

# THE TIMBER SUPPLY SITUATION IN THE SOUTHEAST: IMPLICATIONS FOR INTENSIVE MANAGEMENT.

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Abstract.--For as long as we have been collecting inventory information, the southern timber inventory has been increasing. In the last decade, however, softwood removals in the South have exceeded growth. If current trends continue, hardwood removals will exceed growth in about a decade. If availability and operability constraints are considered, the supply situation looks even more serious. These structural changes in the supply situation, coupled with increasing demand on the resource have led to dramatic price increases. This paper analyzes past trends and assesses the future supply and price situation for the South. The potential effect of intensive management on both regional supply and wood cost will also be examined.

Keywords: timber supply, markets, prices, inventory.

## INTRODUCTION

Timber supply issues have been a focus of forestry research and policy since the days of Pinchot. While our assessments and measures of resource scarcity have become more sophisticated, the central question of resource availability and cost competitiveness remains (Cabbage et al. 1995). The purpose of this paper is to examine the current timber supply situation in the South. This is best understood by considering the social, historical, regional, and economic context in which southern timber markets operate.

The southern timber market is one important component of an integrated U.S. and global fiber market. The South is the dominant supplier of both hardwood and softwood fiber in the U.S. Private investment in forestry will be a key determining factor in the future of the resource. For the softwood resource, this means the productivity of pine plantations is a key variable. Addressing the complexities of recycling markets, international fiber sources, and end-use markets is beyond the scope of this paper. Most analyses of these issues, however, conclude that the demand for fiber in the South will increase. The focus here is on the historical and economic context of the timber supply. An understanding of some fundamental changes in past trends provides a basis for examining implications for the future of the resource in the face of increasing demand, and the possible role of intensive management in influencing that future.

The paper begins with a focus on historical inventory. The inventory of standing timber is not the same as the economic supply. Supply refers to that inventory which will be available for harvest at different prices. Regulations, landowner objectives, and accessibility are among the factors that create differences between inventory and supply. Inventory trends do provide insight into potential opportunities and problems.

Figure 1 shows the trends for softwood and hardwood growing stock levels in North Carolina. They indicate that, like the South as a whole, inventory has been steadily increasing over the last half century. In the last decade increases in inventory are smaller and for the South as a whole, softwood inventory have decreased slightly. Figures 2 and 3 show that this can be attributed to both an increase in harvest and reduced growth.

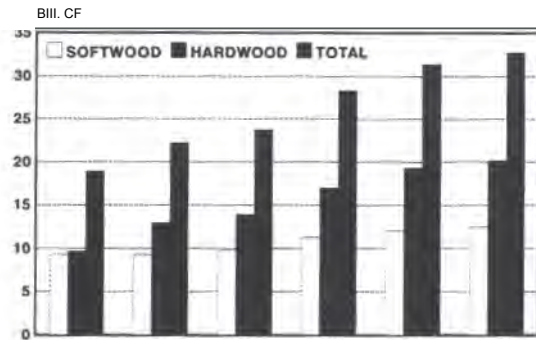


Figure 1. Growing stock volumes, NC

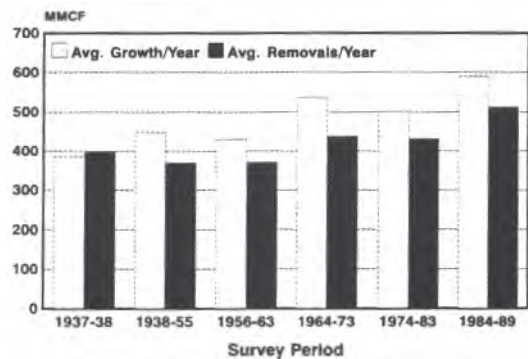


Figure 2. Softwoods net annual growth and removals, NC

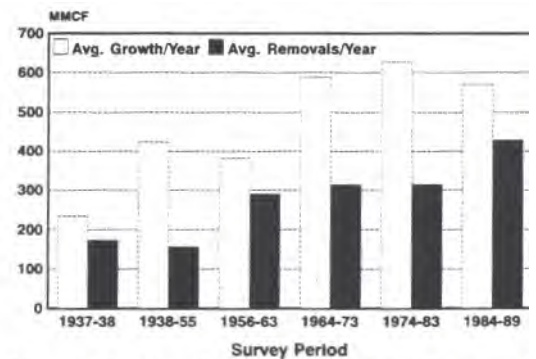


Figure 3. Hardwoods net annual growth and removals, NC

Harvest increasing faster than inventory also has economic implications as is shown in the stumpage prices for the Southeast in Figures 4 and 5. For the period since the mid 1980's softwood prices have doubled their rate of increase while hardwood prices have quadrupled as reported by Timber Mart South, Inc. Similar trends hold for sawtimber, though the prices don't start to increase until the early 1990's. Note that the price levels differ between states but the trends are similar. This is one result of a competitive market. As prices diverge between regions, harvest shifts to take advantage of lower prices until trends converge.

## MODELING

The assumption of competitive markets for the resource is the basis for the projections to be discussed below. The SouthEastern Regional Timber Supply (SERTS) model simulates supply as a function of stumpage price and inventory (Abt et al. 1993). Empirical estimates indicate that timber supply is price inelastic ie it takes a relatively large price increase to

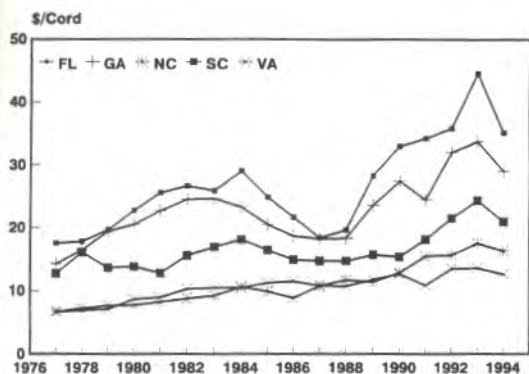


Figure 4. Softwood pulpwood prices

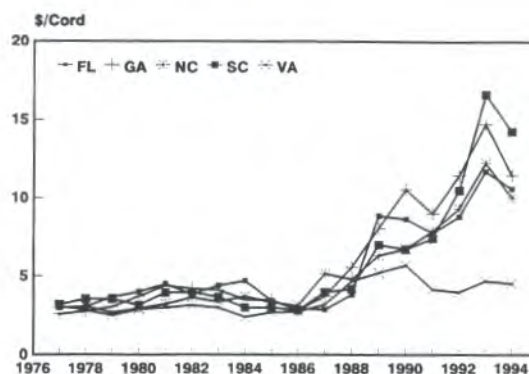


Figure 5. Hardwood pulpwood prices

yield an increase in harvest. These studies also indicate that inventory seems to have a proportionate affect on harvest, i.e. at a given price an increase in inventory leads to a proportionate increase in harvest. The range of elasticity estimates is large depending on the products, regions, and time periods being studied.

Other than the market elasticity estimates the model requires an assumption about future harvest levels. Based on this harvest, the model calculates the aggregate regional rice trend and also the shift in harvest between regions. The harvest projection is based on the 1993 Draft RPA trend for the South. Growth is calculated in the model based on the latest FIA survey information for each state. The configuration discussed here shows results from running the 21 survey units of the Southeast region as one market. This model also does not differentiate between products so the price and inventory trends relate to the aggregate growing stock.

### PROJECTIONS

Figures 6 and 7 show the inventory projections for softwood and hardwood growing stock respectively in the Southeast. As Figure 6 shows, softwood harvest currently exceeds growth and if harvest continues to increase as expected, inventory will continue to decline. For hardwoods, current growth exceeds harvest by a significant amount, but within the next decade the removals could exceed growth.

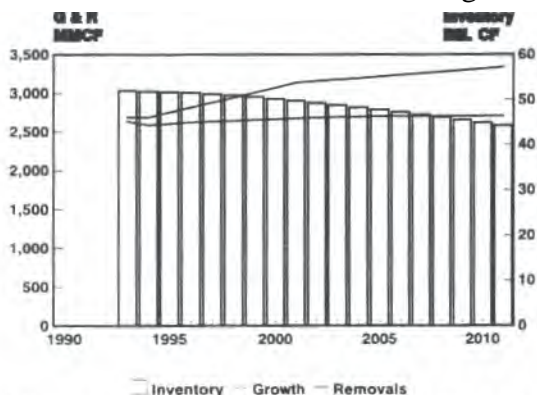


Figure 6. Softwood projections, Southeast

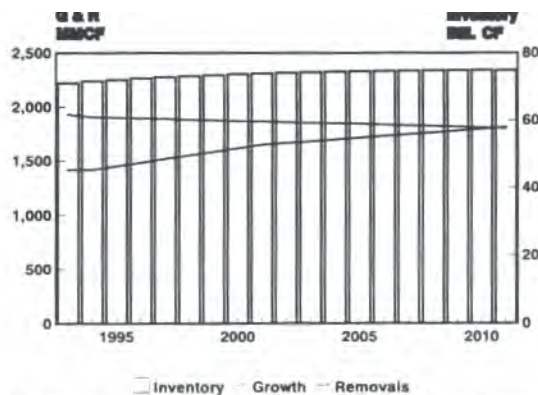


Figure 7. Hardwood projections, Southeast

Implicit in this forecast is a continuation of conversion pine plantations as shown in Figure 8. Productivity gains that might come from intensive management in these areas are expected to reduce the projected price trends, as explained below. These area trends by management type are based on those reported by the Forest Service South's Fourth Forest Report (U.S.D.A. Forest Service 1988).

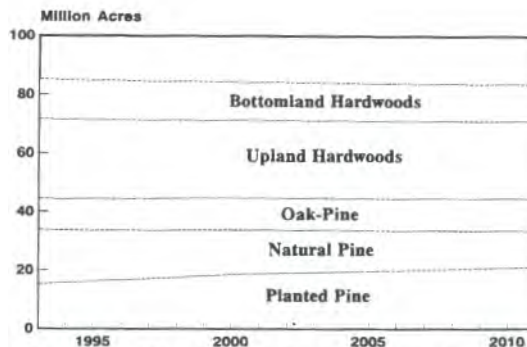


Figure 8. Southeast acreage trends

Over the projection period softwood harvest tends to shift to greater dependence on pine plantations in the coastal plain and the Atlantic Coast region as shown in Figures 9 through 11.

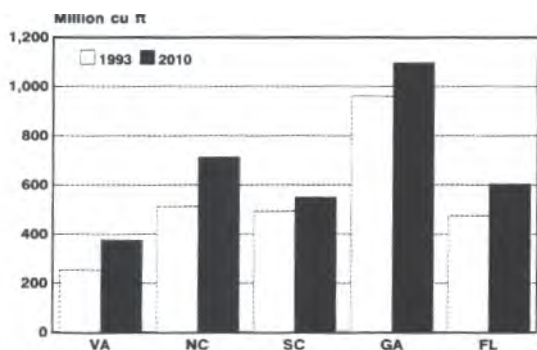


Figure 9. Projected distribution of softwood harvest

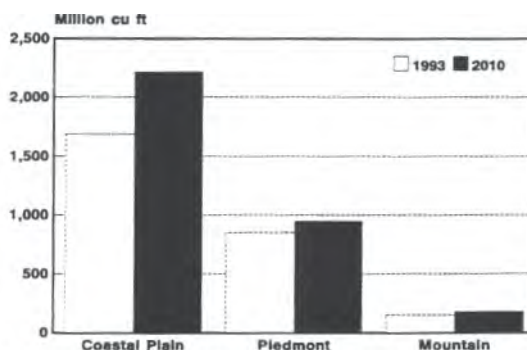


Figure 10. Projected softwood harvest by physiographic region

State projected harvest shifts appear to be larger in the states of Virginia and North Carolina. Our base projection suggests that the coastal plain region in the South might become a major source of future softwood harvest in the next fifteen years. A potentially significant implication of this projection is the major shift of harvest into pine plantations. If intensive management increases the productivity of these areas the economic consequences will be substantial, as explained below.

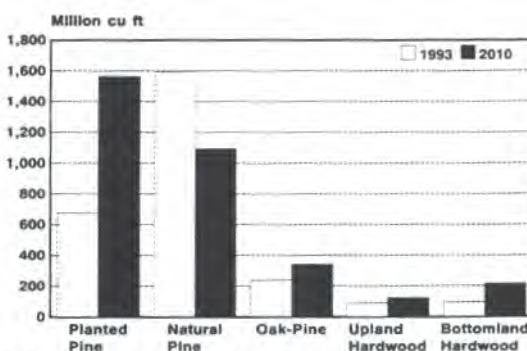


Figure 11. Softwood harvest by management type

For the region as a whole, increasing harvest with declining inventory implies large price increases over the next 15 years as shown in Figure 12. The effect of increasing growth rates on pine plantations is also shown. Though real prices increase in all scenarios, the potential impact of increased growth is significant. Estimates of productivity gains from intensive management (genetically improved stock, etc.) range widely. Our projection includes a base case that represents no gain, and incremental gains up to a 40% increase in growth. We also assumed that all of the pine plantations had the same growth boost. The results show a projected base softwood price over 220% higher than the projected price

increase with a 40% boosted growth. The significance of the economic consequences of intensive management depends on the realized productivity gains.

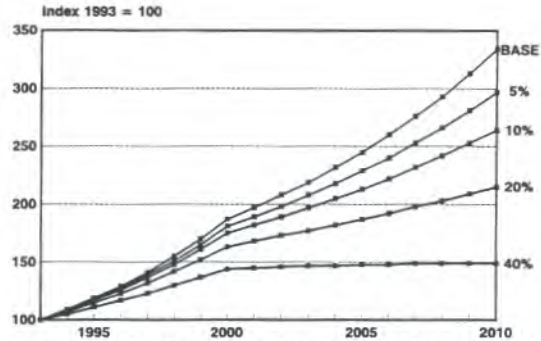


Figure 12. Softwood price with boosted growth in pine plantations.

In all of the above scenarios the total inventory was used to shift supply. A recent study by the North Carolina Forestry Association indicate that up to one fourth of the softwood inventory may not be available due to water, slope, or a variety of other accessibility problems (North Carolina Forestry Association 1993). Figure 13 shows inventory projections for North Carolina for the base case described above, the inventory decrease when acres are screened out (medium availability case), and the ameliorating impact of increasing growth 20 percent above current FIA levels in pine plantations. The lower line in the graph represents the impact on inventory from reduced availability screening. The projection shows that adding a 20% productivity gain to the reduced availability scenario reduces NC softwood inventory about half as much as the reduced availability screen and no productivity gain.

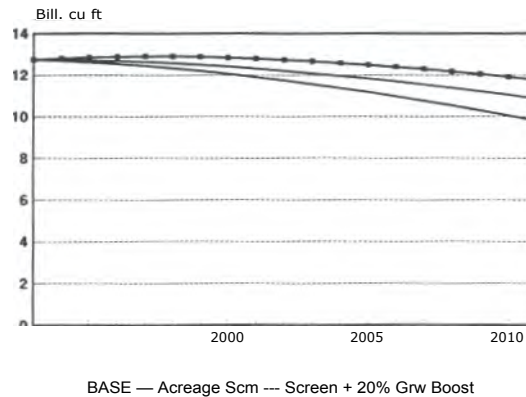


Figure 13. NC softwood inventory, screened acres and plantation growth boost.

While the above projections imply that wood costs will continue to increase, higher prices especially on higher faster growing trees make investment in intensive management profitable. Figure 14 shows the effect on the internal rate of return from various levels of volume and price increases.

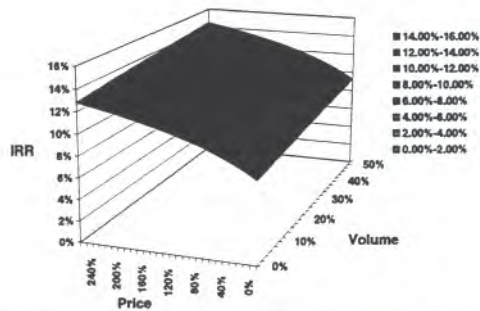


Figure 14. Relationship between price, volume, and the IRR. Cost=150, volume=40, price=25

In summary, these projections show that we may be entering a period of significant structural change in timber markets and investment. Increasing demand, less accessible supply, and the resulting higher prices imply a renewed interest in forest investment.

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