

Impacts On South Carolina Timber Production Over The Last Five Decades

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Timberland ownership patterns and national forest timber harvesting policy have undergone significant changes in South Carolina over the past five decades. Timber output studies for the state commonly focused on short time frames and seldom addressed timberland ownership patterns in detail. We describe fifty-year timber output for South Carolina, allowing us to address economic cycles, industrial expansions and contractions, hurricanes, shifting ownership patterns, and national forest timber harvesting policies. We also addressed the relationship between mill capacity and industrial timber output.

We utilized published timber trend, industrial roundwood output data, mill data from the USDA Forest Service and additional data from their Forest Inventory and Analysis (FIA) unit in order to extend prior studies in terms of time frame and ownership focus. We broke public ownership into national forest system, other federal land, and state-owned land classes and private timberland into industrial, other corporate, and family forest land classes. Other corporate timberland owners included institutional investors like timber investment management organizations (TIMOs) and real estate investment trusts (REITs).

By establishing these timber production trends by ownership beyond the simple private and public ownership classes, additional insights were gained on which sectors contributed to timber output.

Industrial Roundwood Output Trends

General industrial roundwood output from 1967 to 2009 for South Carolina is shown in Figure 1. Hardwood roundwood output has remained relatively stable and softwood output has nearly doubled since 1967. Overall roundwood output showed a slow steady annual increase of 1%. Softwood dominated roundwood output.

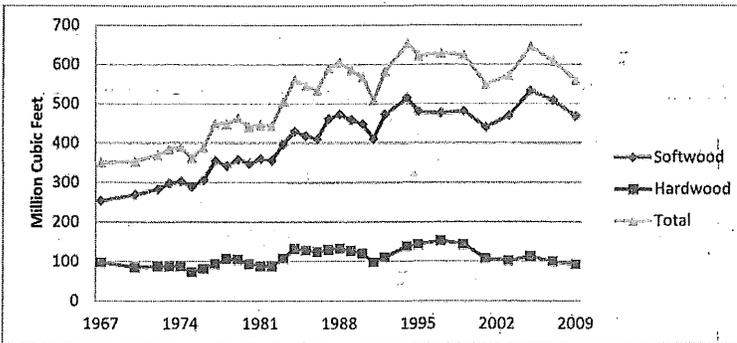


Figure 1. Industrial roundwood output for South Carolina, 1967-2009.

The proportion of softwood varies quite a bit and has noticeable peaks and valleys caused by general economic conditions and an increase in market demand for hardwood products like furniture and pallets. Figure 1 shows three distinctive decreases occurred in years 1991, 2001 and 2009. It illustrates how certain events, like a hurricane, major timber price changes, economic conditions, and mill closings, can impact industrial timber output.

Hurricane Hugo And Timber Prices Impact Timber Output

A 10% decrease in industrial roundwood production occurred in 1991. This can be attributed to Hurricane Hugo that devastated the South Carolina coast in September 1989 and damaged 4.5 million acres of timberland, resulting in a 21% and 6% decrease in the softwood and hardwood inventory, respectively. Salvage operations affected timber output, but the bottom line result occurred in 1991, exacerbated by a recession the same year. Hurricanes have long-term implications, like changes in basal area and tree species composition, that impact industrial timber output.

Total industrial roundwood output decreased by 12% 1999 to 2001. A couple of factors were responsible. First, from the first quarter of 1998 to the second quarter of 2001, pine sawtimber and chip-n-saw timber prices were down by about 25% and pine pulpwood prices down by nearly 50%. Second, damage from southern pine beetles was impacting the pine timber markets during that time period. Pine sawtimber and pulpwood

stands suffered high levels of mortality from southern pine beetle attacks and salvage operations pushed prices down. Also, in the late 1990s the use of hardwood pulpwood increased because it was cheaper than softwood pulpwood. An 8% reduction in the industrial roundwood output occurred in 2009 due to the 2007-2008 economic crisis and the dramatic decline of housing starts. This also affected timber prices, with pine sawtimber and chip-n-saw prices decreasing by about one-third, while pulpwood production and prices remained relatively stable. The on-going impact was a dramatic sustained decrease in timber output.

Hurricanes, insect infestations, and other short term natural disturbances clearly impact timber output. Price fluctuations seem to result from longer term market impact. All of these combined made industrial roundwood output unpredictable and unstable.

Impacts From Changes In Number Of Timber Mills

Figure 2 shows the general trend of the number of timber mills from 1967 to 2009 in South Carolina. The total number of timber mills decreased 73% from 283 to 77. The reduction was mainly in the number of sawtimber and veneer mills (decreased by 84%); the number of other types of mills basically remained the same or slightly increased. The decline of the number of sawmills started right after World War II, mainly due to the sharp reduction in warfare demand and later due to developments in efficient sawing technology. Also, the decrease in public timber removals, especially softwood removals, seemed to contribute to the sawmill decline located near national forests. A simple regression analysis showed softwood timber removals from public timberland were strongly correlated with number of mills ($R^2=0.79$).

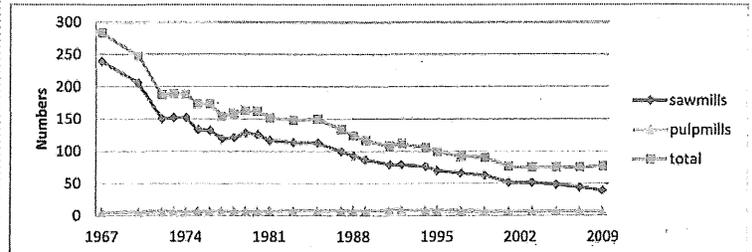


Figure 2. Number of mills in South Carolina, 1967-2009.

A simple regression analysis showed that while the number of total mills in South Carolina during this time period declined sharply, a negative relationship existed between the number of timber mills and the industrial roundwood output ($R^2=0.72$). There was an increase in mill capacity, especially pulpmill capacity, which kept timber production up as mills decreased. The dominance of pulpwood as a component of total roundwood output throughout the five decades was a primary reason why industrial roundwood output could maintain an upward trend while number of timber mills declined. From 1968 to 2009, pulpmill capacity in South Carolina increased by 39% and from 1990 to 2008 sawmill capacity increased 6%.

Impacts From Changes In Timberland Ownership

Changes in timberland ownership could also affect the timber output. Ownership information based on industrial roundwood output is difficult to obtain, so we utilized the more-readily available historical timber removals from FIA plot data as a substitute for timber output canvasses. Statistically, we found a positive relationship was exhibited between the timber removals and the industrial timber output. Figures 3 and 4 show that private timber removals occupied the major part of the total removals throughout the decades (accounting for 95% of total timber removals). Public timber removals, a small portion of total timber production, decreased by 22%, with the vast majority of that coming from the decline in the timber removals from national forests (down by 67%). Private timberlands experienced an increase in timber removals (69%). Within the private ownership classes, timber removals from corporate timberland, including TIMOs and REITs, offset the decrease from industrial timberland, mainly due to the transfer of ownership.

Timberland owned by the traditional vertically integrated forest product companies ended up being owned by more than the TIMOs and REITs; some went to conservation organizations, some to individuals, and some was sold outside of forestry for highest and best use purposes, such as development. Corporate owners (TIMOs, REITs, and other corporate owners) accounted for a significant proportion of total timber output.

This ownership transition between industrial timberland and corporate timberland could impact timber production in South Carolina by causing a change in timberland management objectives, increasing the rate of timberland parcelization, and, perhaps, changing ownership pattern over time. Forest industry had long-term ownership in timberland, while TIMOs usually plan for only 10-15 year ownership. Also, industry share-

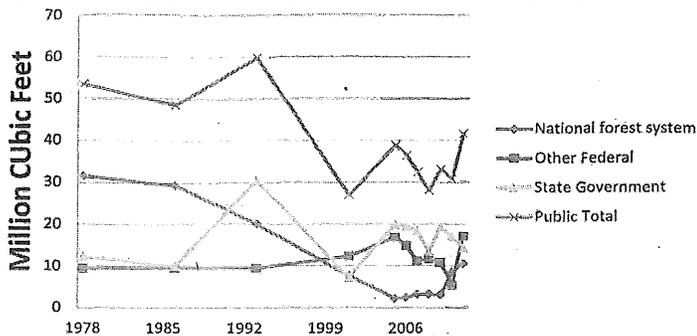


Figure 3. Average annual timber removals in SC from public timberlands, 1978-2011.

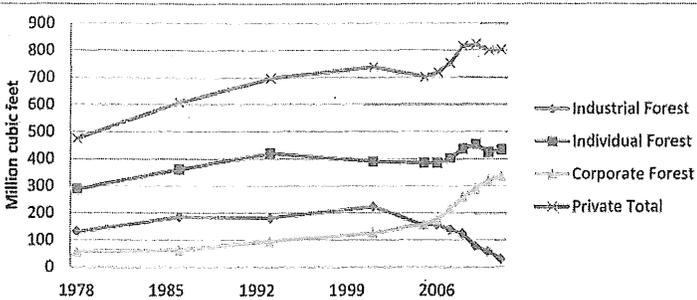


Figure 4. Annual average timber removals from private timberland in SC, 1978-2011.

holders often prefer annual dividends; TIMOs certainly are less likely to have to produce annual shareholder returns. Besides ownership, other long-term changes have the potential to impact timber output: societal preferences for more recreational land, urban sprawl and development, parcelization trends that could decrease timber production indirectly affecting forest owner management objectives on smaller and smaller forested tracts, and, finally, the increasing chances of wildfires as the urban wildland interface and may reduce available timberland inventories.

Conclusion

We've discussed typical short term impacts (Hurricane Hugo, southern pine beetle) and long term impacts (timber price fluctuation, changes in number of timber mills, transitions in timberland ownership) on timber production in South Carolina during the past five decades. Unlike the short term impacts which tended to have a negative impact on timber production, influences from long term impacts were much more complicated. Throughout the decade, the number of sawtimber mills declined, while mill capacity kept increasing and timber production (particularly softwood) maintained an upward trend. Inefficient mills closed, while mills with technological upgrades increased productivity. On the other hand, changes in the timberland ownership could have multiple impacts on timber production. Timberland management objectives are changing and rate of timberland parcelization increased as more industrial timberland converted to corporate- and individual-owned timberland. These will have some impact on available timber supply.

The changing timber industry and timberland environment is complex. Forest industry, timberland ownership, timberland investment objectives, timber harvesting output on public land (especially national forest land), and public forestry expectations have changed. Our discussion illustrated some impacts on timberland and timber output over the last five decades. It also provides insights into what the next five decades might hold.

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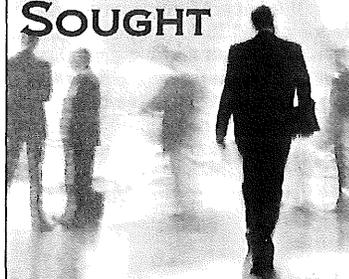
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