PULPWOOD & CHIPS: The North American Pulp and Paper industry continues to experience challenges and changes much like most other business sectors of the hardwood industry. Marketing policies and the raw material supply chain of pulpwood and chips are being affected.

The issues surrounding supply for pulpwood and chips have a broad reach in affecting timber and log purchases, logging contractors and sawmill operations throughout the hardwood industry, particularly in the Southern region. Availability and pricing of timber and logs can be impacted by positive or negative factors surrounding the pulpwood and chip supply.

The success of many logging contractors depends on pulpwood markets. If pulpwood is not in demand or is impacted by negative price circumstances, logging contractors may not be able to operate. A resulting loss of qualified loggers can have a long term impact on overall timber and log supply. Fewer qualified loggers can mean that available timber and/or log sales are restricted or delayed by the harvesting process.

Pulpwood and chip supply issues also have a direct bearing on sawmill operations, not only due to the log availability but because the consistent sale and pricing of hardwood residue chips can be an integral part of their business.

Recognized as an authority on the marketing aspects and supply chain of the North American Pulp & Paper industry, ***MR. PETER J. INCE,*** USDA Forest Service, Forest Products Laboratory, Madison, Wisconsin has provided the following Guest Editorial on issues and observations facing this industry and the resulting effects on hardwood pulpwood and chips.

The Hardwood Chip Market in 2005:

By: Peter J. Ince, USDA Forest Service
Forest Products Laboratory: Madison, Wisconsin

Two forces emerged as highly visible drivers of hardwood chip markets in 2005: rising energy prices and catastrophic Gulf Coast hurricanes. But those forces also mask some underlying shifts in hardwood stumpage supply. Hurricane Katrina struck the Gulf Coast ai the end of August and caused catastrophic damage, with extensive damage to forests in Louisiana, Mississippi and Alabama, followed a month later by Hurricane Rita. The period since early 2004 already showed substantial energy price increases, which skewed prices upward for a range of commodity products including pulp, paper, and paperboard products as well as hardwood chips. However, over the same period, underlying shifts in hardwood stumpage markets suggested additional drivers of price trends for hardwood chips.

The law of supply and demand tells us that commodity price increases can arise from higher product demand or shortages of raw material supply, and also from price increases for other inputs, such as energy. Crude oil spot prices per barrel doubled from around $30 in early 2004 to over $60 by late August 2005 (***before*** the landfall of Hurricane Katrina in Louisiana). Figure 1 illustrates spot crude oil price trends, showing the significant runup of prices since early 2004.

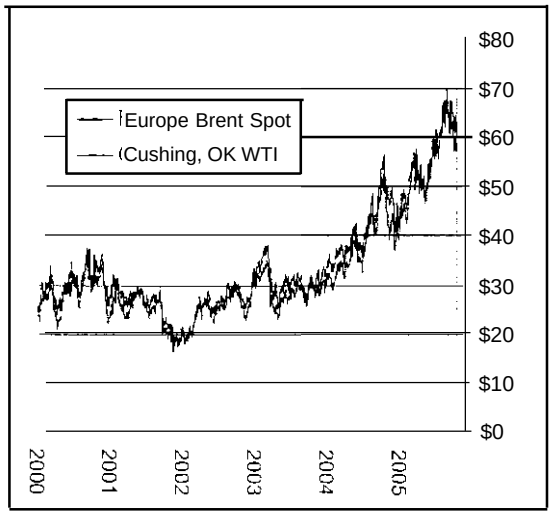

Fig. 1 — Daily spot market prices ($/barrel) for crude oil (FOB), 2000-2005, including Europe Brent spot and Cushing, OK WTI spot price (Energy Information Administration).

Paper and Paperboard Markets

Demand for paper and paperboard in the United States entered the fourth quarter of 2005 with growth falling below the more robust levels of a year earlier (output had increased by 4 percent in 2004). By the fourth quarter of 2005, total U.S. paper and paperboard production was running at an annual rate estimated between 1 and 2 percent below the previous year (with paperboard output dropping a bit less than paper). From an economic perspective, the drop in apparent consumption (and output) over the past year may be attributable in part to higher product prices, as producers experienced continued pressures from cost inflation in raw materials, energy, and freight, as well as costs related to the impact on Southern operations following the hurricanes in the third quarter.

Increased energy prices were a pervasive economic driver over the past year, putting pressure on prices and profits across a range of products and services, from timber harvesting and wood transportation to pulp and paper chemical supplies. For example, from the second half of 2004 into 2005, prices for paper coating materials (pigments, binders, and additives) increased substantially, driven by higher energy, chemical, and transportation costs. Coated paper prices also increased, posting year-over-year increases at upwards of 10 to 15 percent by October 2005 (*Pulp & Paper* Week), but U.S. coated paper shipments at the same time registered a year-over-year decline of over 2 Percent (*AF&PA*). Upward price trends for coated paper were clearly not attributable to higher consumption, but instead to higher costs for materials and energy. Passed on to pulp and paper producers and ultimately as surcharges to paper consumers.

Hardwood Chip Markets

In the context of rising energy and product prices, it becomes somewhat more challenging to fathom the behavior of prices for raw materials such as hardwood chips. In general, as of the third quarter of 2005, delivered hardwood chip prices in all U.S. regions were registering year-over-year price increases in the vicinity of 5 to 10 percent (*International Woodfiber Report*). At the same time, U.S. shipments of printing & writing paper (a leading indicator of demand for hardwood chips) were down by about 2 percent on a year-over-year basis (*AF&PA*), and thus the firmness of prices in hardwood chip markets over the past year is not directly attributable to higher demand for fiber in paper production. However, it could be suggested that higher energy prices and related increases in procurement and transport costs contributed over the past year to higher hardwood chip prices (on a delivered-to-mill basis), at least in the period leading up to the arrival of major hurricanes in September. But is energy the only story?

A reasonable hypothesis is that increases in delivered hardwood chip prices over the past year were mainly a result of higher harvest and transport costs (due to higher energy prices). However, an alternative hypotheses is that increases in hardwood chip prices stemmed also from other factors, such as shifts in timber supply. The hypothesis can be tested by comparing price trends for standing hardwood timber on the stump over the same period. Data show that average hardwood pulpwood stumpage prices in the U.S. South increased by 32 percent (from third quarter of 2004 to third quarter of 2005) according to Timber Mart-South (www.tmart-south.com/tmart/). On a price per ton basis, the year-over-year increase in hardwood pulpwood stumpage prices nearly matched the increase in delivered hardwood chip prices in the South (according to Timber Mart-South). Hardwood pulpwood stumpage prices reported by Louisiana, Mississippi, and Texas state agencies also show increases, at least in the first half of 2005, prior to arrival of the hurricanes, although prices have subsequently dropped. Thus. the increase over the past year in delivered hardwood chip prices is attributable to rising hardwood pulpwood stumpage prices as well as higher energy costs, at least in the South.

In forested areas heavily damaged by hurricanes (Katrina heavily impacted forests in Mississippi, Louisiana: and Alabama) pulpwood prices will likely be depressed for a period by excess wood supply from forest clean-up and salvage operations. Hurricane Katrina and Hurricane Rita (which arrived later in Texas) also interrupted U.S. supplies of oil and natural gas, leading to further energy market impacts that were expected to have lingering effects for many months. It was noted recently, for example, that there was a run-up in fuel costs in the Southeast following the recent

hurricanes, including both in-woods harvest and transportation costs (*Forest2Market, Southwide Timber Report,* 3rd Quarter 2005).

Factors Influencing Hardwood Timber Supply

Rising energy prices were important, but timber stumpage prices were also a source of inflationary pressure in hardwood chip markets over the past year. Hardwood and softwood pulpwood stumpage prices increased in the past year, but hardwood prices have been firmer and have generally increased more in recent years than softwood prices (the South-wide average year-over-year increase was 32 percent for hardwood pulpwood stumpage and 8 percent for pine as of the third quarter 2005, according to *Timber Mart-South*). The hardwood timber supply situation is clearly somewhat different than the softwood supply situation. A relative abundance of softwood timber, particularly in the U.S. South, has resulted from expansion in growth and output of managed softwood plantations in recent decades, notably Southern pine plantations in the South. In a departure from historical circumstances of past decades (when hardwood pulpwood was always cheaper than softwood), stumpage and delivered pulpwood prices for hardwood and softwood have reached near equivalency in recent years. Thus, hardwood timber supplies seem to be under the influence of supply constraints or limitations, as reflected in higher prices (hardwood sawtimber stumpage prices in the United States have also generally increased over the past decade).

Several supply-side factors can be identified as likely contributors to firmer hardwood pulpwood and chip prices in recent years. Most of those factors tend to be long-term supply-side resource conditions that will therefore likely contribute to firm prices for hardwood pulpwood for years to come, although markets will of course also experience cyclical and short-term adjustments. One obvious long-term factor mentioned already is that unlike the increasingly plantation-based softwood resource, hardwood fiber in the United States continues to be derived primarily from natural hardwood forests. Figure 2 shows historical trends in hardwood timber inventory and hardwood timber productivity for the U.S. North and South regions. The hardwood forest resources of the United States have experienced little gain in productivity and also appear to be maturing or peaking in terms of standing hardwood timber inventories.

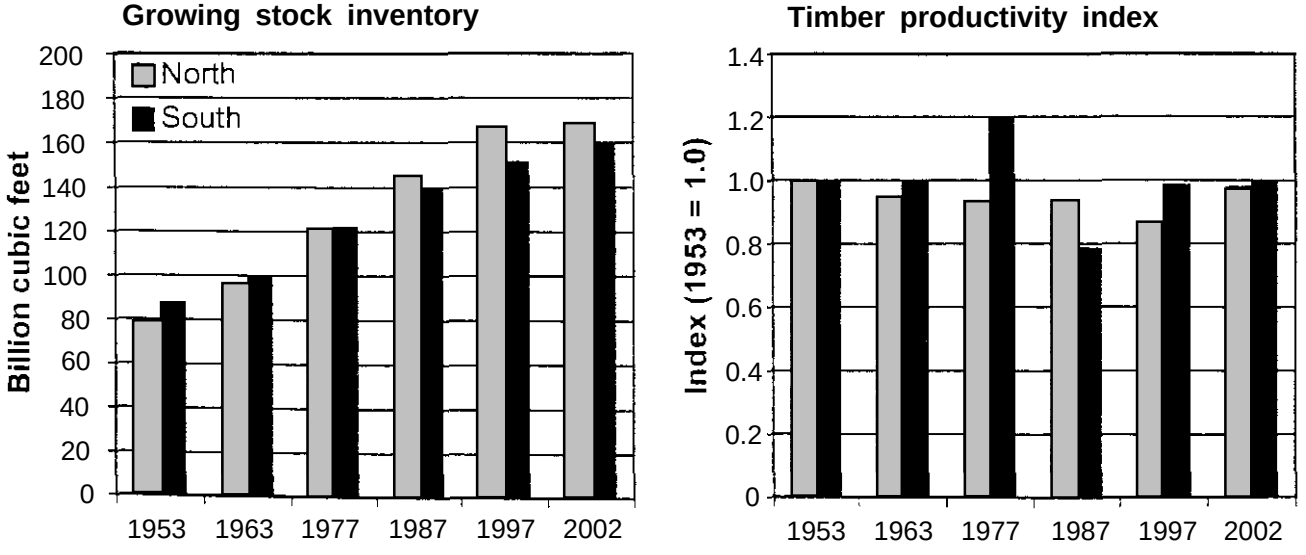

Figure 2.–U.S. hardwood timber inventory and hardwood timber productivity index (growth per unit of inventory) in eastern U.S. regions, 1953–2002 (USDA Forest Service, "Forest Resources of the United States, 2002", Gen. Tech. Report NC-GTR-241, 137).

As shown in Figure 2, total volumes of standing hardwood timber (timber inventories) are similar in the U.S. North (Northeast and North Central regions combined) and U.S. South (Southeast and South Central regions combined). In both cases, hardwood timber inventories have expanded over the past 50 years, but inventories now appear to be reaching a peak, particularly in the North (and Forest Service projections indicate the likelihood that hardwood inventories may also peak in the South within the next couple of decades). Meanwhile, an index of timber resource productivity (timber growth per unit volume of inventory, Figure 2) shows little or no historical gain in productivity for hardwood timber resources in the principal hardwood-growing eastern regions of the United States over the past 50 years. A peaking or maturing of hardwood timber inventories with little or no gain in hardwood timber productivity is likely to be a constraint on growth in hardwood fiber supply and hence also a factor contributing to firmer hardwood pulpwood and chip prices in the long run.

Other long-term factors that likely influence hardwood resource supply include shifting patterns of forest ownership, with more diversified forest landowner objectives, and an ongoing conversion of forested land into housing or commercial development. Globalization, consolidation, and restructuring in the U.S. forest product industry have led to the divestiture of tens of millions of acres of timberland by integrated forest product firms in recent years. Timberland investment management organizations (TIMOs) and real estate investment trusts (REITs) have acquired the bulk of timberlands sold by integrated forest product firms in recent years, focusing objectives on forest land as a real estate investment asset as well as a source of timber supply. TIMOs and REITs are mostly committed to active timber management, but the reality is that forest land obtains higher value in developed or residential uses, and thus in some cases forest assets are being sold to other owners, fragmented into smaller parcels, and developed.

Forest land owners are increasing in numbers, with smaller parcels of land and ubiquitous conversion of forest land into housing and commercial development, particularly in the eastern United States (where hardwood forests predominate). Studies have shown that decreases in timber production and active timber management occur when population densities in forested areas increase (see *"Forests on the Edge",* Gen. Tech. Report PNW-GTR-636). Thus, fragmentation of forest ownership and changing landowner objectives are likely contributing factors in limiting the available supply of hardwood timber and helping to maintain firm hardwood pulpwood and chip prices despite limited growth in hardwood fiber demand.

Summary

Energy prices increased significantly from early 2004 into 2005, with roughly a doubling in spot crude oil prices from early 2004 to the arrival of Hurricane Katrina in August of 2005. The major hurricanes (Katrina and later Rita) interrupted oil and natural gas energy resource and chemical supplies from the Gulf of Mexico regional port terminals and refineries, putting additional pressures on energy prices and related costs, such as transportation, wood procurement, and chemical costs. Thus, prices increased for paper products such as coated paper and for delivered hardwood chips, despite a modest year-over-year drop in paper and paperboard consumption and output. Such price increases were in part attributable to the rising costs of energy, transportation, and chemicals, but those rising costs tended to mask another driver of the upward price trend in hardwood chip markets, namely higher hardwood timber stumpage prices.

In the near term, hurricane clean-up and timber salvage operations will likely flood the market with excess wood fiber supplies for a period, particularly in states with extensive storm damage to forests, such as Louisiana, Mississippi, and Alabama. However, in the long run if hardwood fiber demand remains robust, fairly tight market conditions are likely to prevail for hardwood pulpwood and chips, even if energy prices subside, because of the supply-constraining long-run effects of factors such as limited gains in hardwood forest productivity, likely peaking of hardwood timber inventories, fragmentation of forest ownership, and continued forest land conversion to development in areas where hardwood forests predominate.

Ince, Peter, 2005. The hardwood chip market in 2005. Hardwood market report. 9th annual statistical analysis of the north American hardwood marketplace: 84-87.