



Wood Supply Market Trends in the US South

1995 - 2015



Forest2Market

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Prepared for:

National Alliance of Forest Owners
US Endowment for Forestry and Communities
US Industrial Pellet Association

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Date: November 19, 2015

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In order to provide credible benchmarks, every piece of data collected at Forest2Market goes through a rigorous validation and standardization process before being entered into one of our unique databases. Forest2Market's staff of foresters carefully reviews the market variables affecting timber prices and uses a data normalization process to account for excess variability, which allows only market factors to influence prices. Once each transaction is validated and expertized, it is included in the data sets that formulate our comprehensive suite of data-driven products, including:

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- Market Guides and Trend Reports
- Economic Forecasts
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- Procurement Zone Analyses
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These critical sales data and verification processes converge to form the most secure, accurate and unbiased database within the forest products industry. It is a powerful resource for analyzing trends and markets, forecasting, and as an on-demand tool that provides an intensive, high level of detail that aids buyers and sellers in making sound business decisions that drive improvements and profitability, project developers and their financial partners in ensuring project success and policy makers in constructing sound frameworks for forest and energy based legislation and regulation.

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1 Executive Summary

1.1 Overview

The National Alliance of Forest Owners (NAFO), the US Industrial Pellet Association (USIPA) and the US Endowment for Forestry and Communities (hereafter, “the Organizations”) seek objective, factual information to inform present discussions about the impact of the export wood pellet market on American forests and other forest products industries, particularly those in the southern United States (US South).

An estimated 11 million metric tons of wood pellets were consumed globally in 2014 for industrial purposes. Approximately 3.6 million metric tons of wood pellets were exported from the US, most of which were used for industrial power generation in Europe¹. European industrial consumers of wood pellets generally receive some type of subsidy because their projects are intended to support compliance with government-sponsored renewable energy and climate change goals and mandates.² This report focuses specifically on the industrial export sector of the wood pellet industry and particularly on pellet mills supplying European markets.³

At the time of this report, discussions are being held at the European Commission about whether incentives for RWE Group’s proposed Lynemouth project comply with European Union state aid rules. The incentives are offered under the United Kingdom’s (UK) Contract for Difference (CfD) program. At issue is the level of the proposed strike price, £105/MWh (in 2012£), and whether that price is higher than could be achieved in a competitive auction. Also of concern is whether the subsidies afforded to certain CfD qualifying projects distort competition in biomass markets.

Concurrent with the growth of the export pellet industry in the US South, other market forces have created fundamental changes in the market:

- Historic downturn in home construction and the resulting reduction of dimensional lumber and panel production
- Changes in market demand for pulp and packaging products
- Changes in forestland ownership
- Changes in the location of operational and closed mills

As a result, it is important to examine each of these market drivers and separate the effects of the emergence of the pellet industry from the effects of other market forces.

To explain these forces, the Organizations seek to quantify and contextualize the manufacturing, wood supply and price trends that have occurred in the US South prior to and since the emergence of the export wood pellet

¹ Forest2Market internal estimate.

² Forest2Market is not aware of any US projects using domestically produced industrial wood pellets on a scale comparable to European usage. Although Ontario Power Generation’s Atikokan Generating Station has been converted to consume biomass, it prefers to source wood pellets from Canadian producers.

³ Wood pellets consumed domestically and internationally in the residential and commercial sector are an established, affordable heating option that generally does not receive government subsidies on the level afforded industrial consumers. As a result, the domestic pellet heating market is not experiencing significant change. This report focuses solely on the industrial wood pellet market.

industry and assess the effect, if any, of feedstock demand from the export wood pellet industry relative to other market drivers. To address these objectives, Forest2Market®, Inc. (F2M) conducted the following three studies:

- Study 1: Wood Supply and Pricing Trends: 2000-2014
- Study 2: Geographic Distribution of Operational and Closed Wood Fiber Consumers: 1995-2015
- Study 3: Market Case Studies: 2006-2015

Consistent with industry practice in the US, all references in this report to wood fiber represent green wood measured in short tons unless otherwise stated. Because industrial wood pellets are primarily consumed in countries that use the metric system, all references in this report to wood pellets are reported in metric tons. See the glossary for further definitions of pellet mill wood fiber use, short tons and metric tons.

1.2 Key Findings

1.2.1 Study 1: Wood Supply and Pricing Trends: 2000-2014

Overall, forest inventory supply in the US South has increased by 1,199.5 million tons between 2000 and 2014 (409.1 million tons in the Atlantic Region and 790.4 million tons in the Gulf Region). Predominantly, the increases have occurred in sawtimber inventory. Even pine pulpwood inventory has increased, however. The only noticeable decrease in inventory has occurred with hardwood pulpwood; this is the result of decreased demand for hardwood sawtimber, which—had it been harvested—would have been regenerated, creating higher hardwood pulpwood inventory.

During the US housing market decline between 2006 and 2009 and the US Great Recession, sawtimber demand declined, having the effect of reducing harvests and the available pulpwood supply in the market. In addition, the decline of sawtimber processing reduced residual chip supply; the demand that could no longer be met with residual chips shifted to pulpwood.

Pine Pulpwood Harvest Removals and Prices

While the US housing market has been experiencing a recovery as of late, it has been a slow and steady recovery. Even though an improved market has increased residual wood chip output over the last few years, non-pellet demand for pine pulpwood has also increased in response to market recovery. The increase in demand from non-pellet manufacturers has coincided with pellet mill demand entering the market.

In 2014, pine pulpwood removals in the South were largely driven by non-pellet consumers (Figure 1-1). The detailed summary for pellet and non-pellet consumers is as follows:

Atlantic Region

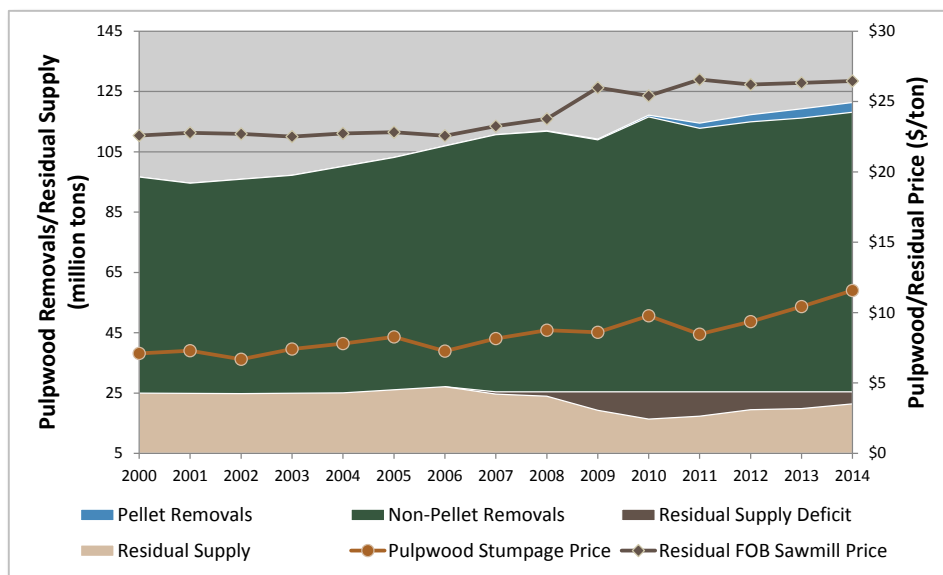
- Harvest removals for pellet consumers totaled 1.7 million tons and equated to approximately 0.3% of the pine pulpwood inventory and 3.2% of pine pulpwood removals.
- Harvest removals for non-pellet consumers totaled 52.2 million tons and equated to 10.0% of the pine pulpwood inventory and 96.8% of pine pulpwood removals.

Gulf Region

- Harvest removals for pellet consumers totaled 2.0 million tons and equated to approximately 0.3% of pine pulpwood inventory and 3.0% of pine pulpwood removals.
- Harvest removals for non-pellet consumers totaled 65.4 million tons and equated to 10.0% of the pulpwood inventory and 97.0% of pine pulpwood removals.

In a competitive market with constrained supply and increased demand, prices for residual chips and pulpwood will naturally increase. Since the advent of pellet mills, total demand for pine pulpwood from pellet producers in the South increased from zero to 3.7 million tons by 2014 (1.7 million tons in the Atlantic Region and 2.0 million tons in the Gulf Region). In comparison, demand for pine pulpwood from non-pellet mills increased by a total of 4.0 million tons (1.6 million tons in the Atlantic Region and 2.4 million tons in the Gulf Region) during the same period. Data suggest that, on a regional basis, the component of price change related to incremental demand from non-pellet mills is equivalent to (in the Atlantic Region) or greater than (in the Gulf Region) that from pellet mills. It is likely that price for pine pulpwood would have increased without incremental demand from pellets, especially when other factors such as supply restrictions and weather are taken into account.

Figure 1-1 Market Dynamics – US South – Pine

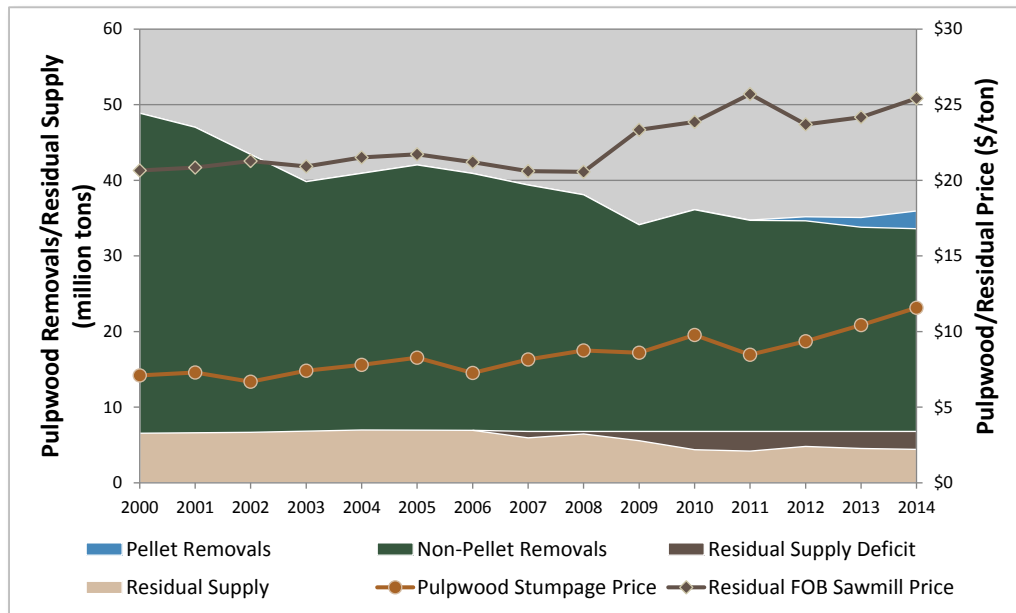


Hardwood Pulpwood Harvest Removals and Prices

Hardwood pulpwood harvests and prices in the South have changed significantly since 2000, the result of declining demand for paper:

- Hardwood pulpwood harvested in the combined Atlantic and Gulf regions for non-pellet mills has declined 31% from 48.9 million tons harvested in 2000 to 33.6 million tons harvested in 2014 (Figure 1-2).
- Despite declining demand, stumpage prices have increased to a 15-year high of \$11.57 per ton due to a decline in *available* residual chip and pulpwood supply (See Section 4.1.3 for a detailed explanation of “*available*”).

Figure 1-2 Market Dynamics – US South – Hardwood



The detailed summary for pellet and non-pellet consumers in 2014 is as follows:

Atlantic Region

- Harvest removals for pellet consumers totaled 2.3 million tons and equated to approximately 0.4% of the hardwood pulpwood inventory and 15.2% of hardwood pulpwood removals.
- Harvest removals for non-pellet consumers totaled 12.8 million tons and equated to 2.2% of the hardwood pulpwood inventory and 84.8% of hardwood pulpwood removals.

Gulf Region

- Harvest removals for pellet consumers totaled roughly 31,000 tons and equated to a negligible amount of the inventory and hardwood pulpwood removals.
- Harvest removals for non-pellet consumers totaled 20.8 million tons and equated to 3.3% of the pulpwood inventory and nearly 100% of hardwood pulpwood removals.

Since 2010, total demand for hardwood pulpwood from pellet producers in the South has risen to 2.4 million tons primarily in the Atlantic Region. In comparison, demand from non-pellet mills decreased by 2.5 million tons (1.5 million tons in the Atlantic Region and 1.0 million tons in the Gulf Region). Data suggest that hardwood pulpwood price change is driven more by supply restrictions and precipitation events.

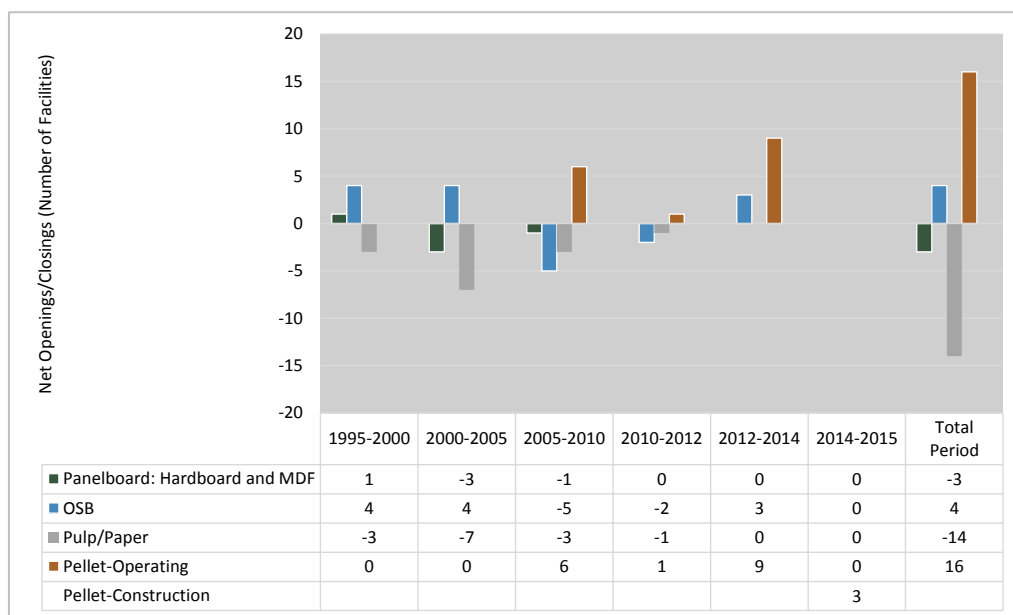
This is most evident in the Gulf Region. Even though demand has decreased from non-pellet mills and pellet mill demand is modest, prices have increased in the Gulf Region as both residual supply and available pulpwood supply have been constrained. In the Atlantic Region, in more recent years, pellet demand has supplanted a portion of non-pellet demand (2.3 million tons from pellet mills vs -1.4 million tons from non-pellet mills). In 2014, total demand from both pellet and non-pellet mills (15.1 million tons) remained below historic highs from non-pellet mills (18.8 million tons in 2000). While the added layer of demand from pellet mills is likely to have

some influence on price, supply restrictions (similar to those occurring in the Gulf Region) are likely to be more significant factors.

1.2.2 Study 2: Geographic Distribution of Operational and Closed Wood Fiber Consumers: 1995-2015

The total number of active mills, both non-pellet⁴ and pellet, in 2015 is the same as it was in 2000 (119 operating facilities). Three additional pellet facilities are under construction. Due to market dynamics (Section 4.1.1), there have been significant changes, however – 38 facilities have opened and 35 have closed permanently. Between 2000 and 2015, the panelboard and OSB sectors both experienced openings and closings with the panelboard sector experiencing a net loss of three facilities and the OSB sector experiencing net growth of four facilities (Figure 1-3). The trend for pulp and paper was more one directional – 15 facilities closed, none opened and 1 re-opened. Nineteen⁵ export pellet mills have opened or are under construction in the US South, and none have closed.

Figure 1-3 Net Openings and Closings – 1995-2015



The results of geographic analysis show that the six export pellet mills that were operational by 2010 did not locate in close proximity to closed facilities. Over time, however, export pellet mills have located closer to closed sites. Seventy-two percent (72%) of export pellet mills are now within 65 miles of a closed facility. However, results also demonstrated that site selection is the result of complex decision making. While vacated demand is one criterion decision makers evaluate, other factors—such as economic development incentives, tax abatements, fiber supply and price, proximity to fiber supply and proximity to a deep water port—are also important.

⁴ Non-pellet mills include any mills consuming pulpwood and residual chip fiber; pellets mills also utilize this raw material.

⁵ German Pellets-Urania, Louisiana Phase I and Phase II counted as separate openings.

Results from this study also revealed that no compelling evidence exists that pellet mills have forced competitive mills to close. In fact, in some instances, competitive mills opened or re-opened in close proximity to pellet mills. Rather, closures are the result of lagging demand for end products, not increased competition from pellet mills.

Despite the addition of export pellet mill demand, nearby mills have continued to operate. Export pellet mills have attempted to avoid competition (i.e. 61% are located more than 30 miles distant from a competitor), but they have not operated in a vacuum (i.e. 100% have located within 65 miles of a competitor). The same could be said for competing mills – historically, they have not operated in a vacuum absent of any other competition.

Table 1-1 Proximity of Export Pellet Mills to Closed/Operating Competitive Mills – Current Footprint - 2015⁶

Competitive Mill Status	Total Current Export Pellets	Proximity Analysis			
		30 Miles	65 Miles	100 Miles	100+ Miles
Operational	18	7 (39%)	18 (100%)	18 (100%)	18 (100%)
Closed	18	8 (44%)	13 (72%)	16 (89%)	18 (100%)

1.2.3 Study 3: Market Case Studies: 2006-2015

Results from the case studies suggest that multiple market drivers combine to influence price. The price trends observed in the case studies connect with surrounding regional trends – markets without export pellet mill influence in adjacent areas to markets with export pellet mill influence experienced similar general trends both in terms of price increase and price decrease.

Wood fiber prices result from the interaction of demand and supply. Export pellet mill demand in and of itself is not a factor that drives price changes. Any change in demand has a direct price impact. In most of the case studies, where demand increased, so did price. The opposite is also true; in two case studies where mills closed and demand decreased, so did prices.

In addition, results demonstrated that supply restrictions can have long-term and short-term impacts on prices. In the long-term, for instance, the decline in the sawmill residual market has put upward demand pressure on pulpwood. Short-term precipitation events (as occurred in the winter seasons of 2009 and 2013) have also put upward pressure on pulpwood.

⁶ German Pellets-Urania, Louisiana Phase I and Phase II considered as one site.

1.3 Report Conclusions

The recent advent of the export pellet mill marketplace has caused some to question the impact export pellet mills are having on pine and hardwood pulpwood forest inventory and wood fiber prices in the US South. Our data indicates that these impacts are minimal and that export pellet demand in and of itself does not drive price changes.

Forest Inventory

Data shows that pulpwood harvests for export facilities is a small fraction of overall harvests when compared to harvests for non-pellet facilities and will likely remain relatively small in the future taking into consideration realistic estimates of future export pellet demand from Europe.

In 2014, pellet exports from the US South (Atlantic and Gulf regions) to Europe were 3.6 million metric tons, or 40% of Europe's 9 million metric ton industrial pellet consumption.

Wood fiber removals for this demand represent a minor portion of harvests in the relevant regions:

- In 2014, total removals of pine for export pellet production in the Atlantic and Gulf regions totaled approximately 3.7 million tons annually compared to 117.7 million tons for non-pellet production.
- Removals for export pellet production represents 0.3% of the total pine pulpwood inventory and 0.09% of the combined pine pulpwood and sawtimber inventory.
- In 2014, total removals of hardwood for export pellet production in the Atlantic and Gulf regions totaled approximately 2.4 million tons annually. Hardwood removals for export pellet production in the Atlantic region were 2.3 million tons; in the Gulf region, hardwood removals were a mere 31,000 tons. Comparatively, non-pellet hardwood pulpwood consumers harvested 33.6 million tons.
- Removals for export pellet production represents 0.2% of the total hardwood pulpwood inventory and 0.06% of the combined hardwood pulpwood and sawtimber inventory.

Existing and under construction export pellet plants in the US South have the potential to produce 7.4 million metric tons of pellets to meet demand from funded biomass projects in Europe. Applying the US South's current market share of 40% to the 8.5 million metric tons of increased incremental European demand (see Section 4.2.10) would mean an additional 3.4 million metric tons would be supplied from the US South. Adding 3.4 million metric tons to the 7.4 million metric tons of current production capacity, the total US South industrial exports of biomass pellets to Europe could rise to 10.8 million metric tons. To produce this additional supply of pellets would require an additional 7.9 million short green tons of wood fiber.

The potential of 10.8 million metric tons of export pellets represents a total of 25.0 million tons of wood fiber, which is 1.0% of total US South pulpwood inventory and 0.3% of all US South inventory. By comparison, total removals in the US South in 2014 were 250.2 million tons or 3.3% of total inventory.

Wood Fiber Prices

It is likely that wood fiber prices would have increased without incremental demand from export pellet markets in Europe, especially when other factors such as supply restrictions and weather are taken into account.

Over the last 15 years, demand for pine fiber in the US South has increased while demand for hardwood fiber has decreased. However, in recent years, disruptions in supply have had a greater impact on wood fiber prices. During

the housing crisis and economic downturn in the US, available pulpwood and sawmill residual chip supply declined significantly in the US South. In certain years, significant precipitation events magnified supply restrictions.

In a competitive market, when supply is constrained in this way, prices for residual chips and pulpwood will naturally increase:

- Average residual supply between 2007 and 2014 was 21% less than the supply between 2000 and 2006, causing pine residual prices to increase 12.5% and hardwood residual prices to increase 10.7%; comparing averages over the respective periods.
- For pine pulpwood, since the advent of pine consuming pellet mills in 2008, non-pellet mill demand has increased by 5.8 million tons (from 111.8 to 117.7 million tons) while pellet mill demand has increased by 3.7 million tons (from 0 to 3.7 million tons). US South average pulpwood prices increased 4.5% annually over this time with similar price trends occurring for regions with and without export pellet mill influence.
- For hardwood pulpwood, since the advent of hardwood consuming pellet mills in 2010, non-pellet mill demand has decreased by 2.5 million tons (from 36.1 to 33.6 million tons) while pellet mill demand has increased by 2.4 million tons (from 0 to 2.4 million tons). US South average pulpwood prices increased 7.4% annually over this time with similar price trends occurring for regions with and without export pellet mill influence.

A comprehensive survey of the market factors affecting wood fiber supply and demand in the US South shows that changes are due, not solely to the rise of the industrial pellet market, but to a combination of the following:

- **Land ownership change** – The divestiture of industry land ownership to financial and private ownership has resulted in a stand-level management change for the growth and maximization of timber and land value instead of an operational management strategy to supply a mill with wood fiber as needed.
- **Sawmill ownership change** – The divestiture of sawmill ownership has separated the pulp/paper intercompany tie to residual chip supply, ending the cliché: “running the sawmill just to feed the paper mill.”
- **Decline in newsprint and print paper demand / increase in containerboard, fluff pulp and performance fiber demand** – With the digital age, declining demand for coated and uncoated papers has resulted in the closure of 13 newsprint and paper mills and the conversion of several to pulp and performance fiber production. These closures were market driven and not the result of competition from export pellet mills. This has also led to declining demand for hardwood wood fiber and increased demand for pine wood fiber.
- **Housing market crash and the Great Recession** – During the downturn of the market, sawmill residual chip production declined resulting in heightened demand for pulpwood. In addition, sawtimber final harvests declined, causing inventories to increase and pulpwood supply to be constrained. Also, over this time, OSB production has shifted from older, less efficient mills to larger, more efficient mills. As the housing market has recovered, these OSB mills have steadily increased their purchases of pine pulpwood.
- **Precipitation events** – Long-term precipitation patterns and strong deviations from average, such as above average rainfall in 2009 and 2013, have caused volatility in pulpwood pricing.

- **Pellet mill demand** – With the development of the pellet industry, competitive demand for wood fiber has been interjected into the market.

Each of these factors is correlated to and has affected both forest inventory and price for wood fiber and sawtimber products. Moreover, pulpwood price increases in regions with export pellet mill influence are comparable to price increases in regions without pellet mill influence. While a multivariate statistical analysis is needed to confirm and quantify how each of these factors combines together to affect the market, these studies demonstrate that it is unlikely that pellet mill development alone drives changes to forest inventory levels and wood fiber prices. It is more likely that all of the above variables combine and interact to influence forest inventory and price.

2 Scope of Studies

2.1 Study 1: Wood Supply and Pricing Trends: 2000-2014

The objective of Study 1 is to provide historical wood supply and pricing trends for pulpwood, sawtimber and residual chips. The purpose here is to provide a view as to which market drivers have been affected by incremental demand from export wood pellets and which ones would have occurred independently. Supporting detail is provided around the market drivers for price trends and volatility, including:

- The interrelationship between sawtimber demand, residual chip supply and pulpwood supply
- Changes in demand from incremental pellet demand and non-pellet demand
- Other influences such as weather-related events

2.2 Study 2: Geographic Distribution of Operational and Closed Wood Fiber Consumers: 1995-2015

The objective of Study 2 is to contextualize the historical and current relationship of export wood pellet mills to traditional wood fiber consumers by examining the operating status and distance between pellet mills and pulp/paper, oriented strand board (OSB), panel and composite mills. By performing this analysis at multiple points in time and by identifying where demand has been vacated and where incremental demand has emerged, the study answers the following questions:

- How has the landscape of fiber consuming mills changed—or not—over time?
- To what extent have pellet mills filled market voids left by closed forest products mills?
- In areas where export pellet mills have located, have nearby competitor mills continued to operate (i.e., not been forced to close due to pellet demand)?

2.3 Study 3: Market Case Studies: 2006-2015

The objective of Study 3 is to provide actual case studies to examine the role that market drivers have played relative to price changes. Market drivers such as those listed in the scope of Study 1 were examined. Several case studies have been selected to demonstrate markets where both pellet demand was added and markets where pellet demand was not added as well as markets where demand was reduced:

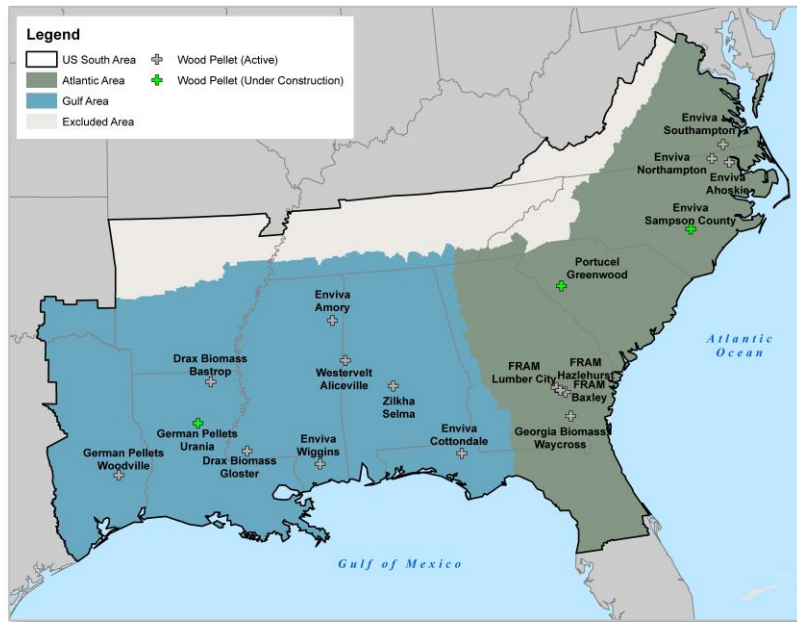
- 1) An export pellet mill locates within the wood basin of a closed traditional, competitor mill
- 2) An export pellet mill locates within the wood basin of an operational competitor mill: Florida Panhandle
- 3) An export pellet mill locates within the wood basin of an operational competitor mill: Coastal Georgia
- 4) A traditional, competitive mill locates within the wood basin of another traditional competitor mill
- 5) A traditional, competitive mill closes and no new competitive demand, including wood pellet demand, enters the wood basin

2.4 Geographic Scope

For Study 1, the US South was divided into two sub-regions: an Atlantic Area and a Gulf Area as identified in Figure 2-1. The sub-regions were created based on which oceanic route export pellet mills were likely to use. For

Study 2, individual mill locations were examined across the entire southern region. For Study 3, individual wood basins were chosen based on competitive procurement patterns (see Section 4.3 for case study maps).

Figure 2-1 US South Study Areas



3 Initial Observation – Wood Chip Mill Emergence in the 1990s

Similar to concerns being voiced today regarding the emergence of the export wood pellet industry, the rapid proliferation of wood chip mills in the US South between 1985 and 2000 generated considerable controversy. Much like today, environmentally minded non-governmental organizations (NGOs) were concerned about impacts to forest resources and habitat while competing users of feedstock were concerned about 1) erosion of margin due to price increases and 2) that feedstock was being diverted to export markets. By examining the evolution and maturity of wood chip mills in the US South, we can see how those concerns played out and perhaps shed light on how these same issues may play out for the export wood pellet industry.

As federal policies began restricting harvests on federal land in the Northwest, the resulting supply constraints forced the industry in that region to downsize. More than 200 Northwest sawmills closed between 1989 and 2004⁷. In 1990 alone, the year the Northern Spotted Owl was declared a threatened species, 50 mills closed in the region. At the same time, forested acres in the US South were increasing, the result of afforestation on abandoned agricultural land. Since being overharvested early in the 20th century, forests in the South—more than 80 percent of them privately owned—had recovered and offered abundant, sustainable, fast growing supply. The convergence of these two factors—supply constraints in the Pacific Northwest and abundant sustainable supply in the South—led to the migration of the forest products industry from the Pacific Northwest to the South beginning in the 1990s.

As more production capacity trickled into the South, the needs of pulp and panel manufacturers to optimize their supply chains in order to absorb this incremental demand led many of them to replace their remote pulpwood yards with chip mills. Before the influx, pulp and panel mills depended on remote log concentration yards and installed large on-site chipping facilities at their manufacturing plants. Because it is expensive to load and haul logs, however, the decision to rely more heavily on the chip mill model was an economic one. In this model, pulpwood is chipped at a standalone, satellite facility and then shipped to the manufacturing facility as needed for a much lower cost.

At the same time, Pacific Northwest production was moving to the South, Japanese hardwood pulp producers were ramping up production. With limited domestic resources, these producers began targeting and securing wood fiber supply from southern entities who built chip mills for export. Prior to 1985, 32 chip mills existed in the South; as a result of incremental demand from both the migration of Pacific Northwest production to the South and exports to Japan, by 2000, that number had increased to more than 150⁸.

This rapid proliferation of the chip mill model generated considerable controversy. Organizations like the Dogwood Alliance emerged in the environmental movement fighting chip mills. The arguments of these organizations included:

- “Chip mills have encouraged massive, industrial-scale clearcutting across the South.”⁹

⁷ Welch, C. (2004, 04 11). Old-growth logging nearing a standstill in dramatic shift. *Seattle Times*. Retrieved from <http://community.seattletimes.nwsourc.com/archive/?date=20040411&slug=forestplan11m>

⁸ Jehl, D. (2000, August 8). Loggin's Shift South Brings Concern on Oversight. *New York Times*.

⁹ Smith, D. (1998, Winter). The Infestation of Chip Mills in the Southern U.S. *Synthesis/Regeneration*, pp. 15-17. Retrieved from www.greens.org/s-r/15/15-17.html

- “Since the mid-1980’s, at least 100 chip mills have sprung up like measles across the landscape of the South, causing unprecedented forest destruction.”⁹
- “If a forest is managed for wood chips it could be cut on continuous rotations as short as 20 years, thereby reducing the forest to its lowest economic and ecological value—a fiber farm.”⁹
- “Although only a small percentage of the wood chips produced in the South are exported, exports are unnecessarily increasing the burden on our forest resources and have a negative impact on jobs. Sawmills have already had to close down because of the increase in prices driven by the export markets.”¹⁰

These arguments proved to be hyperbolic and even false in the end. Chip mills were not a source of forest destruction, a reduction in harvest timing did not occur and the fact that wood chips were exported did not put other forest products companies out of business, nor did they put undue burden on forest resources in the South. A study commissioned by the State of North Carolina in 2000, for instance, concluded that while they did find that wood chip mills increased the forest areas harvested in the state, the actual impacts were much “lower than commonly presumed or publicized in popular literature opposing wood chip mills. Even with increased harvests experienced in the 1990s, the state as a whole would generally have sustainable inventory and removal levels in the foreseeable future based on simple growth to removal ratio analyses for the addition of wood chip mills alone.”¹¹

And by looking at historical data now, the dire consequences predicted did not materialize.

- The main focus of the attacks on wood chip mills, which used 88% hardwoods and 12% softwoods¹¹, was that they were clearcutting hardwood forests and replacing them with pine plantations. Today, hardwood comprises 59% of the timber inventory in the South, and more than 148 million acres are natural hardwoods. In addition, natural hardwoods in the South have a growth to removals ratio of 2.45, which means that for every ton of natural hardwood that is harvested each year, the forest is growing an additional 2.45 tons of volume.
- Rotation lengths have not changed because the reason for a clear cut harvest is the production of higher value sawtimber, not lower grade wood fiber like wood chips or pulpwood. Any changes in rotation age that do occur are due to an increase in productivity brought about by better management practices.
- Exports made up 5% of chip markets in 2000, a small percent that was unlikely to affect forest resources as a whole. No statistical correlation between sawtimber prices and export wood chip markets exists.

Today, roughly 70 wood chip mills remain in the South. The real market drivers behind this change include:

- Japanese demand for hardwood chips peaked in 1998 and then dropped precipitously when Japan started sourcing wood from New Zealand, Australia and Indonesia.
- Hardwood pulpwood demand decreased in the South as demand for writing paper (uncoated freesheet) fell in the wake of technological advancements.

¹⁰ Manuel, J. (1999, August). Do Wood Chip Mills Threaten the Sustainability of North Carolina Forests? *North Carolina Insight*, pp. 66-91.

¹¹ Dodrill, J. D., Cabbage, F. W., Schaberg, R. H., & Abt, R. C. (2002, Nov-Dec). Wood chip mill harvest volume and area impacts in North Carolina. *Forest Products Journal*. Retrieved from www.freepatentsonline.com/article/Forest-Products-Journal/96121846.html

- With the advent of the sawhead shear in 1994, logging production increased, and high production loggers could be placed near the mill. As a result, there was not as much of a need to have satellite operations to provide surge capacity for mills.
- Mill consolidation meant fewer pulp mill companies could fully utilize chip mills (for example, instead of two competing chip mills running at 50% capacity, one—operated by the consolidated company—could run at 100%)
- The chip mills built in the 1980s and 1990s had a chipping capacity of 200-300,000 tons per year. New ones operate at 750,000 to 1,000,000 tons annually.

Similar arguments are now being floated about the effects of the industrial export wood pellet industry on southern forest resources. The purpose of the following sections is to present a complete and objective view on all market drivers before and after the appearance of pellet mills.

4 Study Results

4.1 Study 1: Wood Supply and Pricing Trends: 2000-2014

4.1.1 Market History

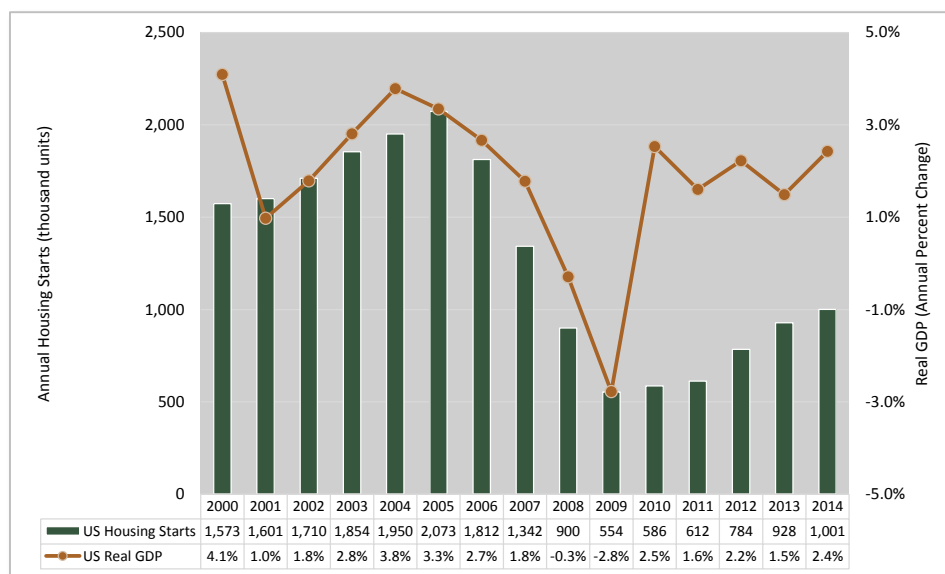
In order to understand trends in wood supply and pricing, it is important to understand the history of timber markets. The beginning decade and subsequent four years of the 21st century can be described as a re-invention of the US South forest products industry. This era was marked by segregation of the traditional integrated forest products companies, specifically the separation of timberland (and therefore the raw material resource supply) and sawmill production (and therefore residual chip fiber supply) from pulp and paper mill production. In addition, non-strategic assets were divested and multiple paper producing mills closed or converted to other product lines. Four distinct periods are worth noting.

Early Woes and Consolidation (2000-2002)

At the start of the century, after the dot-com era of the 1990s, the forest products industry underwent its first wave of consolidation, beginning with International Paper’s acquisition of Champion International and the takeover of Willamette Industries by Weyerhaeuser Company. It was during this time that the use of the internet rapidly expanded and marked a strong decline in the use of newsprint, print advertising and, subsequently, printing papers.

Between March and November of 2001, the US experienced its first recession of the century. It was during this time that both the expiration of the US-Canadian Softwood Lumber Agreement and the events of September 11 occurred, creating a dour operating environment that lasted well into 2002. Despite these events, however, GDP grew 2.4% annually and housing starts were steady, ranging between 1.5 and 1.8 million starts per year (Figure 4-1).

Figure 4-1 US Housing Starts and Gross Domestic Product – 2000-2014



Of notable significance was the spin-off of Georgia-Pacific's (GP) timberland base. In the late 1990s, GP had separated its timberland into the subsidiary called the Timber Co. In July 2000, it was announced that Plum Creek Timber Co., a real estate investment trust (REIT), was acquiring the subsidiary. It was the beginning trend of traditional forest products companies severing their vertical integration, which tied the raw material resource to the mill, by selling to financial owners with differing timberland management objectives.

Housing Boom and Asset Sales (2003-2006)

Over this 4-year period, GDP grew 4.1% annually driving demand in containerboard and fluff pulp markets while demand for newsprint and printing papers continued to wane. However, it was the housing market that captured attention.

Beginning in 2003, the US housing market exploded from a February 2003 index measurement of 1.6 million starts per year to a height in January 2006 of 2.3 million starts per year. Sawmills, particularly in the western portion of the US South, increased production to match an almost insatiable demand for lumber. Also during this time, four OSB plants were announced and constructed (Section 4.2):

- Louisiana-Pacific in Thomasville, Alabama
- RoyOMartin in Pawnee, Louisiana (Oakdale Mill)
- Grant Forest Products (now owned by Georgia-Pacific) in Allendale and Clarendon Counties, South Carolina

Perhaps the most significant event of this period was the announcement by International Paper (IP) in 2004 that it was transforming its business portfolio through the divestiture of its solid wood products facilities and 6.8 million acres of timberland. In April 2006, it followed through with this strategy when it sold almost its entire US South portfolio: 3.8 million acres to Resource Management Service and 0.9 million acres to TimberStar. It was the largest land sale since the Gadsden Purchase.

In November 2006, IP again followed through with its strategy, announcing the sale of 13 sawmills to West Fraser, marking the largest solid wood investment in the US South by a Canadian-owned company.

Also of significance was Potlatch Corporation's conversion to REIT status. As a part of its conversion, it divested of its Cypress Bend, Arkansas paperboard mill to Clearwater Paper Co.

Housing Bust, Consolidation, Expansion, More Land Sales and Wood Pellets (2007-2009)

During 2006 and into 2007, the effects of sub-prime mortgage lending had taken hold. The US officially entered into the Great Recession in December of 2007 and an over-built housing market crashed to a historical low of less than 500,000 starts in early 2009. While experiencing profitable gain during the prior period, sawmill producers operated close to break-even or experienced periodic losses during this time. Approximately 20 southern yellow pine (SYP) mills closed over the period, and those that remained opened were ones that had held onto their cash for liquidity or had invested in cap-ex improvements that lowered their production cost substantially. In 2009, sawmills were operating, on average, at 60% of capacity.

Sawmills, however, were not the only solid wood producers affected. Approximately 10 plymills and 3 OSB mills were shuttered over the period. In addition, Louisiana-Pacific and Grant Forest Products mothballed the newly constructed OSB mills mentioned previously.

Notable changes were also taking place in the pulp and paper industry. International Paper announced the following:

- November 2007 – the Bastrop, Louisiana mill would be converted from uncoated freesheet paper production to market and fluff pulp grades.
- December 2008 – the Bastrop, Louisiana mill would close permanently due to declining world demand for market pulp.
- October 2009 – the Pineville, Louisiana (linerboard) and Franklin, Virginia (uncoated freesheet) mills would close permanently. The Franklin mill would later reopen in late 2011 for fluff pulp production.

Other notable conversions included Domtar’s Plymouth, North Carolina mill from uncoated freesheet to fluff pulp and Resolute Forest Products’ newsprint machine at its Coosa Pine, Alabama mill to packaging grades.

Timberland ownership changes continued during this period. Of note were:

- August 2007 – the former Temple-Inland¹² divested its timberland (1.6 million acres) to Campbell Global and the Forestar Group.
- August 2007 – the former MeadWestvaco¹³ divested a portion of its Georgia and Alabama timberlands to Wells Timberland REIT (now called Catchmark Timber Trust).
- December 2009 – Weyerhaeuser announced it would convert to REIT status. Its containerboard mills in Pine Hill, Alabama, Campiti, Louisiana and Valiant, Oklahoma were divested and sold to International Paper while it maintained ownership of a few market pulp mills.

This time period was also significant in that the first industrial grade export pellet mills were built. In 2007, the first company to open in the US South was FRAM Renewable Fuels’ Appling County Pellet mill in Baxley, Georgia. The second was the former Green Circle Energy¹⁴ mill in Cottondale, Florida in 2008.

Post-Recession and Pellet Mill Growth (2010-2014)

Exiting the recession in 2009, the housing market improved gradually and passed the 1.0 million mark in 2014. GDP increased 2.1% annually over the four-year period. Solid wood producers gradually increased production operating at roughly 80% of capacity; however, by this time 20% of 2006 capacity had been permanently removed.

Declining trends for newsprint and paper continued as containerboard, fluff pulp and performance fiber production grew. As a result of these consumer driven trends, several notable changes occurred. Rayonier Advanced Materials converted and expanded a fluff pulp line in Jesup, Georgia to produce performance cellulose fibers. In 2014, International Paper closed its Courtland, Alabama paper mill and Domtar announced in December 2014 that it was converting an uncoated freesheet machine at its Ashdown, Arkansas mill to fluff pulp production. During this time, International Paper also acquired Temple-Inland Inc. and split apart its containerboard mills and sawmills by selling the latter to Georgia-Pacific.

¹² Temple-Inland’s containerboard mills are now owned by International Paper Co. Its sawmills are now owned by Georgia-Pacific Corp.

¹³ MeadWestvaco merged with RockTenn in 2015 to become the WestRock Co.

¹⁴ The Green Circle mill is now owned by Enviva Biomass.

As for timberland sales, the majority of large land holdings had previously been divested or converted to REIT status. In 2013, MeadWestvaco sold the remainder of its holdings to Plum Creek, and this marked the last integrated land holding to be sold by a pulp and paper company.

During this period, the development of large-scale industrial grade export pellet mills expanded. Led by Enviva Biomass, Georgia Biomass, German Pellets and Drax, approximately 18 industrial grade export pellet mills became either operational or were under construction (Section 4.2).

4.1.2 Forest Inventory and Harvest Removal Definitions

The principal source of timber resource information in the United States is the Department of Agriculture Forest Service's Forest Inventory and Analysis (FIA) database. The Forest Service is mandated to conduct periodic assessments of timber inventories across the United States. Inventory measurements in this report represent growing stock tons on private timberland only as the majority of harvests in the US South occur on this ownership type.

The Forest Service defines growing stock inventory as trees at least 5.0 inches in diameter-at-breast-height (DBH) to a minimum 4.0 inch top diameter. It defines pine sawtimber inventory as trees being 9.0 inches in DBH and larger. It defines hardwood sawtimber inventory as trees being 11.0-inches in DBH and larger. Pulpwood inventory, therefore, is defined as 5.0 inches to 8.9 inches in DBH for pine and to 10.9 inches in DBH for hardwood. Inventory data in this report follow the Forest Service delineations, however, it should be noted that operationally within the market, pulpwood and sawtimber diameter ranges can overlap. In addition, top diameters for pulpwood may be less than the 4.0 inch minimum.

For harvest removals, data is sourced from Forest2Market's proprietary databases and the Forest Service's Timber Product Output database. These databases represent operational harvested trees that are considered "pulpwood" and "sawtimber." Pulpwood is defined as trees that are harvested and delivered to pulp/paper, pellet, chip and OSB mills. It is likely that pulpwood contains some trees with diameters over 8.9 or 10.9 inches as defined by the FIA inventory database. This is due to many factors, including supply/demand/price interaction, the harvester's operational cost to merchandise, and sawtimber quality defects that preclude the tree from being sawn into lumber or plywood.

Sawtimber is defined as trees that are harvested and delivered to sawmills for the production of lumber, ply and veneer mills for the production of wood panels and post/pole mills. As with pulpwood, operational advantages may include trees with smaller diameters being used as sawtimber.

4.1.3 Interaction of Sawtimber and Pulpwood Forest Inventory and Harvest Removal Trends

In general, pulpwood supply to the market is generated in two ways: by forest thinnings and as a lower-valued, by-product from a final harvest. Landowners, in general, will grow their timber for larger diameter trees. The reason for this is that lumber and plymill producers require and pay more for larger diameter trees than pulp/paper, OSB and export pellet mills. For example, if a lumber producer desires to produce a solid wood, 12-inch wide board, it must procure trees with a diameter of at least 13 to 14-inches (if the producer is using a plainsawn method, and even wider if using quarter or riftsawn methods). In order to make it worthwhile to grow

this larger tree size, a landowner must be compensated for the time it takes to grow larger timber. Because of this investment, landowners are price sensitive to the price of sawtimber, particularly non-industrial private landowners who have flexibility with respect to the timing and strategy of their timber harvests. It is Forest2Market's opinion that they are price conscious and may delay timber harvests until they perceive prices are "high."

As a result, the harvest of pulpwood is related to sawtimber markets. When sawtimber pricing is depressed and final harvests are delayed, the residual pulpwood from the harvest is unavailable. Between 2006 and 2012, available pulpwood supply was restricted due to a fall-off in final harvest timber. Because of the dramatic decrease in housing starts, lumber was not needed by the housing industry so sawtimber harvests were delayed¹⁵. In addition, when sawtimber harvests were delayed and sawmills did not produce as much lumber, the supply of sawmill residual chips produced in the market also decreased. This heightened the demand for pulpwood, as pulpwood is a substitute for sawmill residual chips. When sawtimber markets are depressed (and final harvests are delayed), a greater percentage of pulpwood is generated from forest thinnings. These restrictions in the supply of both pulpwood and residual chips put upward price pressure on pulpwood. See Section 4.1.8 for more detail on the interaction of sawmill residual chips and pulpwood.

4.1.4 Forest Inventory and Harvest Removal Trends – Atlantic Region – Pine Species

Total inventory for pine species has increased 1.7% annually over the last 15 years in the Atlantic Region (Table 4-1, Figure 4-2). This was primarily driven by declining demand for sawtimber during the recession and post-recessionary period between 2006 and 2010. Since 2010, sawtimber harvests have increased roughly 2.0 million tons per year with the exception of 2014. Overall, sawtimber inventory increased 2.4% annually.

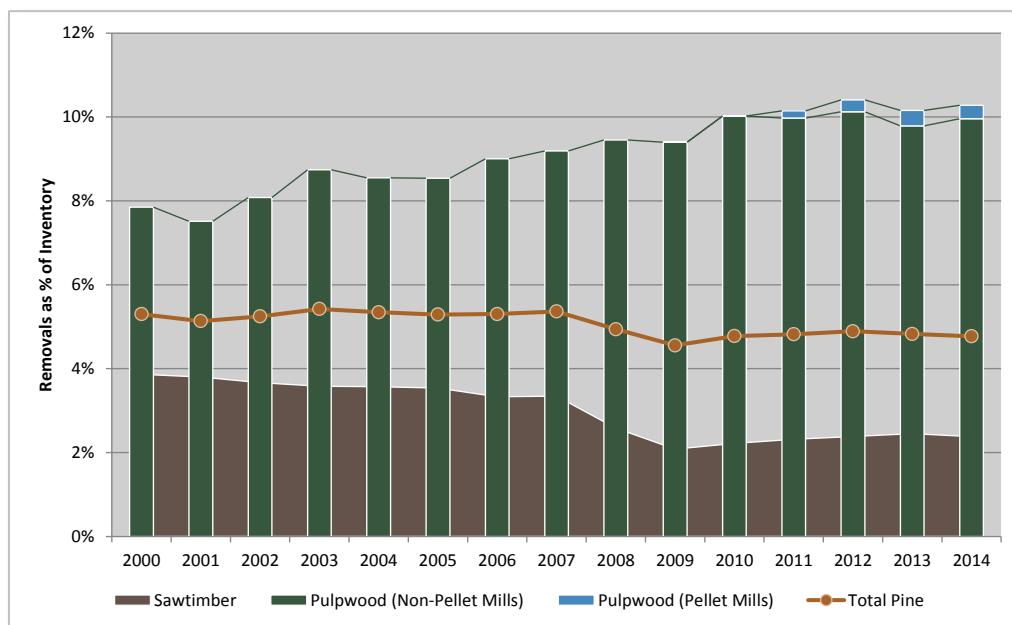
Pulpwood inventory increased 0.4% annually and was slightly more volatile year-to-year than sawtimber. This volatility is the result of stand-level management and the way that pulpwood inventory is harvested and delivered to consumers (as described in Section 4.1.3). This effect was evident during the decline in pine pulpwood inventory from a height of 516.1 million tons in 2008 to 506.0 million tons in 2012. Since 2012, pulpwood inventories have recovered to a 15-year high of 524.6 million tons.

¹⁵ <http://blog.forest2market.com/stumpage-market-trends-us-south-harvest-type-tons-per-acre>

Table 4-1 Forest Inventory and Harvest Removal Trends – Atlantic Region – Pine Species

Year	Atlantic Region										
	Pulpwood					Sawtimber			Total Pine		
	Inventory	Non-Pellet Mill Removals	Removals	Pellet Mill Removals	Removals	Inventory	Removals	Removals	Inventory	Removals	Removals
	(million tons)		% of Inventory	(million tons)	% of Inventory	(million tons)	% of Inventory		(million tons)	% of Inventory	
2000	490.7	38.5	7.8%			872.2	33.7	3.9%	1,362.9	72.2	5.3%
2001	490.4	36.8	7.5%			875.3	33.3	3.8%	1,365.7	70.1	5.1%
2002	496.1	40.1	8.1%			889.5	32.6	3.7%	1,385.6	72.7	5.2%
2003	495.5	43.3	8.7%			892.2	31.9	3.6%	1,387.7	75.3	5.4%
2004	505.6	43.2	8.6%			912.6	32.6	3.6%	1,418.2	75.8	5.3%
2005	505.4	43.2	8.5%			938.5	33.2	3.5%	1,443.8	76.3	5.3%
2006	505.9	45.5	9.0%			948.6	31.6	3.3%	1,454.5	77.1	5.3%
2007	512.4	47.1	9.2%			971.1	32.5	3.3%	1,483.5	79.6	5.4%
2008	516.1	48.8	9.4%			987.5	25.5	2.6%	1,503.6	74.3	4.9%
2009	512.5	48.2	9.4%	0.0	0.0%	1,004.4	20.9	2.1%	1,516.9	69.1	4.6%
2010	504.7	50.6	10.0%	0.0	0.0%	1,035.0	23.0	2.2%	1,539.7	73.5	4.8%
2011	503.3	50.2	10.0%	0.9	0.2%	1,070.1	24.8	2.3%	1,573.4	75.8	4.8%
2012	506.0	51.2	10.1%	1.5	0.3%	1,113.5	26.5	2.4%	1,619.5	79.2	4.9%
2013	517.9	50.7	9.8%	1.9	0.4%	1,160.7	28.4	2.5%	1,678.6	81.0	4.8%
2014	524.6	52.2	10.0%	1.7	0.3%	1,207.6	28.7	2.4%	1,732.2	82.6	4.8%
Average	505.8	46.0	9.1%	1.0	0.2%	991.9	29.3	3.0%	1,497.7	75.6	5.1%
Trendline Growth Rate	0.4%	2.4%	2.0%	61.8%	58.9%	2.4%	-2.2%	-4.5%	1.7%	0.7%	-0.9%

Figure 4-2 Forest Inventory and Harvest Removal Trends – Atlantic Region – Pine Species



Export Pellet Mill Impact – Atlantic Region – Pine Species

As shown in Table 4-1, export pellet mills in the Atlantic Region purchased approximately 1.7 million tons of pine pulpwood in 2014, equating to approximately 0.3% of the pulpwood inventory and 3.2% of pine pulpwood removals. The 1.7 million tons of pine includes a ramp-up from low levels in 2009 and 2010 to 1.5 million tons in 2012. Since 2012, only 0.3 million tons have been added (discrepancy due to rounding).

In comparison, non-pellet mills increased their pine pulpwood purchases from 48.2 million tons in 2009 to an average of 50.7 million tons between 2010 and 2013. In 2014, with improved markets for containerboard and

OSB, pulpwood demand increased another 1.5 million tons to 52.2 million tons. The 2014 demand from non-pellet consumers equates to 10.0% of the pulpwood inventory and 96.8% of pine pulpwood removals.

Since 2010, increased demand for pine pulpwood for export pellet uses has been 1.7 million tons compared to an increase in demand for non-pellet uses of 1.6 million tons.

4.1.5 Forest Inventory and Harvest Removal Trends – Atlantic Region – Hardwood Species

Total hardwood inventory in the Atlantic Region has increased 0.1% annually over the last 15 years (Table 4-2, Figure 4-3). Total inventory averaged 1,766.2 million tons in 2000 and declined until the recession in 2009. Since 2009, total inventory has increased 0.6% to a total of 1,806.0 million tons in 2014.

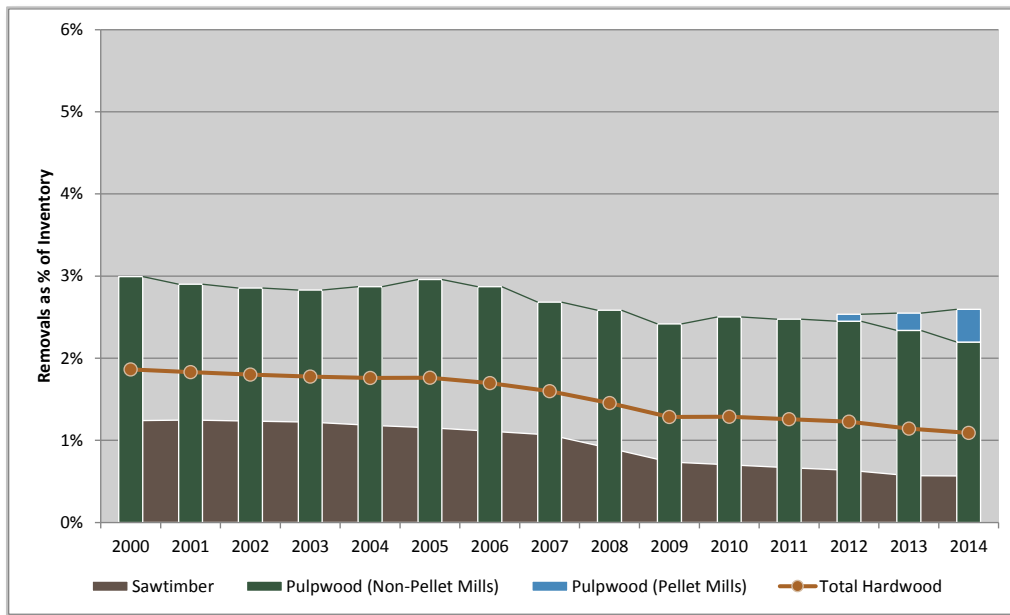
While total inventory has increased, two disparate trends have occurred with sawtimber and pulpwood inventories. Sawtimber inventory has increased every year since 2000, averaging 0.5% annually. Pulpwood inventory, on the other hand, has decreased by 0.6% annually. In terms of harvest removals, however, this disparity disappears. Both pulpwood and sawtimber removals have declined over the timeframe. Pulpwood removals have decreased 2.6% annually while sawtimber removals have declined 5.9% annually.

The upward trend in inventory, particularly with sawtimber, is reflective of declining demand for hardwood in this region. Hardwood sawmill capacity has been rationalized, as “mom and pop” operations were absorbed by larger, more efficient producers. Sawtimber harvest removals in 2014 of 6.9 million tons were just 49.1% of the 14.1 million tons that were harvested in 2000. Even at the height of the US economy in 2005-06, sawtimber removals dropped to roughly 13.0 million tons. As for pulpwood, with declining demand for paper, the need for hardwood declined. Removals in 2014 of 12.8 million tons were 68.0% of the 18.8 million tons harvested in 2000. With declining demand, hardwood timber continued to grow and age. Eventually, as the pulpwood aged and became larger, it transitioned into the sawtimber category and with anemic demand from sawmills, the inventory in this product class continued to increase.

Table 4-2 Forest Inventory and Harvest Removal Trends – Atlantic Region – Hardwood Species

Year	Atlantic Region										
	Pulpwood					Sawtimber			Total Hardwood		
	Inventory (million tons)	Non-Pellet Mill Removals	Removals % of Inventory	Pellet Mill Removals (million tons)	Removals % of Inventory	Inventory (million tons)	Removals	Removals % of Inventory	Inventory (million tons)	Removals	Removals % of Inventory
2000	627.9	18.8	3.0%			1,138.3	14.1	1.2%	1,766.2	32.9	1.9%
2001	620.1	18.0	2.9%			1,140.4	14.2	1.2%	1,760.5	32.2	1.8%
2002	613.1	17.5	2.9%			1,142.7	14.1	1.2%	1,755.8	31.6	1.8%
2003	600.6	17.0	2.8%			1,144.1	14.0	1.2%	1,744.7	31.0	1.8%
2004	596.2	17.1	2.9%			1,148.5	13.6	1.2%	1,744.7	30.7	1.8%
2005	582.7	17.2	3.0%			1,144.1	13.2	1.2%	1,726.8	30.4	1.8%
2006	575.0	16.5	2.9%			1,152.9	12.8	1.1%	1,727.9	29.3	1.7%
2007	572.6	15.4	2.7%			1,166.1	12.4	1.1%	1,738.7	27.8	1.6%
2008	569.1	14.7	2.6%			1,167.5	10.6	0.9%	1,736.6	25.3	1.5%
2009	572.4	13.8	2.4%			1,179.1	8.7	0.7%	1,751.5	22.5	1.3%
2010	571.3	14.3	2.5%			1,181.4	8.3	0.7%	1,752.8	22.6	1.3%
2011	573.1	14.2	2.5%			1,185.4	7.9	0.7%	1,758.5	22.1	1.3%
2012	575.9	14.1	2.5%	0.5	0.1%	1,192.5	7.6	0.6%	1,768.4	22.2	1.3%
2013	580.1	13.6	2.3%	1.2	0.2%	1,210.4	6.9	0.6%	1,790.5	21.7	1.2%
2014	582.2	12.8	2.2%	2.3	0.4%	1,223.8	6.9	0.6%	1,806.0	22.0	1.2%
Average	587.5	15.7	2.7%	1.3	0.2%	1,167.8	11.0	0.9%	1,755.3	26.9	1.5%
Trendline Growth Rate	-0.6%	-2.6%	-2.0%	131.3%	129.8%	0.5%	-5.9%	-6.4%	0.1%	-3.5%	-3.6%

Figure 4-3 Forest Inventory and Harvest Removal Trends – Atlantic Region – Hardwood Species



Export Pellet Mill Impact - Atlantic Region – Hardwood Species

As shown in Table 4-2, export pellet mills in the Atlantic Region purchased approximately 2.3 million tons of hardwood pulpwood in 2014, equating to approximately 0.4% of the pulpwood inventory and 15.2% of hardwood pulpwood removals. The 2014 demand from non-pellet consumers equates to 2.2% of the pulpwood inventory and 84.8% of pine pulpwood removals.

The 2.3 million tons of pellet demand for hardwood pulpwood includes a ramp-up from zero production in 2011 and low levels in 2012 of 0.5 million tons. In comparison, over the same time period, non-pellet mills decreased their hardwood pulpwood purchases from 14.2 million tons in 2011 to 12.8 million tons in 2014, a difference of 1.3 million tons. When compared to the 15-year trend, non-pellet mills have decreased their pulpwood purchases by 0.8% of inventory. When factoring in the demand from pellets, another 2.3 million tons of hardwood pulpwood demand could be added before reaching the height of the market (3.0% of inventory) in the years 2000 and 2005.

4.1.6 Forest Inventory and Harvest Removal Trends – Gulf Region – Pine Species

Pine inventory trends in the Gulf Region mirror that of the Atlantic with the exception of the volatility in pine pulpwood inventory (Table 4-3, Figure 4-4). Total pine inventory has increased 2.1% annually since 2000 from the combination of a 2.2% annual increase in pine sawtimber inventory and a 1.7% annual increase in pine pulpwood inventory.

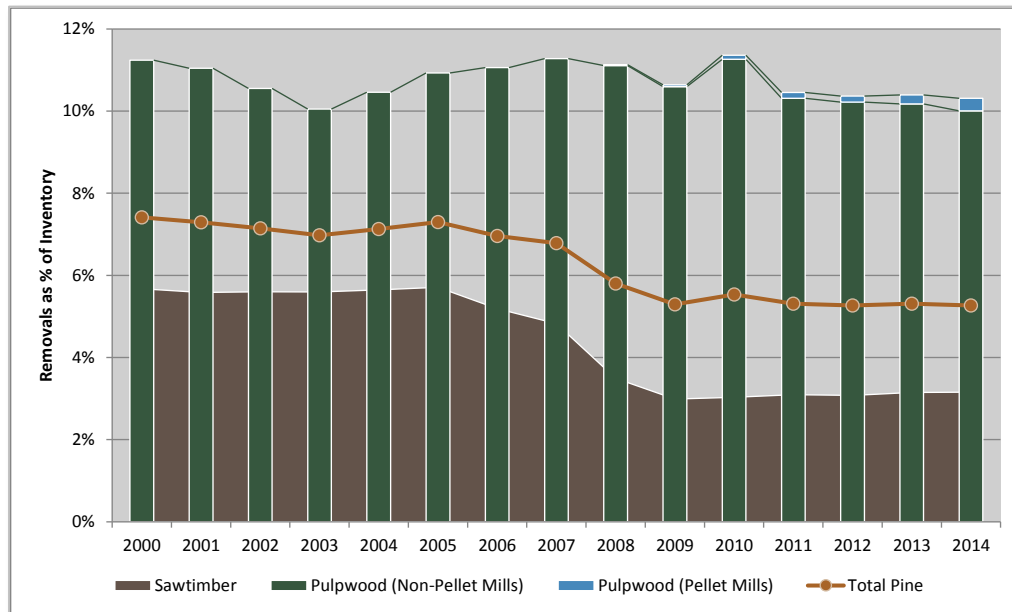
Harvest removal trends also mirror the Atlantic. In 2005, pine sawtimber removals reached their height during the housing boom at 71.4 million tons. By 2009, harvest removals fell during the housing bust to a low of 39.7 million tons. Since this time, sawtimber removals have increased 4.5% annually. Pulpwood removals from non-

pellet mills have increased 1.2% annually over the timeframe. In terms of removals as a percent of inventory, both sawtimber and pulpwood (non-pellet mills) have declined.

Table 4-3 Forest Inventory and Harvest Removal Trends – Gulf Region – Pine Species

Year	Gulf Region										
	Pulpwood					Sawtimber			Total Pine		
	Inventory	Non-Pellet Mill Removals	Removals % of Inventory	Pellet Mill Removals	Removals % of Inventory	Inventory	Removals	Removals % of Inventory	Inventory	Removals	Removals % of Inventory
	(million tons)			(million tons)		(million tons)			(million tons)		
2000	517.2	58.1	11.2%			1,137.4	64.5	5.7%	1,654.6	122.7	7.4%
2001	522.9	57.7	11.0%			1,148.0	64.1	5.6%	1,670.9	121.8	7.3%
2002	529.0	55.8	10.6%			1,168.2	65.4	5.6%	1,697.1	121.2	7.1%
2003	536.5	53.9	10.0%			1,192.7	66.7	5.6%	1,729.1	120.6	7.0%
2004	544.4	56.9	10.5%			1,223.6	69.1	5.6%	1,768.0	126.0	7.1%
2005	548.8	60.0	10.9%			1,251.4	71.4	5.7%	1,800.2	131.4	7.3%
2006	555.0	61.4	11.1%			1,284.8	66.7	5.2%	1,839.8	128.0	7.0%
2007	563.8	63.6	11.3%			1,293.8	62.4	4.8%	1,857.6	126.0	6.8%
2008	567.6	63.0	11.1%	0.1	0.0%	1,307.9	45.7	3.5%	1,875.5	108.8	5.8%
2009	573.8	60.8	10.6%	0.3	0.0%	1,328.9	39.7	3.0%	1,902.7	100.7	5.3%
2010	586.1	66.0	11.3%	0.6	0.1%	1,363.2	41.3	3.0%	1,949.3	107.9	5.5%
2011	607.1	62.6	10.3%	0.9	0.1%	1,407.5	43.5	3.1%	2,014.6	107.0	5.3%
2012	623.6	63.7	10.2%	0.9	0.1%	1,450.0	44.6	3.1%	2,073.7	109.2	5.3%
2013	641.5	65.2	10.2%	1.4	0.2%	1,505.1	47.4	3.1%	2,146.6	114.0	5.3%
2014	653.9	65.4	10.0%	2.0	0.3%	1,565.2	49.4	3.2%	2,219.1	116.8	5.3%
Average	571.4	61.0	10.7%	0.9	0.1%	1,308.5	56.1	4.4%	1,879.9	117.5	6.3%
Trendline Growth Rate	1.7%	1.2%	-0.4%	54.8%	46.9%	2.2%	-3.6%	-5.8%	2.1%	-1.0%	-3.0%

Figure 4-4 Forest Inventory and Harvest Removal Trends – Gulf Region – Pine Species



Export Pellet Mill Impact - Gulf Region – Pine Species

Gulf Region export pellet mills have ramped up production over the last 7 years. In 2008, pellet mills started consuming pine pulpwood, and harvest removals for this purpose have increased steadily year over year by increments of 0.2 million tons initially and growing to 0.6 million tons in 2014. More recent growth in the rate of incremental demand occurred between 2013-2014 with the addition of German Pellets, Drax Biomass and the Westervelt Co. These facilities moved consumption from 0.9 million tons in 2012 to 2.0 million tons in 2014, equating to 0.3% of pine pulpwood inventory and 3.0% of pine pulpwood removals.

In comparison, non-pellet mills increased their pine pulpwood purchases from 63.0 million tons in 2008 to an average of 63.7 million tons between 2009 and 2013. In 2014, with improved markets, pulpwood demand increased to almost the market high at 65.4 million tons. The 2014 demand from non-pellet consumers equates to 10.0% of the pulpwood inventory and 97.0% of pine pulpwood removals.

Since 2008, when pine pulpwood removals for pellet mills began, demand for pine pulpwood for pellet uses has increased 1.9 million tons. In comparison, demand for non-pellet uses increased by 2.4 million tons.

4.1.7 Forest Inventory and Harvest Removal Trends – Gulf Region – Hardwood Species

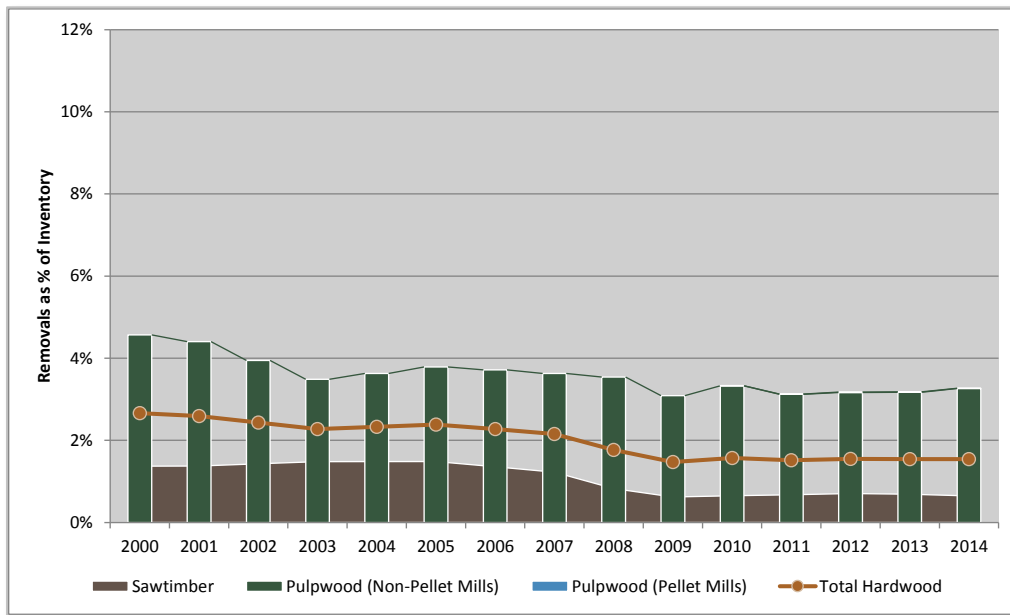
Hardwood inventory patterns also resemble the Atlantic Region with declining demand for both hardwood pulpwood and sawtimber. Because of a reduction in demand, pulpwood inventory continues to age-out, growing into the sawtimber product class that continues to accumulate due to a lack of demand and harvest. Without the subsequent regeneration, pulpwood inventory has declined 0.2% annually over the last 15 years. Sawtimber inventory has increased 2.2%. In total, hardwood inventory has increased 1.3% annually.

Removal patterns are also the same as the Atlantic Region with weakening demand for both sawtimber and pulpwood. Sawtimber harvest removals have declined annually by 5.0% while pulpwood removals have declined 2.6%.

Table 4-4 Forest Inventory and Harvest Removal Trends – Gulf Region – Hardwood Species

Year	Gulf Region										
	Pulpwood					Sawtimber			Total Hardwood		
	Inventory (million tons)	Non-Pellet Mill Removals	Removals % of Inventory	Pellet Mill Removals (million tons)	Removals % of Inventory	Inventory (million tons)	Removals	Removals % of Inventory	Inventory (million tons)	Removals	Removals % of Inventory
2000	658.2	30.1	4.6%			975.4	13.4	1.4%	1,633.5	43.4	2.7%
2001	658.9	29.0	4.4%			980.4	13.5	1.4%	1,639.3	42.5	2.6%
2002	657.7	25.9	3.9%			987.4	14.1	1.4%	1,645.0	40.0	2.4%
2003	654.7	22.8	3.5%			995.7	14.7	1.5%	1,650.4	37.6	2.3%
2004	656.1	23.8	3.6%			1,006.4	14.9	1.5%	1,662.5	38.7	2.3%
2005	655.6	24.8	3.8%			1,017.6	15.1	1.5%	1,673.1	39.9	2.4%
2006	657.4	24.4	3.7%			1,028.8	14.0	1.4%	1,686.2	38.4	2.3%
2007	662.2	24.0	3.6%			1,047.0	12.8	1.2%	1,709.2	36.8	2.2%
2008	660.2	23.4	3.5%			1,247.0	10.3	0.8%	1,907.3	33.7	1.8%
2009	657.3	20.3	3.1%			1,252.7	7.8	0.6%	1,910.0	28.1	1.5%
2010	656.2	21.8	3.3%	0.0	0.0%	1,251.7	8.1	0.7%	1,907.9	30.0	1.6%
2011	657.7	20.5	3.1%	0.0	0.0%	1,253.2	8.5	0.7%	1,910.8	29.0	1.5%
2012	648.5	20.5	3.2%	0.1	0.0%	1,238.9	8.7	0.7%	1,887.5	29.3	1.6%
2013	638.0	20.2	3.2%	0.1	0.0%	1,219.4	8.4	0.7%	1,857.4	28.7	1.5%
2014	637.6	20.8	3.3%	0.0	0.0%	1,221.8	7.9	0.6%	1,859.4	28.7	1.5%
Average	654.4	23.5	3.6%	0.0	0.0%	1,114.9	11.5	1.1%	1,769.3	35.0	2.0%
Trendline Growth Rate	-0.2%	-2.6%	-2.4%	10.8%	11.6%	2.2%	-5.0%	-7.3%	1.3%	-3.4%	-4.7%

Figure 4-5 Forest Inventory and Harvest Removal Trends – Gulf Region – Hardwood Species



Export Pellet Mill Impact - Gulf Region – Hardwood Species

Hardwood pulpwood removals delivered to export pellet mills in the Gulf Region have averaged less than 50,000 tons per year since 2010, representing nearly 0% of the inventory. As such, the export pellet mill impact is negligible.

4.1.8 Market Dynamics – Interaction of Residual Chip Supply, Pulpwood Demand and Pricing

Current and historical pricing for pine and hardwood sawtimber, pulpwood and residual chips are provided.

Residual Chip Supply

One theory in the market is that the recent increase in wood fiber prices, particularly pulpwood prices, will abate once the lumber market improves and the residual chip supply increases. This idea may have some substance.

However, the primary cause of any abatement in wood fiber prices will more likely be the result of an increase in available supply as more sawtimber final harvests occur, since pulpwood is a by-product of final harvests. Any increase in residual supply will be a benefit in satisfying growing wood fiber demand, though it is more likely to cause a rebalance in mills’ wood fiber mix between pulpwood and residuals.

As discussed in Section 4.1.1, the downturn in the housing market and subsequent recession had a noticeable effect on sawmill producers in the US South, including the loss of 20 southern yellow pine (SYP) mills and a reduction in production to 60% of capacity. Because of this, a significant amount of sawmill residual supply essentially disappeared from the market between 2007-2010 (Figure 4-6 and Figure 4-7). Beginning in 2011, as housing demand gradually improved, SYP sawmills began to steadily increase production adding supply back to the market. Hardwood mills, on the other hand, continued to experience volatility with declines in both 2013 and 2014.

Residual supply has yet to approach its 2000-2006 average. During the 2000-2006 period, housing starts averaged 1.8 million starts per year and historically have averaged close to 1.5 million starts per year. Forest2Market forecasts that housing starts will not surpass 1.5 million starts until 2020, and there is a small probability they will reach 1.8 million starts beyond 2020. Consequently, it is likely that pine residual chip supply will reach 24.0 million tons by 2020 but remain below the 25.4 million tons generated on average between 2000 and 2006. Demand and prices for pulpwood will remain strong well into the future as a result.

Figure 4-6 Residual Chip Supply and Price – US South – Pine Species

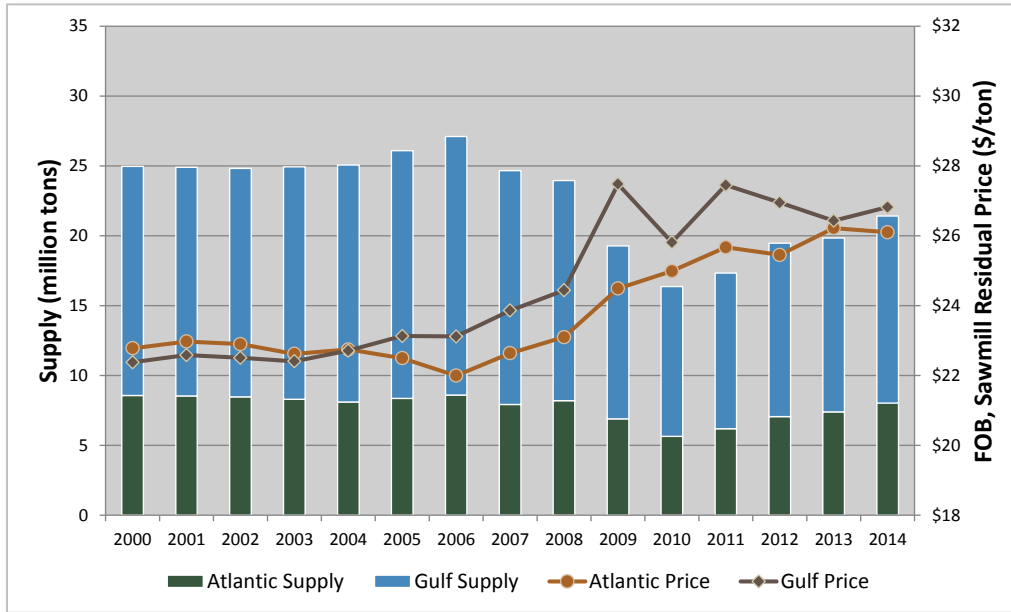
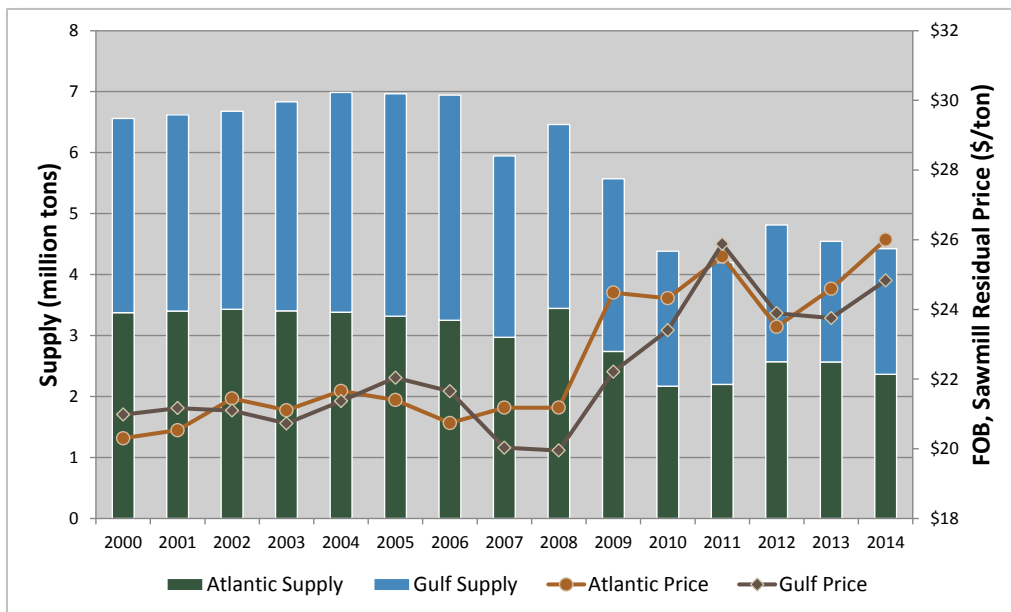


Figure 4-7 Residual Chip Supply and Price – US South – Hardwood Species



Market Dynamics – Atlantic Region

Sawtimber prices dropped dramatically with the Recession and have not yet recovered to pre-recession levels, with hardwood sawtimber recovering slightly better than pine (Table 4-5, Figure 4-8). With this dramatic drop in prices, it becomes obvious why landowners may prefer to delay harvests (the price conscious effect discussed in Section 4.1.3). With the resulting reduction in come-along pulpwood and absence of residual chips in the market, wood fiber consumers have been forced to purchase more pulpwood to meet their production needs.

In the Atlantic Region, pine pulpwood stumpage prices averaged \$6.98 per ton in 2006. Prior to the advent of large export pellet mills, when 2.4 million tons of incremental demand for pine pulpwood from non-pellet users hit the market during a period of restricted residual chip supply in 2010 (Table 4.1), prices increased to \$9.63 per ton, an increase of \$2.65 per ton or 8.4% annually. Since this time, prices for pine pulpwood retreated slightly in 2011 and then continued to escalate as demand from both pellet mills (+1.7 million tons from 2010-2014) and non-pellet mills (+1.6 million tons from 2010-2014) increased (Section 4.1.2). To a lesser degree, prices for hardwood pulpwood also increased in 2010, \$1.35 per ton over 2009, but contrary to pine, hardwood pulpwood prices retreated more substantially in 2011, stayed relatively flat in 2012, and then began to escalate at a similar rate to pine pulpwood.

In addition to supply restrictions and increased demand, the above average rainfall in 2013 and 2014 had a compounding effect on prices (Figure 4-9). Best Management Practices (BMPs) in all states have general guidelines for protecting water quality in the US. In periods of above average rainfall, BMPs prevent harvesting and transporting of roundwood. As a result, access to timber is reduced, supply is periodically restricted and prices will increase. Internal studies by Forest2Market show that price spikes lag significant precipitation events as mills recover depleted inventories¹⁶. In general, the lags are on a shorter, monthly timeframe, but they are noticeable in annual time series data. For example, precipitation inches spiked in the fall and winter seasons of 2009 to bring the annual measurement up to 243 inches in total for the Atlantic Region. However, pulpwood pricing remained high throughout the first part of 2010, causing the annual average for pine to be \$9.63 per ton, \$1.32 per ton over the 2009 average of \$8.31 per ton. A similar effect was observed for hardwood pulpwood with the 2010 average price being \$8.60 per ton, an increase of \$1.35 per ton over 2009.

¹⁶ <http://blog.forest2market.com/when-oil-hits-50-per-barrel-shouldnt-delivered-wood-fiber-prices-fall>

Table 4-5 Stumpage Price Trends – Atlantic Region

Year	Atlantic Region Stumpage Price (\$/ton)			
	Pine Pulpwood	Hardwood Pulpwood	Pine Sawtimber	Hardwood Sawtimber
2000	\$7.74	\$4.30	\$32.33	\$19.46
2001	\$7.83	\$4.44	\$32.77	\$19.76
2002	\$7.16	\$4.51	\$35.28	\$23.84
2003	\$7.37	\$5.42	\$30.27	\$21.05
2004	\$7.54	\$5.17	\$31.30	\$22.51
2005	\$7.30	\$5.71	\$32.73	\$23.71
2006	\$6.98	\$6.05	\$30.51	\$23.69
2007	\$7.52	\$6.11	\$30.27	\$23.69
2008	\$8.03	\$6.67	\$26.70	\$22.43
2009	\$8.31	\$7.25	\$21.74	\$19.40
2010	\$9.63	\$8.60	\$22.68	\$23.46
2011	\$9.10	\$6.37	\$20.82	\$21.36
2012	\$10.13	\$6.45	\$20.09	\$21.93
2013	\$11.56	\$7.35	\$20.91	\$23.11
2014	\$13.19	\$9.30	\$23.11	\$27.16
Average	\$8.63	\$6.25	\$27.43	\$22.44
Trendline Growth Rate	4.0%	4.9%	-3.9%	0.9%

Figure 4-8 Stumpage Price Trends – Atlantic Region

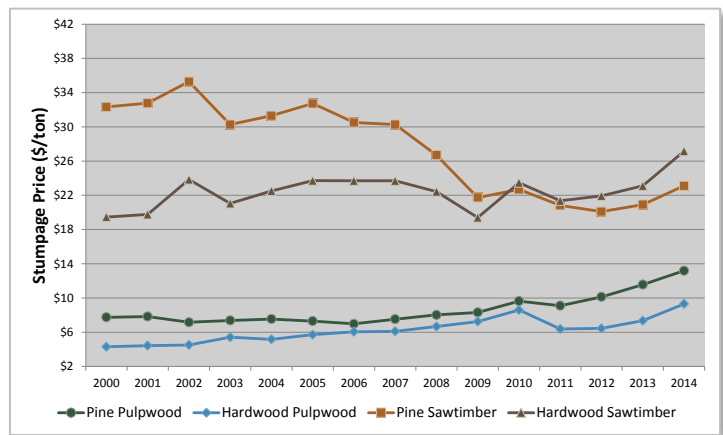
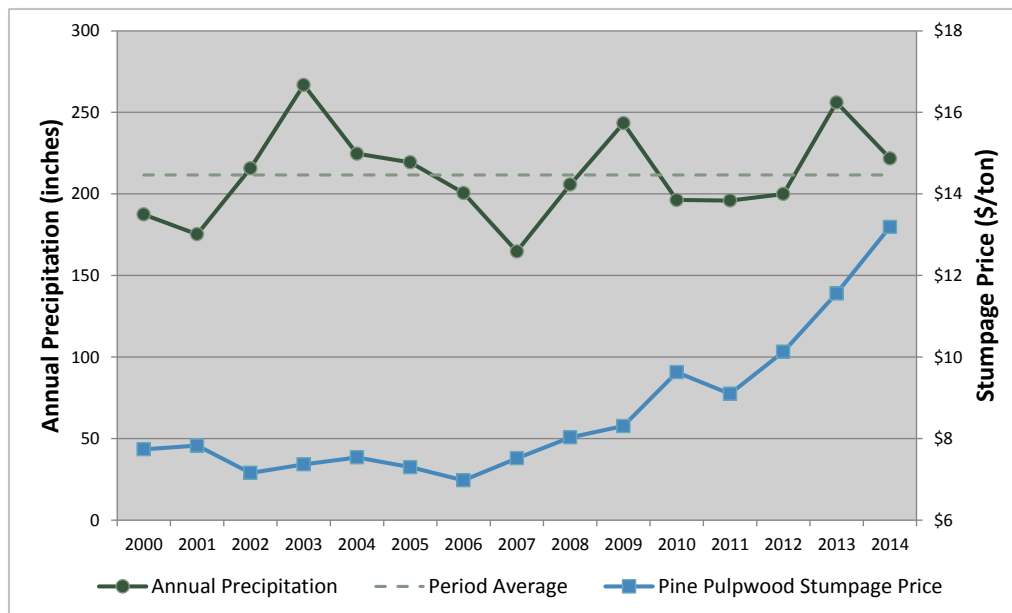
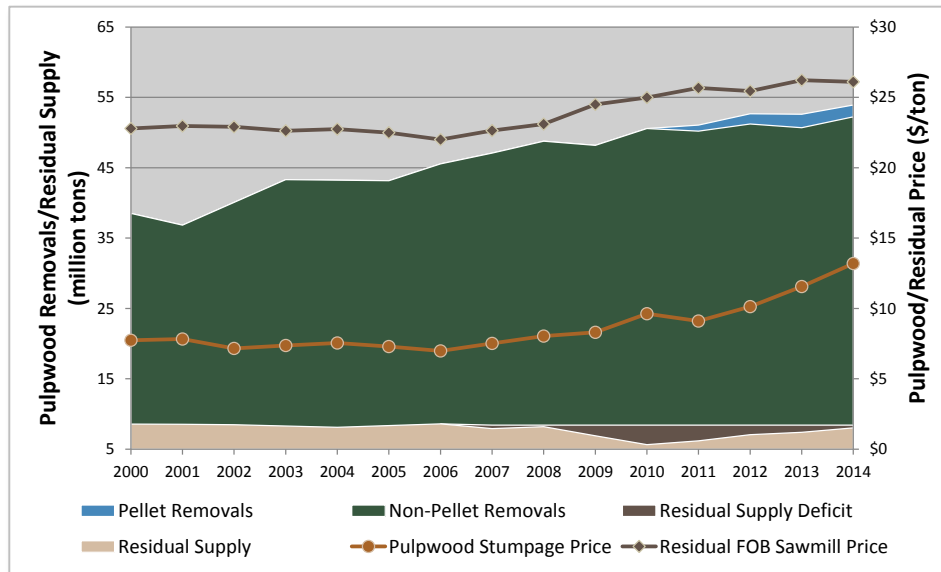


Figure 4-9 Annual Precipitation and Pine Pulpwood Stumpage Price – Atlantic Region



With the residual chip supply deficit and increased demand for pine pulpwood and intermittent above average rainfall, pricing for both products has increased noticeably since 2006¹⁷ (Figure 4-10). Wood fiber pricing, particularly for pine pulpwood, has reached a 15-year high.

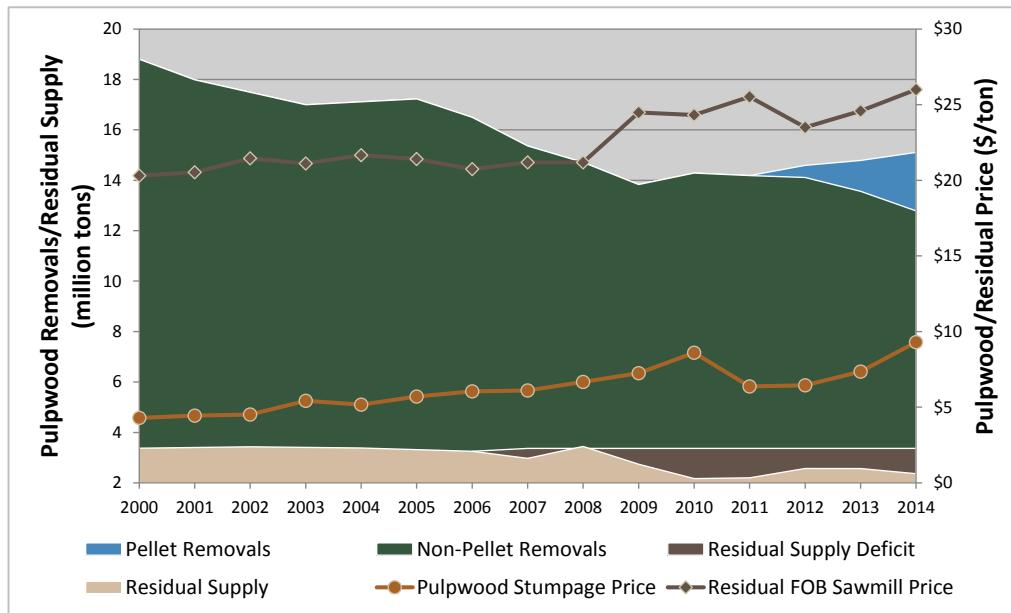
Figure 4-10 Market Dynamics – Atlantic Region – Pine



Hardwood prices and supply conditions exhibit similar patterns as pine with the exception that demand has decreased since 2000 (Figure 4-11). While pellet demand (+2.3 million tons from 2011-2014) has supplanted a portion of the non-pellet demand decrease (-1.4 million tons from 2011-2014), the total demand in 2014 (15.1 million tons) was still much lower than the height of the market in 2000 (18.8 million tons). In addition, while a cursory glance at data seems to show that price increases follow increases in demand from pellet producers, a closer look at the data tells a more complex story. In 2010 and 2014, for instance, the higher prices reflect above average rainfall in 2009 and 2013. In addition, results from the Gulf Region (next section) reveal a conflicting story that applies in the Atlantic Region as well: supply constraints have had a larger impact.

¹⁷ FOB, residual chip prices are roughly 2-3 times the price of pulpwood stumpage due to the fact that the price of harvesting, debarking and converting the wood fiber into a chip form is already inclusive and a natural byproduct of the sawing mill’s production. For example, pine pulpwood stumpage in the Atlantic Region was \$13.19 per ton in 2014 while harvesting and loading prices averaged \$12.00 per ton. Adding the prices together, the pulpwood price prior to transport would be \$25.19 per ton, roughly equivalent to the FOB, residual price of \$26.10 per ton.

Figure 4-11 Market Dynamics – Atlantic Region – Hardwood



Market Dynamics – Gulf Region

Pine sawtimber prices in the Gulf Region dropped dramatically during the recession (similar to the Atlantic Region), but hardwood sawtimber prices weathered the recession well and have experienced significant recent price appreciation (Table 4-6, Figure 4-12). Price trends for pulpwood and residuals are also similar, as both pulpwood and residual pricing have experienced 15-year price appreciation.

Pine pulpwood increased at a lower rate in the Gulf Region compared to the Atlantic Region. In the Gulf, pine pulpwood prices increased 2.6% annually versus the 4.0% increase in the Atlantic Region, and hardwood pulpwood prices increased 6.1% annually versus 4.9% annually in the Atlantic Region. Gulf pine pulpwood pricing appeared to be on a similar path as the Atlantic until 2009, when prices dropped \$0.58 per ton from the 2008 average of \$9.47 per ton. Pine pulpwood prices increased the following year when significant rainfall impacted the market (Figure 4-13). In 2011, the market readjusted after an unseasonably dry 2010, and pine pulpwood prices fell to a low of \$7.84 per ton before climbing again to 2014s high of \$9.94 per ton. Hardwood pulpwood prices in the Gulf Region experienced a similar drop in 2011 and have since appreciated at a faster rate than pine pulpwood.

Table 4-6 Stumpage Price Trends – Gulf Region

Year	Gulf Region Stumpage Price (\$/ton)			
	Pine Pulpwood	Hardwood Pulpwood	Pine Sawtimber	Hardwood Sawtimber
2000	\$6.47	\$4.97	\$37.38	\$23.28
2001	\$6.75	\$5.50	\$37.79	\$23.70
2002	\$6.22	\$5.99	\$38.89	\$26.97
2003	\$7.46	\$8.36	\$34.93	\$24.22
2004	\$8.07	\$7.25	\$38.90	\$28.35
2005	\$9.26	\$8.60	\$38.89	\$27.26
2006	\$7.54	\$5.83	\$35.53	\$24.40
2007	\$8.80	\$7.08	\$32.48	\$26.40
2008	\$9.47	\$8.26	\$26.92	\$26.90
2009	\$8.89	\$8.58	\$21.34	\$23.79
2010	\$9.93	\$11.05	\$23.27	\$27.25
2011	\$7.84	\$7.23	\$20.23	\$25.69
2012	\$8.59	\$9.68	\$21.16	\$27.86
2013	\$9.31	\$11.83	\$22.06	\$31.72
2014	\$9.94	\$14.10	\$23.38	\$36.66
Average	\$8.30	\$8.29	\$30.21	\$26.96
Trendline Growth Rate	2.6%	6.1%	-5.2%	1.9%

Figure 4-12 Stumpage Price Trends – Gulf Region

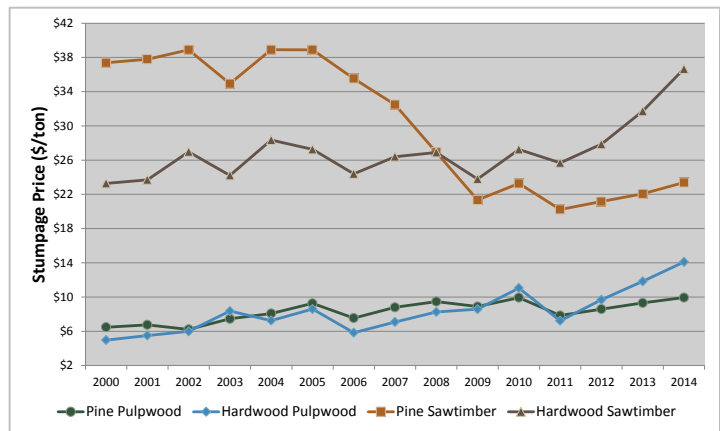
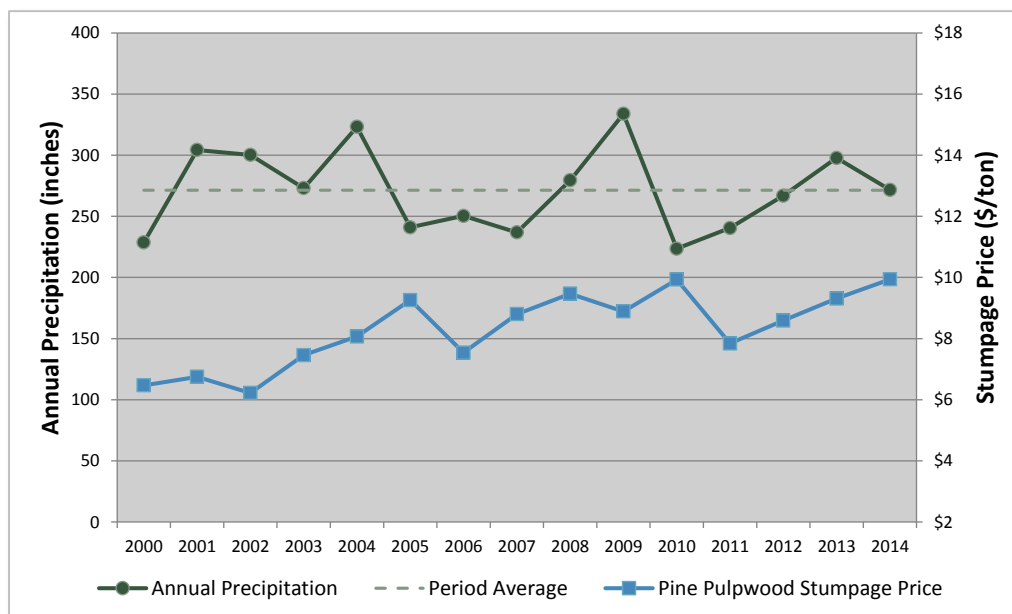
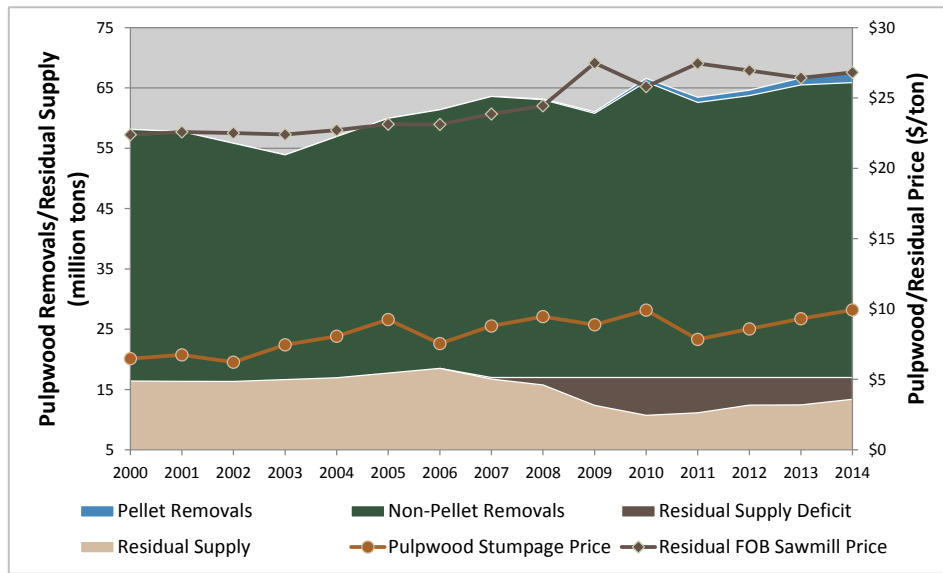


Figure 4-13 Annual Precipitation and Pine Pulpwood Stumpage Price – Gulf Region



Both pellet mill (+1.9 million tons) and non-pellet mill (+2.4 million tons) demand for pine pulpwood increased over the 2008-2014 time period. This increase in demand coupled with the decline in residual supply and precipitation events have driven the price for pulpwood higher (Figure 4-14). One noticeable difference between the Atlantic and the Gulf is that Gulf residual chip pricing and supply recovered more quickly than it did in the Atlantic Region. Beginning in 2011, residual supplies began to increase causing the price for residuals to slide. In 2014, despite an increase in supply, competition caused residual chip prices to increase.

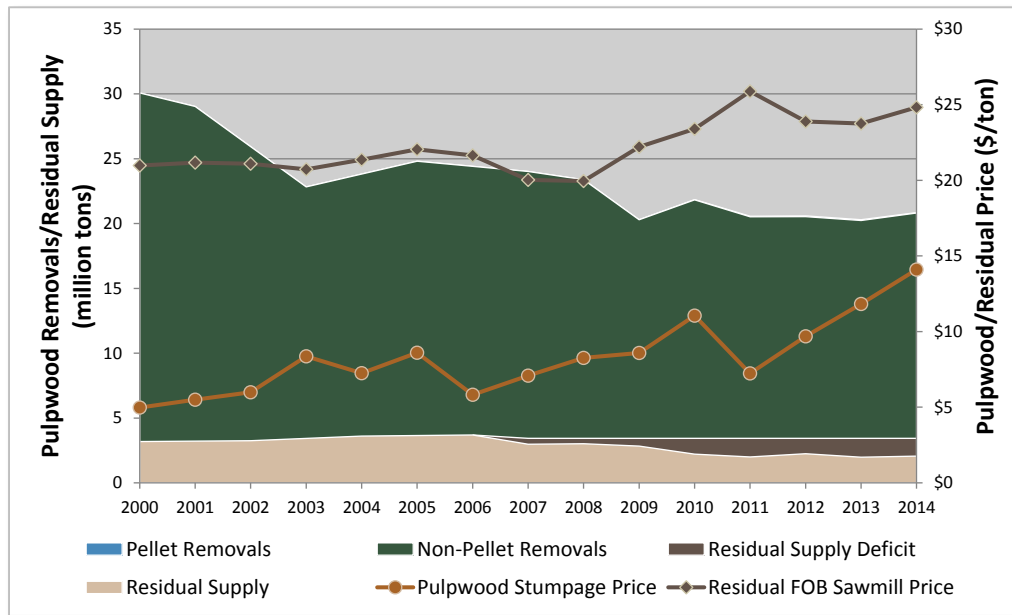
Figure 4-14 Market Dynamics – Gulf Region – Pine



As stated in Section 4.1.7, hardwood pulpwood consumption from pellet mills in the Gulf Region is negligible. However, in the absence of pellet mill demand (0.1 million tons in 2012 and 2013, less than that in 2014) and decreased non-pellet demand (down from 30.1 million tons in 2000 to 20.8 million tons in 2014), prices for both sawmill residuals and hardwood pulpwood have risen (Figure 4-15). Prices for residuals were flat prior to the supply deficit, but began to substantially increase beginning in 2008 as sawmills curtailed and closed operations and the deficit began to expand. Simultaneously, demand was shifted to pulpwood, which when combined with precipitation events, caused pricing to rise, particularly since 2011.

In the absence of substantial pellet demand, pricing has continued to increase suggesting that precipitation events and the residual supply deficits are more significant factors. This observation is as true for the Atlantic Region as it is for the Gulf Region.

Figure 4-15 Market Dynamics – Gulf Region – Hardwood



4.1.9 Study 1 Conclusions

As discussed in Section 4.1.1, significant events over the last 15 years have affected forests in the US South. The landscape of the forest products industry is ever-changing, including the recent addition of export pellet mill consumers. However, after analyzing supply, demand and price statistics, several market trends and key findings emerge.

Supply

Overall, forest inventory supply has increased by 1,199.5 million tons between 2000 and 2014 (409.1 million tons in the Atlantic Region and 790.4 million tons in the Gulf Region). This has occurred predominantly in the sawtimber product class, but even pine pulpwood inventory has increased. The only noticeable decrease in inventory has occurred with hardwood pulpwood, and this is due to decreased demand for hardwood sawtimber, which has led to a decrease in final harvests. When final harvests are delayed, pulpwood grows into the sawtimber product class and subsequent regeneration (i.e., a new supply of pulpwood) is also delayed. However, what is apparent is that with the housing downturn and its slow recovery, the available supply of pulpwood and residual chips has diminished, and this lack of supply has been compounded at times during above average precipitation events.

Demand and Price

During the housing downturn, sawtimber demand declined. While the market has been experiencing a recovery as of late, it has been a slow but steady and has not (and may not for the foreseeable future) match the demand observed during the first six years of the century. With the decline of sawtimber processing, the demand for the restricted supply of sawmill residual chips shifted to pulpwood. However, even with an increase in residual output over the last few years, non-pellet demand for pine pulpwood has continued to increase. At the same time, pellet mill demand entered the market. Naturally, in a competitive market with constrained supply and increased demand, prices for residual chips and pulpwood increased.

From the forest resource perspective, positive inventory growth for pine demonstrates that pellet mills have not caused a decrease in forest inventory. In 2014, harvest removals of pine pulpwood in the Atlantic Region for pellet mills equaled 1.7 million tons. This equates to approximately 0.3% of the pine pulpwood inventory and 3.2% of pine pulpwood removals. The 2014 demand for pine pulpwood in the Atlantic Region from non-pellet consumers was 52.2 million tons, which equates to 10.0% of the pine pulpwood inventory and 96.8% of pine pulpwood removals. In 2014, harvest removals of pine pulpwood in the Gulf Region for pellet mills were equaled 2.0 million tons. This equates to approximately 0.3% of pine pulpwood inventory and 3.0% of pine pulpwood removals. The 2014 demand for pine pulpwood from non-pellet consumers in the Gulf Region was 65.4 million tons, which equates to 10.0% of the pulpwood inventory and 97.0% of pine pulpwood removals.

Hardwood inventories have experienced positive overall inventory growth as well, with the decline in hardwood pulpwood inventory, to date, being more the result of hardwood pulpwood inventories aging into the sawtimber product class and a lack of regeneration (and therefore new pulpwood inventory) rather than pellet mill impact. This conclusion is based on the fact that this trend is occurring in the Gulf Region without substantial pellet demand. For the Atlantic Region, this conclusion is based on a comparison of the differential between peak removals in 2000 from non-pellet consumers (3.0% of inventory) to removals of both pellet and non-pellet consumers in 2014 (2.6% of inventory), a differential of 0.4% of inventory or a 2.3 million ton decrease. Therefore, the reduction in hardwood pulpwood inventory is more the result of pulpwood aging into sawtimber than increased removals for pellet use.

Constrained supply has exerted upward price pressure on pine pulpwood prices. Because removals of pulpwood from non-pellet consumers have increased, it is likely that price for pine pulpwood would have increased without incremental demand from pellets, especially when other factors such as weather are taken into account. Since the advent of large scale export pellet mills, incremental demand for pine pulpwood from non-pellet mills has been 4.0 million tons compared to 3.7 million tons for pellet mills (1.6 million tons non-pellet mills versus 1.7 million tons pellet mills in the Atlantic region from 2010 to 2014 and 2.4 million tons vs 2.0 million tons in the Gulf region from 2008 to 2014). On a regional landscape basis, the price impact from incremental demand from non-pellet mills is equivalent to (in the Atlantic Region) or greater than (in the Gulf Region) the price impact from pellet mills; individual wood basins may have different dynamics.

Constrained supply and precipitation events have exerted upward price pressure on hardwood pulpwood. This is most evident in the Gulf Region where demand has decreased from non-pellet mills and pellet mill demand is miniscule in comparison, yet prices have increased as residual supply and available pulpwood supply has become constrained. In the Atlantic Region, since 2011, pellet demand has supplanted a portion of non-pellet demand (2.3 million tons pellet mills vs -1.4 million tons from non-pellet mills). In 2014, total demand from both pellet and non-pellet mills (15.1 million tons) remained below historic highs from non-pellet mills (18.8 million tons in 2000). While the added layer of demand from pellet mills is likely to have an influence on price, supply constraints (similar to the Gulf Region) may be more significant factors.

4.2 Study 2: Geographic Distribution of Operational and Closed Wood Fiber Consumers: 1995-2015

On a regional basis, Study 1 demonstrated that incremental demand from both pellet mills and non-pellet mills appears to have added a layer of competition to the US South market pine pulpwood market, while in the hardwood pulpwood market, pellet mills appear to be absorbing a portion of vacated demand from non-pellet mills. While Study 1 analyzed market trends on a broader regional basis; this Study 2 provides a more direct view of individual geographic mill competition over time. The analysis in this section addresses the relationship between export wood pellet mills and traditional wood fiber consumers by examining the geographic location and distance between both operational and closed consumers of similar wood fiber feedstock (i.e. pulpwood and residuals). However, it does not differentiate between species nor does it measure the differential in demanded tons.

The study serves to demonstrate that wood basins in the US South are complex, constantly changing and made-up of various consumers that do not operate in a vacuum. Logically, any new consumer that desires to be financially viable now and in the future will perform due diligence analysis on the demand/supply/price interaction of an individual wood basin prior to construction in order to guarantee the long-term, sustainable raw material supply at the lowest cost available. The study serves to prove/disprove this phenomenon by demonstrating that export pellet mills, on an individual basis, have pursued wood basins with sustainable supply and, *as best possible*, that avoid competition. For the reasons explained in Section 1.1, this report focuses specifically on the industrial export sector of the wood pellet industry and particularly on pellet mills supplying European markets as listed in Table 4-7.

Table 4-7 US South Industrial Pellet Mills – 1995 -2015

Company	Mill Name	State	Year Opened
Enviva LP (Green Circle Energy)	Cottondale	FL	2008
FRAM Renewable Fuels LLC	Baxley	GA	2008
Enviva LP	Amory	MS	2010
Enviva LP	Wiggins	MS	2010
Enviva LP	Ahoskie	NC	2011
FRAM Renewable Fuels LLC (Telfair Forest Products)	Lumber City	GA	2011
Georgia Biomass (RWE)	Waycross	GA	2011
Enviva LP	Northampton	NC	2013
Enviva LP	Southampton	VA	2013
German Pellets	Woodville	TX	2013
The Westervelt Company	Aliceville	AL	2013
Drax Biomass International Inc.	Bastrop	LA	2014
Drax Biomass International Inc.	Gloster	MS	2014
FRAM Renewable Fuels LLC	Hazlehurst	GA	2014
German Pellets (Phase I)	Urania	LA	2014
Zilkha Biomass Energy	Selma	AL	2014
Enviva LP	Sampson County	NC	In-Construction
German Pellets (Phase II)	Urania	LA	In-Construction
Portucel, S.A.	Greenwood	SC	In-Construction

Mill locations were plotted and mapped using a Geographic Information System (GIS) for the years 1995, 2000, 2005, 2010, 2012, 2014 and 2015 (Figure 4-16 through Figure 4-22). Pellet mills were identified separately from competitor mills. Competitor mills were grouped into four categories:

- Panelboard, which includes both Hardboard and Medium Density Fiberboard (MDF)
- OSB
- Pulp/Paper

For each year, with the exception of 1995, maps display active mills in gray. Mills that opened since the prior period are denoted in large green icons. Mills that closed are denoted as large red icons and presented as small red icons in all subsequent maps. Opened mills will transition to gray (active status) in subsequent years unless closed. As a result, maps for later years provide a cumulative view from the 1995 footprint – a cumulative mill count of active and closed mills is provided in the lower right corner.

4.2.1 US South Mill Footprint – 1995

To effectively understand the changing landscape of the forest products industry as described in Section 4.1.1, it is important to understand the openings and closings of historic wood fiber¹⁸ consumers, beginning with the footprint of mills in 1995 – the footprint prior to market changes discussed in Section 4.1.1.

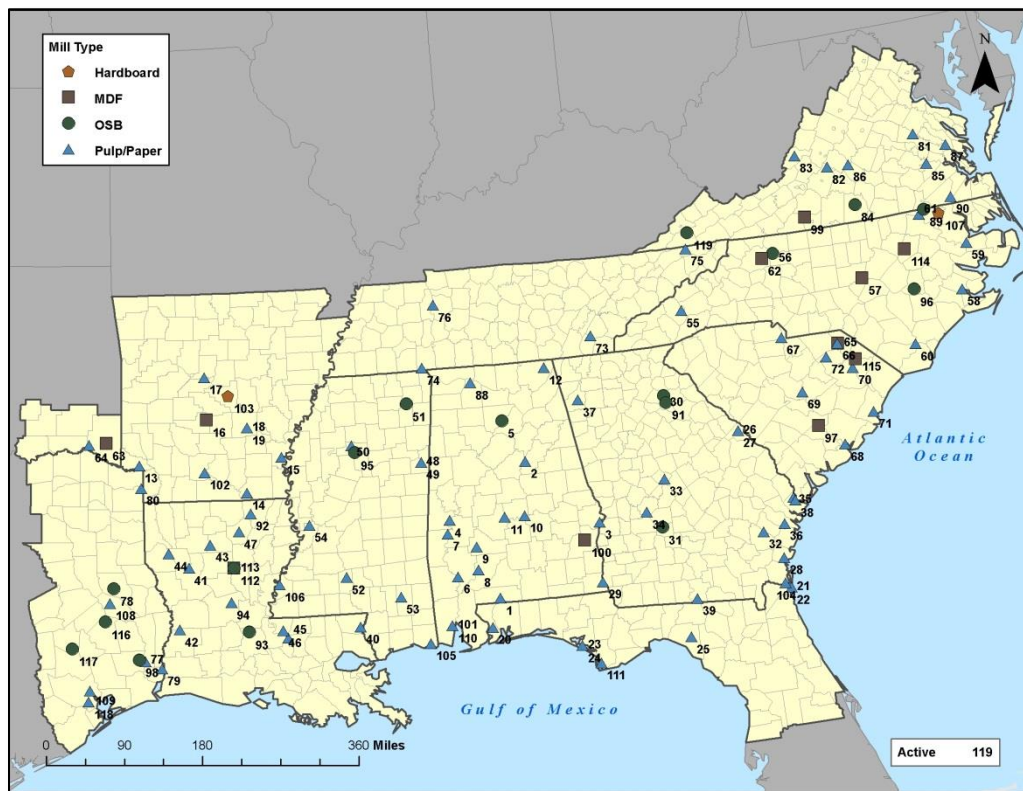
In 1995, 119 active facilities purchased pine and hardwood wood fiber in the US South (Table 4-8, Figure 4-16, Appendix Group A).

Table 4-8 US South Competing Facilities - 1995

Year: 1995	Active
Panelboard: Hardboard and MDF	13
OSB	17
Pulp/Paper	89
Pellet	0
Total	119

Note: Maps located in the Appendix are larger and therefore easier to read.

Figure 4-16 US South Competing Facilities - 1995



¹⁸ Wood fiber in this section is specific to pulpwood and residue fiber that pellet mills consume.

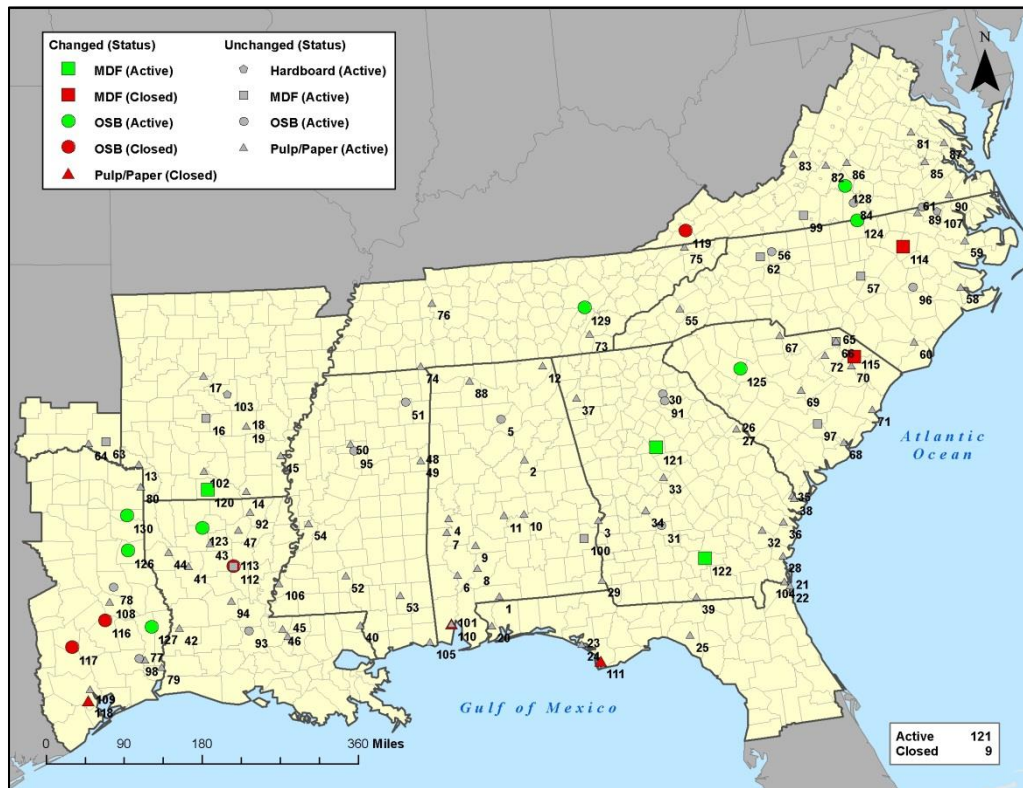
4.2.2 US South Mill Footprint – 2000

By the year 2000, the number of active facilities had expanded to 121 (Table 4-9, Figure 4-17, Appendix Group B). Over the five-year period, however, six of the older MDF and OSB facilities closed while 11 newer facilities opened (3 MDF and 8 OSB)¹⁹. Also over this time, declining markets forced the closure of three pulp/paper facilities along the Gulf Coast in Texas, Alabama and the Florida panhandle. The 2000 US South landscape consisted of 121 active facilities versus 119 active facilities in 1995; a total of 9 mills closed between 1995 and 2000.

Table 4-9 US South Competing Facilities - 2000

Year: 2000	Active	Openings Since 1995	Closures Since 1995
Panelboard: Hardboard and MDF	14	3	-2
OSB	21	8	-4
Pulp/Paper	86	0	-3
Pellet	0	0	0
Total this Period	121	11	-9
Change since 1995	2	11	-9

Figure 4-17 US South Competing Facilities - 2000



¹⁹ In some instances, a gray active facility will be overlaid on a red closed facility. This represents either a multi-complex where one of the facilities closed and one remained open or where two facility types existed in the same city.

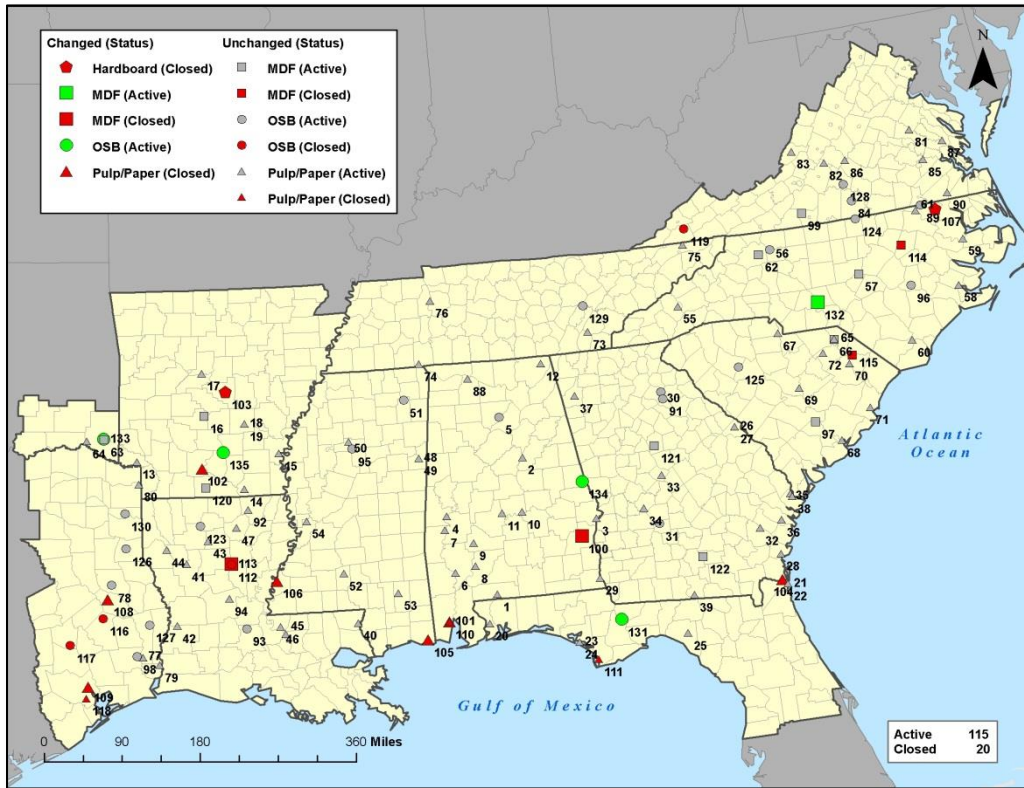
4.2.3 US South Mill Footprint – 2005

By the year 2005, the digital age and declining world demand had taken its toll on pulp/paper producers (Table 4-10, Figure 4-18, Appendix Group C). Over the five-year period, 7 pulp/paper facilities closed. In addition, a significant portion of MDF capacity closed, giving way to lower cost, foreign competition from regions such as Turkey, South America, Indonesia and Indochina. For OSB, growth in the housing market led to the development of larger, newer and more efficient facilities than their 1990’s counterparts. The 2005 US South landscape consisted of 115 active mills; a total of 20 mills closed between 1995 and 2005.

Table 4-10 US South Competing Facilities - 2005

Year: 2005	Active	Openings Since 2000	Closures Since 2000
Panelboard: Hardboard and MDF	11	1	-4
OSB	25	4	0
Pulp/Paper	79	0	-7
Pellet	0	0	0
Total this Period	115	5	-11
Change since 1995	-4	16	-20

Figure 4-18 US South Competing Facilities - 2005



4.2.4 US South Mill Footprint – 2010

Between 2005 and 2010, six large-scale, industrial export pellet mills were constructed²⁰ (Table 4-11, Figure 4-19, Appendix Group D):

- Enviva LP – Amory and Wiggins, Mississippi
- FRAM Renewable Fuels, LLC – Baxley and Lumber City, Georgia
- RWE Group’s Georgia Biomass, LLC - Waycross, Georgia
- Green Circle Energy – Cottondale, Florida

Also during this time, the housing crash took its toll on the OSB market. Approximately eight OSB mills closed and two OSB facilities that had begun construction were put on hold²¹. It was during this time as well that International Paper closed three pulp/paper mills due to market conditions (unrelated to pellets). The 2010 US South footprint consisted of 112 active mills; 34 mills closed between 1995 and 2010.

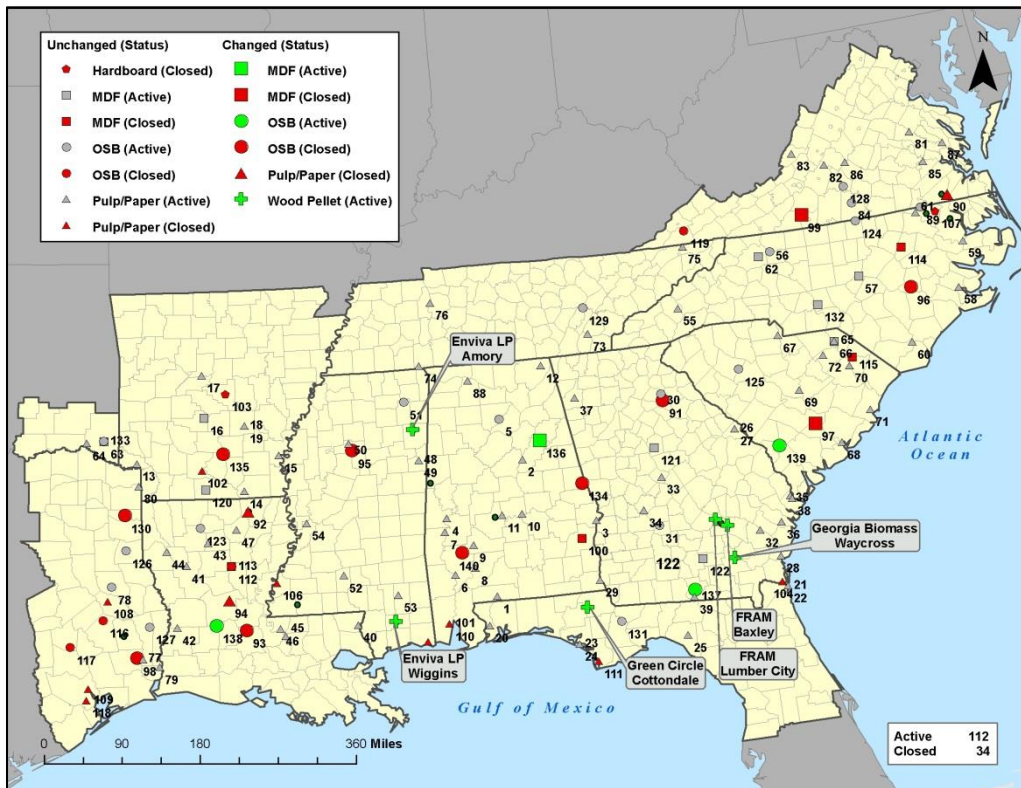
Table 4-11 US South Competing Facilities - 2010

Year: 2010	Active	Openings Since 2005	Closures Since 2005
Panelboard: Hardboard and MDF	10	1	-2
OSB	20	4	-9
Pulp/Paper	76	0	-3
Pellet	6	6	0
Total this Period	112	11	-14
Change since 1995	-7	27	-34

²⁰ A few mills such as Enviva’s Amory, Mississippi facility existed for domestic production but were expanded in capacity for industrial grade pellet export.

²¹ Louisiana-Pacific in Thomasville, Alabama and Grant Forest Products (Georgia-Pacific) in Clarendon, South Carolina.

Figure 4-19 US South Competing Facilities - 2010



4.2.5 US South Mill Footprint – 2012

During the next two years, the number of announced pellet mill projects increased significantly. By the start of 2012, however, only one pellet mill was constructed – Enviva opened its Ahoskie, North Carolina pellet plant (Table 4-12, Figure 4-20, Appendix Group E).

Three mill closures occurred over the period. Domtar shuttered its coated papers facility in Columbus, Mississippi²². Georgia-Pacific closed its Skippers, Virginia OSB mill and Huber Engineered Woods, LLC closed its Spring City, Tennessee OSB mill. The 2012 US South footprint consisted of 110 active mills; 37 mills closed between 1995 and 2012.

Table 4-12 US South Competing Facilities - 2012

Year: 2012	Active	Openings Since 2010	Closures Since 2010
Panelboard: Hardboard and MDF	10	0	0
OSB	18	0	-2
Pulp/Paper	75	0	-1
Pellet	7	1	0
Total this Period	110	1	-3
Change since 1995	-9	28	-37

Figure 4-20 US South Competing Facilities - 2012



²² The Domtar mill had purchased pulp from Weyerhaeuser’s mill in Columbus. The Weyerhaeuser pulp mill remained open.

4.2.6 US South Mill Footprint – 2014

From 2012 to 2014, development activity increased substantially for export wood pellets as nine new facilities were constructed (Table 4-13, Figure 4-21, Appendix Group F):

- Drax – Bastrop, Louisiana and Gloster, Mississippi
- Enviva – Northampton, North Carolina and Southampton, Virginia
- FRAM – Hazlehurst, Georgia
- German Pellets –Urania, Louisiana (Phase I) and Woodville, Texas
- Westervelt Co. – Aliceville, Alabama
- Zilkha Biomass Energy – Selma, Alabama (retrofitted from the former Dixie Pellet plant in Selma, which is not identified in red, as the map displays only opened/closed competitor facilities.)

For non-pellet mills, activity over the two-year time frame was mixed. International Paper closed its pulp/paper facility in Courtland, Alabama as paper demand continued to wane, but reopened its Franklin, Virginia paper mill for fluff pulp production as global demand for this product grew. As the housing market began to show signs of life again, three OSB mills began production. Norbord restarted its Jefferson, Texas mill that had been curtailed during the downturn. Louisiana-Pacific restarted its Thomasville, Alabama mill and Georgia-Pacific opened its Clarendon, South Carolina mill. The 2014 US South landscape consisted of 122 active mills; 38 mills closed between 1995 and 2014.

Table 4-13 US South Competing Facilities - 2014

Year: 2014	Active	Openings Since 2012	Reopenings Since 2012	Closures Since 2012
Panelboard: Hardboard and MDF	10	0	0	0
OSB	21	1	2	0
Pulp/Paper	75	0	1	-1
Pellet	16	9	0	0
Total this Period	122	10	3	-1
Change since 1995	3	38	3	-38

Figure 4-21 US South Competing Facilities - 2014



4.2.7 US South Mill Footprint – 2015

Over the course of 2015, two additional pellet facilities have been financed and/or begun construction, bringing the total pellet mills in the US South to 18 (Table 4-14, Table 4-15, Figure 4-22, Appendix Group G). In addition, one existing facility has started work on an expansion. These facilities include:

- Enviva – Sampson County, North Carolina
- Portucel – Greenwood, South Carolina
- German Pellets –Urania, Louisiana (Phase II)

No changes have occurred in other mill types, bringing the current footprint of mills to 124 active/in-construction (125 if including Phase II of German Pellets’ Urania mill, one of the 3 mills that are under construction); 35 mills that were either active in 1995 or constructed after this date remained closed in 2015. Compared to 1995, the 2015 footprint is a net increase of 6 mills.

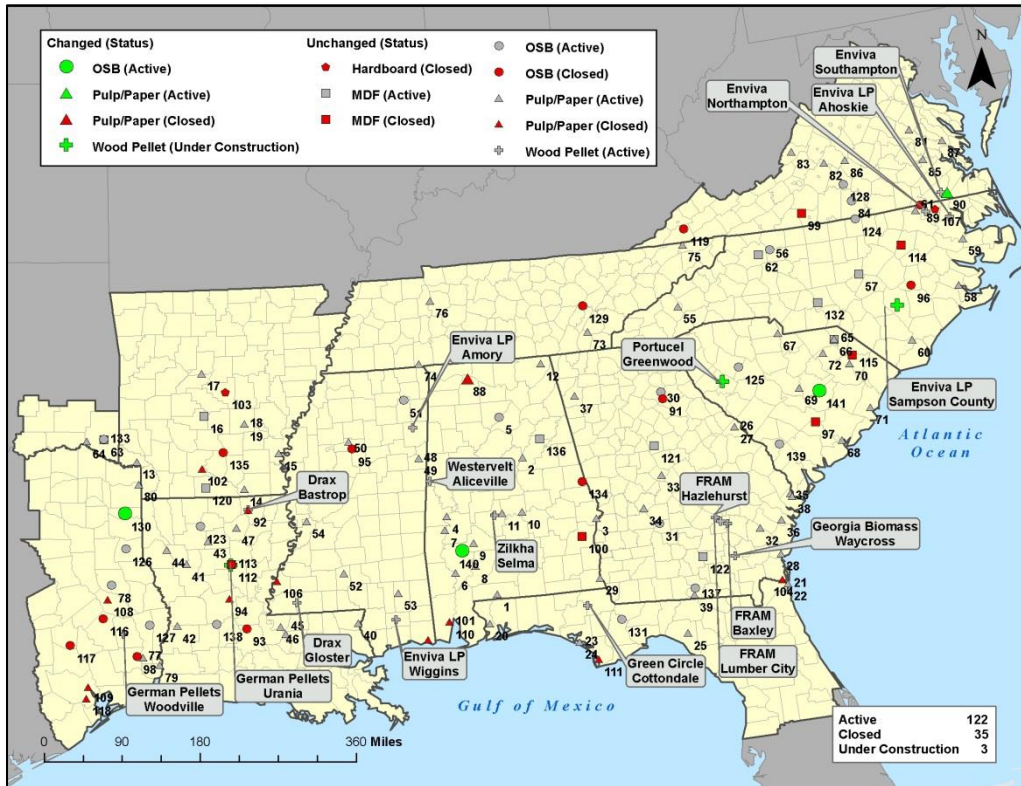
Table 4-14 US South Competing Facilities - 2015

Year: 2015	Active	Openings Since 2014	Reopenings Since 2014	Closures Since 2014	Under Construction Since 2014
Panelboard: Hardboard and MDF	10	0	0	0	0
OSB	21	0	0	0	0
Pulp/Paper	75	0	0	0	0
Pellet	16	0	0	0	3
Total this Period	122	0	0	0	3
Change since 1995	3	38	3	-38	

Table 4-15 US South Cumulative Facilities – 1995-2015

Start Year	End Year	Under Construction	Openings	Cummulative Opening	Reopenings	Closures	Cummulative Closures	Active
	1995							119
1995	2000		11	11		-9	-9	121
2000	2005		5	16		-11	-20	115
2005	2010		11	27		-14	-34	112
2010	2012		1	28		-3	-37	110
2012	2014		10	38	3	-1	-38	122
2014	2015	3	0	38	0	0	-38	122

Figure 4-22 US South Competing Facilities - 2015



4.2.8 Geographic Distribution of Pellet Mills

In addition to mapping mill facilities in the US South, the haul distance between pellet mills and active/closed competitive mills was calculated using GIS²³. The distance by shortest road route was calculated in miles. Data was then compiled into three cumulative frequency tables (Table 4-16, Table 4-17 and Table 4-18). As an example, Table 4-16 is a cumulative frequency table demonstrating the number and percentage of pellet mills located within a measured radius around closed mills. For the year 2010, no pellet mills were located within a radius of 30 miles around closed mills (0-30 miles). By expanding the radius to 65 miles, 2 pellet mills are included (31-65 miles). Expanding the radius even further to 100 miles includes another 3 mills (66-100 miles) for a total of 5 mills (0-100 miles). One pellet mill was located more than 100 miles from a closed mill. Wider radial bands include the count of mills from narrower radial bands.

²³ Pellet mills haul on average 45 miles and on average have a maximum haul distance of 74 miles. The average haul distance for non-pellet mills is 54 miles with an average maximum haul distance of 113 miles.

Table 4-16 Proximity of Export Pellet Mills to Closed Mills – Historic Footprint – 1995-2014

Year	Total Operating Export Pellets	Total Closed Non-Pellets	Proximity Analysis			
			30 Miles	65 Miles	100 Miles	100+ Miles
1995	0	9	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2000	0	20	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2005	0	34	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2010	6	37	0 (0%)	2 (33%)	5 (83%)	6 (100%)
2012	7	35	1 (14%)	4 (57%)	6 (86%)	7 (100%)
2014	16	35	7 (44%)	11 (69%)	14 (88%)	16 (100%)

In 2010, the majority (83%) of early pellet mills were located within 100 miles of closed mills (Table 4-16). Two facilities (33%) were located within 65 miles and none within 30 miles. By 2012, the distribution shifted - one pellet mill opened on the site of a closed facility and as additional mills closed, four pellet mills were located within 65 miles of a closed mill.

By 2014, the distribution had shifted even more with 7 pellet mills located within 30 miles of closed facilities (44%) and an additional 4 locating within 65 miles (for a total of 11 or 69%). In today’s footprint, with the addition of the two pellet mills in construction, the percentages are 44% within 30 miles and 72% within 65 miles of closed non-pellet mills.

In 2010, all early pellet mills were located within 65 miles of operational competitive mills (Table 4-17). This remained the case in 2012 and 2014. Only 1 pellet mill was located within 30 miles of an operating competing mill in 2010; however, as time progressed, this pattern changed with more pellet mills located closer to competitive mills. By 2014, 6 additional facilities were located within 30 miles of competitive mills (44%). In today’s footprint, that percentage is now 39% within 30 miles²⁴.

Table 4-17 Proximity of Export Pellet Mills to Operating Competitive Mills – Historic Footprint – 1995-2014

Year	Total Operating Export Pellets	Total Operating Non-Pellets	Proximity Analysis			
			30 Miles	65 Miles	100 Miles	100+ Miles
1995	0	121	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2000	0	115	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2005	0	112	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2010	6	110	1 (17%)	6 (100%)	6 (100%)	6 (100%)
2012	7	122	2 (29%)	7 (100%)	7 (100%)	7 (100%)
2014	16	122	7 (44%)	16 (100%)	16 (100%)	16 (100%)

In 2015, similar to years past, a greater percentage of pellet mills are located in closer proximity to operating facilities than closed facilities, a function of there being more operating mills (122) than closed mills (35) (Table 4-18).

²⁴ Table 4-18 displays 18 pellet mill locations and does not double-count the German Pellets-Urania, Louisiana – Phase II construction. Previous mentions of the number of pellet mills counted Phase II as a “new” mill (number 19) in order to add production and consumption volumes associated with the expansion.

Table 4-18 Proximity of Export Pellet Mills to Closed/Operating Competitive Mills – Current Footprint - 2015

Competitive Mill Status	Total Current Export Pellets	Total Non-Pellets	Proximity Analysis			
			30 Miles	65 Miles	100 Miles	100+ Miles
Operational	18	122	7 (39%)	18 (100%)	18 (100%)	18 (100%)
Closed	18	35	8 (44%)	13 (72%)	16 (89%)	18 (100%)

4.2.9 Study 2 Conclusions

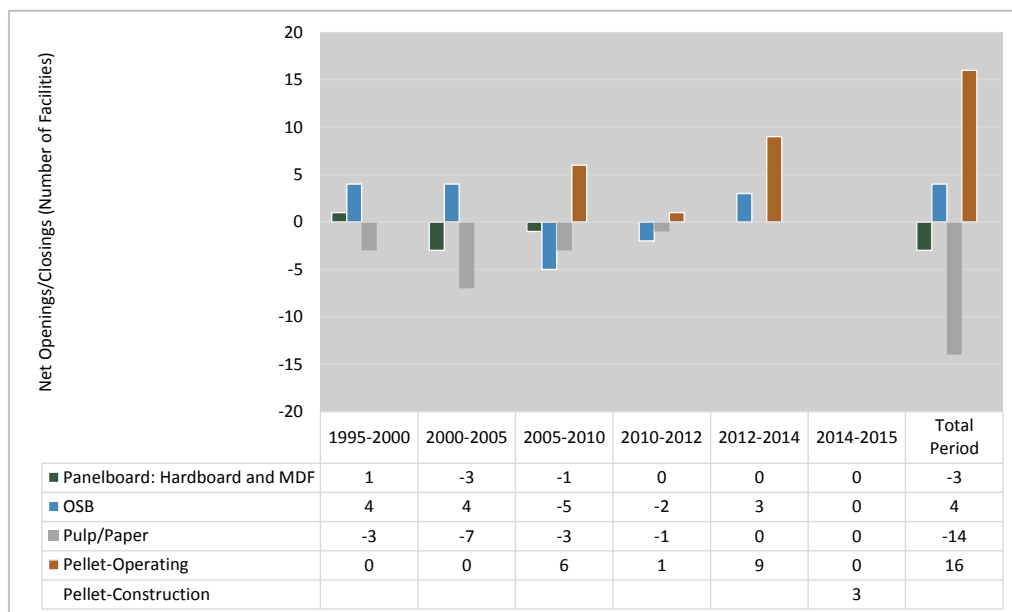
Objectives of this study were to:

- Demonstrate how the landscape of the forest products industry has changed over time
- Identify pellet mills located in wood basins where consumers once operated, closed and left a void in market demand that pellet mills have now filled
- Prove or disprove that where export pellet mills have located, nearby competitor mills have continued to operate and have not been forced to close due to pellet demand

Changes in the Landscape of the Forest Products Industry

In terms of the total number of active mills, the 2015 footprint is essentially the same as the 1995 footprint (119 operating facilities, Figure 4-23). Three additional facilities are under construction. There have, however, been significant changes – 38 facilities have opened and 35 have permanently closed. Between 2000 and 2015, the panelboard and OSB sectors both experienced openings and closings with the panelboard sector experiencing a net loss of three facilities and the OSB sector experiencing net growth of four facilities. The trend for pulp and paper was more one directional – 15 facilities closed, none opened, and 1 re-opened. Nineteen export pellet mills have opened or are under construction in the US South (eighteen, plus one expansion), and none have closed.

Figure 4-23 Net Openings and Closings – 1995-2015



Site Selection

The geographic analysis shows that the six pellet mills that were operational in 2010 did not locate in close proximity to closed facilities (Table 4-16). Over time, however, pellet mills have located closer to these sites. Seventy-two percent (72%) are now within 65 miles of a closed facility. Examples of the facilities that have located in areas where competitors have ceased operations include:

- Three Enviva hardwood pellet mills in Virginia and North Carolina are located in the footprint of International Paper's closed Franklin mill. Prior to closing, IP's mill consumed hardwood fiber. These mills are also in the footprint of a closed Georgia-Pacific OSB mill in Skippers, Virginia.
- In 2014, Drax Bastrop opened on the site of a closed International Paper pulp/paper mill.
- In 2014, German Pellets Urania opened on the site of closed Georgia-Pacific MDF and OSB mills.
- In 2014, German Pellets Woodville and Drax Gloster both opened in close proximity to a number of pulp/paper and OSB mills that closed between 1995 and 2014.
- Enviva Sampson (2015) is in close proximity to a closed Georgia-Pacific OSB mill.

Site selection is the result of complex decision making. While vacated demand is one criterion decision makers evaluate, other factors—such as economic development incentives, tax abatements, fiber supply and price, proximity to fiber supply and proximity to a deep water port—are also important. In 2015, similar to years past, a greater percentage of pellet mills are located in closer proximity to operating facilities than closed facilities, a function of there being more operating mills than closed mills (122 versus 35).

Competitor Reactions to New Pellet Mill Entrants

No compelling evidence exists that pellet mills have forced competitive mills to close.

- **Closures are the result of demand for end products, not increased competition from pellet mills.** Between 1995 and 2005, before the first pellet mill was constructed, 20 traditional forest products mills closed. Because of the rise of digital communications methods, global demand for paper dropped; as a result, the majority of the closed mills were pulp/paper facilities. Since the first pellet mill was constructed, only 4 other pulp/paper facilities have closed (plus the International Paper mill in Franklin, Virginia, which closed paper production and later reopened for fluff pulp production), none of which were caused by the emergence of the export pellet industry. Similarly, the housing market crash led to the closure of 11 OSB mills between 2006 and 2012.
- **Competitive mills opened or re-opened in close proximity to pellet mills.** Not only did export pellet mills not cause closures, the evidence suggests that pulp/paper and OSB mills are not overly concerned about the ability of export pellet mills to compete with them. Louisiana-Pacific's Thomasville, Alabama OSB mill opened despite the fact that it is in close proximity to multiple pulp/paper mills and two export pellet mills sit on the borders of its procurement area (Westervelt-Aliceville and Zilkha-Selma). A Langboard OSB mill opened in Quitman, Georgia, which is in the footprint of Georgia Biomass's Waycross facility. And though they currently use different species of feedstock, International Paper's

Franklin fluff pulp mill opened in the footprint of three Enviva export pellet mills in southern Virginia and northern North Carolina.

No evidence supports the accusation that export pellet mills have forced closures. Despite the addition of export pellet mill demand, nearby forest products mills have continued to operate. It appears that export pellet mills have attempted to avoid competition (i.e. 61% are located more than 30 miles distant from a competitor), but they have not operated in a vacuum (i.e. 100% have located within 65 miles of a competitor). The same could be said for competing OSB/pulp/paper mills that have located close to one another – historically, they have not operated in a vacuum absent of any other competition.

4.2.10 Study 2 A Forward View on Additional Pellet Mill Developments

Study 2 demonstrates that export pellet mills have historically not caused undue hardship for traditional competition. However, the question remains: how likely is it that future export pellet mill developments will have an adverse impact?

It is difficult to determine exactly where the next industrial pellet mill(s) dedicated to the UK (or other European countries) will be located, whether in the US South or other regions such as Brazil or eastern Canada. We do know that industrial pellet customers (i.e. European generators) will diversify the footprint of their fuel supply portfolio and will continue to source industrial pellets from a number of different countries. Over the last 7 years, many export pellet mill announcements have been made, but relatively few have been built. This is because the industrial pellet business is a build to suit business. The average cost of an export pellet mill is approximately \$110 million for a plant that can produce 500,000 metric tons annually. In order to obtain financing for an export pellet mill, the developer must have secured a long-term offtake agreement with a customer so that the financier can be guaranteed that there is secure, long-term demand for the export pellet mill's product. Secure, long-term offtake agreements are only offered by European generators who have obtained long-term subsidy support from their European member state governments. If no long-term offtake agreement has been awarded to a developer, then the likelihood that the developer's announced plant will ever be built is extremely small. Accordingly, over the past several years, the US South has witnessed many export pellet mill announcements, but relatively few export pellet mills being built.

Due to austerity measures in the European Union and its member states, subsidy support for all renewables, including biomass, has been capped with limited near-term opportunities for additional support. As a result, the best estimates of future incremental export pellet mill growth in the US South can only be made from expected incremental demand from the power generators in Europe (and the underlying subsidies supporting biomass conversions or co-firing) and the US South's current market share of current supply.

In 2014, the European Union consumed roughly 9 million metric tons of industrial wood pellets. The US South exported roughly 3.6 million metric tons, roughly a 40% market share, to these industrial consumers. It is expected that the majority of existing and near-term incremental European industrial pellet demand (particularly in Denmark) will be supplied from existing export pellet mills and mills already under construction (total production capacity of approximately 7.4 million metric tons). As such, further growth in industrial pellet demand will originate from incremental projects in the UK, Netherlands and potentially Belgium. Currently, three UK power generation projects--Drax Unit #3, RWE Lynemouth (biomass conversion) and MGT Teesside (new build

biomass)²⁵--have been awarded Investment Contracts under the UK Contract for Difference support scheme. If these projects are ultimately developed and the demand from the Netherlands rises to the government-imposed cap on biomass co-firing, approximately 5 and 3.5 million metric tons, respectively, of incremental industrial wood pellet production capacity will be required.

Assuming an additional 8.5 million metric tons of demand from these biomass power generation projects, and applying the current US market share rate of 40%, roughly 3.4 million metric tons of additional industrial pellets could potentially be sourced from the US South over the next few years. Assuming an average annual pellet mill capacity of 500,000 metric tons, the additional demand equates to an additional 7 export pellet mills in the US Southeast. In terms of green short ton feedstock requirements, 7 export pellet mill plants have the potential of adding 7.9 million tons of demand for wood fiber in the US South²⁶. These harvest removals would represent an additional 0.3% of the existing 2,398 million tons of pulpwood inventory (0.1% of total inventory).

4.3 Study 3: Market Case Studies: 2006-2015

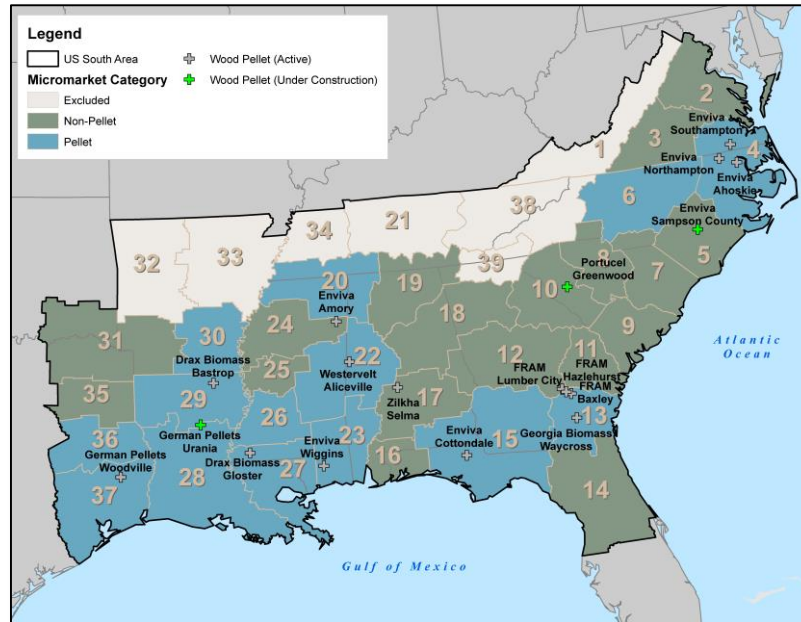
While Studies 1 and 2 provide a high level view of market trends in the US South, Study 3 provides a deeper look at individual wood basins and compares them to other regions in the US South (Figure 4-24). The following case studies were selected to examine the role that market drivers have played relative to price changes. Several market types were considered, including markets where export pellet mills were constructed, where no export pellet mill activity exists, and where other non-pellet mills (OSB/pulp and paper) were constructed. For all case studies, the same time period—from 2006 to year-to-date 2015—was chosen for context, but key findings for each case study are specific to the price response that occurred within the time period between the year of a facility's opening/closing and subsequent years.

- 1) An export pellet mill locates within the wood basin of a closed traditional, competitor mill: North Carolina/Virginia (Section 4.3.1)
- 2) An export pellet mill locates within the wood basin of an operational competitor mill: Florida Panhandle (Section 4.3.2)
- 3) An export pellet mill locates within the wood basin of an operational competitor mill: Coastal Georgia (Section 4.3.3)
- 4) A traditional, competitive mill locates within the wood basin of another traditional competitor mill: Low Country, South Carolina (Section 4.3.4)
- 5) A traditional, competitive mill closes and no new competitive demand, including wood pellet demand, enters the wood basin: North Alabama (Section 4.3.5)

²⁵ MGT Teesside has not yet been financed.

²⁶ These projections are for industrial wood pellets for the identified users only. Demand projections for heating grade pellets and other projects could possibly add another 10 million tons of demand.

Figure 4-24 Forest2Market US South Stumpage Micro-Market Regions

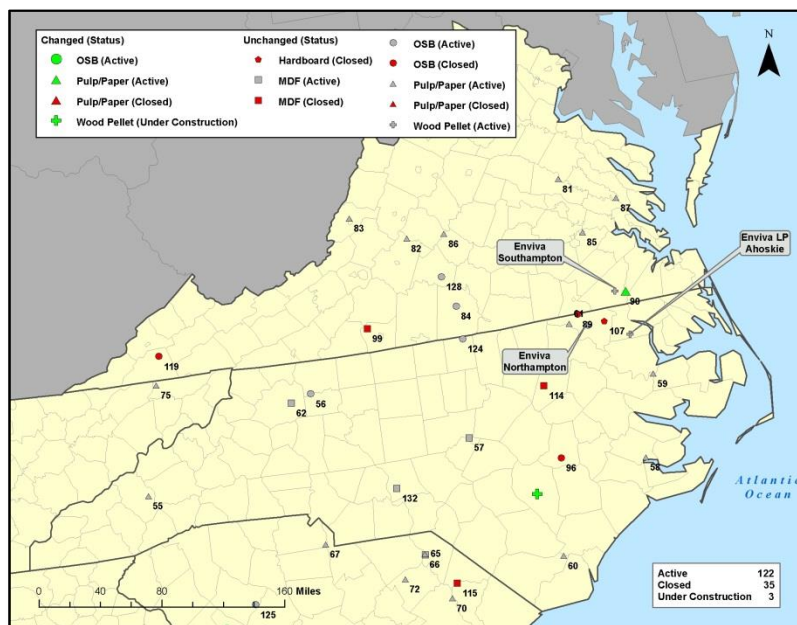


4.3.1 Case Study 1: An Export Pellet Mill Locates within the Wood Basin of a Closed Traditional, Competitor Mill: North Carolina/Virginia

Enviva LP Locates in the North Carolina-Virginia Wood Basin Vacated by International Paper- Franklin

In 2010, International Paper closed its Franklin, Virginia paper mill, reducing the demand for hardwood wood fiber in the wood basin identified in Figure 4-25. Shortly thereafter, in August 2011, Enviva announced its plans to construct its Northampton, North Carolina and Southampton, Virginia export pellet mills that would consume hardwood wood fiber. It also began operations at its Ahoskie, North Carolina facility in November 2011. As the Northampton and Southampton export pellet mills were under construction, International Paper announced it would reopen the Franklin mill for the production of fluff pulp specifically targeting pine wood fiber. As they are consuming different species of wood fiber, IP and Enviva are not in direct competition for wood fiber.

Figure 4-25 Case Study 1 – North Carolina-Virginia Wood Basin – Current Footprint (2015)





From 2006-2015, stumpage prices for hardwood pulpwood were volatile (Table 4-19, Figure 4-26²⁷). During the period of 2006 to 2009, before the Franklin mill closed, demand (measured by removals as a percent of inventory) was relatively flat, and hardwood pulpwood prices averaged \$4.64 per ton. Prices held at this level until above average precipitation in 2008-2009 caused prices to reach a high of \$6.17 per ton in 2010, the year Franklin closed. The following year, in the absence of IP's demand, prices fell 54% to a low of \$2.81 per ton. From 2011 to 2013, as Enviva began operations and other market demand entered the region, prices steadily increased to \$4.66 per ton (percent removals increased from 1.7% to 2.6%). However, prices escalated in 2014 and through the first half of 2015, the result of above average rainfall late in 2013 and a 30% increase in total demand from both pellets and non-pellets; prices climbed to a market high of \$8.31 per ton.

From a resource perspective, the increased demand from Enviva and others has not eclipsed demand from earlier years when IP-Franklin was a hardwood consumer in a robust end-product market. As a result, pulpwood inventory has increased, and projected removals for 2015 are estimated at 3.3% of inventory, significantly less than 2006's measurement of 5.5%.

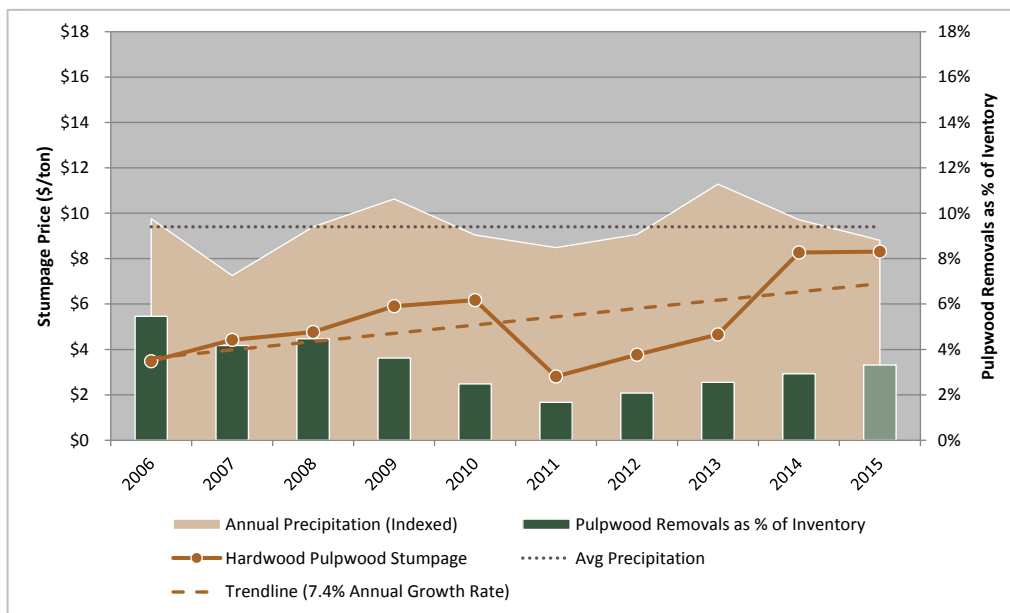
²⁷ Price charts for each case study are scaled equally to demonstrate differences in metrics between wood basins and products. For 2015, stumpage prices represent January-June data from F2M's proprietary dataset. Precipitation and inventory data for 2015 are estimated projections.

Table 4-19 Case Study 1 – North Carolina-Virginia Wood Basin – Hardwood Pulpwood Stumpage

Year	Hardwood Pulpwood Stumpage Case Study 1 (NC-VA)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	International Paper - Franklin business as usual using Hardwood Pulpwood	\$3.48		
2007	International Paper - Franklin business as usual using Hardwood Pulpwood	\$4.42	\$0.94	27%
2008	International Paper - Franklin business as usual using Hardwood Pulpwood	\$4.77	\$0.35	8%
2009	International Paper - Franklin business as usual using Hardwood Pulpwood	\$5.91	\$1.14	24%
2010	International Paper - Franklin shuts down paper mill	\$6.17	\$0.26	4%
2011	International Paper - Franklin closed	\$2.81	(\$3.36)	-54%
2012	International Paper - Franklin reopens paper mill using Pine Pulpwood	\$3.77	\$0.96	34%
2013	Enviva, LP - Northampton and Southampton begin production using Hardwood Pulpwood*	\$4.66	\$0.89	24%
2014	Enviva, LP - Northampton and Southampton ramp up production using Hardwood Pulpwood	\$8.27	\$3.61	77%
2015	Enviva, LP - Northampton and Southampton business as usual using Hardwood Pulpwood	\$8.31	\$0.04	0%

*Enviva began production at Northampton November 2012 and at Southampton mid-2013.

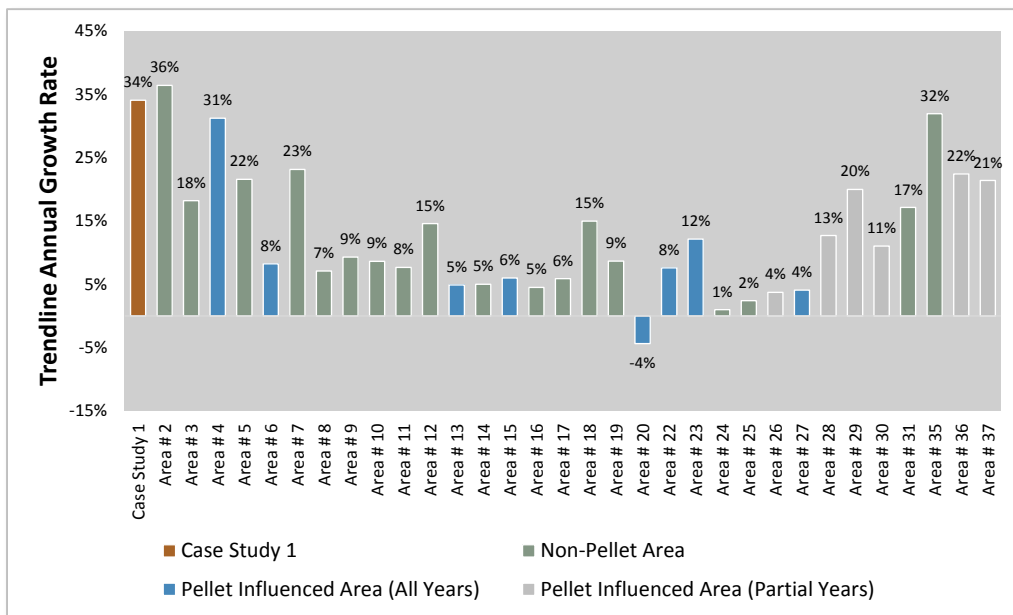
Figure 4-26 Case Study 1 – North Carolina-Virginia Wood Basin – Hardwood Pulpwood Stumpage



US South Comparison

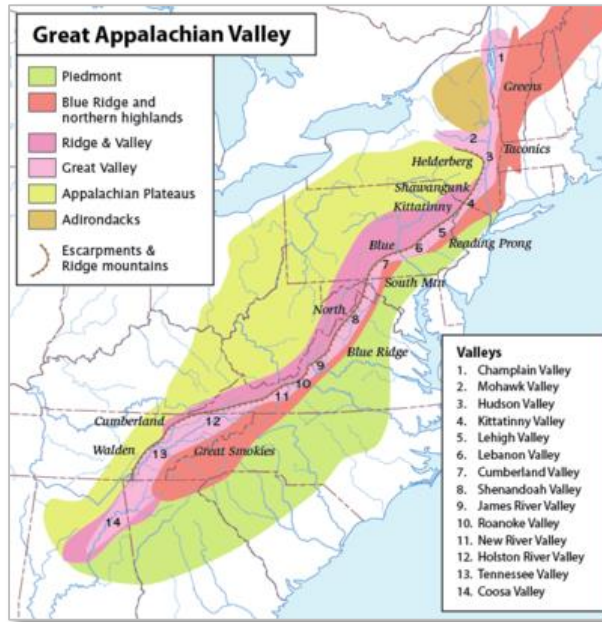
From 2012-2015, hardwood pulpwood prices increased 34% annually in the case study wood basin (Figure 4-27). This increase was on par with Areas #2 (36%) and #5 (22%) that make up the Virginia and North Carolina coastal basins and that had no export pellet mill influence. This increase is also consistent with the encompassing Area #4 at 31%. It is also noted that the interior and central regions of the Virginia/North Carolina Piedmont (Areas #3 and #6) had lower price increases. These differences between markets demonstrate the variability that can occur with hardwood pulpwood, specifically its relationship to the geography and slope in terrain associated with coastal markets versus piedmont markets closer to the Appalachian Mountains (Figure 4-28). As above-average rainfall occurred in 2013, hardwood pulpwood supply in lower lying coastal timberland regions became less available for harvest than in the interior areas, causing prices to increase at a greater percentage rate. It should also be noted that this region, along with portions of Louisiana and Texas (Areas #28 through #37), experienced the largest price increases over this three-year time period within the US South.

**Figure 4-27 Case Study 1 – North Carolina-Virginia Wood Basin²⁸
Hardwood Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2012-2015**



²⁸ The areas represented in the US South comparison charts represent the wood basins identified in Figure 4-24 and have been separated by those that have had pulpwood purchases by an export pellet mill (pellet influenced) versus those that have had little to no purchases (non-pellet). This definition of pellet influence is not defined by a statistical measure of correlation or significance and ignores the possibility that a direct pellet influenced area may have a price effect on a non-pellet area. Gray bars indicate markets with partial pellet influence during the period of the relevant case study, for example Area 37 is influenced for part of the time period of this case study by German Pellets, which came online after the start of the time period for this case study. If a wood basin contained a pellet mill that existed during the entire time period (all years) of the case study, the area is denoted in blue. The percent annual growth rate for the individual case study wood basin is presented separately for precision as it consists of a unique group of counties surrounding the study facility. However, the case study wood basin will be a microcosm of one or more micro-markets. For example, Case Study 1 is a microcosm mostly of Micro-Market #4 and partially of Micro-Market #6.

Figure 4-28 Appalachian Mountain Range and Associated Valleys



Key Findings from Case Study

In the absence of Franklin’s demand, prices decreased in the wood basin. Then, when Enviva’s demand entered the market, prices increased. While Enviva’s demand has supplanted Franklin’s demand, it has not acted alone to raise hardwood pulpwood stumpage prices. Above average rainfall has also contributed to the price increase. Overall, hardwood pulpwood prices increased 34% annually in the case study wood basin, which is on par with other areas that make up the Virginia and North Carolina coastal basins and that had no export pellet mill influence.

Harvest removals (including harvests delivered to Enviva) have not exceeded the market highs, which occurred between 2006 and 2009. Hardwood pulpwood inventory has also increased.

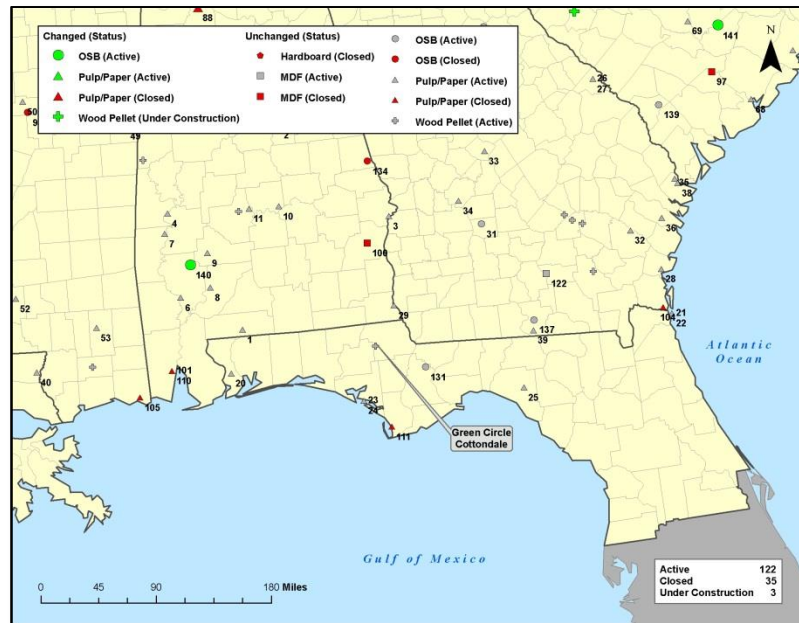
International Paper reopened Franklin mill for the production of fluff pulp specifically targeting pine wood fiber. Because they consume different species, IP and Enviva are not in direct competition for wood fiber.

4.3.2 Case Study 2: An Export Pellet Mill Locates within the Wood Basin of an Operational Competitor Mill: Florida Panhandle

Green Circle Energy Inc. locates in the Florida Panhandle wood basin

One of the first operational pellet mills was Green Circle Energy’s plant in Cottondale, Florida, almost 90 miles north of Panama City and Port St. Joe, Florida (Figure 4-29).

Figure 4-29 Case Study 2 – Florida Panhandle Wood Basin – Current Footprint (2015)



Pine pulpwood prices in this wood basin have steadily increased since 2006, with a patch of volatility between 2009 and 2012 (Table 4-20, Figure 4-30). In 2007, the year before Green Circle’s entrance in the wood basin, prices increased 11%. When the plant came online in 2008, prices increased almost the same amount (10%). The following year as it ramped up production, prices increased a minimal 3%. In its second full year of operation in 2010, prices escalated \$2.17 per ton as winter 2009 precipitation was above average by 26% and as demand in 2010 increased by 26%²⁹. As precipitation fell below average between 2010 and 2012, the run-up in market price subsided. As a gauge to 2009-2010’s weather effect, prices fell and remained at a level below 2010 even as demand over the period increased 9%.

An interesting set of events has occurred in more recent years. Precipitation patterns affected the market again in 2013 driving price up to \$13.96 per ton in 2014. In addition, total demand from pellets and non-pellets peaked in 2012. Since this escalation, demand and precipitation have softened and prices appear to be leveling off. However, it should be noted that while demand has declined since 2012, pulpwood inventory has declined at a quicker rate³⁰. As a result, removals as a percent of inventory eclipsed 14% in 2014 and may continue to increase in 2015.

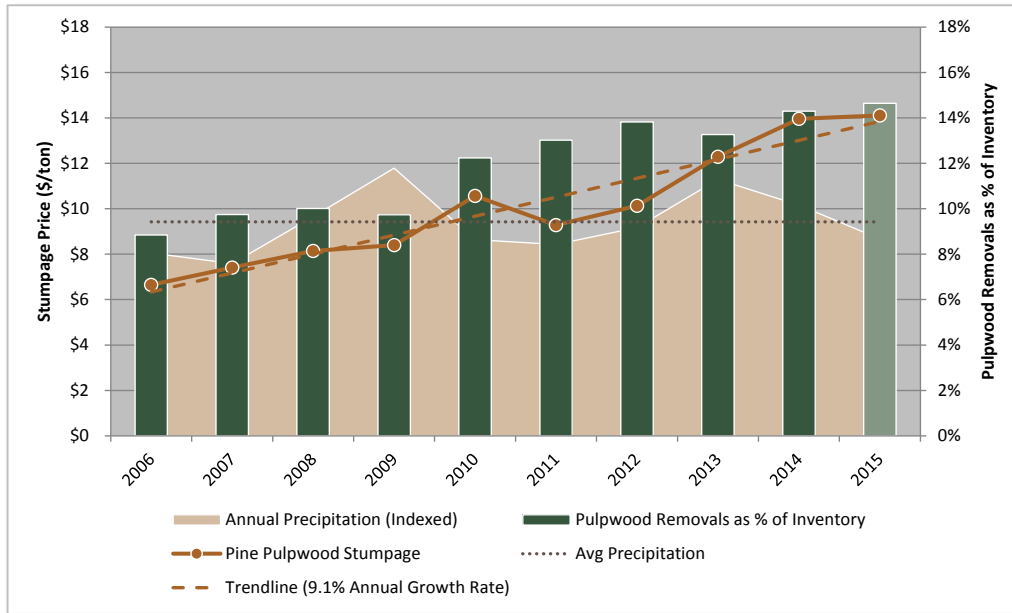
Table 4-20 Case Study 2 – Florida Panhandle Wood Basin – Pine Pulpwood Stumpage

Year	Pine Pulpwood Stumpage Case Study 2 (Cottdale, FL)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	Business as usual using Pine Pulpwood	\$6.65		
2007	Business as usual using Pine Pulpwood	\$7.41	\$0.76	11%
2008	Green Circle Bioenergy - Cottdale begins production using Pine Pulpwood	\$8.14	\$0.73	10%
2009	Green Circle Bioenergy - Cottdale ramps up production using Pine Pulpwood	\$8.40	\$0.26	3%
2010	Green Circle Bioenergy - Cottdale business as usual using Pine Pulpwood	\$10.57	\$2.17	26%
2011	Green Circle Bioenergy - Cottdale business as usual using Pine Pulpwood	\$9.28	(\$1.29)	-12%
2012	Green Circle Bioenergy - Cottdale business as usual using Pine Pulpwood	\$10.13	\$0.85	9%
2013	Green Circle Bioenergy - Cottdale business as usual using Pine Pulpwood	\$12.29	\$2.16	21%
2014	Green Circle Bioenergy - Cottdale business as usual using Pine Pulpwood	\$13.96	\$1.67	14%
2015	Enviva, LP acquires Green Circle Bioenergy - Cottdale and resumes business as usual using Pine Pulpwood	\$14.11	\$0.15	1%

²⁹ The 26% demand increase was a combination of demand from Green Circle and other local mills.

³⁰ Total pine inventory declined in 2013, but increased in 2014. Total pine inventory is projected to increase in 2015.

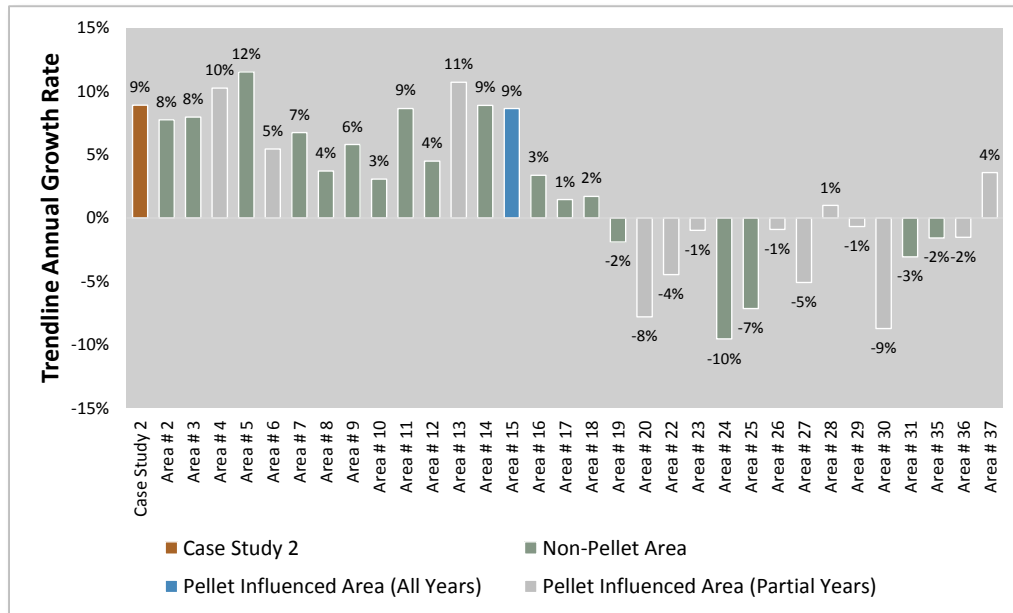
Figure 4-30 Case Study 2 – Florida Panhandle Wood Basin – Pine Pulpwood Stumpage



US South Comparison

Between 2008 and 2015, pine pulpwood prices increased 9% annually in the case study wood basin (Figure 4-31). While this increase is consistent with Atlantic coastal areas (Areas #2, 4, 5, 7, 9, 11, 13, 14 – Average = 10%) and the encompassing Area #15 (9%), it is slightly higher than the neighboring Gulf coastal market of Area #16 (3%). It should also be noted that the increase is on par with the non-pellet Area #14 (9%). Interestingly, it is apparent that during this time period, eastern markets (Areas #2 through #18) experienced positive price increases, while the majority of western markets experienced price declines. As part of the eastern region (Area #15), the Green Circle case study wood basin is not an exception to the pattern.

Figure 4-31 Case Study 2 – Florida Panhandle Wood Basin
Pine Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2008-2015



Key Findings from Case Study

Prior to Green Circle’s entrance into the market, a \$0.76 per ton price increase had occurred. When Green Circle began production, a subsequent \$0.73 per ton price increase occurred. As the two price increases are comparable, it is difficult to conclude that Green Circle alone caused the \$0.73 per ton price increase. Also, in its subsequent year of ramping up production, price increased by just \$0.26 per ton. And even in later years, as prices continued to increase, the increase is attributed to the earlier expansion of demand from both pellet and non-pellet consumers and above average rainfall, not to Green Circle alone. Based on the timing of price increases, Green Circle appears to have had a minimal impact on prices.

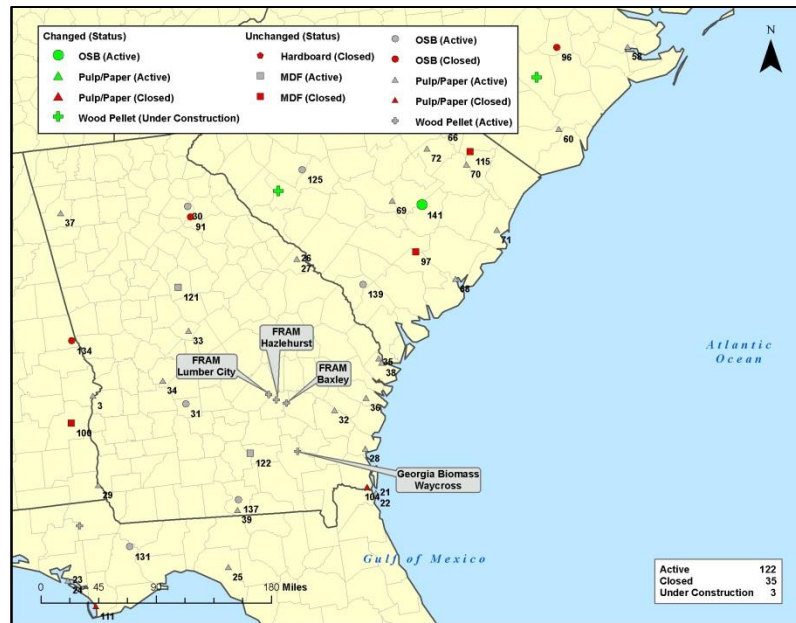
Pine pulpwood prices in the wood basin increased 9%, which is consistent with the Atlantic coastal areas average of 10%), the encompassing Area #15 (9%) and with the non-pellet Area #14 (9%).

4.3.3 Case Study 3: An Export Pellet Mill Locates within the Wood Basin of an Operational Competitor Mill: Coastal Georgia

Georgia Biomass Inc. locates in the Coastal Georgia wood basin

Perhaps one of the most competitive wood basins in the US South is the coastal Georgia wood basin, where pellet, containerboard, fluff pulp, performance fibers and OSB mills compete for pine wood fiber (Figure 4-32).

Figure 4-32 Case Study 3 – Coastal Georgia Wood Basin – Current Footprint (2015)



Prior to Georgia Biomass locating in the wood basin, pine pulpwood prices were increasing (Table 4-21, Figure 4-33). The fallout of the housing market and recession hit the state of Florida hard. Most construction stopped, and regional sawmills that shipped lumber into the Florida market suddenly had to find markets to the North. These producers become disadvantaged by their trucking distance as a result. As sawmill production was reduced, residual chip supply dwindled; this led competing mills to increase their demand for pulpwood. By 2008, pine pulpwood price had increased over \$2.00 per ton to average \$10.35 per ton.

As Georgia Biomass began purchasing pulpwood in 2010, competition escalated. The increase in competition combined with above average precipitation in 2009 drove prices up 13% or an additional \$1.35 per ton in 2010. In 2011, the market adjusted and prices decreased by 4%.

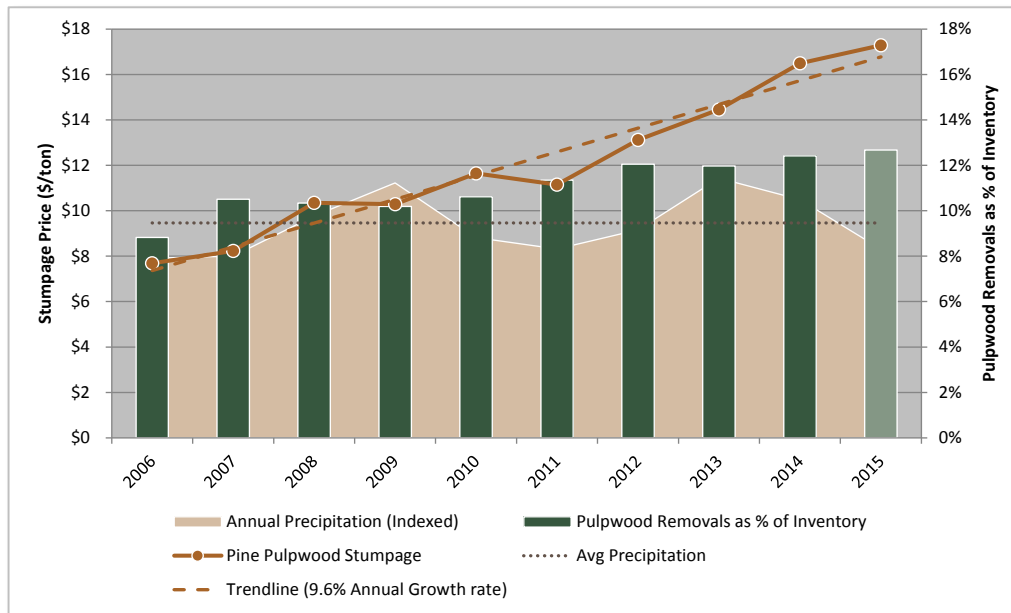
Since 2011, a similar situation has occurred as in the Cottdale case study (Section 4.3.2). Above average rainfall in 2013 contributed to a price spike and demand in this basin peaked in 2012, though it has subsequently softened. However, as with Cottdale, the pulpwood inventory has declined slightly and at a quicker rate than removals³¹. As a result, removals as a percent of inventory have increased.

Table 4-21 Case Study 3 – Coastal Georgia Wood Basin – Pine Pulpwood Stumpage

Year	Pine Pulpwood Stumpage Case Study 3 (Waycross, GA)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	Business as usual using Pine Pulpwood	\$7.69		
2007	Business as usual using Pine Pulpwood	\$8.23	\$0.54	7%
2008	Business as usual using Pine Pulpwood	\$10.35	\$2.12	26%
2009	Business as usual using Pine Pulpwood	\$10.29	(\$0.06)	-1%
2010	Georgia Biomass - Waycross begins production using Pine Pulpwood	\$11.64	\$1.35	13%
2011	Georgia Biomass - Waycross ramps up production using Pine Pulpwood	\$11.15	(\$0.49)	-4%
2012	Georgia Biomass - Waycross business as usual using Pine Pulpwood	\$13.12	\$1.97	18%
2013	Georgia Biomass - Waycross business as usual using Pine Pulpwood	\$14.45	\$1.33	10%
2014	Georgia Biomass - Waycross business as usual using Pine Pulpwood	\$16.49	\$2.04	14%
2015	Georgia Biomass - Waycross business as usual using Pine Pulpwood	\$17.28	\$0.79	5%

³¹ Total pine inventory increased over this period.

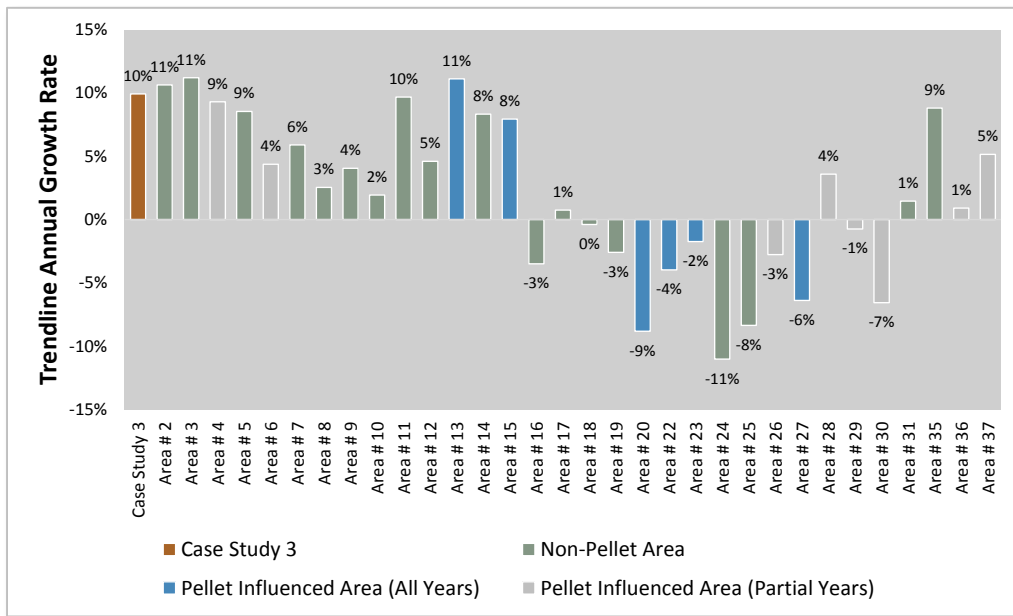
Figure 4-33 Case Study 3 – Coastal Georgia Wood Basin – Pine Pulpwood Stumpage



US South Comparison

Between 2010 and 2015, pine pulpwood prices increased 10% annually in the case study wood basin (Figure 4-34). This increase is consistent with the encompassing Area #13 (11%) and neighboring non-pellet coastal markets of Areas #11 (10%) and #14 (8%). Results of this comparison, even though over a shorter time period, are similar to the Green Circle case study. The increase is consistent with Atlantic coastal areas (Areas #2, 4, 5, 7, 9, 11, 13, 14 – Average = 9%). It is also consistent with eastern markets (Areas #2 through #15), which experienced positive price increases, while the majority of western markets experienced price declines. Like Green Circle, the Georgia Biomass case study wood basin is not an exception to the regional patterns.

**Figure 4-34 Case Study 3 – Coastal Georgia Wood Basin
Pine Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2010-2015**



Key Findings from Case Study

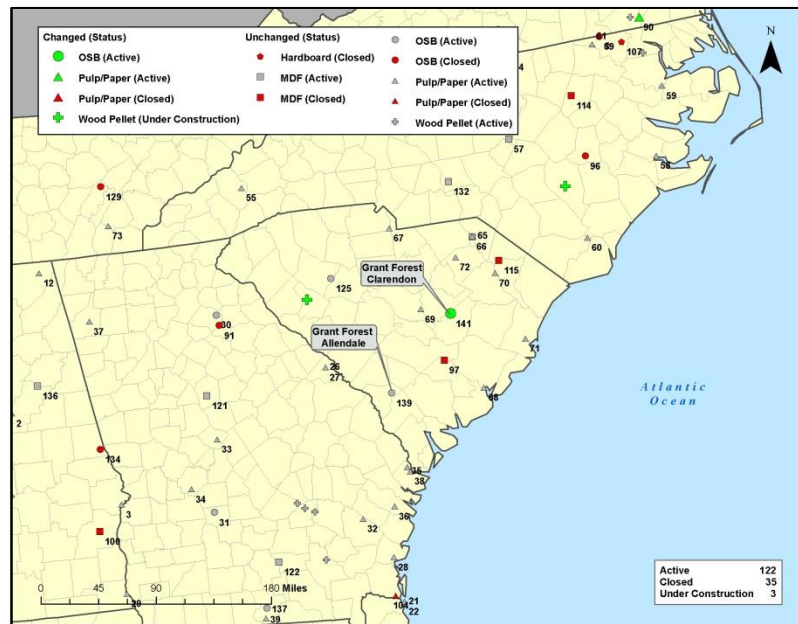
When Georgia Biomass began operating in 2010, a large price increase occurred (\$1.35 per ton increase). However, as prices increased by \$2.12 per ton in 2008 prior to Georgia Biomass’ construction, and as above average rainfall occurred in 2013 and 2014, it is unlikely that Georgia Biomass’ demand alone caused pine pulpwood prices to increase. In addition, in comparison to other wood basins along the Atlantic coast, price increases have been consistent averaging 9% in both pellet and non-pellet influenced areas.

4.3.4 Case Study 4: A Traditional, Competitive Mill Locates within the Wood Basin of another Traditional Competitor Mill: Low Country, South Carolina

Grant Forest Products, Inc. locates in the Low Country South Carolina wood basin

In 2005, Grant Forest Products announced that it would build two OSB facilities in South Carolina. The first was constructed in Allendale, South Carolina and the second in Clarendon County (Figure 4-35).

Figure 4-35 Case Study 4 – Low Country South Carolina Wood Basin – Current Footprint (2015)



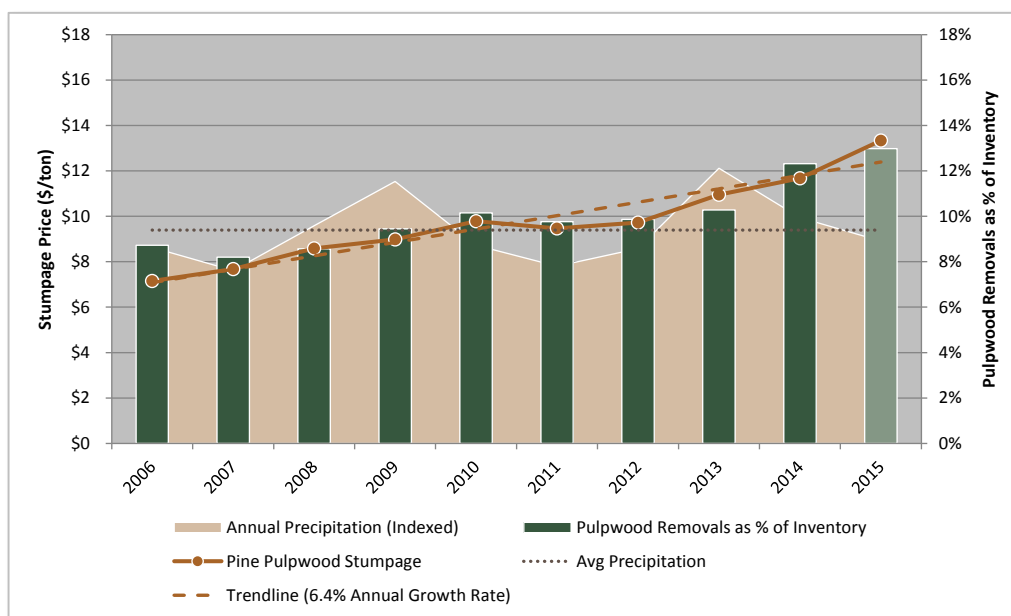
Over the 2005-2006 period, Grant constructed both mills, but as the housing market crashed, the Allendale facility operated at reduced production and construction was halted on the Clarendon facility. By 2011, Grant had sold the mills to Georgia-Pacific. Georgia-Pacific finished construction on Clarendon and began production in 2013.

Since Grant's entrance into the market, pine pulpwood prices have increased steadily with 2011 being the only year with a decrease due to softened demand (Table 4-22, Figure 4-36). A portion of the price increase in 2010 may be attributed to 2009's above average precipitation, though it has the appearance of being more muted than in previous case studies. Precipitation and increases in demand have driven more recent prices higher. Demand has increased 23% since 2012, and combined with above average precipitation in 2013, has caused a nearly \$4.00 per ton increase in stumpage prices. Harvests as a percentage of inventory have also increased.

Table 4-22 Case Study 4 – Low Country South Carolina Wood Basin – Pine Pulpwood Stumpage

Year	Pine Pulpwood Stumpage Case Study 4 (Allendale, SC)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	Grant Forest Products - Begins construction	\$7.15		
2007	Grant Forest Products - Allendale begins production using Pine Pulpwood	\$7.68	\$0.53	7%
2008	Grant Forest Products - Allendale ramps up production using Pine Pulpwood	\$8.59	\$0.91	12%
2009	Grant Forest Products - Allendale business as usual using Pine Pulpwood	\$8.98	\$0.39	5%
2010	Grant Forest Products - Allendale business as usual using Pine Pulpwood	\$9.78	\$0.80	9%
2011	Georgia Pacific acquires Grant Forest Products - Allendale and maintains business as usual using Pine Pulpwood	\$9.47	(\$0.31)	-3%
2012	Georgia Pacific - Allendale business as usual using Pine Pulpwood	\$9.72	\$0.25	3%
2013	Georgia Pacific - Allendale business as usual using Pine Pulpwood	\$10.95	\$1.23	13%
2014	Georgia Pacific - Allendale business as usual using Pine Pulpwood	\$11.67	\$0.72	7%
2015	Georgia Pacific - Allendale business as usual using Pine Pulpwood	\$13.34	\$1.67	14%

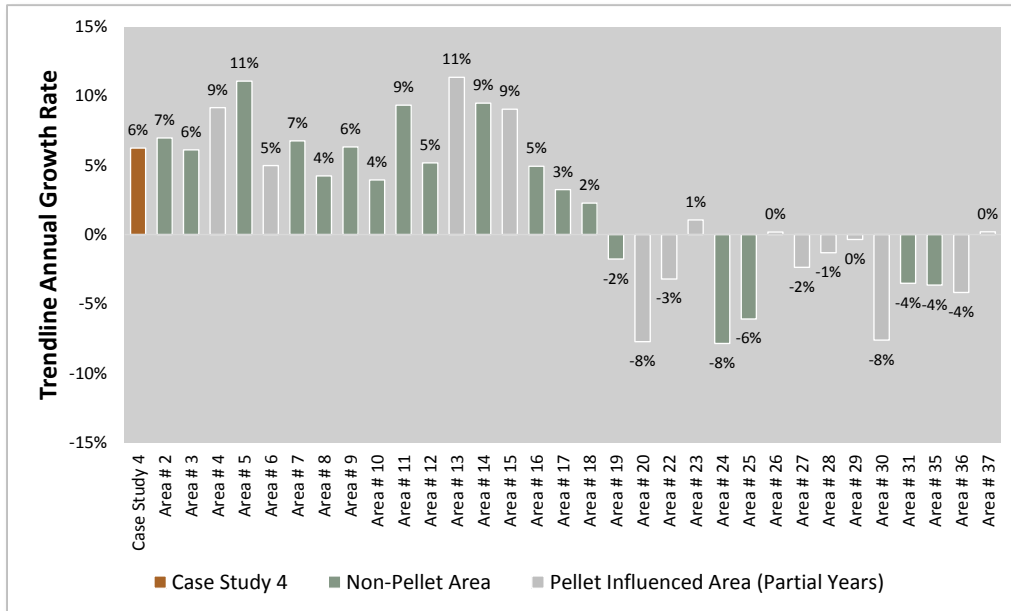
Figure 4-36 Case Study 4 – Low Country South Carolina Wood Basin – Pine Pulpwood Stumpage



US South Comparison

Between 2007 and 2015, pine pulpwood prices increased 6% annually in the case study wood basin (Figure 4-37). This increase is consistent with the encompassing market Area #9 (6%) and surrounding market areas (Areas #7, 8, 10, 11 – Average = 6%). As with Case Studies 2 and 3, the regional patterns are the same over this longer time period. Eastern market areas (Areas #2-18) experienced price increases ranging from 2% to 11% while western market areas experienced price decreases ranging from slightly less than 0% to -8%. As stated previously, this case study wood basin is not an exception to the broader regional patterns, even one with a non-pellet opening.

**Figure 4-37 Case Study 4 – Low Country South Carolina Wood Basin
Pine Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2007-2015**



Key Findings from Case Study

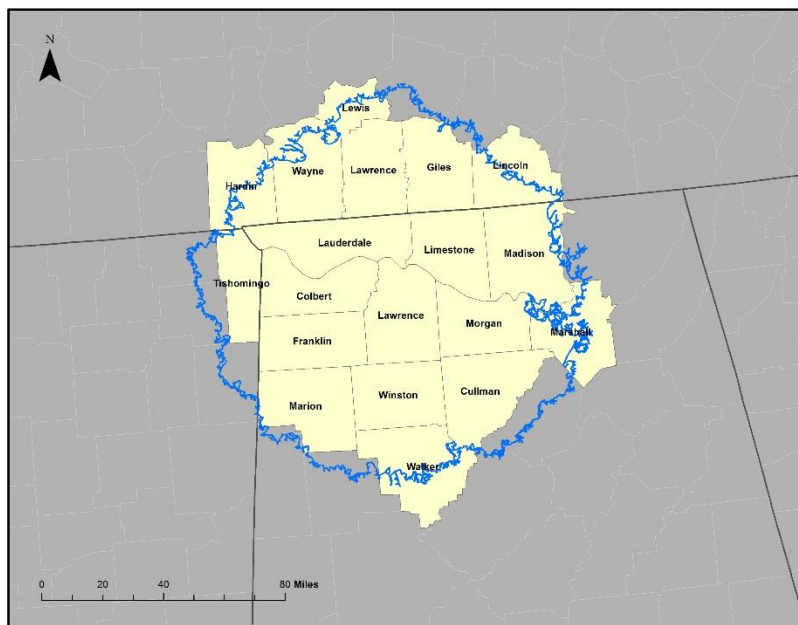
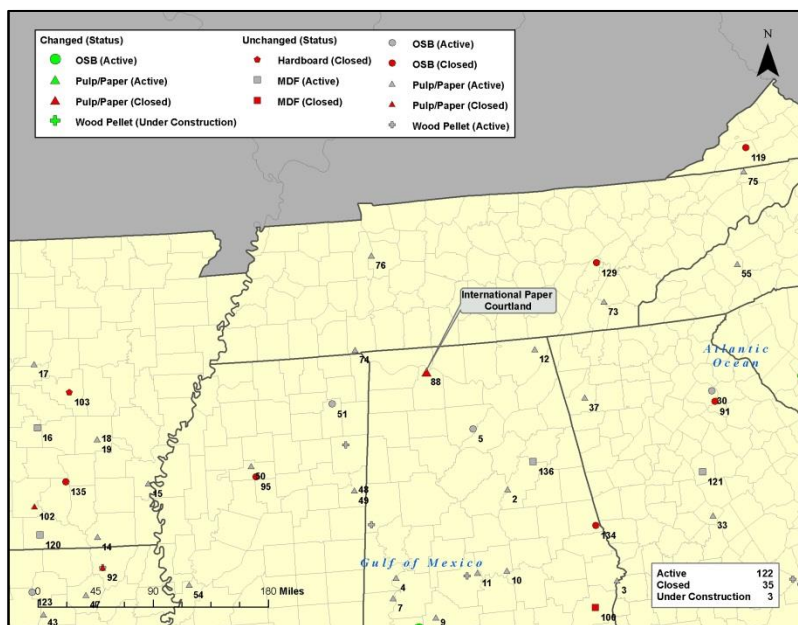
Pine pulpwood prices have increased in the study area due to increased demand, independent of pellet mill demand. As demand (harvest removals) and above average precipitation have increased in later years, so have prices.

4.3.5 Case Study 5: A Traditional, Competitive Mill Closes and No New Competitive Demand, Including Wood Pellet Demand, Enters the Wood Basin

International Paper Co. Closes in the North Alabama Wood Basin

In 2013, International Paper announced it was closing its Courtland, Alabama paper mill due to declining demand for print papers (Figure 4-38). The mill purchased hardwood wood fiber predominantly, but consumed pine wood fiber as well; this case study speaks to both.

Figure 4-38 Case Study 5 – North Alabama Wood Basin – Current Footprint (2015)



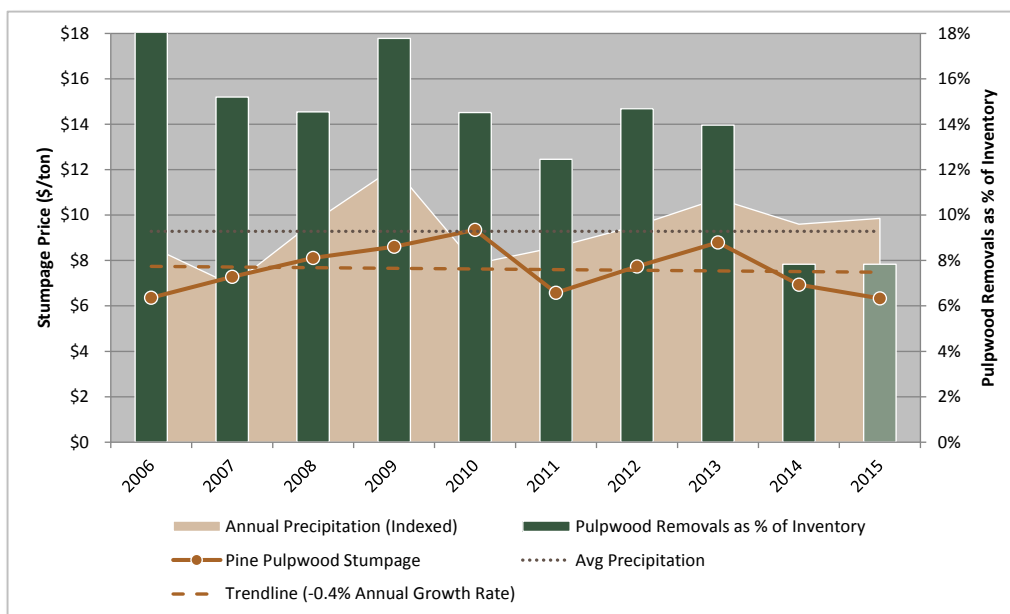
Pine Pulpwood

Inventory levels for pine pulpwood are lower in this region as it is located near the northern end of the pine forest belt of the US South and closer to the oak and hickory forests of the Cumberland Plateau (Table 4-23, Figure 4-39). As such, pine can be difficult to secure. This caused stumpage prices to increase in this wood basin until demand declined by 14% in 2011. After dropping almost \$3.00 per ton in 2011, prices began to increase again reaching a near high of \$8.79 per ton in 2013. When Courtland closed, demand decreased 36%. Pine stumpage prices have since returned to the low point of 2011, averaging \$6.63 per ton over the 2014-2015 period.

Table 4-23 Case Study 5 – North Alabama Wood Basin – Pine Pulpwood Stumpage

Year	Pine Pulpwood Stumpage Case Study 5 (Courtland, AL)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	International Paper - Courtland business as usual using Pine Pulpwood	\$6.36		
2007	International Paper - Courtland business as usual using Pine Pulpwood	\$7.28	\$0.92	14%
2008	International Paper - Courtland business as usual using Pine Pulpwood	\$8.11	\$0.83	11%
2009	International Paper - Courtland business as usual using Pine Pulpwood	\$8.61	\$0.50	6%
2010	International Paper - Courtland business as usual using Pine Pulpwood	\$9.35	\$0.74	9%
2011	International Paper - Courtland business as usual using Pine Pulpwood	\$6.58	(\$2.77)	-30%
2012	International Paper - Courtland business as usual using Pine Pulpwood	\$7.74	\$1.16	18%
2013	International Paper - Courtland business as usual using Pine Pulpwood	\$8.79	\$1.05	14%
2014	International Paper - Courtland shuts down paper mill	\$6.93	(\$1.86)	-21%
2015	International Paper - Courtland is closed	\$6.33	(\$0.60)	-9%

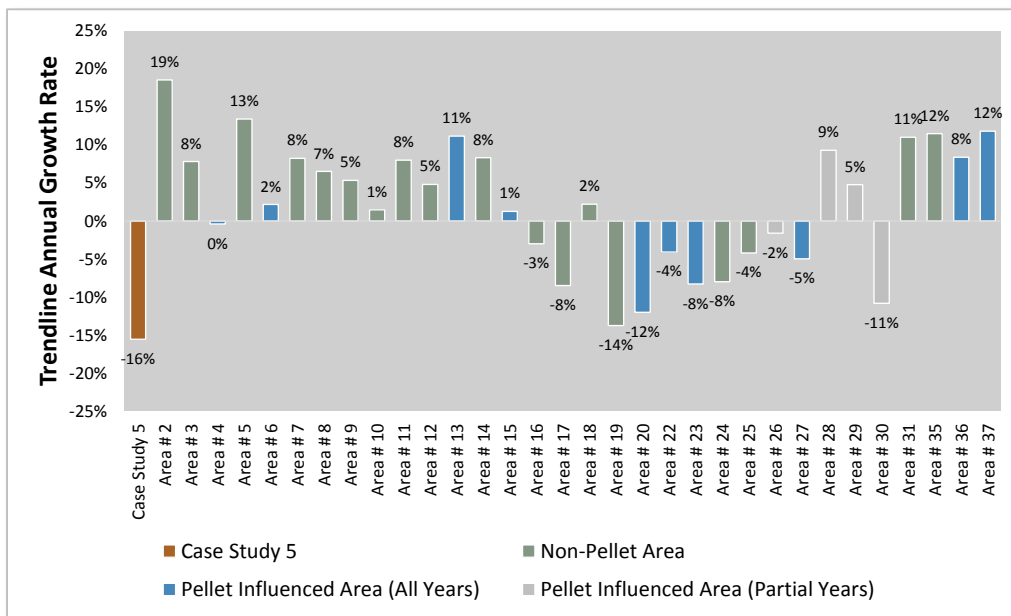
Figure 4-39 Case Study 5 – North Alabama Wood Basin – Pine Pulpwood Stumpage



US South Comparison

Between 2013 and 2015, pine pulpwood prices decreased 16% annually in the case study wood basin (Figure 4-40). This decrease is consistent with other surrounding market areas (both pellet and non-pellet), but in the absence of Courtland’s demand, the decrease in this area has been more significant than others. Interesting to note, is that the majority of pellet influenced areas were in operation during the entire time period and have price changes that are consistent with non-pellet areas. Where prices increased in pellet influenced areas, so did prices in regional non-pellet areas. The opposite is also true: where prices decreased in pellet influenced areas, so did prices in regional non-pellet areas. This includes the East Texas and Louisiana markets (Areas #28, 29, 31, 35, 36, 37) where German Pellets’ Woodville, Texas facility opened (Areas #36 and 37).

**Figure 4-40 Case Study 5 – North Alabama Wood Basin
Pine Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2013-2015**



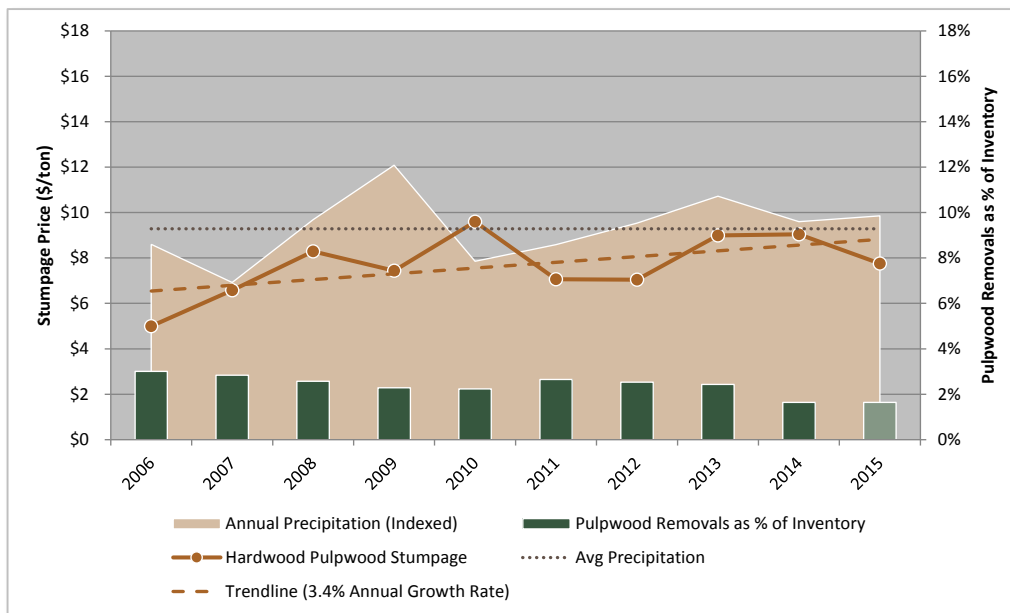
Hardwood Pulpwood

Contrary to pine, hardwood pulpwood inventory is abundant. However, like pine, securing this supply is also difficult. Hardwood pulpwood prices increased until 2009 when demand hit a low point (Table 4-24, Figure 4-41). Above average precipitation in the winter of 2009 caused hardwood prices to escalate in 2010. They subsequently dropped in 2011 despite a slight uptick in demand. Prices escalated again in 2013-2014 reaching a high of \$9.04 per ton, the result of above average precipitation. In the absence of Courtland’s demand, which ceased in 2014, hardwood price retreated 14% to \$7.76 per ton.

Table 4-24 Case Study 5 – North Alabama Wood Basin – Hardwood Pulpwood Stumpage

Year	Hardwood Pulpwood Stumpage Case Study 5 (Courtland, AL)			
	Event	\$/Ton	\$/Ton Change	% Change
2006	International Paper - Courtland business as usual using Hardwood Pulpwood	\$5.00		
2007	International Paper - Courtland business as usual using Hardwood Pulpwood	\$6.58	\$1.58	32%
2008	International Paper - Courtland business as usual using Hardwood Pulpwood	\$8.29	\$1.71	26%
2009	International Paper - Courtland business as usual using Hardwood Pulpwood	\$7.44	(\$0.85)	-10%
2010	International Paper - Courtland business as usual using Hardwood Pulpwood	\$9.60	\$2.16	29%
2011	International Paper - Courtland business as usual using Hardwood Pulpwood	\$7.06	(\$2.54)	-26%
2012	International Paper - Courtland business as usual using Hardwood Pulpwood	\$7.04	(\$0.02)	0%
2013	International Paper - Courtland business as usual using Hardwood Pulpwood	\$8.99	\$1.95	28%
2014	International Paper - Courtland shuts down paper mill	\$9.04	\$0.05	1%
2015	International Paper - Courtland is closed	\$7.76	(\$1.28)	-14%

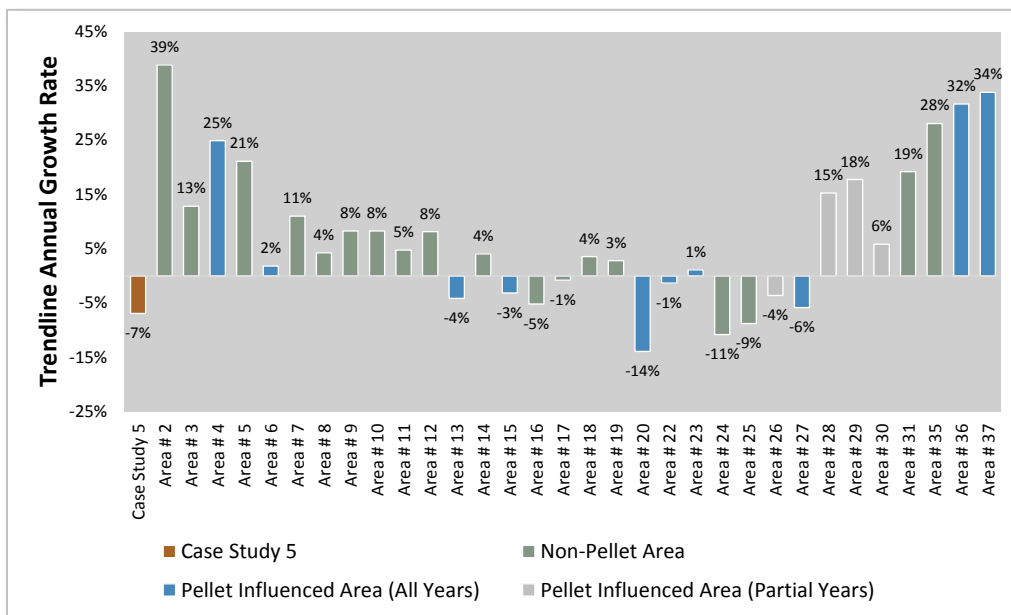
Figure 4-41 Case Study 5 – North Alabama Wood Basin – Hardwood Pulpwood Stumpage



US South Comparison

Between 2013 and 2015, hardwood pulpwood prices decreased 7% annually in the case study wood basin (Figure 4-42). This decrease is much less than the pellet influenced markets of Area #20 (-14%) and is mid-range between Area #20 and #22 (-1%), both of which surround Courtland. Interestingly, the case study’s decrease is not consistent with the neighboring non-pellet markets of Area #18 (4%) and Area #19 (3%), which both saw increases. The differing results in contiguous wood basins demonstrate the variability that can be associated with hardwood markets, particularly in this Cumberland Plateau area (Figure 4-28, Section 4.3.1).

**Figure 4-42 Case Study 5 – North Alabama Wood Basin
Hardwood Pulpwood Stumpage Price Trend Comparison to US South Micro-Markets – 2013-2015**



Key Findings from Case Study

In the absence of Courtland’s demand, and independent of pellet demand, stumpage prices for pine and hardwood pulpwood have decreased.

4.3.6 Study 3 Conclusions

Together, these case studies suggest that multiple market drivers combine to influence price. Wood fiber prices result from the interaction of demand and supply.

- **Pellet mill demand in and of itself does not drive price changes.** Any change in demand has a direct price impact. In most of the case studies, where demand increased, so also did price. The opposite is also true; in the two case studies where International Paper closed Franklin, Virginia and Courtland, Alabama, when demand decreased so did prices. And as demonstrated in the Green Circle case study (during the years 2008-2009) and the Grant Forest case study (during the years 2007-2008), added demand can result in subtle price increases. Or as demonstrated in the Georgia Biomass case study, at times, added demand can result in more significant price increases. Demand increases or decreases of any kind will result in price changes. In all of the case studies with increased demand (including the case study with no pellet demand), prices increased between \$4-4.50 per ton from 2012 to 2015. These increases are consistent with increases seen across the US South including those without pellet demand.
- **Supply interruptions drive price impacts.** Supply restrictions can have long-term and short-term impacts on prices. In the long-term, for instance, the decline in the sawmill residual market and the available pulpwood supply (discussed in Sections 4.1.3 and 4.1.8 and in the Case Study 3: Georgia Biomass) has put upward demand pressure on pulpwood. And short-term precipitation events as occurred in the winter seasons of 2009 and 2013 (discussed in all case studies) have also put upward pressure on pulpwood prices.

Variables that affect price and the impact of pellet mill demand can be more precisely determined in a multivariate statistical analysis. Such an analysis is likely to confirm that the correlations above, and at varying degrees, combine together to impact price.

5 Conclusion

The recent advent of the export pellet mill marketplace has caused some to question the impact pellet mills are having on pine and hardwood pulpwood forest inventory and wood fiber prices in the US South. Our data indicates that these impacts are minimal and that export pellet demand in and of itself does not drive price changes.

Forest Inventory

Data shows that pulpwood harvests for export facilities is a small fraction of overall harvests when compared to harvests for non-pellet facilities and will likely remain relatively small in the future taking into consideration realistic estimates of future export pellet demand from Europe.

In 2014, pellet exports from the US South (Atlantic and Gulf regions) to Europe were 3.6 million metric tons, or 40% of Europe's 9 million metric ton industrial pellet consumption.

Wood fiber removals for this demand represent a minor portion of harvests in the relevant regions:

- In 2014, total removals of pine for export pellet production in the Atlantic and Gulf regions totaled approximately 3.7 million tons annually compared to 117.7 million tons for non-pellet production.
- Removals for export pellet production represents 0.3% of the total pine pulpwood inventory and 0.09% of the combined pine pulpwood and sawtimber inventory.
- In 2014, total removals of hardwood for export pellet production in the Atlantic and Gulf regions totaled approximately 2.4 million tons annually. Hardwood removals for export pellet production in the Atlantic region were 2.3 million tons; in the Gulf region, hardwood removals were a mere 31,000 tons. Comparatively, non-pellet hardwood pulpwood consumers harvested 33.6 million tons.
- Removals for export pellet production represents 0.2% of the total hardwood pulpwood inventory and 0.06% of the combined hardwood pulpwood and sawtimber inventory.

Existing and under construction export pellet plants in the US South have the potential to produce 7.4 million metric tons of pellets to meet demand from funded biomass projects in Europe. Applying the US South's current market share of 40% to the 8.5 million metric tons of increased incremental European demand (see Section 4.2.10) would mean an additional 3.4 million metric tons would be supplied from the US South. Adding 3.4 million metric tons to the 7.4 million metric tons of current production capacity, the total US South industrial exports of biomass pellets to Europe could rise to 10.8 million metric tons. To produce this additional supply of pellets would require an additional 7.9 million short green tons of wood fiber.

The potential of 10.8 million metric tons of export pellets represents a total of 25 million tons of wood fiber, which is 1.0% of total US South pulpwood inventory and 0.3% of all US South inventory. By comparison, total removals in the US South in 2014 were 250.2 million tons or 3.3% of total inventory.

Wood Fiber Prices

It is likely that wood fiber prices would have increased without incremental demand from export pellet markets in Europe, especially when other factors such as supply restrictions and weather are taken into account.

Over the last 15 years, demand for pine fiber in the US South has increased while demand for hardwood fiber has decreased. However, in recent years, disruptions in supply have had a greater impact to wood fiber prices. During

the housing and economic downturn in the US, available pulpwood and sawmill residual chip supply declined significantly in the US South. In certain years, significant precipitation events magnified this constraint of supply.

In a competitive market, when supply is constrained in this way, prices for residual chips and pulpwood will naturally increase:

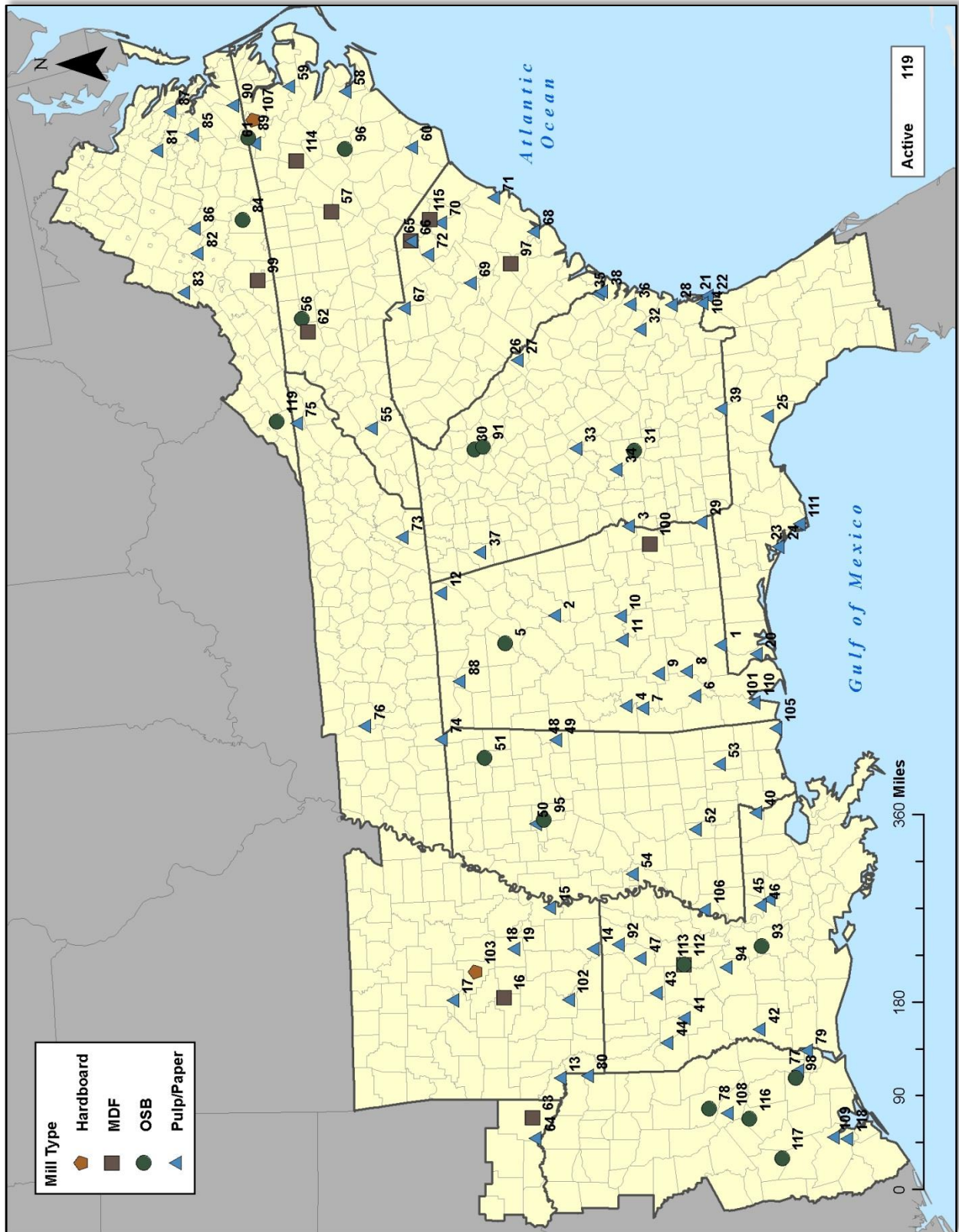
- Average residual supply between 2007 and 2014 was 21% less than the supply between 2000 and 2006, causing pine residual prices to increase 12.5% and hardwood residual prices to increase 10.7%; comparing averages over the respective periods.
- For pine pulpwood, since the advent of pine consuming pellet mills in 2008, non-pellet mill demand has increased by 5.8 million tons (from 111.8 to 117.7 million tons) while pellet mill demand has increased by 3.7 million tons (from 0 to 3.7 million tons). US South average pulpwood prices increased 4.5% annually over this time with similar price trends occurring for regions with and without export pellet mill influence.
- For hardwood pulpwood, since the advent of hardwood consuming pellet mills in 2010, non-pellet mill demand has decreased by 2.5 million tons (from 36.1 to 33.6 million tons) while pellet mill demand has increased by 2.4 million tons (from 0 to 2.4 million tons). US South average pulpwood prices increased 7.4% annually over this time with similar price trends occurring for regions with and without export pellet mill influence.

A comprehensive survey of the market factors affecting wood fiber supply and demand in the US South shows that changes are due, not solely to the rise of the industrial pellet market, but to a combination of the following:

- **Land ownership change** – The divestiture of industry land ownership to financial and private ownership has resulted in a stand-level management change for the growth and maximization of timber and land value instead of an operational management strategy to supply a mill with wood fiber as needed.
- **Sawmill ownership change** – The divestiture of sawmill ownership has separated the pulp/paper intercompany tie to residual chip supply, ending the cliché: “running the sawmill just to feed the paper mill.”
- **Decline in newsprint and print paper demand / increase in containerboard, fluff pulp and performance fiber demand** – With the digital age, declining demand for coated and uncoated papers has resulted in the closure of 13 newsprint and paper mills and the conversion of several to pulp and performance fiber production. These closures were market driven and not the result of competition from export pellet mills. This has also led to declining demand for hardwood wood fiber and increased demand for pine wood fiber.
- **Housing market crash and the Great Recession** – During the downturn of the market, sawmill residual chip production declined resulting in heightened demand for pulpwood. In addition, sawtimber final harvests declined, causing inventories to increase and pulpwood supply to be constrained. Also, over this time, OSB production has shifted from older, less efficient mills to larger, more efficient mills. As the housing market has recovered, these OSB mills have steadily increased their purchases of pine pulpwood.
- **Precipitation events** – Long-term precipitation patterns and strong deviations from average, such as above average rainfall in 2009 and 2013, have caused volatility in pulpwood pricing.
- **Pellet mill demand** – With the development of the pellet industry, competitive demand for wood fiber has been interjected into the market.

Each of these factors is correlated to and has affected both forest inventory and price for wood fiber and sawtimber products. Moreover, pulpwood price increases in regions with export pellet mill influence are comparable to price increases in regions without pellet mill influence. While a multivariate statistical analysis is needed to confirm and quantify how each of these factors combines together to affect the market, these studies demonstrate that it is unlikely that pellet mill development alone drives changes to forest inventory levels and wood fiber prices. It is more likely that all of the above variables combine and interact to influence forest inventory and price.

Appendix A.1 – 1995 – Map of Wood Fiber Consumers



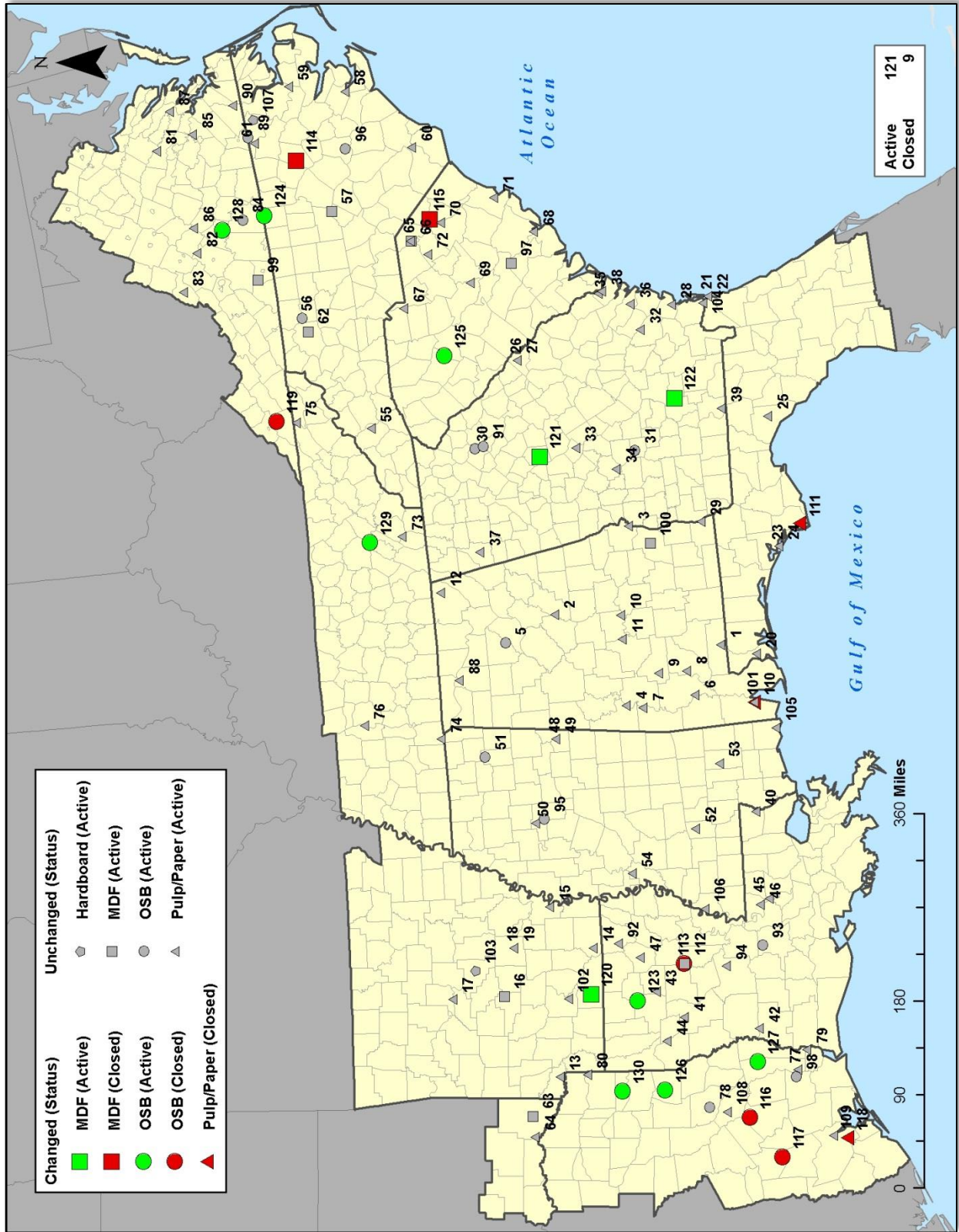
Appendix A.2.1 – 1995 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-1995	Status-1995	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Jefferson Smurfit Corporation/CCA	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	Kimberly-Clark Corp	Active	Resolute Forest Products	Active
3	Cottontont (Mahrt)	AL	Pulp/Paper	Mead Coated Board	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Gulf States Paper Corporation	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Fort Howard Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Alabama River Companies	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	MacMillan Bloedel Packaging Inc	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	Union Camp Corporation	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Mead Corporation	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Potlatch Corporation	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Willamette Industries, Inc.	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Gaylord Container Corporation	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	International Paper Company	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	Champion International Corporation	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Jefferson Smurfit Corporation/CCA	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Stone Container Corporation	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Buckeye Florida, LP	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	Federal Paper Board Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Augusta Newsprint Company	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	International Paper Company	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Riverwood International Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	Inland Paperboard and Packaging, Inc.	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	Union Camp Corporation	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Tenneco Packaging	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	Gaylord Container Corporation	Active	International Paper Company	Active
41	Campti	LA	Pulp/Paper	Willamette Industries, Inc.	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Stone Container Corporation	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	James River Communication Papers	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Riverwood International Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Newsprint South Inc	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Champion International Corporation	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	Weyerhaeuser Company	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	Federal Paper Board Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	Champion International Corporation	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	ABTco Inc	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Willamette Industries, Inc.	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Willamette Industries, Inc.	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	Westvaco Corporation	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	Union Camp Corporation	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix A.2.2 – 1995 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-1995	Status-1995	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Willamette Industries, Inc.	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Inland Paperboard and Packaging, Inc.	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	Temple-Inland Forest Products Corporation	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	International Paper Company	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	Temple-Orange Inc	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	Bear Island Paper Company, LLC	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	Westvaco Corporation	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Stone Container Corporation	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Virginia Fiber Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Chesapeakee Corporation	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	Champion International Corporation	Active	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	Union Camp Corporation	Active	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd	Active	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Georgia-Pacific Corporation	Active	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.	Active	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Gilman Paper Company	Active	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Champion International Corporation	Active	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Champion International Corporation	Active	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Scott Paper Company	Active	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	St. Joe Forest Products Company	Active	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Louisiana Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Louisiana Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company	Active	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company	Active	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Simpson Pasadena Paper Company	Active	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	N/A	Nonexistent	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	N/A	Nonexistent	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	N/A	Nonexistent	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	N/A	Nonexistent	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	N/A	Nonexistent	Norbord Inc.	Active
126	Carthage	TX	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	N/A	Nonexistent	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	N/A	Nonexistent	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	N/A	Nonexistent	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	N/A	Nonexistent	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	N/A	Nonexistent	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	N/A	Nonexistent	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	N/A	Nonexistent	Kronospan US LLC	Active
137	Quitman	GA	OSB	N/A	Nonexistent	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	N/A	Nonexistent	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
	Active				119		122
	Closed				0		35

Appendix B.1 – 2000 – Map of Wood Fiber Consumers



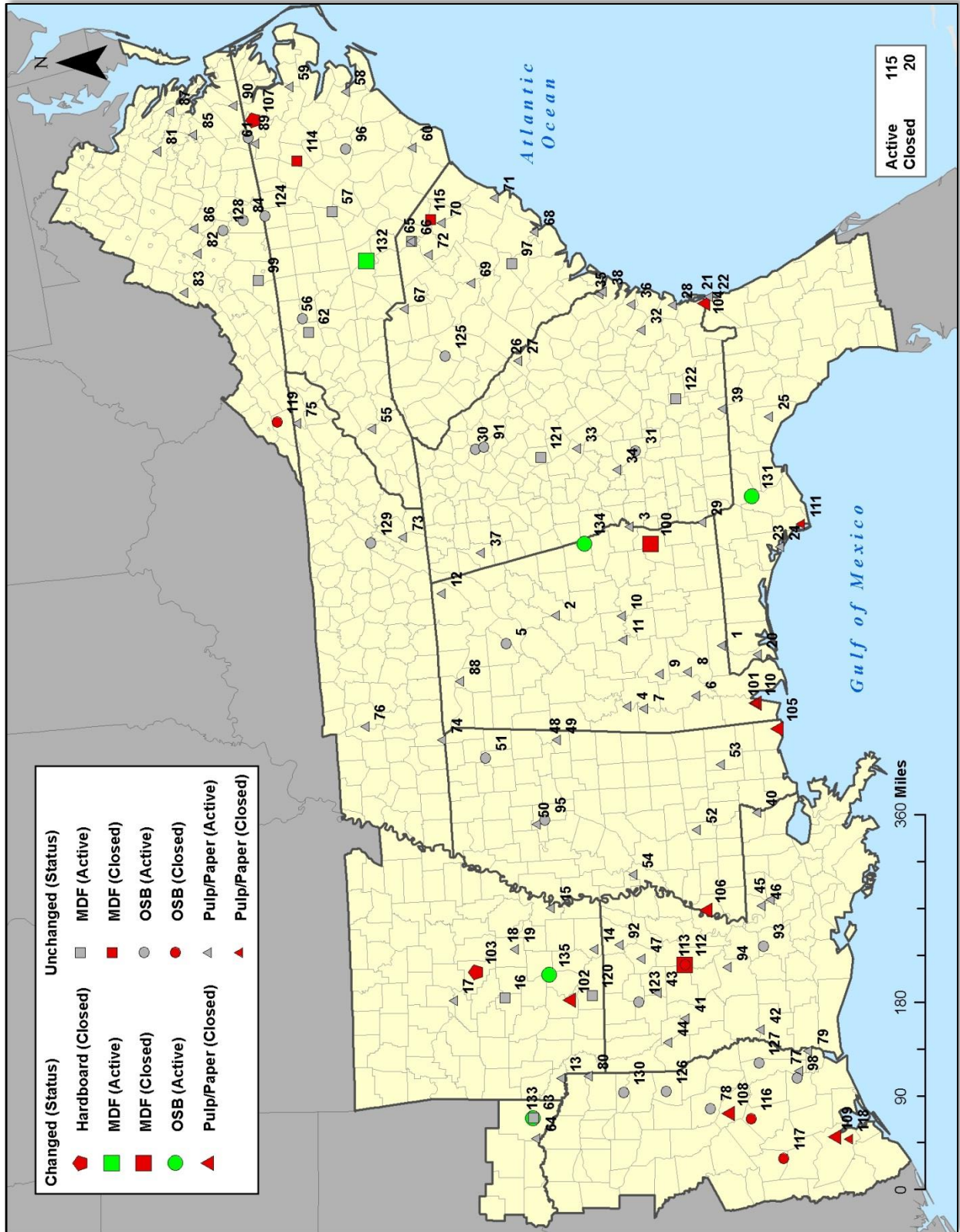
Appendix B.2.1 – 2000 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2000	Status-2000	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	U.S. Alliance Coosa Pines Corporation	Active	Resolute Forest Products	Active
3	Cottontown (Mahrt)	AL	Pulp/Paper	Mead Coated Board	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Gulf States Paper Corporation	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Fort James Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Alabama River Companies	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Potlatch Corporation	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Willamette Industries Inc.	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Gaylord Container Corporation	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	International Paper Company	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Buckeye Florida, LP	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Augusta Newsprint Company	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	International Paper Company	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Riverwood International Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Willamette Industries, Inc.	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	Inland Paperboard and Packaging, Inc.	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	Gaylord Container Corporation	Active	International Paper Company	Active
41	Campti	LA	Pulp/Paper	Willamette Industries, Inc.	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	Crown Vantage, Inc.	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Riverwood International Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Blue Ridge Paper Products, Inc.	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	SierraPine	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	International Paper Company	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Willamette Industries Inc.	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Willamette Industries, Inc.	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	Westvaco Corporation	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix B.2.2 – 2000 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2000	Status-2000	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Willamette Industries, Inc.	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Inland Paperboard and Packaging, Inc.	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	Inland Eastex	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	International Paper Company	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	Inland Container Corp	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	Bear Island Paper Company, LLC	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	Westvaco Corporation	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd	Active	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Georgia-Pacific Corporation	Active	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.	Active	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Gilman Paper Company	Active	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated	Active	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated	Active	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Louisiana Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Louisiana Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Del-Tin Fiber LLC (Temple-Inland/Deltic Timber JV)	Active	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Willamette Industries Inc.	Active	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	International Paper Company	Active	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	N/A	Nonexistent	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	N/A	Nonexistent	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	N/A	Nonexistent	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	N/A	Nonexistent	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	N/A	Nonexistent	Kronospan US LLC	Active
137	Quitman	GA	OSB	N/A	Nonexistent	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	N/A	Nonexistent	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
Active					121		122
Closed					9		35

Appendix C.1 – 2005 – Map of Wood Fiber Consumers



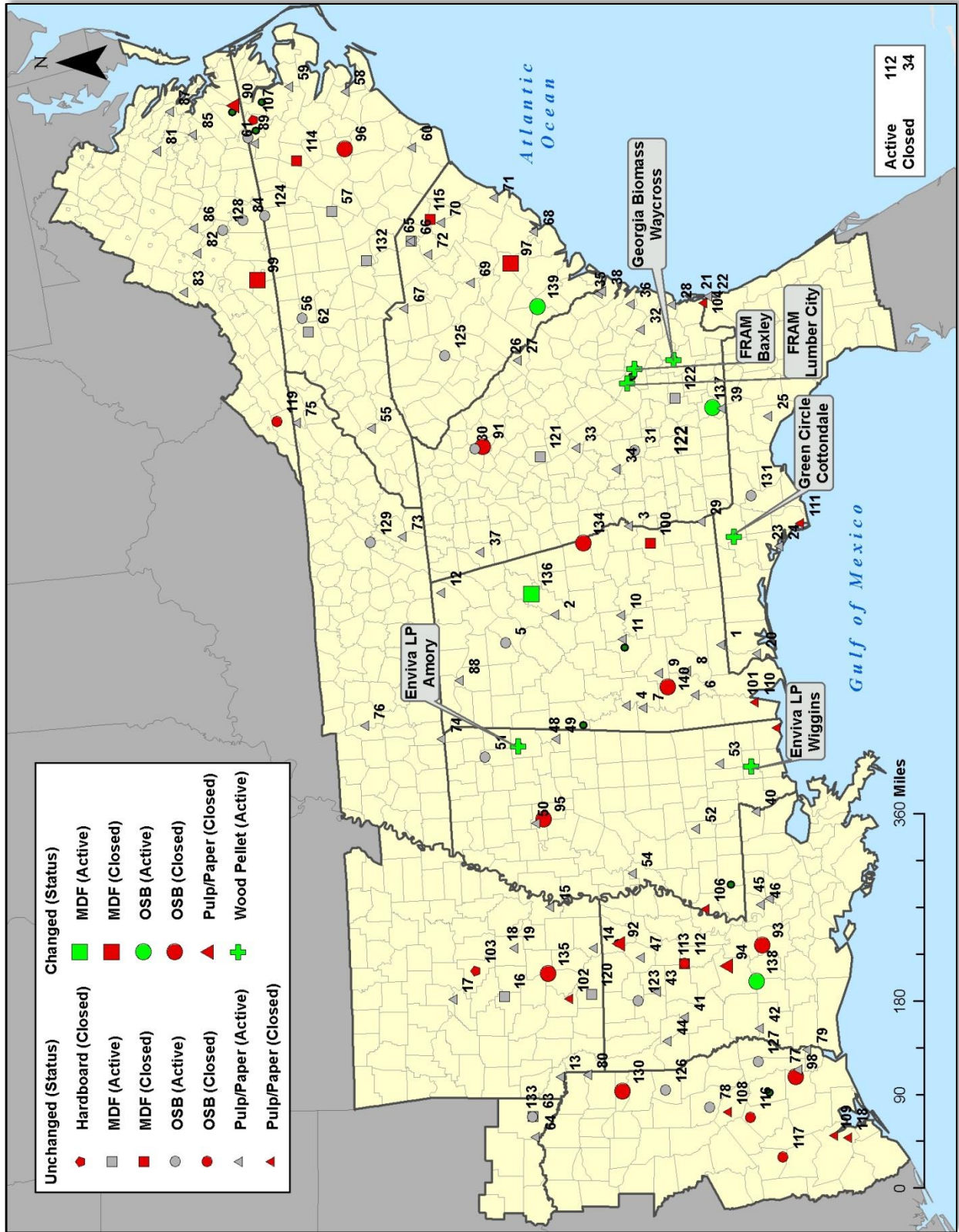
Appendix C.2.1 – 2005 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2005	Status-2005	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	Bowater Inc	Active	Resolute Forest Products	Active
3	Cottonton (Mahrt)	AL	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Alabama River Companies	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Domtar Inc.	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Potlatch Corporation	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Weyerhaeuser Company	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Delta Natural Kraft	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	International Paper Company	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Buckeye Florida, LP	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Augusta Newsprint Company	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	Temple-Inland, Inc.	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	Temple-Inland, Inc.	Active	International Paper Company	Active
41	Campti	LA	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Boise Cascade Corporation	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	Tembec, Inc.	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Blue Ridge Paper Products, Inc.	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	ATC Panels	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	International Paper Company	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	Weyerhaeuser Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Weyerhaeuser Company	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	MeadWestvaco Corporation	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix C.2.2 – 2005 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2005	Status-2005	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Bowater, Inc.	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Weyerhaeuser Company	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Temple-Inland, Inc	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	Temple-Inland, Inc.	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	Bear Island Paper Company, LLC	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd	Active	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Georgia-Pacific Corporation	Active	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.	Active	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Closed	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Durango-Georgia Paper Company-Closed	Closed	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed	Florida Coast Paper Company, LLC-Closed	Closed
112	Urania	LA	MDF	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
113	Urania	LA	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Del-Tin Fiber LLC (Temple-Inland/Deltic Timber JV)	Active	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	Unilin US MDF	Active	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	Norbord Inc.	Active	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	N/A	Nonexistent	Kronospan US LLC	Active
137	Quitman	GA	OSB	N/A	Nonexistent	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	N/A	Nonexistent	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	N/A	Nonexistent	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
Active					115		122
Closed					20		35

Appendix D.1 – 2010 – Map of Wood Fiber Consumers



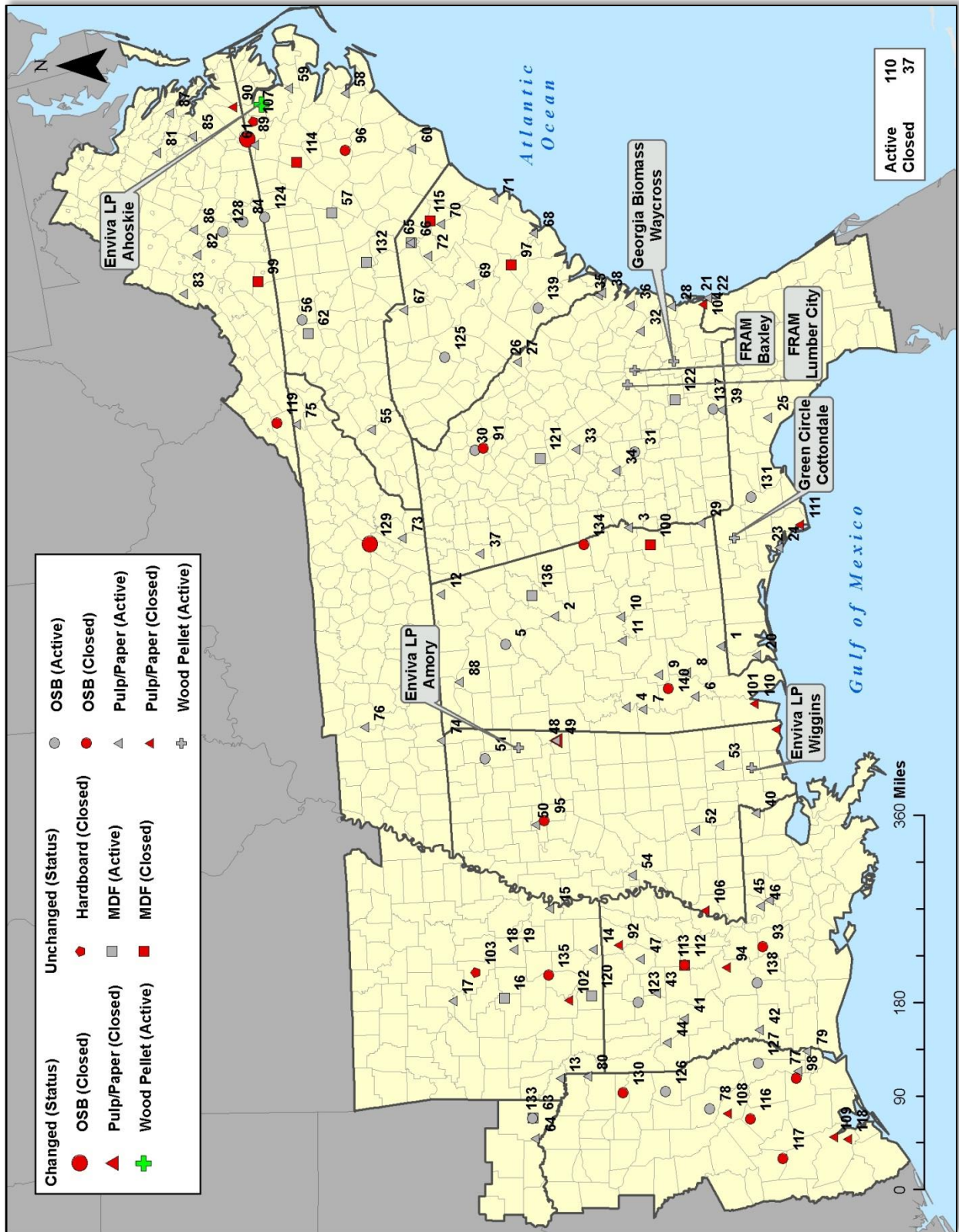
Appendix D.2.1 – 2010 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2010	Status-2010	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	AbitibiBowater, Inc	Active	Resolute Forest Products	Active
3	Cottonton (Mahrt)	AL	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Boise Inc.	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Alabama River Companies	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Clearwater Paper Corp.	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Flakeboard Company Ltd	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Delta Natural Kraft	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Buckeye Florida, LP	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	AbitibiBowater, Inc.	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	Temple-Inland, Inc.	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	Temple-Inland, Inc.	Active	International Paper Company	Active
41	Campti	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Boise Inc.	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	KPAQ Industries LLC	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	AbitibiBowater, Inc.	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Koch Industries	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	Uniboard USA LLC	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Flakeboard Company Ltd	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	AbitibiBowater, Inc.	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix D.2.2 – 2010 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2010	Status-2010	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	AbitibiBowater, Inc	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Temple-Inland, Inc	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	Inland Paperboard & Packaging	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	White Birch Paper Co.	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Smurfit-Stone Container Corporation	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Closed	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd-Closed	Closed	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Roseburg Forest Products-Closed	Closed	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.-Closed	Closed	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Closed	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Durango-Georgia Paper Company-Closed	Closed	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Louisiana Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Del-Tin Fiber LLC (Temple-Inland/Deltic Timber JV)	Active	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	Norbord Inc. (Nexfor Inc.)-Closed	Closed	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	Mohawk Industries Inc.	Active	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	Norbord Inc.-Closed	Closed	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	Kronospan US LLC	Active	Kronospan US LLC	Active
137	Quitman	GA	OSB	Langboard Inc.	Active	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	Martco Ltd	Active	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	Georgia-Pacific Corporation (Grant Forest Products)	Active	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
Active					112		122
Closed					34		35

Appendix E.1 – 2012 – Map of Wood Fiber Consumers



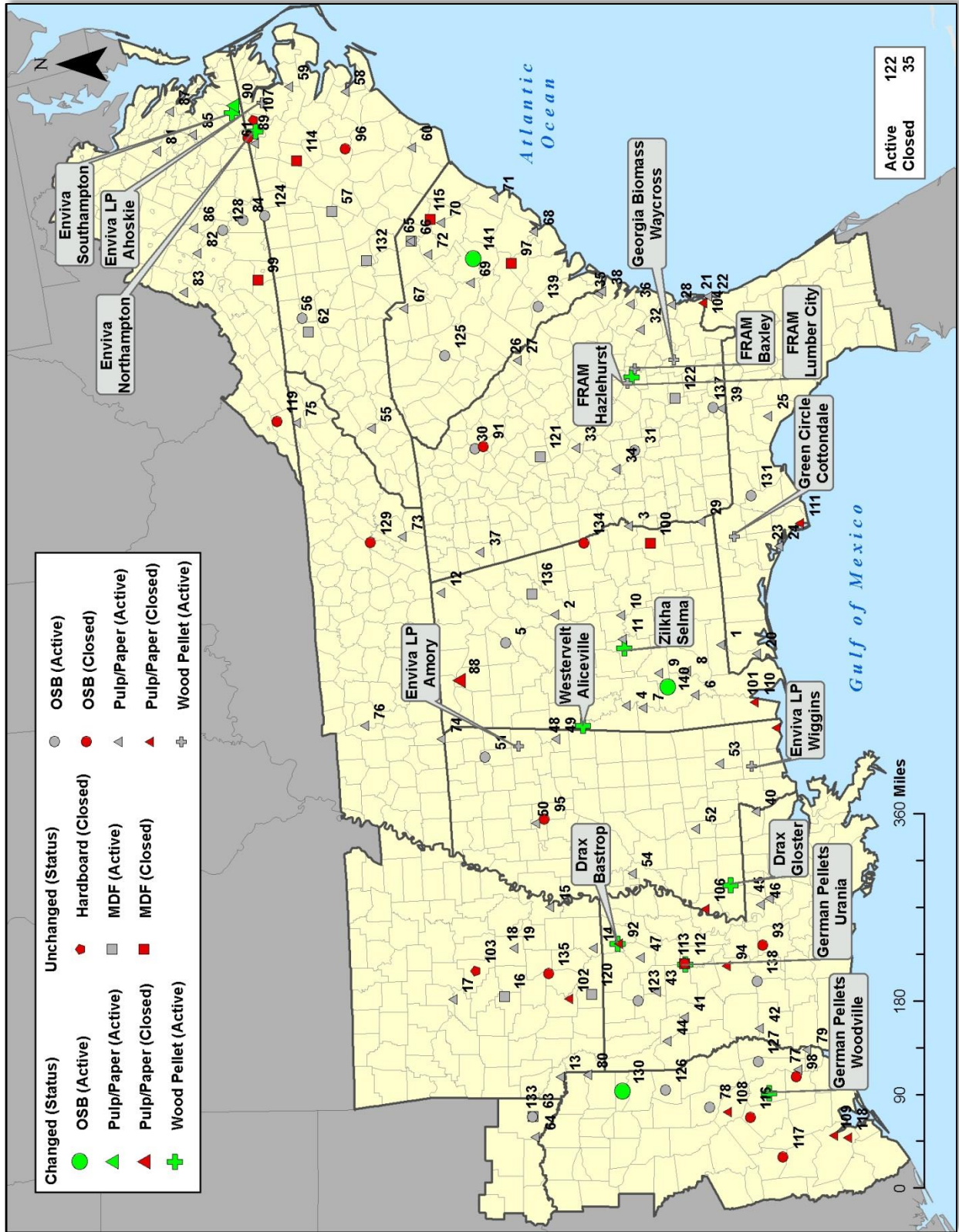
Appendix E.2.1 – 2012 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2012	Status-2012	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
3	Cottonton (Mahrt)	AL	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Boise Inc.	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Clearwater Paper Corp.	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Graphic Flexible Packing	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Buckeye Florida, LP	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier, Inc.	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
41	Campti	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Boise Inc.	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	KPAQ Industries LLC	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Domtar Corporation-Closed	Closed	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Koch Industries	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix E.2.2 – 2012 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2012	Status-2012	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	International Paper Company, Hood Industries	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	White Birch Paper Co.	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	MeadWestvaco Corporation	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Rock-Tenn Company	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company	Active	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Closed	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd-Closed	Closed	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Roseburg Forest Products-Closed	Closed	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.-Closed	Closed	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Closed	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Durango-Georgia Paper Company-Closed	Closed	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Del-Tin Fiber LLC (Temple-Inland/Deltic Timber JV)	Active	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC-Closed	Closed	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	Norbord Inc. (Nexfor Inc.)-Closed	Closed	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	Mohawk Industries Inc.	Active	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	Norbord Inc.-Closed	Closed	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	Kronospan US LLC	Active	Kronospan US LLC	Active
137	Quitman	GA	OSB	Langboard Inc.	Active	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	Martco Ltd	Active	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	N/A	Nonexistent	Georgia-Pacific Corporation	Active
Active					110		122
Closed					37		35

Appendix F.1 – 2014 – Map of Wood Fiber Consumers



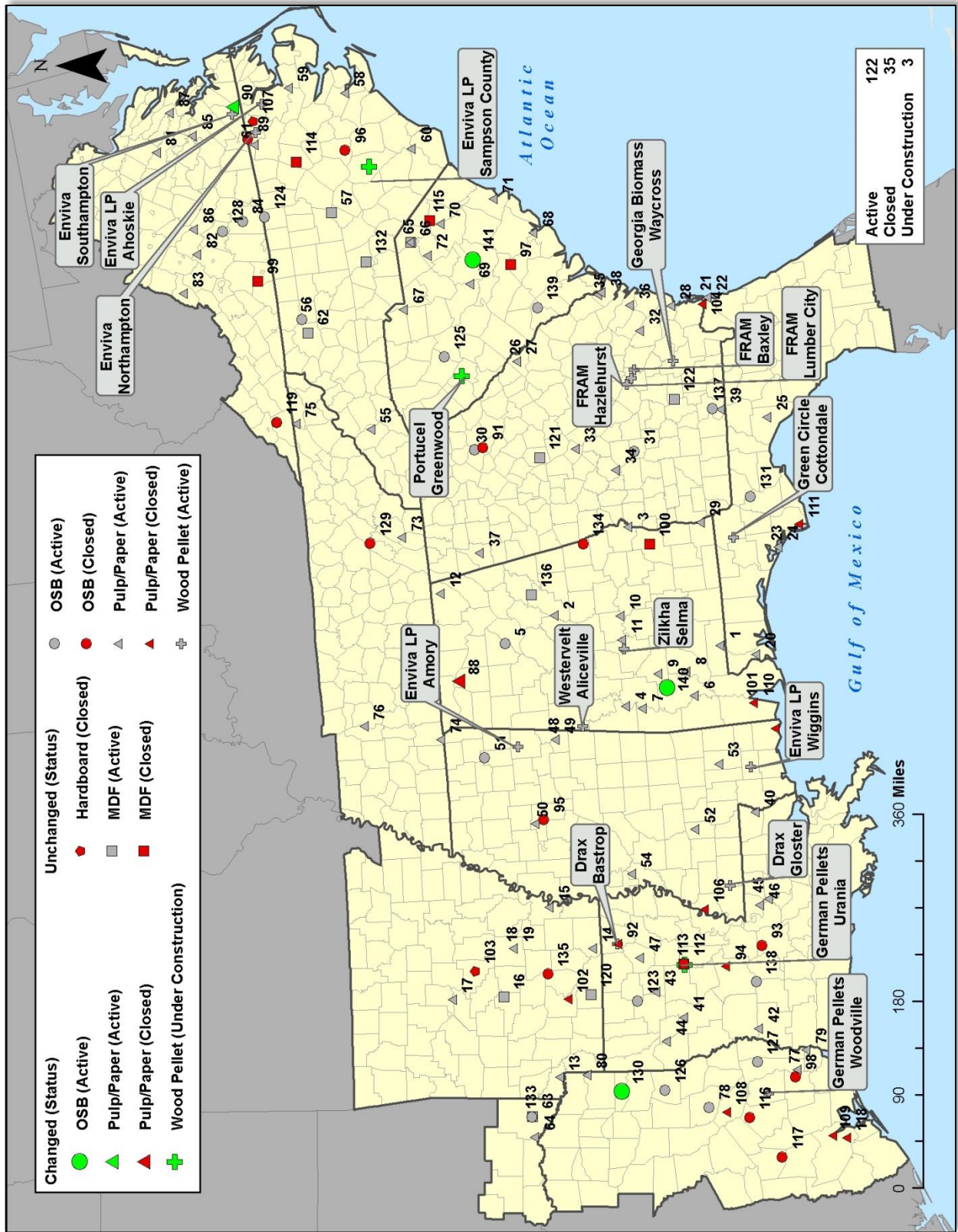
Appendix F.2.1 – 2014 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2014	Status-2014	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
2	Coosa Pines	AL	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
3	Cottonton (Mahrt)	AL	Pulp/Paper	MeadWestvaco Corporation*	Active	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Clearwater Paper Corp.	Active	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Mondi Group	Active	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier Advanced Materials	Active	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier Advanced Materials	Active	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
41	Campiti	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	KPAQ Industries LLC	Active	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Graphic Packaging Corporation	Active	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Domtar Corporation-Closed	Closed	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Koch Industries	Active	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Evergreen Packaging, Inc.	Active	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
65	Bennettsville	SC	MDF	Arauco (Flakeboard North America)	Active	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
70	Florence	SC	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active	Sonoco Products Company	Active

Appendix F.2.2 – 2014 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2014	Status-2014	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Resolute Forest Products	Active	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Domtar Corporation	Active	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Hood Industries	Active	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	MeadWestvaco Corporation*	Active	WestRock Company	Active
78	Nacogdoches	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	White Birch Paper Co.	Active	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	MeadWestvaco Corporation*	Active	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	Rock-Tenn Company*	Active	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Active	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd-Closed	Closed	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Roseburg Forest Products-Closed	Closed	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
99	Bassett	VA	MDF	Bassett Furniture Industries Inc.-Closed	Closed	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Closed	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Durango-Georgia Paper Company-Closed	Closed	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Deltic Timber Corporation	Active	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Weyerhaeuser Company	Active	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC-Closed	Closed	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	Mohawk Industries Inc.	Active	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	Huber Engineered Woods LLC	Active	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	Norbord Inc.-Closed	Closed	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	Georgia-Pacific Corporation-Closed	Closed	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	Kronospan US LLC	Active	Kronospan US LLC	Active
137	Quitman	GA	OSB	Langboard Inc.	Active	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	Martco Ltd	Active	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	Louisiana Pacific Corporation	Active	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	Georgia-Pacific Corporation	Active	Georgia-Pacific Corporation	Active
Active					122		122
Closed					35		35

Appendix G.1 – 2015 – Map of Wood Fiber Consumers



Appendix G.2.1 – 2015 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2015	Status-2015
1	Brewton	AL	Pulp/Paper	Georgia-Pacific Corporation	Active
2	Cosa Pines	AL	Pulp/Paper	Resolute Forest Products	Active
3	Cottonton (Mahrt)	AL	Pulp/Paper	WestRock Company	Active
4	Demopolis	AL	Pulp/Paper	WestRock Company	Active
5	Hanceville	AL	OSB	Louisiana Pacific Corporation	Active
6	Jackson	AL	Pulp/Paper	Packaging Corporation of America	Active
7	Naheola	AL	Pulp/Paper	Georgia-Pacific Corporation	Active
8	Perdue Hill (Claiborne)	AL	Pulp/Paper	Georgia-Pacific Corporation	Active
9	Pine Hill	AL	Pulp/Paper	International Paper Company	Active
10	Prattville	AL	Pulp/Paper	International Paper Company	Active
11	Selma	AL	Pulp/Paper	International Paper Company	Active
12	Stevenson	AL	Pulp/Paper	WestRock Company	Active
13	Ashdown	AR	Pulp/Paper	Domtar Corporation	Active
14	Crossett	AR	Pulp/Paper	Georgia-Pacific Corporation	Active
15	Cypress Bend (McGehee)	AR	Pulp/Paper	Clearwater Paper Corp.	Active
16	Malvern	AR	MDF	Arauco (Flakeboard North America)	Active
17	Morrilton	AR	Pulp/Paper	Green Bay Packaging, Inc.	Active
18	Pine Bluff	AR	Pulp/Paper	Mondi Group	Active
19	Pine Bluff	AR	Pulp/Paper	Evergreen Packaging, Inc.	Active
20	Cantonment	FL	Pulp/Paper	International Paper Company	Active
21	Fernandina Beach	FL	Pulp/Paper	Rayonier Advanced Materials	Active
22	Fernandina Beach	FL	Pulp/Paper	WestRock Company	Active
23	Palatka	FL	Pulp/Paper	Georgia-Pacific Corporation	Active
24	Panama City	FL	Pulp/Paper	WestRock Company	Active
25	Perry	FL	Pulp/Paper	Georgia-Pacific Corporation	Active
26	Augusta	GA	Pulp/Paper	International Paper Company	Active
27	Augusta	GA	Pulp/Paper	Resolute Forest Products	Active
28	Brunswick	GA	Pulp/Paper	Georgia-Pacific Corporation	Active
29	Cedar Springs	GA	Pulp/Paper	Georgia-Pacific Corporation	Active
30	Commerce	GA	OSB	Huber Engineered Woods LLC	Active
31	Cordele	GA	OSB	Norbord Inc. (Nexfor Inc.)	Active
32	Jesup	GA	Pulp/Paper	Rayonier Advanced Materials	Active
33	Macon	GA	Pulp/Paper	Graphic Packaging Corporation	Active
34	Oglethorpe	GA	Pulp/Paper	Weyerhaeuser Company	Active
35	Port Wentworth	GA	Pulp/Paper	Weyerhaeuser Company	Active
36	Riceboro	GA	Pulp/Paper	Interstate Paper LLC	Active
37	Rome	GA	Pulp/Paper	International Paper Company	Active
38	Savannah	GA	Pulp/Paper	International Paper Company	Active
39	Valdosta (Clyatville)	GA	Pulp/Paper	Packaging Corporation of America	Active
40	Bogalusa	LA	Pulp/Paper	International Paper Company	Active
41	Campiti	LA	Pulp/Paper	International Paper Company	Active
42	DeRidder	LA	Pulp/Paper	Packaging Corporation of America	Active
43	Hodge	LA	Pulp/Paper	WestRock Company	Active
44	Mansfield	LA	Pulp/Paper	International Paper Company	Active
45	Port Hudson	LA	Pulp/Paper	Georgia-Pacific Corporation	Active
46	St. Francisville	LA	Pulp/Paper	KPAQ Industries LLC	Active
47	West Monroe	LA	Pulp/Paper	Graphic Packaging Corporation	Active
48	Columbus	MS	Pulp/Paper	Domtar Corporation-Closed	Closed
49	Columbus	MS	Pulp/Paper	Weyerhaeuser Company	Active
50	Grenada	MS	Pulp/Paper	Resolute Forest Products	Active
51	Guntown	MS	OSB	Norbord Inc.	Active
52	Monticello	MS	Pulp/Paper	Georgia-Pacific Corporation	Active
53	New Augusta	MS	Pulp/Paper	Koch Industries	Active
54	Vicksburg	MS	Pulp/Paper	International Paper Company	Active
55	Canton	NC	Pulp/Paper	Evergreen Packaging, Inc.	Active
56	Elkin	NC	OSB	Weyerhaeuser Company	Active
57	Moncure	NC	MDF	Arauco (Flakeboard North America)	Active
58	New Bern	NC	Pulp/Paper	Weyerhaeuser Company	Active
59	Plymouth	NC	Pulp/Paper	Domtar Corporation	Active
60	Riegelwood	NC	Pulp/Paper	International Paper Company	Active
61	Roanoke Rapids	NC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active
62	Roaring River	NC	MDF	Louisiana Pacific Corporation	Active
63	Broken Bow	OK	MDF	Dominance Industries Inc (dba Pan Pacific Products)	Active
64	Valliant	OK	Pulp/Paper	International Paper Company	Active
65	Bennettsville	SC	MDF	Arauco (Flakeboard North America)	Active
66	Bennettsville	SC	Pulp/Paper	Domtar Corporation	Active
67	Catawba	SC	Pulp/Paper	Resolute Forest Products	Active
68	Charleston	SC	Pulp/Paper	KapStone Paper & Packaging Corp.	Active
69	Eastover	SC	Pulp/Paper	International Paper Company	Active
70	Florence	SC	Pulp/Paper	WestRock Company	Active
71	Georgetown	SC	Pulp/Paper	International Paper Company	Active
72	Hartsville	SC	Pulp/Paper	Sonoco Products Company	Active

Appendix G.2.2 – 2015 – Table of Wood Fiber Consumers

ID	City	State	Mill Type	Company Name-2015	Status-2015
73	Calhoun	TN	Pulp/Paper	Resolute Forest Products	Active
74	Counce	TN	Pulp/Paper	Packaging Corporation of America	Active
75	Kingsport	TN	Pulp/Paper	Domtar Corporation	Active
76	New Johnsonville	TN	Pulp/Paper	Hood Industries	Active
77	Evadale (Silsbee)	TX	Pulp/Paper	WestRock Company	Active
78	Nacogdoches	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active
79	Orange	TX	Pulp/Paper	International Paper Company	Active
80	Texarkana	TX	Pulp/Paper	International Paper Company	Active
81	Ashland	VA	Pulp/Paper	White Birch Paper Co.	Active
82	Big Island	VA	Pulp/Paper	Georgia-Pacific Corporation	Active
83	Covington	VA	Pulp/Paper	WestRock Company	Active
84	Crystal Hill	VA	OSB	Huber Engineered Woods LLC	Active
85	Hopewell	VA	Pulp/Paper	WestRock Company	Active
86	Riverville	VA	Pulp/Paper	Greif Brothers Corporation	Active
87	West Point	VA	Pulp/Paper	WestRock Company	Active
88	Courtland	AL	Pulp/Paper	International Paper Company-Closed	Closed
89	Skippers	VA	OSB	Georgia-Pacific Corporation-Closed	Closed
90	Franklin	VA	Pulp/Paper	International Paper Company	Active
91	Athens	GA	OSB	Louisiana Pacific Corporation-Closed	Closed
92	Bastrop	LA	Pulp/Paper	International Paper Company-Closed	Closed
93	LeMoyen	LA	OSB	Martco Ltd-Closed	Closed
94	Pineville	LA	Pulp/Paper	International Paper Company-Closed	Closed
95	Grenada	MS	OSB	Georgia-Pacific Corporation-Closed	Closed
96	Dudley	NC	OSB	Georgia-Pacific Corporation-Closed	Closed
97	Holly Hill	SC	MDF	Roseburg Forest Products-Closed	Closed
98	Silsbee	TX	OSB	Louisiana Pacific Corporation-Closed	Closed
99	Basnett	VA	MDF	Bassett Furniture Industries Inc.-Closed	Closed
100	Eufaula (Clayton)	AL	MDF	Louisiana Pacific Corporation-Closed	Closed
101	Mobile	AL	Pulp/Paper	International Paper Company-Closed	Closed
102	Camden	AR	Pulp/Paper	International Paper Company-Closed	Closed
103	North Little Rock	AR	Hardboard	Georgia-Pacific Corporation	Closed
104	St. Marys	GA	Pulp/Paper	Durango-Georgia Paper Company-Closed	Closed
105	Moss Point	MS	Pulp/Paper	International Paper Company-Closed	Closed
106	Natchez	MS	Pulp/Paper	International Paper Company-Closed	Closed
107	Conway	NC	Hardboard	Georgia-Pacific Corporation-Closed	Closed
108	Lufkin	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed
109	Sheldon	TX	Pulp/Paper	Abitibi-Consolidated-Closed	Closed
110	Mobile	AL	Pulp/Paper	Kimberly-Clark Corporation-Closed	Closed
111	Port St. Joe	FL	Pulp/Paper	Florida Coast Paper Company, LLC-Closed	Closed
113	Urania	LA	MDF	Georgia-Pacific Corporation-Closed	Closed
112	Urania	LA	OSB	Georgia-Pacific Corporation-Closed	Closed
114	Spring Hope	NC	MDF	International Paper Company-Closed	Closed
115	Sellers (Marion)	SC	MDF	International Paper Company-Closed	Closed
116	Corrigan	TX	OSB	Louisiana Pacific Corporation-Closed	Closed
117	New Waverly	TX	OSB	Louisiana Pacific Corporation-Closed	Closed
118	Pasadena	TX	Pulp/Paper	Pasadena Paper Company-Closed	Closed
119	Dungannon	VA	OSB	Louisiana Pacific Corporation-Closed	Closed
120	El Dorado	AR	MDF	Deltic Timber Corporation	Active
121	Monticello	GA	MDF	Georgia-Pacific Corporation	Active
122	Willacoochie	GA	MDF	Langboard Inc.	Active
123	Arcadia (Simsboro)	LA	OSB	Weyerhaeuser Company	Active
124	Roxboro	NC	OSB	Louisiana Pacific Corporation	Active
125	Joanna (Kinards)	SC	OSB	Norbord Inc.	Active
126	Carthage	TX	OSB	Louisiana Pacific Corporation	Active
127	Jasper	TX	OSB	Louisiana Pacific Corporation	Active
128	Brookneal (Gladys)	VA	OSB	Georgia-Pacific Corporation	Active
129	Spring City	TN	OSB	Huber Engineered Woods LLC-Closed	Closed
130	Jefferson	TX	OSB	Norbord Inc. (Nexfor Inc.)	Active
131	Hosford	FL	OSB	Georgia-Pacific Corporation	Active
132	Mt. Gilead	NC	MDF	Mohawk Industries Inc.	Active
133	Broken Bow	OK	OSB	Huber Engineered Woods LLC	Active
134	Huguley (Lanett)	AL	OSB	Norbord Inc.-Closed	Closed
135	Fordyce	AR	OSB	Georgia-Pacific Corporation-Closed	Closed
136	Eastaboga	AL	MDF	Kronospan US LLC	Active
137	Quitman	GA	OSB	Langboard Inc.	Active
138	Oakdale (Pawnee)	LA	OSB	Martco Ltd	Active
139	Allendale (Fairfax)	SC	OSB	Georgia-Pacific Corporation	Active
140	Thomasville	AL	OSB	Louisiana Pacific Corporation	Active
141	Clarendon (Alcolu)	SC	OSB	Georgia-Pacific Corporation	Active
	Active				122
	Closed				35

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Appendix I – Glossary

Annual growth and annual removal – A comparison of the rate at which wood is produced in the forest and the rate at which it is destroyed by natural causes and removed by man should be the most important feature of any forest inventory. Data may show that the forests are being felled too heavily or that the wood contained therein is not being fully utilized. If overexploitation persists, destruction of the forest and loss of future production will follow. On the other hand, underutilization indicates failure to make full use of the productive power of the forest soil (See Growth-to-removal ratio).

DBH – Diameter at breast height is used to determine a log's classification as pulpwood, chip-n-saw, or sawtimber. The DBH of a standing tree is measured 4-1/2 feet off of the ground (the breast height of a forester taking a forest inventory).

Growth-to-removal ratio (GRR) – The annual growth in forest inventory divided by the annual tons removed comprises the growth-to-drain ratio. A ratio above 1.0 may indicate opportunities for additional harvests, while a ratio below 1.0 indicates that timber is removed from production faster than it is replaced by growth.

Hardwood – Usually a natural stand of predominately deciduous broad-leaved species of trees without a predominate species.

Inventory – The amount of living trees of commercial value grown on timberland acres. The amount is measured by the US Forest Service in units of volume (such as cubic meters, cubic feet or board feet) for sound wood and inclusive of moisture. Amounts stated in this report contain conversions by F2M to be inclusive of bark and to be represented in units of green short tons.

Metric Ton – Commonly used international unit of measure of weight of wood fiber. A metric ton is equivalent to 2,204.62 pounds compared to 2,000 pounds (a short ton) in the United States.

Pellet Mill Wood Fiber Use – Export pellet mill feedstocks include harvest and sawmill residuals (chips, sawdust and shavings), pulpwood (including thinnings and in-woods chips) and unmerchantable trees.

Pine – A coniferous forest containing predominantly the southern yellow pine species of loblolly (*Pinus taeda*) and slash (*Pinus elliotii*) pines.

- **Natural pine** – A forest of predominately pine that grew from a natural re-seeding process.
- **Planted pine** – A man-made forest stand that was regenerated artificially either by sowing or planting.

Pulpwood – Any stemwood that is generally 5 to 9 inches in DBH; also low-quality trees and top-wood stemwood, not suitable for the production of veneer or lumber. Pulpwood is used by chip mills, Oriented Strand Board (OSB) mills, pellet mills and pulp and paper mills.

Removals – The amount of harvested roundwood removed from the timberland inventory by harvesting, cultural operations, or land clearing.

Roundwood – A length of cut stemwood generally having a round cross-section, such as a log. Logs and other round timber generated from harvesting trees for industrial or consumer use.

Sawmill residual chips – These chips are generated from the edge cuts necessary to turn round logs into lumber. The material size is generally consistent and free from contaminants. Secondary chips are primarily used by pulp and paper mills.

Sawtimber – Large stemwood trees that are generally over 8-inches in DBH and harvested for the production of lumber. Sawtimber may also contain plylogs for the production of veneer and plywood and posts and poles.

Softwood – A coniferous tree, usually evergreen, having needles or scale-like leaves.

Stemwood – Wood from the main part of a tree not including the branches, stump or roots.

Ton – Commonly used unit of measure of weight of wood fiber in the United States. A ton is frequently referred to as a short ton when compared to a metric ton because it is equivalent to 2,000 pounds compared to 2,204.62 pounds.