

Forest markets; enabling economic and environmental interests to work together

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When it comes to the issue of managing forests, environmental and economic concerns can often seem irreconcilable. Those unfamiliar with forestry and silviculture practices oftentimes approach this subject believing that there is either one advantage or the other, but not both.

This simply isn't true.

How do we know that a market-based system enables economic and environmental interests to work together? A detailed forensic analysis by Forest2Market found a synergistic relationship between healthy markets and increased inventory (carbon

sequestration) in the forest, which obviously benefits the environment.

Due to concerns about the growth of the wood pellet industry in the US South, Forest2Market was commissioned to examine the history and sustainability of regional forest assets in 2017. For [the study](#), we conducted a statistical analysis for a 70-year period of the forest acreage, demand and inventory, and we uncovered some statistically significant correlations.

Since the middle of the twentieth century, the amount of timberland—unreserved, productive forest land—in the US South has remained stable, increasing by about 3% between 1953 and 2015. During this period,

economic growth and increased construction spurred consumer demand for forest products, which led to a significant increase in timber harvests (removals) by almost 60 percent. **Yet, over this same period, the amount of wood fiber inventory stored in southern forests more than doubled on essentially the same land base.**

Forest2Market's in-depth analysis of historical data over the past six decades documents the link between increased demand for forest products and increased forest inventory. Further, it explains that the dramatic increase in forest inventory was made possible by even more remarkable increases in forest productivity, especially on privately-owned timberlands.

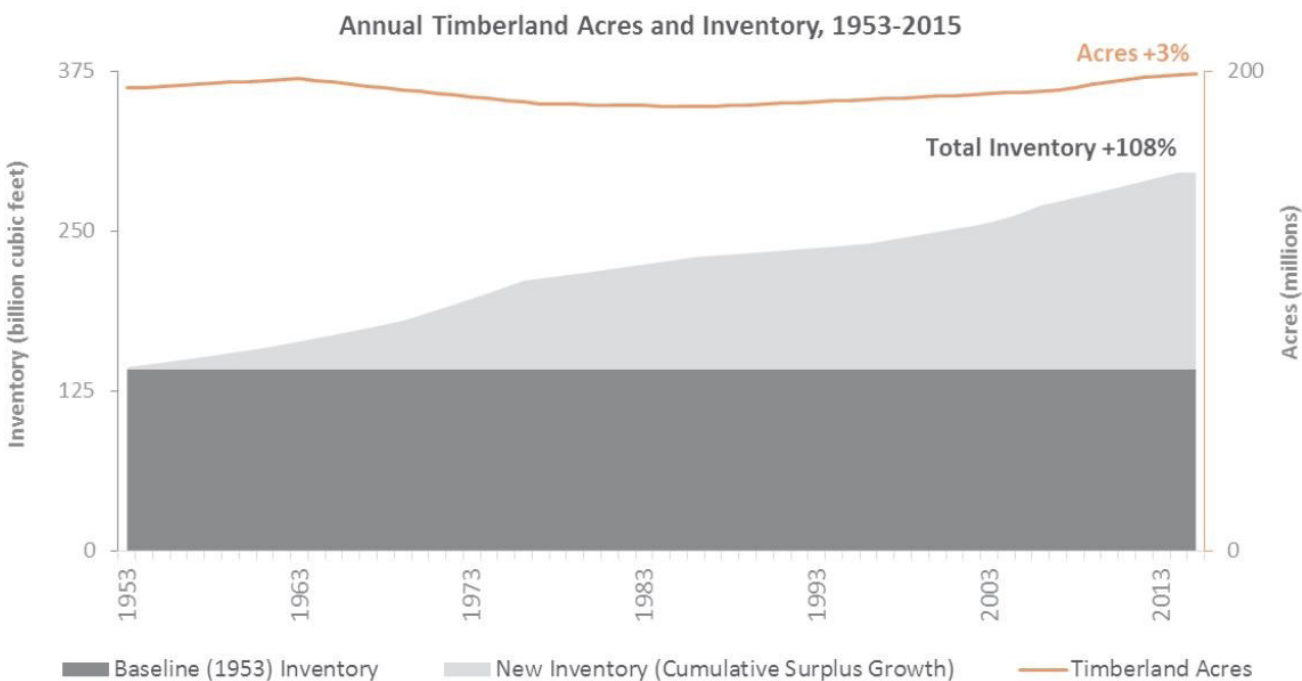


Figure 1: Wood fiber inventory in the US South has more than doubled since 1953.

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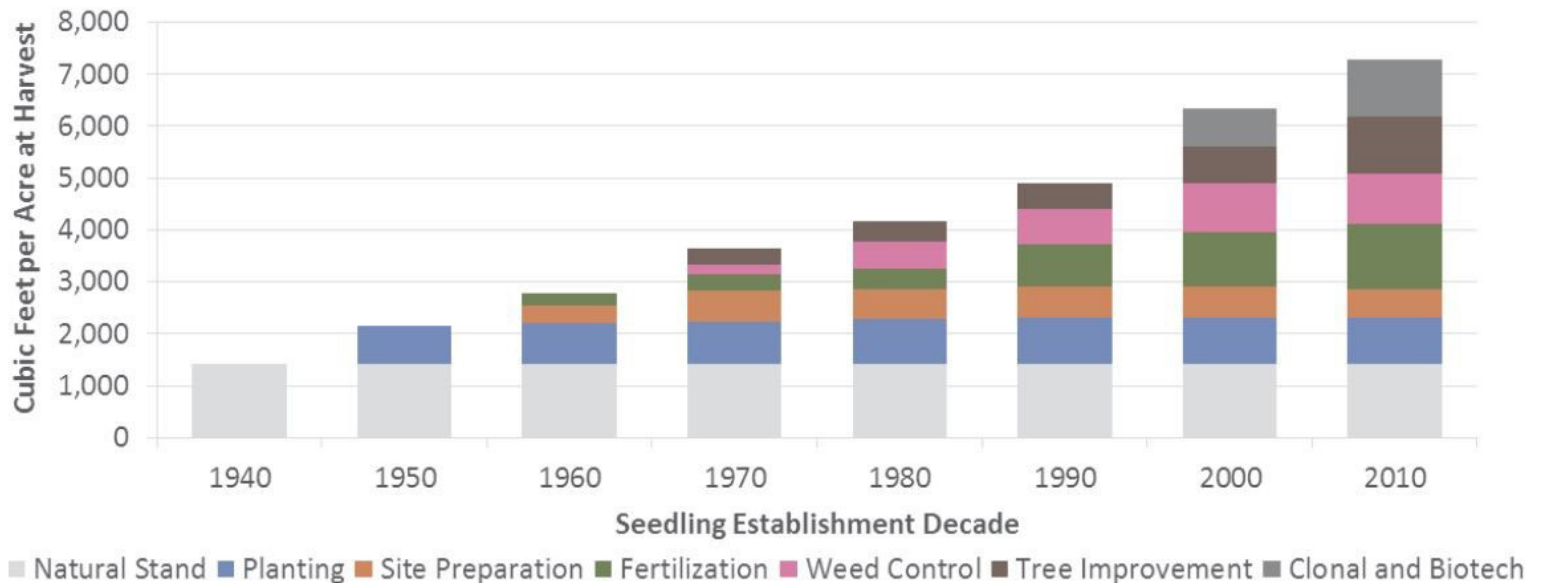


Figure 2: Advanced silviculture practices in response to market demand have dramatically increased the volume of fiber volume per acre.

- Rising demand for forest products drives increased removals from timberlands.**

As the US population and GDP grew in the last half of the twentieth century, so did its demand for wood-based products. Annual timber removals nearly doubled by 1996 and were 57% higher in 2015 than they were in 1953.

- The forest products industry and landowners responded by increasing the productivity of their forests.**

To ensure their mills would have a stable, high-quality source of supply, forest products companies invested heavily in research to promote forest productivity by improving management practices.

- These practices drove the development of high-yield plantations that resulted in a 3.5x increase in wood inventory per acre, which increased availability of wood fiber on timber plantations and thereby reduced harvest pressure on natural stands of timber. The following chart shows the

significant impact on standing inventory achieved by advanced silviculture practices in response to market demand.

- Increased demand has not depleted forests.**

The number of timberland acres has remained stable, increasing by 3%. At the same time, total inventory has doubled (+108%, from 142 to 296 billion cubic feet) because growth has outpaced removals.

- Statistical analyses show that increased demand is associated better growth and larger inventories.** Regression models show statistically significant correlation (65-90 percent) between demand and inventory.

The statistical correlation is that increased demand results in increased inventory, not the opposite. Why does that happen?

Timber and the land timber occupy are economic assets. As in any market, when there is strong demand, owners actively manage

their assets to maximize economic return. In this case, timberland owners manage their forests to maximize tree growth, especially the growth of the highest value product from the forest – sawtimber. This management structure increases their return on investment. In turn, forest products and bioenergy manufacturers use the raw materials that they purchase to the fullest extent possible, including the utilization of low-value trees and residuals for energy purposes where market exist.

The growth of the forest products industry, including the wood pellet sector, continues to create new demand for biomass, which has resulted in an increase, rather than a reduction, in forest inventory.

Forest Management 101

While much of the feedstock material used to produce wood pellets consists of wood chip residues generated from other wood products manufacturing processes, it is important to clarify that many pellet producers also use low-value pulpwood in the manufacturing process.

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How are harvested trees routed through the forest supply chain?

The sizes of the trees removed from timberland are quite different, serve a range of needs, and therefore vary in value. In general, southern pine logs fall into one of the following categories:

- Logs 5"-7" diameter at breast height (DBH) are considered "pulpwood"
- Logs 8"-11" DBH are considered "chip-n-saw" (CNS)

- Logs 12"+ DBH in diameter are considered "sawtimber"

Timberland owners in the US South who manage their land for timber production have historically managed for large diameter, high-value sawtimber logs. Centuries of demand for solid wood products used for structural purposes has driven this paradigm, as larger logs result in better yield and quality in solid wood product manufacturing. Landowners are therefore incentivized to grow larger logs through high price offerings for the

sawtimber from solid wood product manufacturers. As such, timberland management practices have evolved over time to maximize real returns on large logs, with landowners implementing silvicultural prescriptions to yield larger, high-value logs faster.

One such management practice known as "thinning" involves removing low-value pulpwood (generally small, misshapen, deformed and off-species) trees. This thinning process reduces competition for soil nutrients and

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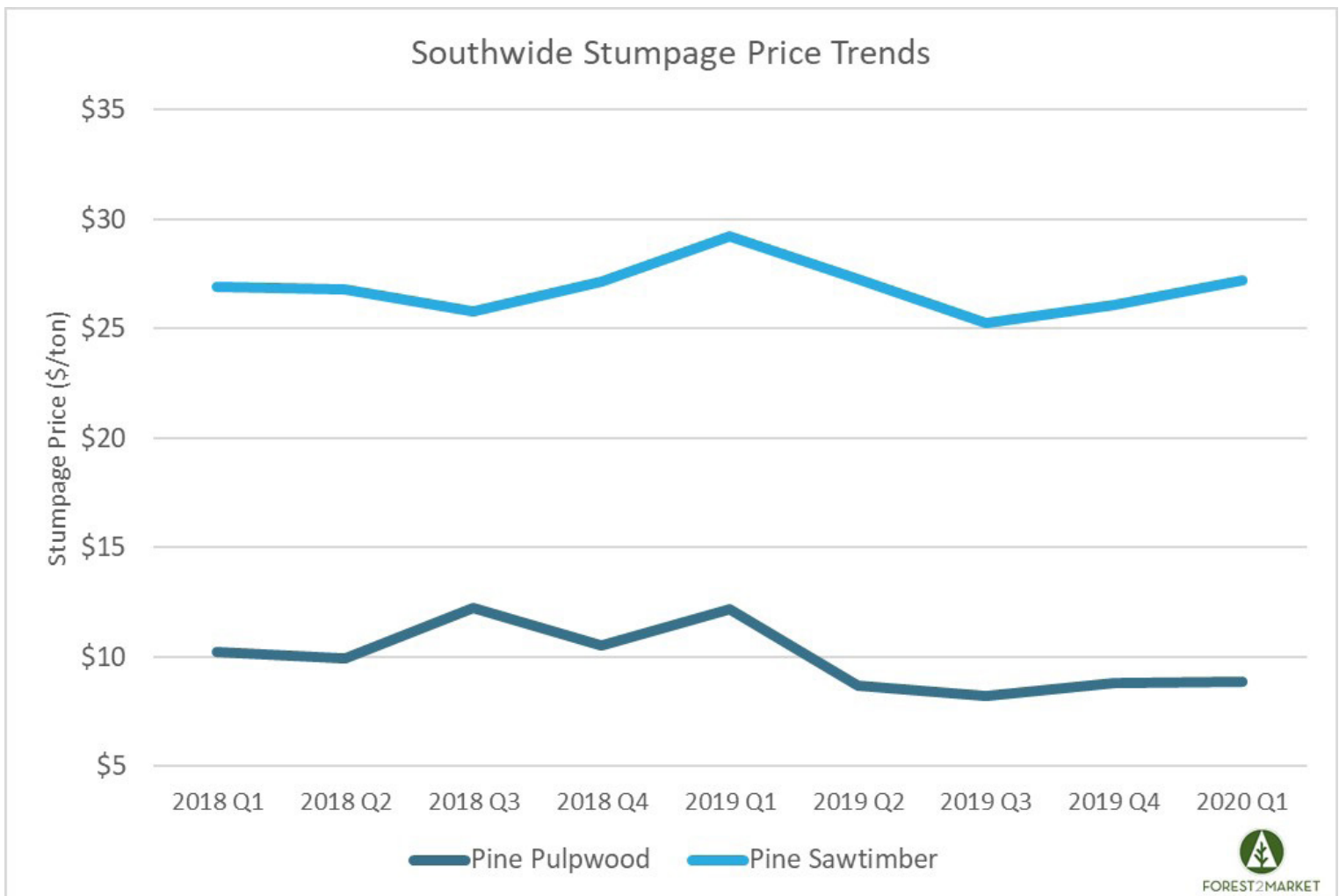


Figure 3: The relative stumpage price differential between pulpwood and sawtimber ensures pulpwood harvests remain a result of land management prescriptions as opposed to the incentive to manage for pulpwood production.

For southern landowners who have made the long-term investments necessary to significantly improve forest productivity and increase inventory on a stable land base, the wood pellet industry has opened up new markets for their low-value, small diameter timber.

opens the forest canopy to allow more light into the timber stand, which induces higher growth rates for the remaining high-value trees. These trees continue to grow until reaching larger diameter and quality specifications to be considered for solid wood product manufacturing.

The Economics of Wood Consumption

Basic economics and industry best practices ensure that harvested trees are used to maximize their value. Consider the price differential between sawtimber and pulpwood: In [1Q2020](#), the southwide volume weighted average price (stumpage) for pine sawtimber was roughly \$27/ton, and the southwide volume weighted average price of pine pulpwood was \$9/ton.

Timberland owners will not harvest all of their timber as small trees at \$9/ton when they can harvest mature trees at \$27/ton. In addition to the higher value for larger logs, the increased growth of the trees in the intervening years also results in many more tons of sawtimber that can be sold at the higher price. Economically, it makes no sense to do otherwise.

Therefore, there are three important points to understand about the economics of pulpwood supply:

1. Pulpwood is the lowest-value, smallest-diameter product that can be removed from a stand of timber.
2. While the incremental cash flows from pulpwood sales are not the primary motive for thinning, demand for pulpwood results in incremental cash

flows for timberland owners. The relative stumpage price differential between pulpwood and sawtimber upholds the justification for managing timberland to yield more sawtimber.

3. This also ensures pulpwood harvests remain a result of land management prescriptions as opposed to the incentive to manage for pulpwood production.

The Importance of New Markets

The wood pellet industry is dwarfed by the traditional forest products industry. In the US South, roughly 280 million tons of logs are harvested each year. Approximately 145 million tons go to pulp and paper mills as pulpwood; approximately 120 million tons go into dimensional lumber and panel/plywood production as CNS and sawtimber; and roughly 15 million tons of harvested roundwood go into the production of wood pellets. Roundwood used for pellet production represents only 10% of the small diameter roundwood harvested.

While the growth of ecommerce has increased demand for packaging and shipping boxes, demand for printing and writing papers is declining 6% annually and is expected to continue. In 2017 alone, newsprint demand was down 10% from the previous year and most of the newsprint plants in the US South have been closed or converted to other products such as lightweight linerboard where possible.

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to significantly improve forest productivity and increase inventory on a stable land base, the wood pellet industry has opened up new markets for their low-value, small diameter timber. In a dynamic economy, these outlets are imperative to ensuring the long-term viability of managed timberland.

The forest products industry—including wood products, paper and pellet manufacturers—takes the harvesting and regeneration of trees very seriously. The entire forest value chain has evolved over time to efficiently utilize every single part of a harvested tree. The result is an environmental/industrial relationship that produces valuable products that we have all come to depend upon, while also using low-value materials for beneficial purposes where markets exist.

An increase in forest stocking levels is the ultimate environmental benefit, which naturally occurs when landowners manage their timber resources for economic purposes. It is this symbiotic relationship that, most importantly, incents timberland owners to keep forestlands forested and invest in advanced timber management practices, which provides both economic benefits to the timberland owner and environmental benefits to all of us.

When forestland ownership becomes uneconomical, the risk for converting the land to other uses increases. With such conversion, the forest is lost forever. Keeping the economics of forest ownership strong, including the utilization of low-value forest materials, is a key component in preserving the proven relationship between environmental and economic interests of the forest.