Will South's timber industry have dependable wood supply?

by HENRY SPELTER

Demand for southern pine is forecast to rise 25% in 20 years. Projections indicate that moderate increases in forest growth can meet it, but prices will rise

According to *Timber Mart South,* southern pine sawtimber stumpage prices increased by more than 150% in this decade. Recently some researchers have questioned whether timber supplies in the US South are adequate to meet projected demands, which are forecast to increase by about 25% over the next two decades. Given what we know about inventories and growth rates, what are the prospects for supplies to meet the needs of the southern pine industry?

Markets generally balance because prices stimulate or slacken offers and bids to maintain equilibrium. So the more appropriate question is, what are prospects for timber prices?

For an answer, we first need some idea of a sector's supply structure. We can't observe a timber supply curve, but we can approximate one from harvests and prices. To do this, we need a frame of reference by which to standardize harvests across regions. Production capacity provides such a benchmark for industry analysis. For forestry, the ultimate measure of capacity is the available inventory of timber itself, so calculating ratios of timber drain to timber inventory and contrasting them with prices might indicate the market's supply response.

We estimated softwood timber drain from log exports, pulpwood receipts and production of lumber and plywood. Products made from residues and not accounted for by pulpwood receipts, such as particleboard and medium-density fiberboard, were also counted. So was oriented strand board production where softwoods are the primary furnish.

Timber inventory data are gathered by the US Forest Service's Forest Inventory and Analysis FIA) program. FIA surveys are highly regarded for their quality and depth. We used these data for the most recently published years.

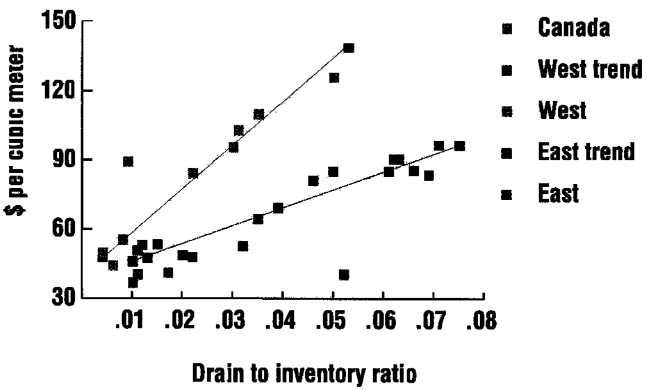
Plotting the ratios of drain-to-inventory against 1997 delivered sawtimber prices for various eastern states produces the general relationship shown in Fig. 1 (*page 52*). We use this relationship to translate projections of timber harvests and inventory into prices.

As a matter of interest, we derived similar data for western US states and Canadian provinces using prices of softwoods prevalent in those regions. A difference between eastern and western calculations is the omission of public timber from the inventory because of the limits on harvests from public forests.

The results show a similarly strong correspondence between western prices and drain/inventory ratios, but the relationship is steeper than its eastern counterpart, yielding higher prices for a given level of resource use. There is no clear relationship for Canada. But if we join coastal British Columbia with the US West and the other provinces (excluding the Maritimes) with the US East, we find that Canadian prices (in US dollars) are generally not out of line with those in states having similar resource types and utilization rates.

Of the US South's 216 million hectares of land (*1 hectare = 2.47 acres*), 81 million are forests considered available for timber production. About 29 million of these are primarily pine. In 1992, 20%

Fig. 1—Price (delivered) vs. drain-to-inventory ratio



of the pine land was classed as highly productive, 33% as moderately productive, while 40% was average or lower. Ownerships were divided among the forest industry (30%), public agencies (11%) and nonindustrial private forests (59%)

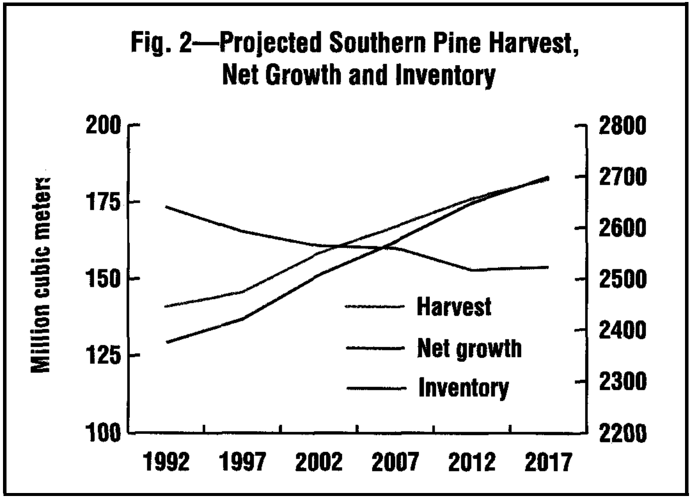
A further point of interest is stand size. One-third of the softwood area (12 million hectares) was classed as seedling/sapling size-less than 12.7 cm *(1 cm =. 0.4 inches)* in diameter., This partly reflects the roughly 1 million hectares of farmland converted to forest in the late 1980s under the Conservation Reserve Program.

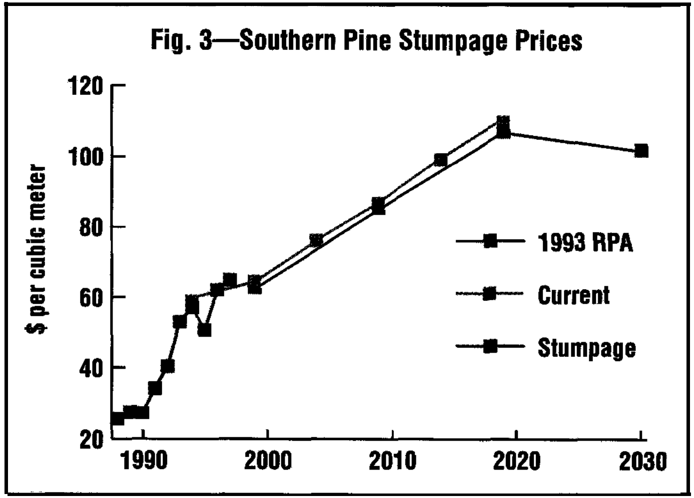
Besides site productivity, land's production potential depends on management intensity. Forest Service measurements of yields for various management levels range from minimal inputs to active management with site preparation, weed control and periodic fertilization.

Management regimes embodying low management intensity have been typical of forestry, and are still employed on many smaller nonindustrial private holders.

Higher management intensities are becoming the norm on industrial or other professionally managed forests. But even the most intensive option pales in comparison with results achievable from highly intensive cultivation, including annual fertilizer applications. This indicates the untapped potential that exists in forestry.

I applied these yields across the land base, making adjustments for site fertility and ownership. Further, I adjusted yields across the board to force the resulting 1992 aggregate inventory of pine roundwood (12.7 cm in diameter or larger) to match the FIA inventory value of about 2.65 billion cubic meters. Last, management mixes were chosen to produce net growth of 129 million cubic meters of pine, matching the 1992 FIA estimate, For perspective; I contrasted the resulting aggregate yield curve for the beginning of the 25-year projection with the yield for the lowest management intensity. This comparison results in a shortfall, reflecting real-world leakage from the idealized amounts caused





by such factors as incomplete stocking, fire breaks, roads, lakes and intrusion of non-pine species.

To portray probable future growth, I gradually introduced higher management intensities over time from the spectrum of yields on harvested and replanted lands. The same reduction factor used for the 1992 starting period was maintained. To meet projected demands, harvest schedules were set to allow cuts to increase by 30% relative to the 1992 starting point.

Despite the modest yield improvements—reflected in moderate stocking increases of 25%-35% in younger age classes and less than 10% in older groups—growth increases by 42%. The extra grow is due to the stand's rejuvenated age structure. To meet demands, which at first exceed growth, harvest on older stands must be accelerated. This raises the proportion of more vigorously growing younger stands. The downside, of course, is that older, bigger trees become scarcer.

Under these harvesting and growth regimes, the inventory of growing stock initially declines (*Fig. 2, this page*). But, by the end of the projection, growth catches up with removals and inventories stabilize.

To extract such harvests, owners would have to be enticed to accelerate cutting. Under this scenario, drain-inventory ratios increase through the 25-year projection from 0.052 to 0.072. The relationship derived above translates this to an increase in pine sawtimber stumpage prices of a third in constant 1997 dollars. Under the assumption of an underlying annual inflation rate of 2%, prices would be almost 90% higher in 2020 than they were in 1995.

Fig. 3 (*page 53*) shows these projections along with historical prices. For perspective, projections made for the 1993 EPA Timber Assessment Update, boosted for inflation, are shown through 2030. The two projections are almost identical through 2020. The RPA analysis shows a decline when-growth catches up with removals and inventories recover. I note that the RPA projections were made in the early 1990s when stumpage prices were considerably lower. Thus the projected increases were a significant departure from then-prevailing conditions. Events in the initial part of the forecast period have tended to validate the earlier analysis.

In these projections, the forestland area is assumed to recycle as areas are harvested.

A concern, though, is that increasing urbanization is replacing forests. An irony of the forestry business is that a key driver of its prosperity, homebuilding, also undermines its viability as forests are converted to subdivisions. Private timberlands have indeed decreased by more than 4% since 1952. But from 1987 to 1992, the trend reversed as 1 million hectares of farmland were converted to forest. One could argue that trends in farming support the future conversion of clayey southern lands to forests because more productive midwestern soils have a competitive advantage in grain growing ability

Field tests confirm that productivity of southern forests can be greatly increased. The inevitable lags between management actions and supply responses are due to the time it takes to grow trees. But with the rise in the value of timber, the motivation to step up management intensity has increased for all forest owners. As more areas come under intensive management, the resulting rise in productivity will increase supplies in the long-term in much the same way that agriculture output has been raised even from a shrinking land base.

In summary, the purpose of this exercise was to show what would happen if a projected 25% increase in demand on southern timber occurs over the next twenty years. The results show that such demands can be met if the market is willing to pay higher prices. Increasing the supply can be physically accomplished by accelerating harvests of existing stocks and moderately raising forest productivity. With these assumptions, growth initially lags behind removals, but eventually it catches up and inventories stabilize. More intensive management would dampen prices, but this would happen more in the long- than short-run. WT

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