CHANGES IN THE RESIDUAL WOOD FIBER MARKET 2004 TO 2017

EXECUTIVE SUMMARY

1 INTRODUCTION

Resources for the Future (RFF), the US Endowment for Forestry & Communities, Inc. and the National Wooden Pallet & Container Association (NWPCA) engaged Forest2Market to perform a comprehensive wood fiber residuals market analysis. The objectives of this study included:

- Uncovering the underlying market forces that impact the residual market
- Assessing the nature and implications of these impacts
- Determining whether the changes occurring in the market are:
    - Fundamental, structural changes that necessitate a systematic problem-solving approach or
    - Temporary, short-term, cyclical changes that require a corporate-level response

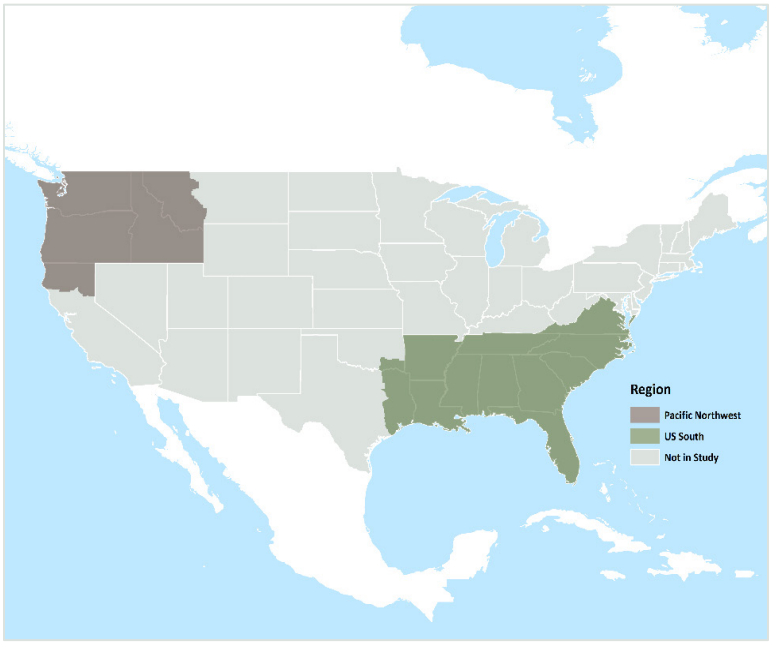

Figure 1-1 Residual Wood Fiber Study Regions

The geographic scope for this study was divided into two broad regions of the United States: the US South and the Pacific Northwest (PNW) (Figure 1-1).

Structural market changes are often caused by profound shocks to the economy. Over the last 15 years, the US economy has taken some body blows. To provide context for how these changes have affected the residual market, this study segments and compares two periods that are starkly different from each other:

1. 2004-2009—The Pre-Recessionary Period and the market crash
2. 2007-2017—The Great Recession and the Recovery

2 CONCLUSIONS

The underlying market forces that most impacted the residual market in these two regions are:

1. The structural decline in printing and writing papers and other end products derived from hardwood fiber
2. Buoyant demand for softwood fiber driven by strong pulp markets and bioenergy in the form of pellets
3. Renewed softwood lumber demand and capacity post-recovery that oversupplied residual markets
4. Fiber constraints in the PNW that stymied growth and led to stagnate, but stable markets

2.1 Hardwood Fiber Demand Decline

Consumer trends and preferences are moving away from products made from hardwood fiber. Demand for printing and writing papers is declining 6% annually and is expected to continue. In 2017, newsprint demand was down 10% from the previous year and the recent demand trends for boxboard and liquid packaging have been flat to decreasing. This has resulted in a 25% decrease in hardwood fiber demand (or 4 million bone dry tons) in the past 10 years (Figure 2-1).

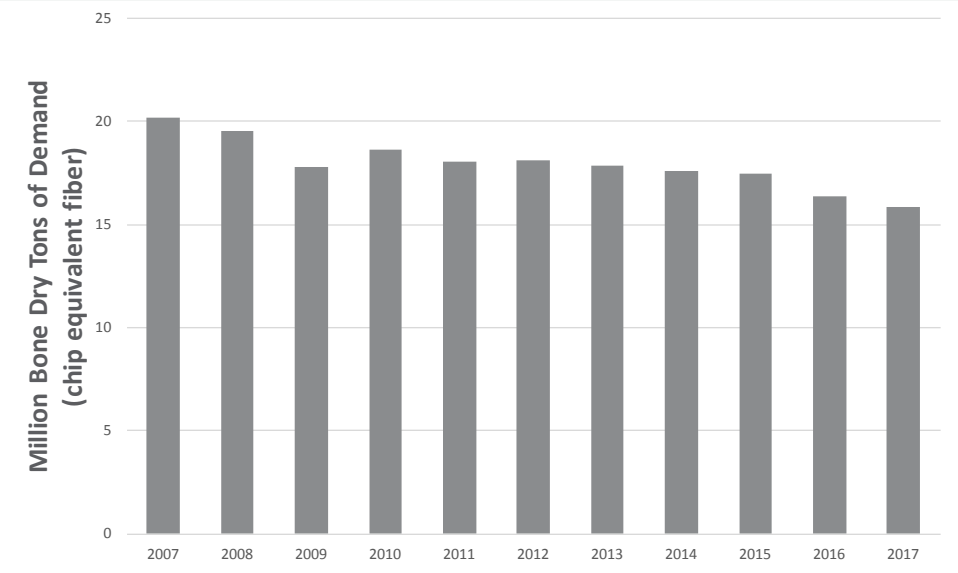

Figure 2-1 Total Demand for Hardwood Fiber

In the past five years, three southern pulp mills have been converted from hardwood to pine—further evidence that hardwood pulp demand is steadily eroding. Hardwood fiber was the feedstock of choice for the first pellet mills that served the European renewable market. However, most subsequent mills chose to use pine for its superior heat value and easy adherence to European sustainability standards.

The hardwood lumber industry, hard-hit by the recession, produced 30% less lumber in 2017 versus 2007 and residual production declined precipitously. As a result, hardwood sawmill residual chip prices were largely unaffected—in fact, they increased over the study period.

2.2 New Demand for Softwood Fiber

A significant development over the last decade has been new demand from the industrial wood pellet industry. Exports from the US have increased from essentially zero in 2007 to over 5 million tons in 2017, propping up demand for softwood fiber (Figure 2-2).

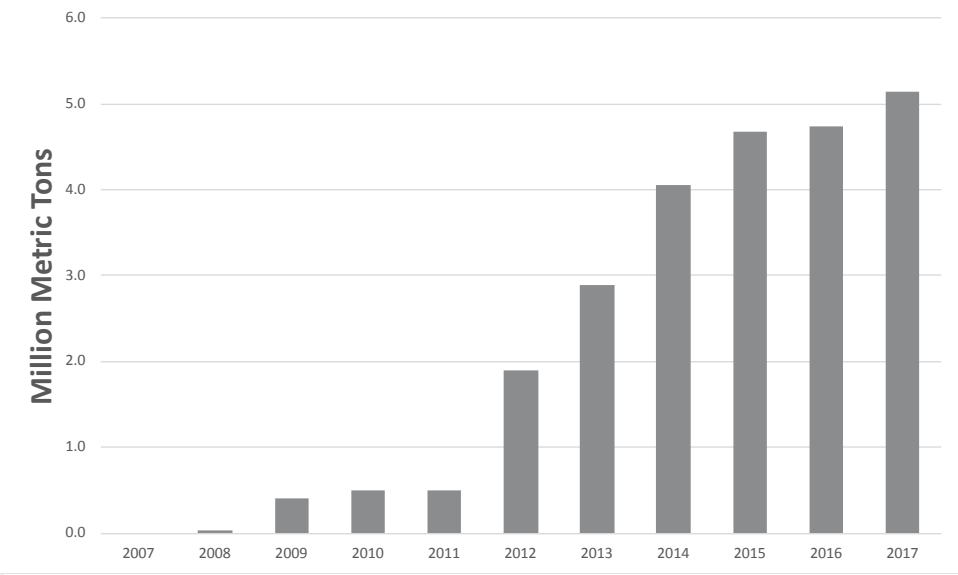

Figure 2-2 US Industrial Wood Pellet Exports from 2007 to 2017

While fluff pulp is a relatively small market for softwood fiber at only 6 million tons, worldwide demand is increasing at a 4% annual rate. Fluff pulp, made from softwood fiber, gives absorbent products (diapers and industrial towels) their absorbent qualities.

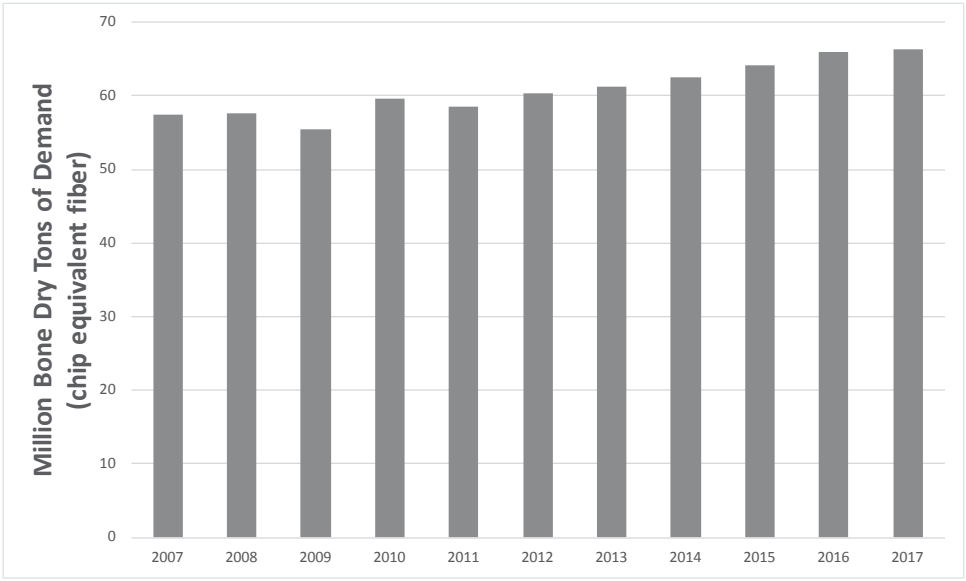

Figure 2-3 Total Demand for Softwood Fiber

More than 95% of all products in the US are shipped in cardboard boxes, which are made from high-strength softwood fiber. Demand for containerboard (the commercial name for cardboard before it is made into a box) is increasing at an annual rate between 2-4%. Demand trends look favorable as e-commerce sales are expected to increase from 10.2% of all retail sales to 17.5% in 2021.

Growth within these markets has driven total demand for softwood fiber in the US, which has been on the rise since 2011 (Figure 2-3).

2.3 New Southern Sawmill Capacity Underpins Supply of Residuals

While the total number of operating pine sawmills in the US South has decreased over the last decade, lumber production has fully recovered to pre-recession levels. Low lumber production cost—mainly driven by very low log costs—has stimulated investment in Southern sawmills. Five new pine sawmills started operations in 2017, and at least nine new mills have been announced (Table 2-1).

Most of these facilities plan for annual capacities of 180 to 350 million board feet—replacing mills that produced 80 to 120 million board feet of lumber.

Table 2-1 US South - Newly Established and Proposed Pine Sawmills

Recent Builds:		
Company Name	**Mill Location**	**Startup**
Weyerhauser Co.	Dierks, AR	December 2017[1]
Biewer Lumber, LLC	Newton, MS	January 2017
Conifex Timber Co.	El Dorado, AR	January, 2017[1]
Winston Plywood & Veneer, LLC	Louisville, MS	April 2017
Two Rivers Lumber Co.	Demopolis, AL	September 2017
Proposed New Builds:		
Company Name	**Mill Location**	**Anticipated Startup**
Georgia-Pacific, LLC	Talladega, AL	Q4 2018
Tolko Ind. & Hunt Forest Products	Urania, LA	Q4 2018
Rex Lumber	Pike County, AL	Q2 2019
Georgia-Pacific, LLC	Warrenton, GA	Q2 2019[1]
Georgia-Pacific, LLC	Albany, GA	Q3 2019
Canfor Co.	Washington, GA	Q3 2019
Interfor Co.	Central US South	Unannounced
Ashton Lewis Lumber Co.	Abbeville, AL	Unannounced
Westervelt Co.	Southern AL	Unannounced

[1]Rebuild or modernization of pre-existing mill site

When these nine new sawmills are operational, the supply of wood fiber residuals will increase between 0.32 and 0.44 million dry tons per year (Figure 2-4).

Existing mills are also expanding as well—adding drying capacity, running longer hours and upgrading equipment to take advantage of the strong lumber market and plentiful supply of softwood logs.

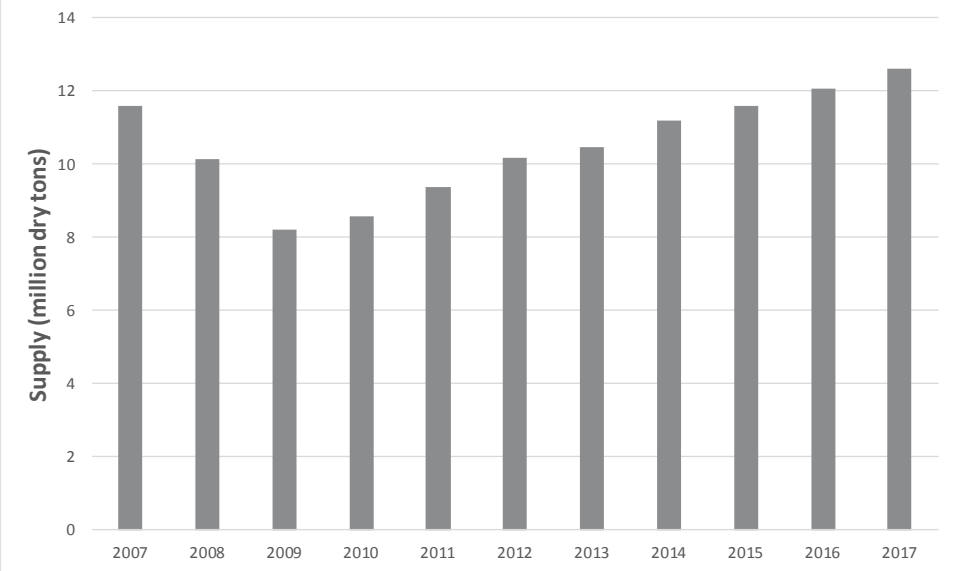

Figure 2-4 Residual Chip Supply Delivered to Consumer - US South - Pine Species

Prices have yet to reflect this change in the market. The oversupply of pine sawtimber is keeping sawlog prices low, even as demand for lumber and sawmill production increases. At the same time, the demand for pulpwood has remained strong, but plentiful availability in the forest and new supply created by additional lumber production has kept prices stable (Figure 2-5).

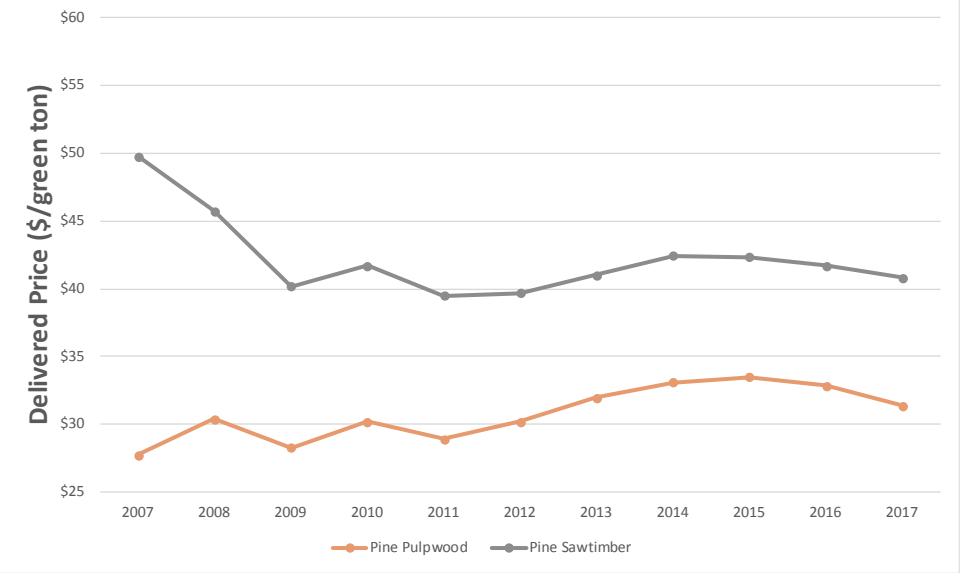

Figure 2-5 US South Delivered Pine Sawtimber and Pulpwood Prices

Housing starts, gross domestic product, the remodeling index and annual home improvement spending all showed very strong recoveries from 2007 to 2017 (Figure 2-6).

With expanding southern lumber production and associated residual production, we expect residual chip (and pulpwood) prices to soften, even as demand remains strong.

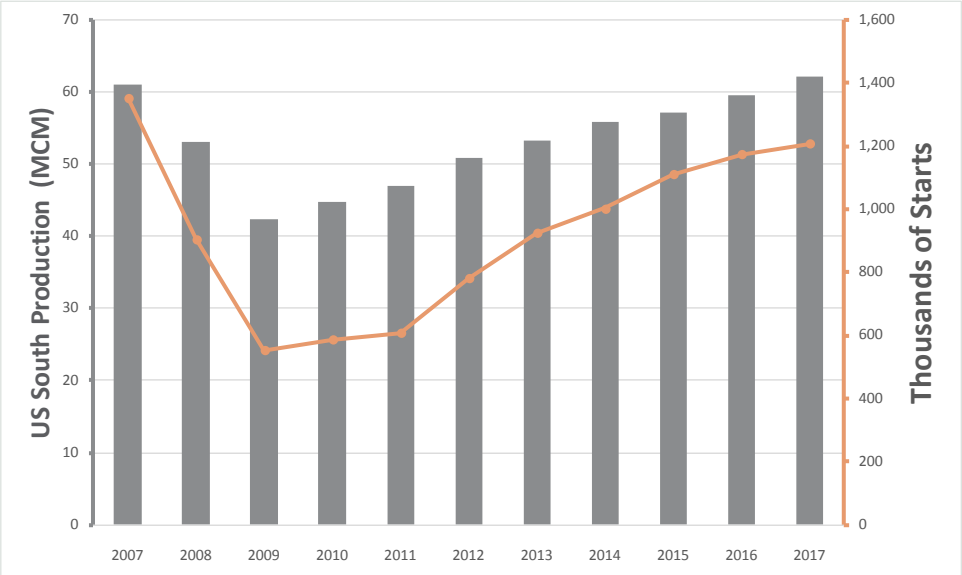

Figure 2-6 Volume of Lumber and Panels Produced in the US South and Housing Starts from 2007 to 2017
(Source: Western Wood Products Association)

2.4 Constrained Resource in the Pacific Northwest

Demand for PNW sawlogs has remained strong but, unlike the US South, timber supply is constrained.

The domestic PNW industry is resource-constrained due to the combined effects of four factors:

1. Recovering PNW lumber industry
2. Lingering effects of restricted harvest on federal lands
3. Restricted supply from Canada
4. Export demand from China

The supply of sawdust, shavings and wood fuel has been remarkably stable over the past five years as lumber production is maxed out due to finite log supply (Figure 2-7).

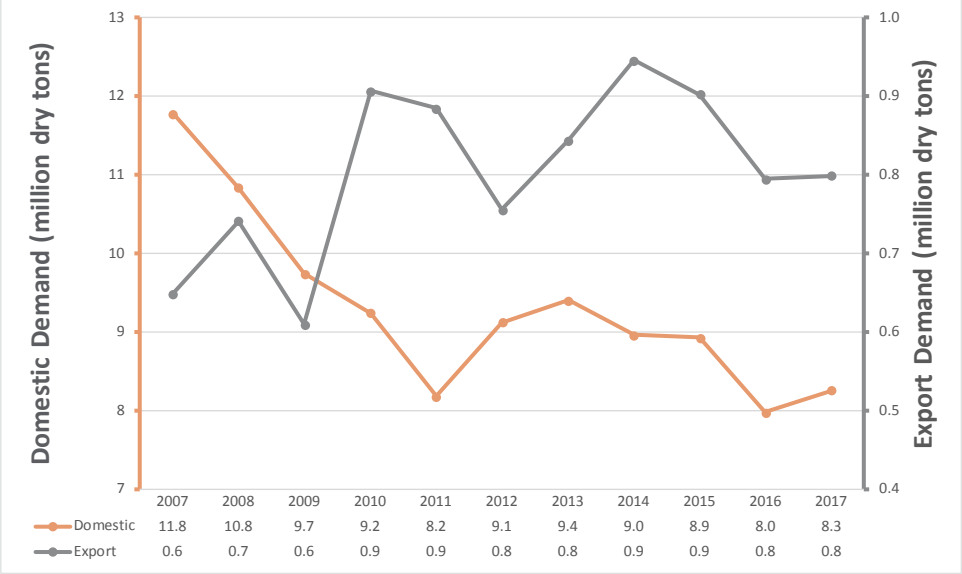

Figure 2-7 Domestic and Export Chip Demand in the PNW

3 IMPLICATIONS

3.1 US South

The South's forest products industry is a tale of two worlds defined by the region's hardwood and pine resources. The pine fiber industry has seen a robust recovery, capital inflows and high profitability; the hardwood industry has never recovered to pre-recession highs, and it has endured a significant number of mill closures and suffered at the hands of changing consumer preferences. Structural changes have affected the hardwood market in the South in ways that cannot be reversed.

The supply and demand and volume flows of all pine residual products surpassed 2007 levels by 2017, indicating a full recovery from (and adjustment to) the malaise of the Great Recession (Figure 3-1). Investment capital is building new mills and consumer preferences favor pine pulp fiber production. The industry is solidly profitable with globally-low cost structures. One challenge and possible inhibitor to growth is the oversupply of residual chip material. Forest2Market believes that the negative result of this—if it occurs at all—will be borne by the forestland owner as mills choose to weight their pine fiber mix toward wood residuals and away from pulpwood. In addition, since pine sawtimber growth widely outpaces demand (and will continue to do so even after new lumber production capacity is brought on line), the forestland owner will suffer through many more years of historically low sawtimber prices.

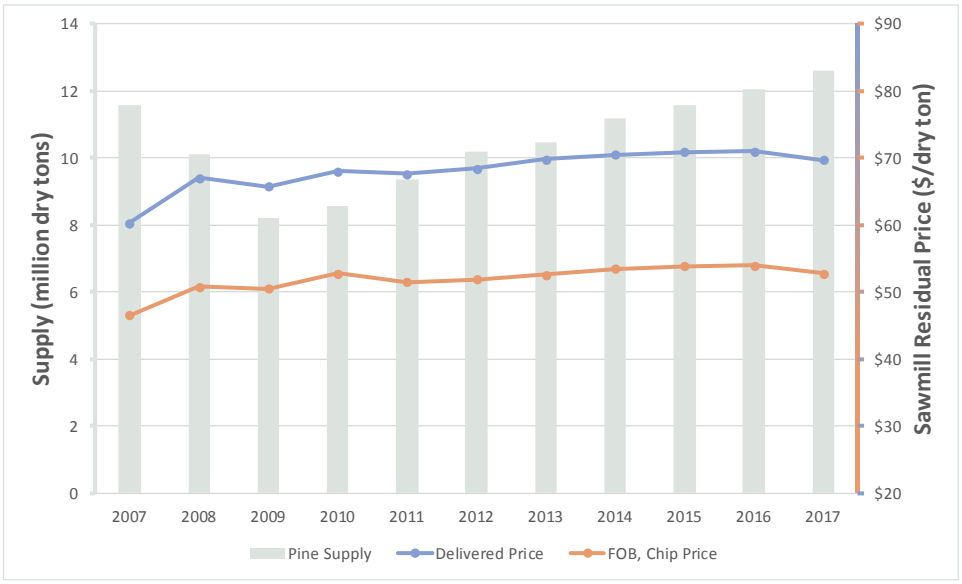

Figure 3-1 Residual Chip Supply Delivered to Consumer and Price - US South - Pine Species

Prices for hardwood residual chips have increased by roughly $10/dry ton over the past 10 years. This is a modest increase that mimics general inflation trends in the US, but with different drivers (Figure 3-2). Compared to pine, where supply increased over the last decade, we would have expected stronger price reaction in the hardwood residual market. The underlying reason is that demand decreased by 4.4 million bone dry tons (Figure 2-1). This more than offset the decrease

Figure 3-2 Residual Chip Supply Delivered to the Consumer and Price - US South - HW Species

in supply, having only a marginal effect on price.

3.2 Pacific Northwest

The market in the PNW might best be described as structurally stagnant. However, it is reasonably healthy despite the high cost of fiber and lack of new capital. Sawmills are profitable, and forestland owners are enjoying near record log prices.

The upside potential of the PNW industry is limited due to the structural changes in log supply. The lack of supply will impact the industry for years to come. With no additional log supply, there can be no additional lumber production or residual production and, of course, no new pulp capacity (Figure 3-3).

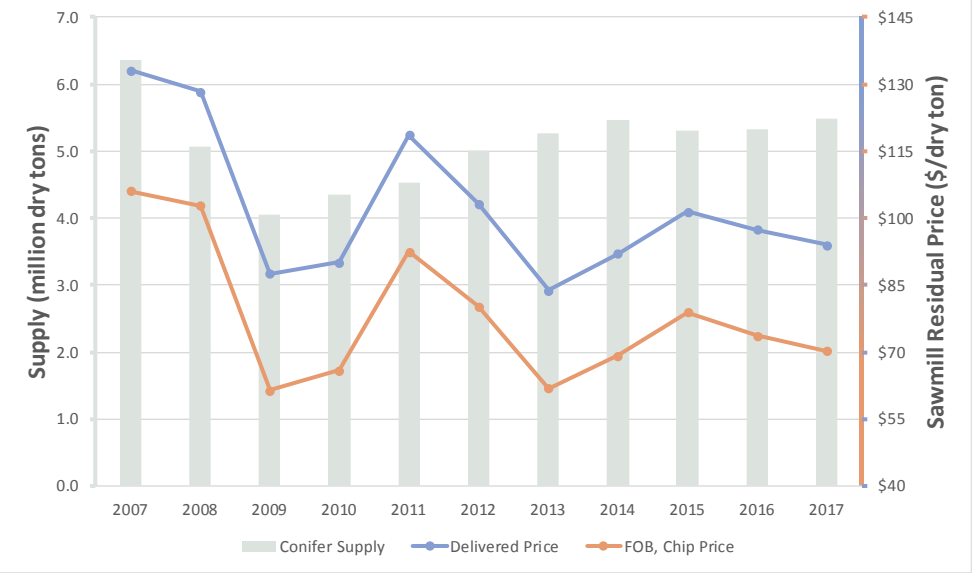

Figure 3-3 Residual Chip Supply Delivered to the Consumer and Price - PNW - Conifer Species

If nothing else, the study demonstrates the inextricable link between PNW log supply, lumber production and pulp capacity. The Northwest US market is severely hobbled due to the tight log supply, and the added demand of export markets further complicates the supply situation. PNW lumber capacity has never recovered from the spotted owl crisis of the 1990s, let alone the aftermath of the Great Recession.

Strangely, the PNW residual chip market is very much insulated from the production declines, as pulp mills make up residual chip deficits with primary chip mill chips. To be sure, this is a cost issue, but not a supply issue. Also notable is the fact that very little capital is flowing to the PNW industry, owing in large part to the restricted log supply and perniciously high log costs, which are some of the highest in the world. Pulp mill numbers and production have declined dramatically. On the surface, this should be alarming; however, the supply of residual chips is only about half the amount demanded by pulp mills (the rest being made up by chip mill chips).

3.3 Structural or Temporal Market Shifts

The hardwood lumber and hardwood pulp markets have been in a state of structural decline for a couple decades. The Great Recession only hastened the demise of the hardwood lumber business. The structural decline started in the 1980s when lumber manufacturing migrated to Mexico, China and now broader Southeast Asia. The 30% decline in hardwood lumber production since 2007 has restricted wood chip and wood fuel availability by the same amount. If it were not for declining demand for hardwood fiber during this period, the restricted supply of chips would have been debilitating for many hardwood fiber consumers. As misfortune would have it, the products made from hardwood fiber, including writing and specialty papers, have been out of favor for years. Consumers now prefer to receive their “daily paper”

electronically and print out fewer and fewer emails and hardcopy reports. It is hard to imagine a world where this trend reverses. As a consequence, Forest2Market concludes that the hardwood residual market has undergone a tremendous structural shift. This type of structural shift can only be addressed by a wide industry effort to attract new users of hardwood fiber and to secure the economic health of the hardwood lumber industry.

Demand for softwood fiber has increased substantially since 2007. The rise of the European pellet industry that first started as a cottage industry in 2007 had grown to a 5 million ton per year export by 2017 and resulted in 10 million additional tons of fiber demand, most softwood. During the same period, demand for fluff pulp for absorbent products has spawned new southern pulp production. The recovering economy along with the migration to online retailing has increased demand for cardboard boxes that is principally fulfilled by the southern pine pulp industry. At the same time, the supply of pine fiber increased quite drastically. The supply of pine fiber in the woods has increased, as have the residuals produced by a recovering pine lumber market. This dynamic has created favorable economic conditions for softwood pulp producers—both positive demand trends and widening availability of softwood fiber to meet those demands. By any measure, except price received by the landowner, the softwood fiber market has fully recovered since the Great Recession. Between 2007 and 2017, the underlying structure of the market has certainly temporarily shifted. However, the southern pine fiber and residual markets are sound and profitable, even if oversupplied.

The market for all products in the PNW might be best described as structurally stagnant. The limited timber availability gates the size of the market. Since pulp mills, MDF and MDP facilities are highly reliant on residuals from sawmills, the sawlog resource is the key to fiber availability. When sawlog availability is restricted, lumber and subsequent residual chip production is also restricted. Many factors restrict sawlog availability in the PNW, the largest being the lack of harvesting on federal timberland. In order for the industry in the PNW to grow, new log resources must be supplied. This can come through improved silviculture—improving growth rates—on private timberlands, imports from other markets or increased access to timberland that has been off limits to harvesting. On the margin, private landowners will improve growth rates and thereby avail more timber to the market. Sawlog imports into the PNW are highly unlikely as British Columbia is dealing with its own sawlog deficit and shipments from any other region would pose too many logistical challenges. The only viable option is to develop avenues to open National Forests to greater harvesting opportunities. Without which, the PNW will stagnate at its current size. It's hard to characterize this issue as structural or temporal. It's absolutely structural if viewing from a growth perspective, but it's also reasonably healthy—and profitable—if looking at it at a specific moment in time and without any concern for long-term growth opportunities or sustainability.