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## Southern Timber Markets and Prospects

Fred Cabbage, Bob Abt, Rajan Parajuli, Jesse Henderson, and Bruno Kanieski  
North Carolina State University, Southern Forest Resource Assessment Consortium (SOFAC)

Attached is a piece written by my friends and colleagues. Hope you enjoy the read. Regards, Rich

### **Contact:**

Rajan Parajuli, PhD  
Assistant Professor and Extension Specialist  
Forest Economics and Policy  
Department of Forestry and Environmental Resources  
North Carolina State University  
4217 Jordan Hall Addition  
Raleigh, NC 27695  
Email: [rparaju@ncsu.edu](mailto:rparaju@ncsu.edu)  
Phone: 919-513-2579



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Richard P. Vlosky, Ph.D.  
*Director, Louisiana Forest Products Development Center*  
*Crosby Land & Resources Endowed Professor of Forest Sector Business Development*  
Room 227, School of Renewable Natural Resources  
Louisiana State University, Baton Rouge, LA 70803  
Phone (office): (225) 578-4527; Fax: (225) 578-4251; Mobile Phone: (225) 223-1931  
Web Site: [www.LFPDC.lsu.edu](http://www.LFPDC.lsu.edu)



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# Southern Timber Markets and Prospects

Fred Cabbage, Bob Abt, Rajan Parajuli, Jesse Henderson, and Bruno Kanieski  
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We have been asked to present a brief overview of timber markets for the National Woodland Owners, which is daunting given all the market and resource changes over the last decade. As forest economists, we have spent much of our extensive (or young) careers studying exactly this topic, but timber supply, demand, and prices are broad measures of a complex market system comprised of diverse landowners and forest management options. To make our task manageable, we will focus on southern U.S. timber markets, which had 7.859 billion cubic feet of softwood and hardwood removals in 2016, comprising about 60% of the total timber removals of 13.041 billion cubic feet in the U.S. (Table 1).

Region	Softwood	Hardwood
Billion Cubic Feet		
South	5.647	2.212
Northeast & North Central	0.653	1.837
Rocky Mountain	0.395	0.008
Pacific Coast	2.204	0.081
U.S. Total	8.901	4.139

**Table 1. U.S. Timber Removal Statistics by Region and Species Group, 2016**

Source: Oswalt et al. 2018

In addition to different production by region, there also are differences in product classes in each region, which we could broadly class as sawtimber and pulpwood, although there are intermediate timber products—especially pine chip-and-saw timber or even poles in the South—and wood chips in all regions. In addition, sawing timber into lumber does provide a large amount of wood chips as a byproduct that often is used in pulp, composite board, or pellet manufacturing. Most landowners and timber analysts know about these general product types, but the myriad of possible products—say at least five pine timber product classes and three broad hardwood product

classes (not to mention species differences)—all with variable product breakdowns by diameter, species, quality and location—make timber markets complex.

## Timber Markets in Theory

To focus the treatise here on timber markets, we will make a few assumptions, as economists are wont to do, about the key factors of interest regarding southern timber markets. We will assume that woodland owners want to know the most about timber prices, and when they will get better, and how much they might increase, or worse, not increase, and why. Econ 101 of course tells us the basic principle: timber prices will increase when demand increases; supply decreases; or both. The amount of these price changes will depend on the sensitivity (e.g., price elasticities) of timber prices to changes in supply and demand. Generally, timber supply and demand are inelastic for most forest products—with a price elasticity ranging between 0.1 and 0.5 based on empirical studies—which means the amounts demanded and supplied are not very sensitive to price changes.

Let us examine southern timber markets in theory, and illustrate the effects of timber inventories, supply, and demand on the bottom line of timber prices for woodland owners. We will initially assume that timber prices reflect the market equilibrium between supply and demand, and that there is perfect competition in timber markets, and discuss the caveats to such assumptions later. We used USDA Forest Service Forest Inventory and Analysis (FIA) data in our SubRegional Timber Supply (SRTS) model (Abt et al. 2009) to analyze changes in the timber markets for sawtimber as a case study.

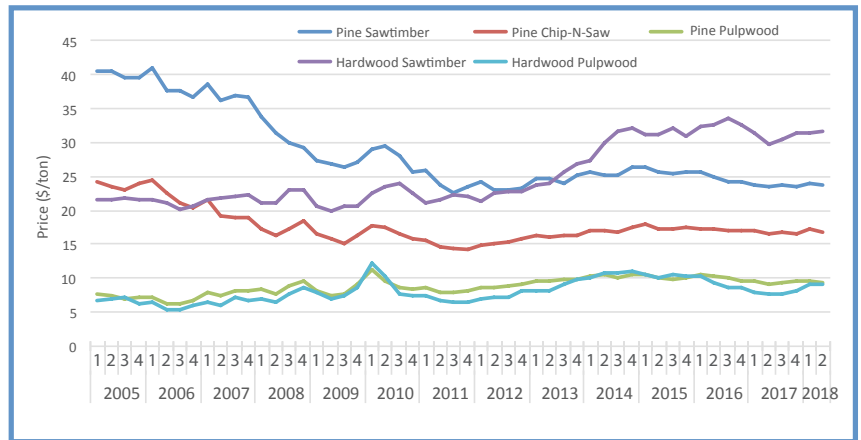
Timber supply represents the economic relationship between the quantity of timber that will be grown and harvested at a given price in a given region, such as the South. Timber inventory is the biological amount of timber that exists, and is the basis for supply, but is not equal to supply. It will however, be the principal

driver of prices based on its costs to grow timber. Timber demand is derived as the residual value for wood as an input into the production process of lumber, market pulp, or other products. Large increases of timber inventory are apt to translate into a cheaper costs, shifting the total supply curve out, and vice versa for inventory losses. Supply increases benefit wood consumers, but not timber producers. Large demand will increase equilibrium prices, benefiting timber growers, not forest products firms that buy wood.

### Timber Price Prospects in a Market Model

The laudable goal of most timber growers, of course, is to grow and sell timber at higher prices (and lower costs), in order to make more profits from their timberland investments and keep their land in forests. However, from 2005 to 2018, stumpage prices for southern pine sawtimber have dropped from South-wide averages of about \$40 per ton to about \$25 per ton (almost a 40% decrease), and lost even more value when accounting for inflation (Figure 1). Pine pulpwood prices have been better for landowners, increasing slightly over this period, from an average of about \$8 per ton to \$10 per ton. Hardwood sawtimber prices have increased from about \$20 per ton to more than \$30 per ton, and hardwood pulpwood prices have been relatively stable at prices slightly less than for pine, but with a much smaller quantity sold (Figure 1).

So, what will it take to increase timber prices? In a perfect market, using the approximate timber price elasticities of 0.4 for southern sawtimber as an example, and the base production of 17 billion board



**Figure 1. South-Wide Regional Timber Price Trends, 2005-2018 (Timber-Mart South 2018)**



**Figure 2. SRTS Model Supply, Demand, and Equilibrium Market Price as an Index for Southern Pine Sawtimber, Before Recession of 2008**

feet of timber produced in 2017, economic computations indicate that it would take an additional demand of 650 million board feet to increase prices 10%, or a decrease of sawtimber supply of an equal amount. To increase timber prices back to the 2005 levels, then, it would take demand increases of about 2.6 billion board feet, ceteris paribus (all else equal), assuming no change in the supply curve, or an equal decrease in supply, or a mix of the two. In fact, demand is increasing, but so is supply.

We used the SRTS model for the South-wide FIA data to analyze

the factors that have determined timber prices, and project likely trends to 2040. The largest driver of high pine sawtimber prices previous to 2008 was U.S. housing starts, which exceeded 2 million per year prior to the modern great recession. After the recession, housing starts fell to less than 1 million per year, and pulpwood demand decreased at least 10% as well, decreasing overall demand for total pine volume from 6.2 billion cubic feet per year in 2006 to 5.4 billion cubic feet in 2012 (Figure 2).

Total demand for southern pine timber has increased slowly

toward pre-recession levels since 2006, to about 5.7 billion cubic feet in 2015. However, housing starts have only rebounded to about 1.2 million per year, and are unlikely to exceed these levels by much in the future according to Prestemon et al. (2017). There is more lumber output now—a 17% increase since 2008. Many more southern sawmills have been announced in 2018, for a total of 3.5 billion board feet (Table 2), and expansion at existing mills is projected to increase lumber production in the South from about 17 billion board feet in 2015 to 24 billion board feet from 2016 to 2021 (Forest Economic Advisors 2018). Opening these new mills, however, may require more new final product demand or export markets to materialize, or may force some existing less efficient mills out of business.

Company	Location	Capacity (MMBF)
Klausner 1	Live Oak, FL	350
Brewer Lumber	Newton, MS	200
Two Rivers Lumber	Demopolis, AL	200
Klausner 2	Enfield, NC	350
Georgia-Pacific	Talladega, AL	230
Georgia-Pacific	Warrenton, GA	350
LaSalle Lumber Company	Urania, LA	200
Rex Lumber	Pike County, AL	240
Westervelt	Southern, AL	350
Canfor	Washington, GA	275
Interfor	US South	200
Angelina Forest Products	Lufkin, TX	220
Georgia-Pacific	Albany, Georgia	300

**Table 2. New Sawmills Announced in the South, 2018**

Source: Forest Economic Advisors (FEA) 2018

While timber demand has almost recovered back to 2005 levels by 2018, the forests have not been static. In fact, based on FIA data, sawtimber inventory volumes have increased an average of almost 7% per year from 2011 to 2015. According to our FIA projections, sawtimber inventory volumes were apt to continue to increase for a decade unless major new sawmills do come on line and maintain high levels of production, or if major natural disasters occur.

The large sawtimber inventory increases have occurred for several reasons. First, southern forest industry and many woodland owners converted vast areas from natural to planted pine by the year 2000—almost 30 million acres. Second, in there was significant planting in the late 1980s due to the harvesting of the approximately two million acres of the Soil Bank bubble from the 1950s, and the new Conservation Reserve Program in the 1980s helped plant about two million more acres on marginal agricultural land. Many of the private landowner and CRP lands matured about the time of the great recession of 2007 and 2008. The resulting low prices encouraged many landowners to delay final harvest as prices dropped, and thus total sawtimber volumes increased and replanting was delayed further. Another factor increasing supply has been a 1% per year increase in plantation growth rates over the last 20 years, producing more wood volume per acre than in the past.

This combination of factors caused sawtimber volumes to increase faster than sawtimber demand, which may or may not be reversed if all the new announced sawmills are built, or there are massive adverse hurricane impacts. The lower planting rates since 2000, the lack of sawmill residues, and record high pine pulpwood consumption has led to higher pulpwood prices. The combination of high pine pulpwood prices and low pine sawtimber prices has led to some small sawtimber to be sold as pulpwood since pulpwood is scarce in some regions.

Figures 3 through 6 show our current projections of the past trends and likely future scenarios of sawtimber market outcomes based on SRTS runs of the current timber inventory, supply, and demand assumptions. First, the 2008 recession decreased sawtimber prices to only 67% of their pre-recession levels (Figure 3). Then, per our SRTS runs, there would be a slow recovery after the recession assuming constant timber inventories, with price ascending back to 88% of pre-recession levels (Figure 4). However, the increase of 7% per year in sawtimber inventory per year would wreck this recovery, knocking the potential price increases back to about 65% of the 2007 base (Figure 5). Overall, to get back to the 2008 price levels, we would have to have increased sawtimber demand (or equal supply decrease) of more than 25% above the pre-recession levels (Figure 6)—which were all time record levels of housing starts and other demand.

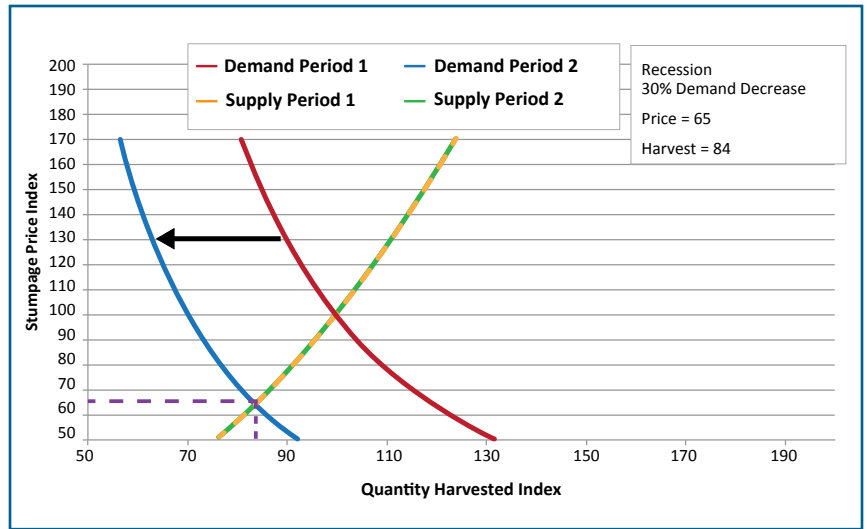
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## Supply and Demand Shifters

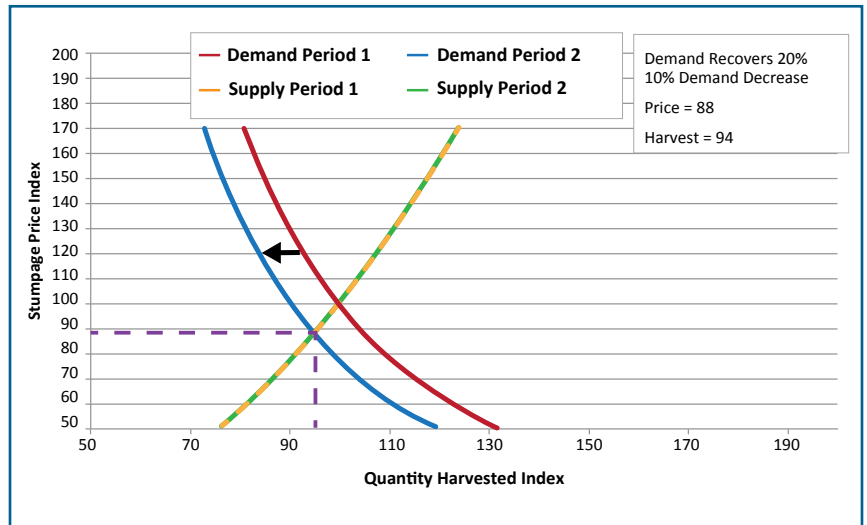
We could achieve these record levels of sawtimber demand if all the planned sawmills are built in the South, which will likely require a continued prosperous economy and high housing starts. Trade policy also will affect timber prices. Parajuli and Johnson (2017) and Parajuli and Abt (2018) found that the Countervailing Duty (CVD) on Canadian exports would reduce the Canadian market share in USA by about 5%, leading to about 1 billion bd ft more production in USA, and 860 million bd ft additional Southern lumber. This would generate about a 7.3% increase in timber prices over 5 years; a 2% increase in lumber prices; and increase annual sawtimber removals by 3.2%. Canada later retaliated against broad U.S. tariffs with related 10% Tariff on most U.S. forest products, although we do not export much manufactured forest products to Canada.

New mass timber markets such as cross laminated timber (CLT) also could expand the use of wood substantially, and while they are quite popular, the implementation is apt to take a decade of building code changes, CLT mill construction, architect and engineering diffusion, and so forth, before mass timber products are widely deployed. Significant losses of timber inventory in the West due to insects, disease, and fire could increase residual southern demand, but the current push for increased federal harvest might offset any potential biological losses.

The massive damages in 2018 from Hurricane Michael, as well as some from Florence, will



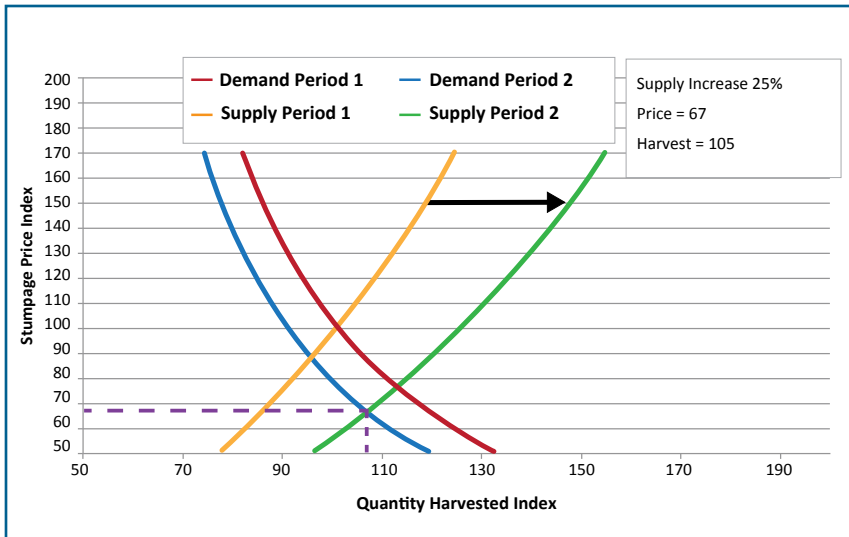
**Figure 3. SRTS Model Supply, Demand Decrease, and Price Index for Southern Pine Sawtimber After Recession of 2008**



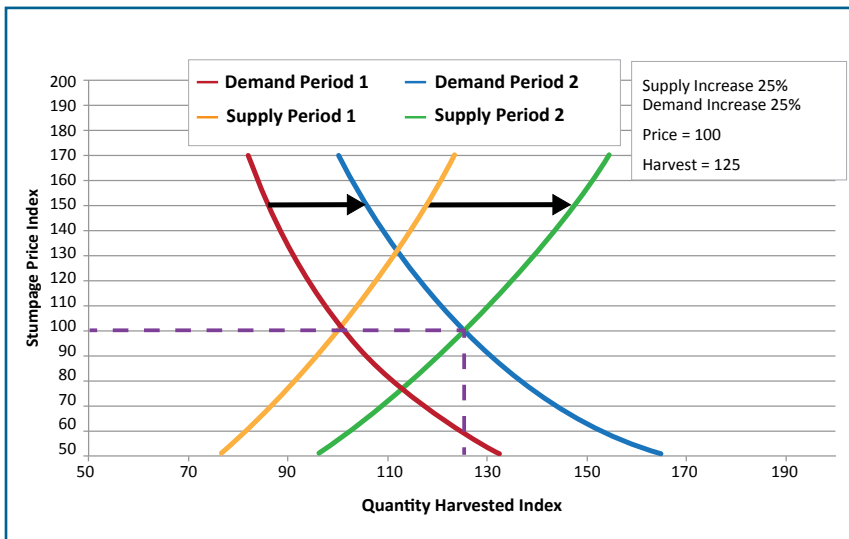
**Figure 4. SRTS Post 2008 Recession Net Demand Decrease and Then Recovery and Price Index for Southern Pine Sawtimber**

have major effects on Florida and Georgia timber markets and in the Carolinas. These hurricanes will reduce inventory and supply in the short and long run, and reducing prices in the short run during timber salvage, but increasing them in the long run. Early estimates at the end of October 2018 indicate that Hurricane Michael caused 1.4 million acres of moderate damage and 1.5 million acres of severe damage to forests in Florida, and impacted 2.4 million acres of forests in Georgia,

as well causing some damages in Alabama. The Georgia Forestry Commission (2018) estimated that 1.2 million acres of pine timberland were affected in the state, or about 10 million tons of timber were destroyed (for easy benchmarking, a pulp mill may use about 1 million tons of wood per year). Multiplying by the larger area in Florida and Alabama, the damaged wood volume losses might amount to 40 to 50 million tons of pine timber. Losses were less instantaneous in



**Figure 5. SRTS Post 2008 Recession Net Demand Decrease, Recovery, Supply Increase, and Price Index for Southern Pine Sawtimber**



**Figure 6. SRTS Post 2008 Recession Net Demand Decrease, Recovery, Supply Increase, and Demand Shift Required a Price Index in Order to Return to Pre-Recession Price Levels for Southern Pine Sawtimber**

the Carolinas, but record rainfalls, floods, and wind damage damaged many stands, and will add more to regional timber losses.

At 133 board feet per ton, 50 million tons would then equal 6.6 billion board feet of sawtimber losses, or about a 100% additional increase in sawtimber prices due to supply losses. Timber salvage might recoup half of this, but the rest would be downgraded to pulpwood at best, or rot in the woods. Dumping this much damaged wood

on the market has already dropped current prices in Florida to maybe a quarter of previous sawtimber prices. Hurricane losses in 2018 alone could have major ripple effects on increased prices up the East Coast. But of course, many landowners will lose drastically, not benefit, due to the large storm losses that they have incurred.

Supply will increase on nondamaged lands because more wood can be produced as we continue to produce faster growing

seedlings and apply better timber stand management practices. More efficient sawmills need perhaps 1% to 2% less wood to produce the same amount of lumber each year. Global competition for sawtimber markets from fast grown timber in South America or Oceania also could increase U.S. supply and decrease prices (Cubbage et al. 2014).

## Conclusions

Economists are seldom noted for cheerful predictions, but we at least have been reputed to see two sides of an issue. Until the raft of new sawmills was announced, and two major Hurricanes struck in 2018, it was hard to be optimistic for a recovery of southern pine sawtimber markets to 2005 price levels in the next decade. But new mills can shift the demand curve out, as long as they do not drive old ones out of business; and unfortunately hurricanes have shifted the supply curve back.

Before hurricanes, there was enough increased sawtimber growth and inventory to feed all the new mills for about a decade without much price increase. Those total announced mills alone would increase demand 7 billion board feet of sawtimber, which in theory would lead to a doubling of sawtimber prices of up to \$50 per ton at 0.65 billion needed per a 10% price increase, which would be offset by current sawtimber growth. However, the one-time hurricane losses of 7 billion board feet as well could add up to \$25 per ton more in the short run. This might cause some announced mills not to open, especially in the Hurricane Michael path, or cause some existing ones to close.

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Either way, we still think sawtimber prices are likely to increase, although the hurricane losses only occur once (hopefully), compared to an annual increase based on new sawmills. This would still average out to 1 million board feet or so per year, pushing prices up a net 10% to 20% per year after the short run drop in prices now. To recap, the forecast increased lumber demand would be almost offset by the projected FIA/SRTS increased sawtimber growth at 7% per year for 5 years, accumulating to 6 billion board feet per year, but the offsetting timber inventory losses would lead in theory to net maybe a 20% price increase as demand increases and supply contracts.

Most macroeconomic forecasters project a significant stock market dip in the next five years, which would dampen U.S. housing, pulp, and timber demand. Fire and disease in the West may decrease timber supplies in the long run, but salvage and increased public land sales are likely to increase supply more in the short run. On the other hand, if all the proposed new mills are built and the 2018 hurricanes have the effects we project, the overhang of excess sawtimber stumpage will disappear in a few years, and the current and proposed mills will be scrambling to find adequate supplies, and stumpage prices will rise rapidly. That would suggest that now—or even a decade or more ago—is the time to plant trees, to have your sawtimber stands ready in 2025 or later.

The timber market story for other products and regions of the U.S. rests on the same economic supply and demand principles, with varying outcomes. In the South, pine pulpwood has the strongest demand of any product, although less than before the recession as well, but with much less supply. Thinning of mid-aged stands has grown more sawtimber, and regenerated fewer young stands. The lack of sawtimber chips has

decreased pulpwood supply as well. Some larger diameter timber also may be used by pulp or pellet mills due to low sawtimber prices. Eastern hardwood timber trends are less predictable in aggregate, since species and quality are more important, as are exports. Pulp demand has decreased, and sawtimber demand is strong, but the huge hardwood inventories and increases continue to outpace those demands, leading to projected stable or decreasing prices in our SRTS projections for the South.

We have not modeled timber markets in other U.S. regions as much as in the South, but have made estimates of timber investment returns and have some familiarity with those timber markets. Many pulp-mills have closed in the northern states, adversely affecting pulpwood demand and prices, and we do not see an improvement there. However, technology has advanced rapidly to allow cutting of large pulpwood size softwood timber for small lumber, as it has in the South. Hardwood sawtimber will fare better as long as the economy grows and we avoid a trade war. The West Coast sawtimber market has prospered due to high demand from China, Japan, and other smaller countries in Asia. That high export demand is likely to continue as Asian economic growth rates continue largely unabated, buffering the West from U.S. commodity dependence. Harvest of more timber from public lands is apt to be offset by inventory losses to insects, disease, and fire, in the West, and in Canada. And public lands timber is not apt to allowed to be sold directly to export markets.

Let's close with a purported Chinese proverb or curse: "May you live in interesting times". Woodland owners certainly do, albeit surely not in as prosperous or as riskless as they would like.

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