data, which we explored in Figures 4 and 5. We also saw that, according to the FIA data, the harvesting levels of northern Arkansas' hardwood timber were not significantly impacted by the economic recession of 2007-2008. This is where we must remind ourselves that while FIA data and data like it is very useful for many types of analyses, it does not always tell the entire story. Numerous data sources contrast this "notion" suggested by the FIA data (see the University of Tennessee/US Forest Service article cited in section 2).

The FIA National Program has been producing this data for decades now, and we have seen that the data can be useful for analyzing the timber supply conditions in a given locality. It has strengths and weaknesses associated with its use, but so long as the user is aware of these, it can be a powerful tool in long-term planning and resource assessments. ■

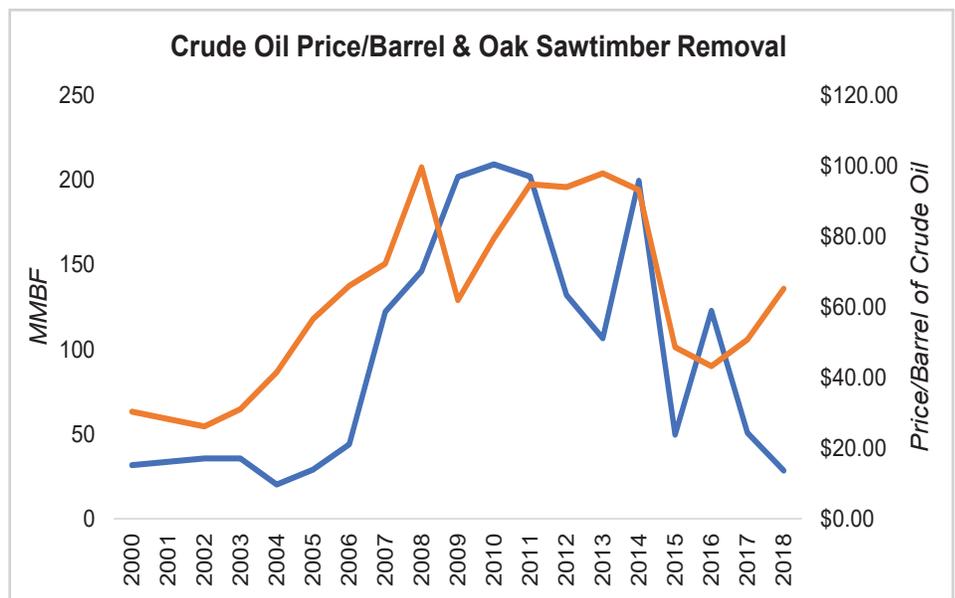
*William Griffin is a graduate student at Mississippi State University in the Department of Sustainable Bioproducts (Formerly the Department of Forest Products). He can be reached via email at [jwg286@msstate.edu](mailto:jwg286@msstate.edu). This work is supported by the USDA National Institute of Food and Agriculture, McIntire Stennis project #1015681. This publication is a contribution of the Forest and Wildlife Research Center, Mississippi State University.*

1 Crossties Magazine - March/April 2019  
 2 D.G. Hodges, A.J. Hartsell, C. Brandeis, T.J. Brandeis, and J.W. Bentley (2011) Recession Effects on the Forests and Forest Products Industries of the South. Forest Products Journal: 2011, Vol. 61, No. 8, pp. 614-624.  
 3 <https://blog.forest2market.com/regional-wood-fiber-costs-vs-oil-prices-is-there-a-correlation>

**Figure 4.** Crosstie industry performance versus oak sawtimber removals in Northern Arkansas.



**Figure 5.** Crude oil price per barrel and oak sawtimber removals in Northern Arkansas.



**EXPERT RR TIE BUYER** seeks work from home position, strong direct mill contacts, rail-truck logistics, inventory management, hedging deep experience.

Contact [rrtiebuyer@gmail.com](mailto:rrtiebuyer@gmail.com) or 720-308-7220

**REGISTER NOW**

2019 RTA Annual Conference & Technical Symposium  
**October 15-18, 2019**  
[RTA.org/2019-rta-annual-conference](http://RTA.org/2019-rta-annual-conference)  
 (770) 460-5553  
 More: Turn to page 21