

*Chapter 8*

## **STATUS AND TRENDS OF U.S. PULPWOOD MARKET**

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### **ABSTRACT**

Global trends in pulp, paper, and paperboard have deeply affected U.S. pulpwood markets since the late 1990s. Global trends included a shift of growth in paper and paperboard production from North America to Europe and Asia over the past decade. This trend was associated with generally slower growth in U.S. industrial production and displacement of growth in print media advertising expenditures by electronic media. Wood pulp consumption in the United States was also offset by increased paper recycling since the late 1980s. The net impact of these trends was a contraction of growth in U.S. pulpwood demand and generally declining real prices for pulpwood since the late 1990s. The current status and trends of the U.S. pulpwood market contrast sharply to decades prior to the 1990s, when growth in U.S. pulpwood demand was more robust. Future growth in U.S. pulpwood demand is likely to be relatively subdued for the near term. Total pulpwood demand for wood pulp, wood panel products, and export has potential to increase in the U.S. South but only gradually in the decades ahead, while likely to remain flat or declining in other U.S. regions. Biofuels and bioenergy represent emerging demands for wood biomass, and potential future demands for pulpwood, but sustained higher oil prices or further technical advances plus new capital investments will be needed before biofuels create strong competing demands for pulpwood. Pulpwood still has much higher value-added potential in production of wood pulp than in production of biofuels such as cellulosic ethanol. In the near future, consumption of pulpwood in the emerging cellulosic biofuel industry is likely to remain a small fraction of total U.S. pulpwood supply and demand, although long-range future wood use for biofuel could be potentially quite large, depending on future oil prices and technological developments. The current depressed status of the U.S. pulpwood market presents a near-term policy challenge in forest management, whether to provide incentives to sustain or expand

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pulpwood supply in current times of lean demand growth when there may be much larger foreseeable needs, but only in the long run.

**Keywords:** Pulp and paper products; Market outlook; Production and demand shifts; Trade.

## 1. INTRODUCTION—GLOBAL TRENDS IN PRODUCTION

A significant global shift of growth in paper and paperboard production has occurred since the late 1990s, as growth shifted toward Asia and Europe and away from North America. Figure 1 illustrates historical changes in the tonnage of paper and paperboard production during three recent decades in North America, Europe, and Asia, based on data from the Food and Agriculture Organization of the United Nations (2009). Over the three decades, combined output of North America, Europe, and Asia accounted steadily for over 90% of global paper and paperboard output (world output reached 383.6 million metric tons in 2007). In each of the three major regions, growth in output each decade typically amounted to tens of millions of tons, but during the most recent decade (1997–2007), growth in production abruptly receded in North America while continuing to expand in Europe and Asia. In the past decade, China was the world's most rapidly expanding producer and consumer of paper and paperboard, as production and consumption of paper and paperboard receded in the United States. U.S. output peaked in 1999, whereas output in Canada peaked in 2000. In 1997, North America produced about 20 million tons more than either Europe or Asia, but by 2007 production in Asia (at 142 million tons) was 40 million tons higher than in North America (at 102 million), while Europe (at 115 million tons) was 13 million tons higher.

The shift in the global distribution of growth affected trends in pulpwood prices, both globally and in the United States. Global expansion of pulp, paper, and paperboard production put record demand pressures on pulpwood prices globally in the past decade, whereas lower production levels in the United States resulted in an easing of demand pressures relative to the late 1990s. Average global pulpwood prices rose steadily from 2002 to 2008, reaching historical record levels in early 2008 according to Håkan Ekström, president of Wood Resources International (Wood Resources International 2008). On the other hand, in the United States, the nominal pulpwood price index peaked in the late 1990s (shortly before paper and paperboard production peaked), and the price index averaged about 20% below that peak throughout the current decade from 2000 to 2009 (U.S. Bureau of Labor Statistics 2008). Figure 2 shows the trend in the U.S. pulpwood price index since the late 1990s. The price index experienced some gains from 2002 to 2008, after bottoming out during the 2001–2002 economic recession, but the index never recovered to its 1998 peak, and the index was falling again amid the latest economic recession in 2008–2009.

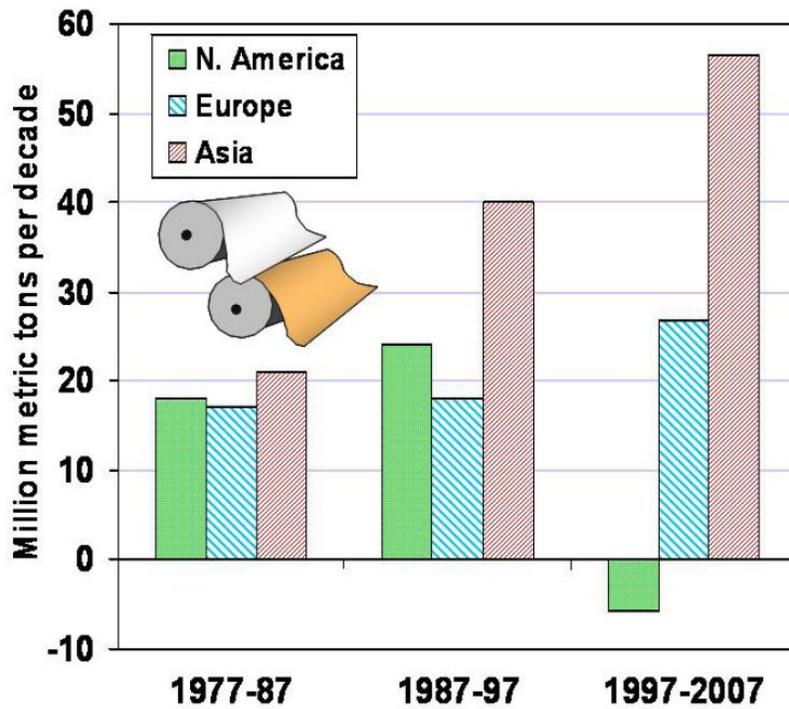


Figure 1. Changes in paper and paperboard production by decade for North America, Europe, and Asia, in millions of metric tons per decade (Food and Agriculture Organization of the United Nations 2009).

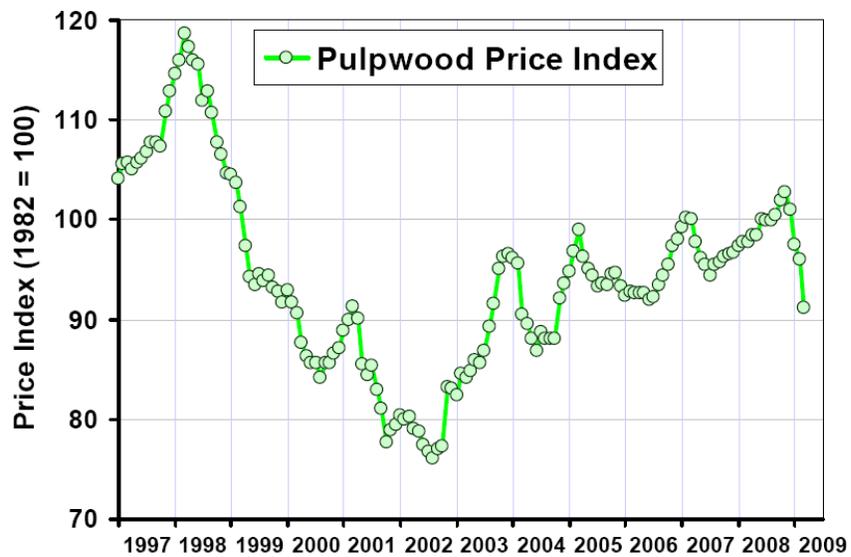


Figure 2. Trend in U.S. nominal price index for delivered pulpwood, monthly data, 1997–2009 (U.S. Bureau of Labor Statistics 2008).

## 2. SHIFTS IN U.S. DEMAND AND TRADE

United States paper and paperboard demands peaked nearly a decade ago, around 1999. Purchases of paper and paperboard in the United States peaked and then sharply declined in 2000–2001, along with U.S. industrial production. Figure 3 shows the monthly U.S. index of industrial production (U.S. Federal Reserve 2008a) and also annualized U.S. purchases of paper and paperboard each month (the sum of purchases for the latest 12 months). The chart shows that U.S. purchases of paper and paperboard were approaching 94 million metric tons per year at the end of 1999 and remained at an annualized rate of around 94 million tons into the first half of 2000. However, the rate of purchases rapidly declined in the second half of 2000 and through 2001, as U.S. industrial production also receded. The recession of 2000–2001 followed the Asian financial crisis of the late 1990s and coincided with a period when the exchange value of the U.S. dollar was increasing, boosting consumer goods imports and negatively affecting U.S. manufacturing output. The largest U.S. demands for paper and paperboard are in the areas of packaging and print advertising, both historically linked to industrial production, so U.S. demands for paper and paperboard generally declined as manufacturing of consumer goods shifted overseas.

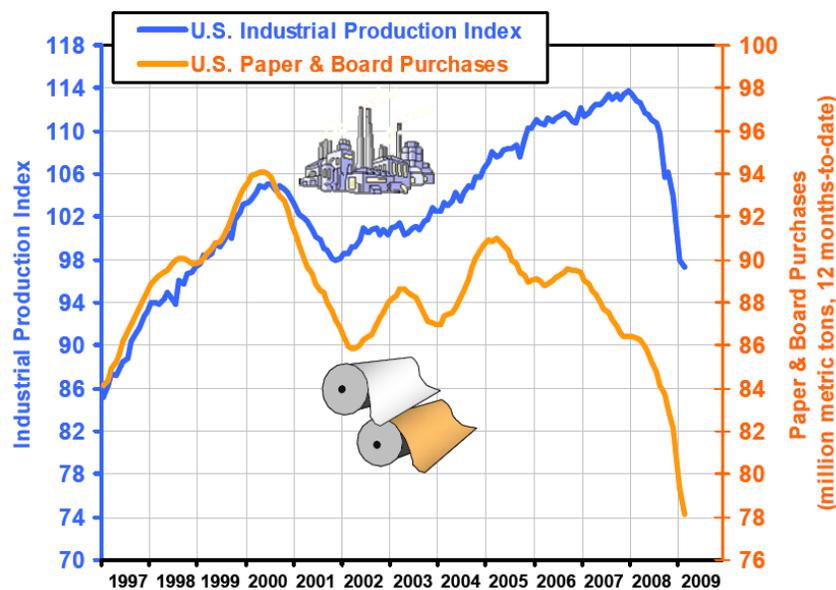


Figure 3. Monthly trends in U.S. industrial production index (U.S. Federal Reserve 2008a) and U.S. paper and paperboard purchases, 12-month-totals-to-date (American Forest & Paper Association 2008), 1997–2009.

Growth in U.S. industrial production resumed after the 2001 downturn, but average growth from 2001 to 2008 was *less than half* the average growth rate for industrial production in the latter half of the 20th century (U.S. Federal Reserve 2008a). The decline of growth in U.S. industrial output reflects expansion of manufactured goods imports, which have soared to record levels over the past decade. U.S. demands for newsprint and printing papers were also negatively affected as growth in advertising expenditures shifted from print media to electronic media. Slower growth in print advertising expenditures and other structural

changes in paper and paperboard use resulted in a gradual divergence over the past decade between the industrial production trend and purchases of paper and paperboard. The recession of 2008 resulted in further steep declines in U.S. industrial production and in purchases of paper and paperboard (figure 3), but this time the downturn was due to sharp declines in retail sales and consumer spending, which were adversely affected by a credit crisis and rising unemployment. U.S. retail sales, for example, dropped by 12.4% in just six months from June to December of 2008 (U.S. Census Bureau), by far the largest and most rapid decline in decades.

In contrast to declining domestic demands for paper and paperboard, the U.S. trade gap in pulp, paper, and paperboard widened for a period in the past decade but then narrowed as the trade-weighted value of the U.S. dollar peaked (in 2002) and then declined. As shown in figure 4, the U.S. trade gap in total tonnage of pulp, paper, and paperboard products (imports minus exports) peaked at around 8 million metric tons in 2002–2003. Rising imports and weaker domestic demands led to industry downsizing and consolidation. For example, according to industry sources, 98 U.S. paper mills were closed between 1998 and 2003 (American Forest & Paper Association 2005). Consolidation resulted in job losses, but the industry achieved higher average labor and capital productivity. Higher productivity and a weaker dollar improved the competitiveness of U.S. producers, and by 2008 the U.S. trade gap as measured by tonnage of pulp, paper, and paperboard products was finally closed (American Forest & Paper Association 2008). Although not shown in figure 4, the trade-weighted dollar index increased in early 2009, as the value of foreign currencies declined amid the global economic recession. A higher dollar could adversely affect the U.S. pulp, paper, and paperboard trade balance.

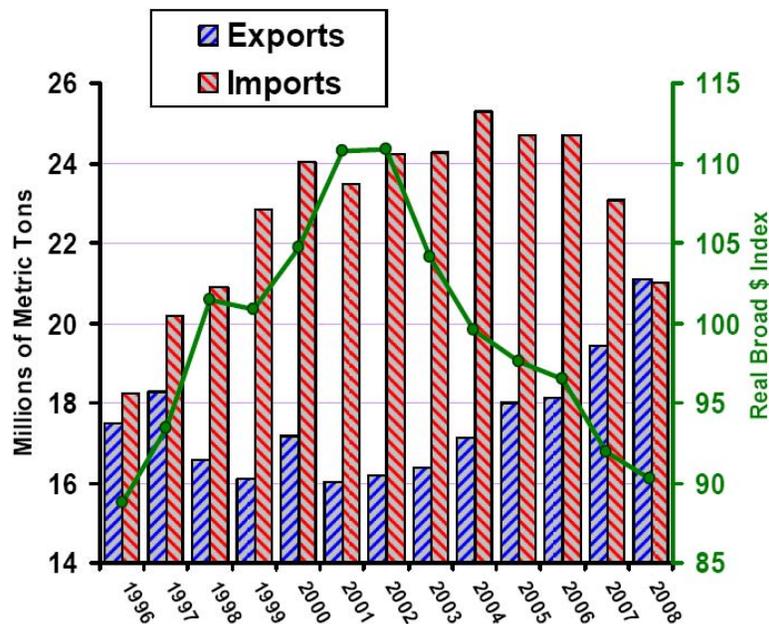


Figure 4. U.S. exports and imports of all pulp, paper, and paperboard products (American Forest & Paper Association 2007, 2008) and real broad trade-weighted dollar index (U.S. Federal Reserve 2008b), 1996–2008.

### 3. RELATIONSHIP TO GDP GROWTH

Another way to visualize the structural change that occurred in the past decade is to compare recent and historical growth trends for paper and paperboard to real Gross Domestic Product (GDP) trends. Throughout most of the 20th century growth in U.S. paper and paperboard consumption was fairly consistent with GDP growth. Figure 5 shows trends since 1975 in U.S. paper and paperboard apparent consumption along with U.S. real GDP. The two trends were not directly proportionate, as the average rate of growth in GDP was higher than the average growth rate for paper and paperboard consumption, but clearly both trends were growing in tandem up until 1999, at which point the trends diverged rather sharply. This divergence between GDP growth and U.S. consumption of paper and paperboard is a clear reflection of structural changes that have occurred in paper and paperboard demands, primarily a result of higher imports of manufactured goods and slower growth in U.S. industrial production and shifts in advertising expenditures from print media to electronic media.

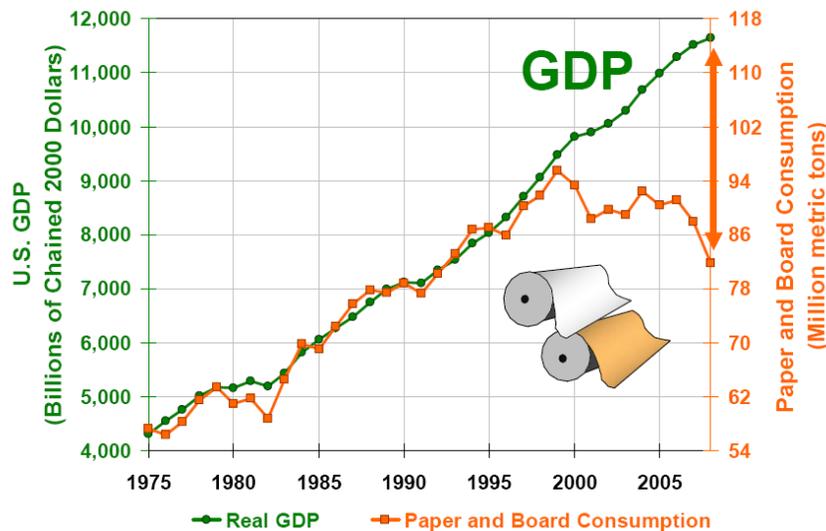


Figure 5. Divergence since 1999 between trends in U.S. real GDP (U.S. Bureau of Economic Analysis 2008) and U.S. paper and paperboard consumption (American Forest & Paper Association 2007, 2008).

The year 1999 was the historic peak year for U.S. paper and paperboard purchases, and from that point forward U.S. paper and paperboard consumption obviously diverged from real GDP. By 2008, the divergence from GDP suggests a loss of more than 30 million metric tons of U.S. market growth (figure 4) relative to demands that might have been reached if historical correlation between real GDP and consumption of paper and paperboard had continued from 1999 through the present decade.

The widening gap between U.S. paper and paperboard growth and GDP growth was offset in production only to a small extent by expansion of U.S. paper and paperboard exports and decreased imports in recent years. Most U.S. production still serves domestic markets, and exports are only a fraction of U.S. paper and paperboard production (about 15%), so U.S. paper and paperboard production also diverged from U.S. GDP growth, beginning around

1999, as shown in figure 6. Although increased exports have somewhat narrowed the gap between GDP and production trends, there was nevertheless a loss of well over 25 million metric tons of growth in U.S. production over the past decade relative to the historical GDP relationship.

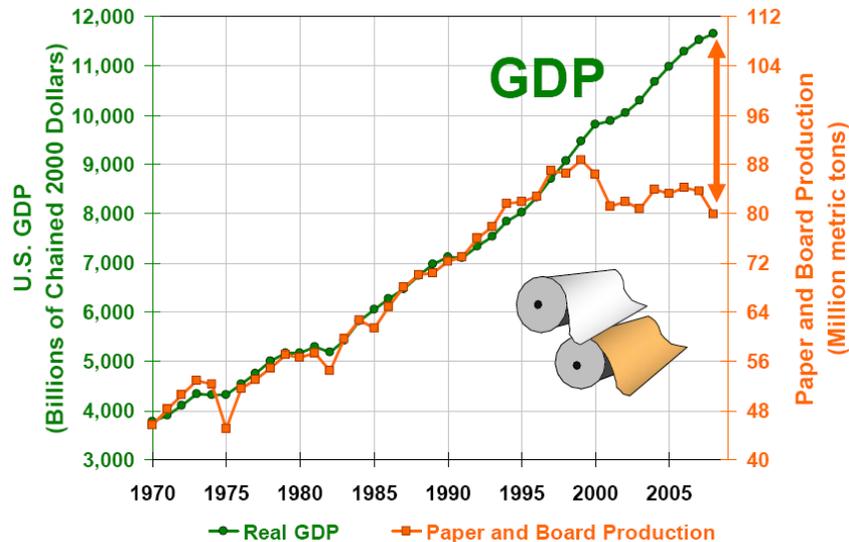


Figure 6. Divergence since 1999 between trends in U.S. real GDP (U.S. Bureau of Economic Analysis 2008) and U.S. paper and paperboard production (American Forest & Paper Association 2007, 2008).

Whether looking at U.S. paper and paperboard consumption (figure 5) or production (figure 6), it is obvious that there was a structural change in growth trends relative to overall economic growth or GDP, and the onset of the structural change was coincident with the Asian financial crisis of the late 1990s, the subsequent rise in value of the U.S. dollar, and consequent downturn in industrial production and recession of 2000–2001. Average historical growth rates prior to 1999 were well above 2% per year for U.S. production and consumption of paper and paperboard, but growth on average has been negligible from 2001 to 2008. The annual rate of growth in production from 2001 to 2008, for example, was just under 0% per year, obviously much less than the average annual growth rate in U.S. production from 1970 to 1999 (2.4% per year).

#### 4. IMPACT ON U.S. WOOD PULP PRODUCTION

The trends in U.S. paper and paperboard demand and output since the late 1990s, along with earlier increases in paper recycling, had profound impacts on the historic trend in U.S. wood pulp production. For most of the 20th century, U.S. wood pulp production was increasing, but production peaked in the mid-1990s (figure 7). Growth was offset by increased paper recycling from the late 1980s to 1990s. However, the utilization rate of recycled fiber in U.S. paper and paperboard products has leveled out since the late 1990s (American Forest & Paper Association 2007). Increased paper recovery for recycling since then has gone mostly for export (mainly to China). Thus, since the late 1990s, shifts in U.S.

wood pulp output were determined primarily by trends in U.S. paper and paperboard output. Therefore, not surprisingly, growth in U.S. wood pulp output has been fairly negligible since 2001, although there were some gains in exports relative to imports. Compared with growth rates of earlier decades in the 20th century, growth in pulpwood consumption at U.S. wood pulp mills in this century has been relatively subdued.

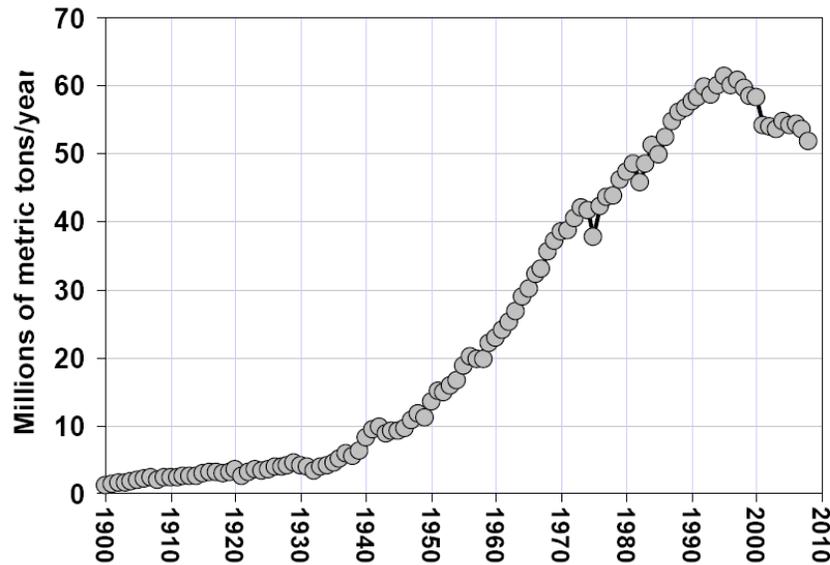


Figure 7. Annual U.S. wood pulp production, 1900–2008 (Department of Commerce, Forest Service, and American Forest & Paper Association 2007).

## 5. STATUS AND TRENDS OF PULPWOOD MARKET

Shifts in U.S. pulp, paper, and paperboard production appear to have deeply affected the status and trends of the U.S. pulpwood market, as reflected by substantially lower real prices for pulpwood since the late 1990s. Figure 8 shows real price indexes for delivered pulpwood in the United States, along with real price indexes for paper and paperboard (1982 = 100). Nominal price indexes as reported by the U.S. Bureau of Labor Statistics (2008) were deflated using the all-commodity producer price index. As shown in figure 8, the real price of pulpwood generally declined over the past 25 years, but there was a transitory period in the 1990s when the real price of pulpwood was on the increase. However, after 1998 the real price of pulpwood declined sharply as U.S. wood pulp production peaked and declined (figure 7). In the decade between 1998 and 2008, the real price of pulpwood in the United States dropped by 42%. Consolidation in the paper industry helped avoid a similar collapse in real paper and paperboard prices, but real prices for paper and paperboard have also been generally declining with weaker demand since the late 1990s. It can be noted that nominal U.S. paper and paperboard prices actually increased from 2002 to 2008, but that was partly attributable to rising energy prices and higher costs for fuel, transport, and chemicals. After adjusting for inflation, the real prices of paper and paperboard (relative to other commodities) were in fact declining, as shown in figure 8.

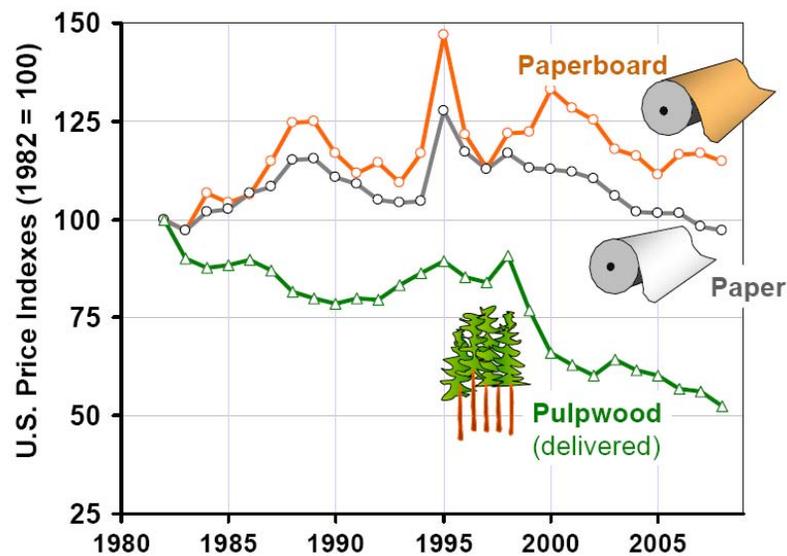


Figure 8. U.S. real price indexes for paper, paperboard, and pulpwood, 1982–2008 (BLS producer price indexes (U.S. Bureau of Labor Statistics 2008) deflated using all-commodity producer price index).

Several market implications are suggested by the real price trends. First, there is the implication that pulpwood supply in the United States generally increased more than demand over the past 25 years, as indicated by generally declining real prices, although there was a period from 1990 to 1997 when the real price trend was increasing, partly a result of reductions in National Forest timber harvests in the late 1980s and early 1990s. However, expansion in the area and productivity of Southern pine plantations no doubt contributed to overall expansion of U.S. pulpwood supply, as did other supply-enhancing developments such as improved pulpwood harvesting technology.

Second, demands for paper and paperboard were sufficient to sustain elevated real prices for paper and paperboard through the 1990s, but declining real prices imply that market demands have weakened for paper and paperboard since the late 1990s. It can be seen that real prices for paper and paperboard were generally increasing prior to the late 1990s, when paper and paperboard production and consumption were still increasing in line with GDP growth, but not since the late 1990s.

Lastly, an implication is that weaker paper and paperboard demands contributed to declines in the real price of pulpwood since the late 1990s. Although the nominal price index for delivered pulpwood actually increased in recent years with higher energy costs (which contributed to higher harvest and transport costs), the real price of pulpwood (after adjusting for inflation) has declined relative to other commodities.

## 6. PULPWOOD DEMAND OUTLOOK

Future pulpwood demands depend on projections of wood pulp production, which in turn depend on projections of paper and paperboard production, along with projections of other pulpwood demands such as demands for pulpwood in production of oriented strandboard

(OSB). Such projections for the United States as a whole have been developed in periodic Forest Service Resources Planning Act (RPA) assessment studies, most recently the 2005 RPA Timber Assessment Update (Haynes et al. 2007). Implications of structural changes in demand should be considered when viewing the RPA projections. In addition, an unprecedented temporary spike in global oil prices in 2005–2008 elevated policy concerns about future energy security and led to renewed interest in expansion of biomass energy and use of biomass (including wood) for biofuels. Such biofuels could introduce new competing demands for pulpwood in the future, although the timing and extent of that outcome is uncertain, because the global price of oil fell off abruptly from peak levels in the second half of 2008.

The 2005 RPA Update projected much lower growth rates for U.S. pulp, paper, and paperboard production in the decades ahead, more in line with growth rates observed since 2001. Figure 9 illustrates historical U.S. paper and paperboard production and wood pulp production and shows the RPA projections to 2030. Average annual growth in paper and paperboard production was 2.4% per year from 1970 to 1999 (the peak year for paper and paperboard production). Average annual growth in production from 2001 to 2030 was projected to be just 0.8% per year for paper and paperboard, and also for wood pulp, or only about one-third of the pre-1999 growth rate for paper and paperboard output.

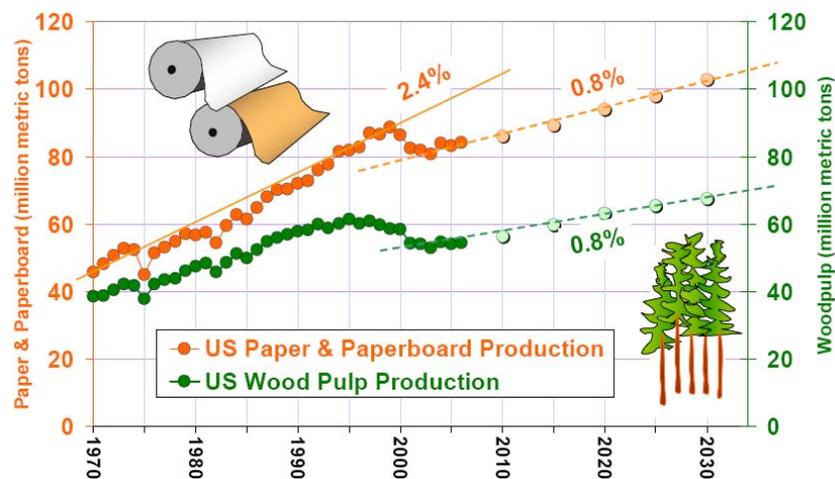


Figure 9. Annual U.S. production of paper and paperboard and wood pulp, 1970–2006 (American Forest & Paper Association 2007), with 2005 RPA projections, 2010–2030 (Haynes et al. 2007).

The 2005 RPA Update (Haynes et al. 2007) and earlier 2000 RPA Timber Assessment (Haynes 2003) recognized that global trends were resulting in much slower growth in U.S. paper and paperboard demands, wood pulp production, and corresponding pulpwood consumption than projected in earlier RPA assessment studies. The last RPA assessment to project a continuation of pre-1990s growth trends in U.S. pulpwood consumption was the 1989 RPA Timber Assessment (Haynes 1990). The 1993 RPA Update (Haynes et al. 1995) recognized that inroads made by increased paper recycling in the 1990s would result in somewhat lower levels of future pulpwood consumption. Figure 10 shows historical pulpwood receipts at U.S. wood pulp mills from 1960 to 2005 (Forest Resource Association

2006) and shows also for comparison projections of pulpwood receipts from the four most recent RPA timber assessments (1989, 1993, 2000, and 2005).

For pulpwood and timber markets, the implication of global change was a substantial lowering of projected U.S. pulpwood consumption relative to earlier RPA assessments, and hence the more recent RPA projections of U.S. pulpwood receipts at wood pulp mills are generally much lower than projections of earlier assessments, as shown in figure 10. Looking at the historical data, it is apparent that after decades of robust expansion, U.S. pulpwood receipts peaked in the mid-1990s (along with U.S. wood pulp production). Growth resumed after the 2000–2001 recession but at a much slower growth rate. According to the 2000 and 2005 RPA timber assessments, pulpwood receipts at wood pulp mills are projected to take decades to fully recover, even with steady GDP growth, as assumed in the RPA analyses.

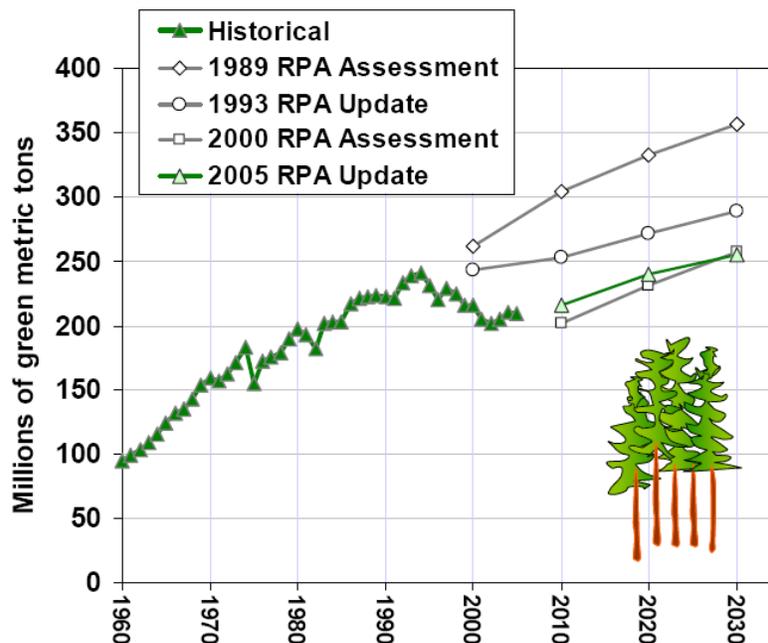


Figure 10. Annual U.S. pulpwood receipts at wood pulp mills, 1960–2005 (Forest Resource Association 2006) and projected receipts from last four RPA studies (Haynes 1990, Haynes et al. 1995, Haynes 2003, Haynes et al. 2007).

## 7. OTHER IMPLICATIONS

Several other implications for forestry and forest products are related to the status and trends of the U.S. pulpwood market. Those implications include industry divestiture of timberlands and resulting shifts in financial objectives of land management; potential expansion of pulpwood consumption in uses other than wood pulp, such as for other wood products or potentially for wood energy; and emergence of the U.S. South as the only U.S. region with much potential for growth in pulpwood supply or demand, but with generally much slower demand growth than prior to the 1990s.

Since the mid-1990s, coincident with receding U.S. pulpwood demand, there was substantial divestiture of timberland ownership in the United States by integrated forest product firms, primarily large pulp and paper companies. As recently as the early 1990s, the industry owned over 25 million hectares of U.S. timberland, but since then most of that timberland changed ownership and is no longer under direct control of forest product firms (Clutter et al. 2005, Hagen et al. 2005). Timberland investment organizations and real estate investment trusts now own the largest share of the former forest industry land. Their financial objectives reflect fiduciary responsibilities to an investor clientele, and in many cases they actively seek higher investment returns by conversion of forest land into so-called “higher and better uses” (such as residential development). Research has shown that expansion of housing development on America’s private forests has serious implications for the condition and management of affected private forests and the watersheds in which they occur (Stein et al. 2005).

The leading alternative use for pulpwood in the United States is oriented strandboard (OSB), a structural wood panel product made primarily from pulpwood. OSB output expanded rapidly since it was introduced commercially in the United States in 1979. OSB is used primarily in housing construction. Thus, North American OSB demand was affected by the recent downturn in U.S. housing construction (2006–2009), but higher U.S. exports of OSB helped avert a more significant collapse in U.S. production. U.S. OSB exports were boosted by generally lower OSB prices, a weaker U.S. dollar, and excess capacity. On the other hand, Canada lost roughly half of its OSB output just since 2006, as the housing slump and a strong Canadian dollar reduced demand for Canadian OSB exports. Figure 11 shows historical trends since 1999 in U.S. and Canadian OSB production.

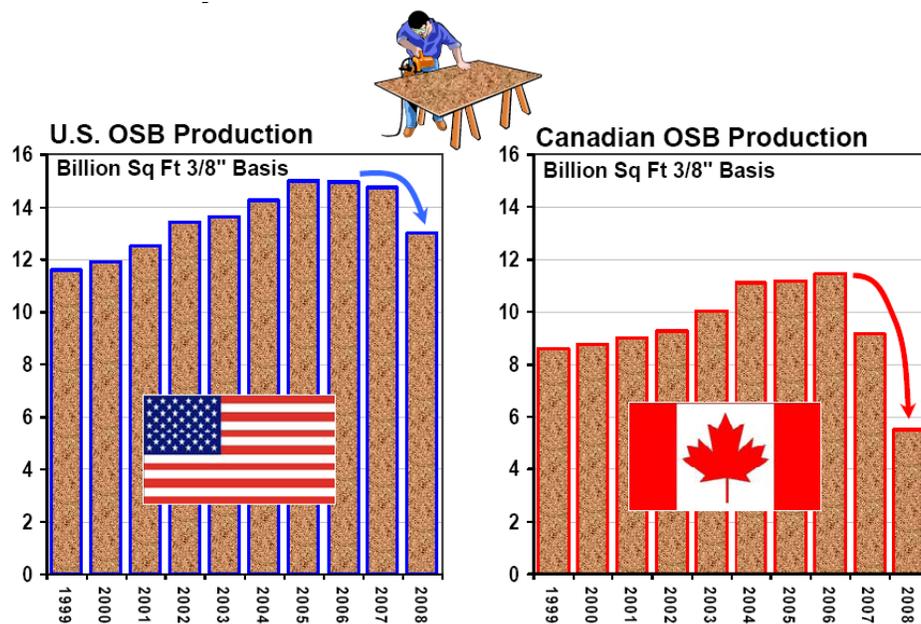


Figure 11. U.S. and Canadian OSB production, 1999–2008 (APA—The Engineered Wood Association 2008); 2008 estimate based on data through 3rd quarter.

According to the 2005 RPA Update, OSB is expected to be a growing element of pulpwood consumption in the decades ahead, but wood receipts at OSB mills will remain relatively small in comparison to wood receipts at wood pulp mills. Figure 12 shows historical data (to 2000) on pulpwood receipts along with RPA projections, including roundwood pulpwood and wood residue receipts at wood pulp mills and roundwood pulpwood receipts at OSB and other wood panel mills. The RPA projections should be viewed in light of the current economic recession, where the downturn in housing is affecting OSB demand and the downturn in industrial production is affecting U.S. output of paper, paperboard, and wood pulp. However, in any case, wood pulp is likely to remain the dominant use of pulpwood in the United States for the foreseeable future.

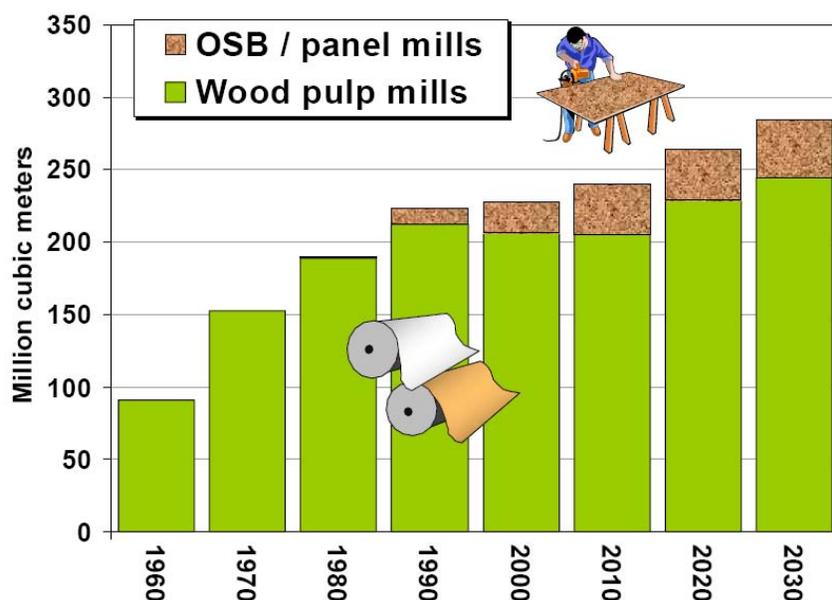


Figure 12. Historical and projected annual pulpwood receipts at U.S. wood pulp mills and at OSB and wood panel mills, 1960–2030 (Haynes et al. 2007).

According to the regional timber supply and demand analysis that was included in the 2005 RPA Timber Assessment Update, the U.S. South was the only U.S. region with much projected expansion of pulpwood supply or demand in the decades ahead, but with much slower overall growth in quantity than that experienced in the late 20th century. Figure 13 shows historical and projected total pulpwood supply quantity by U.S. region, including pulpwood roundwood and residue supplies to wood pulp mills, roundwood pulpwood supplies to OSB and wood panel mills, and pulpwood exports.

There are also some other noteworthy caveats about the current status and trends of the U.S. pulpwood market. The 2005 RPA projections were based on a view that expansion of electronic media in advertising would continue to offset future demand for print advertising, and thus despite projected expansion in U.S. population and GDP, the projections assumed declining demand for pulpwood in newsprint production and gradually declining demand for pulpwood in production of printing and writing paper. Projected expansion in pulpwood consumption is thus limited to wood pulp used for other paper and paperboard products

(chiefly packaging paper and paperboard, and tissue and sanitary paper products) and OSB products. Demands for many of those products, particularly OSB and packaging paper and paperboard, are being adversely affected by the current economic recession.

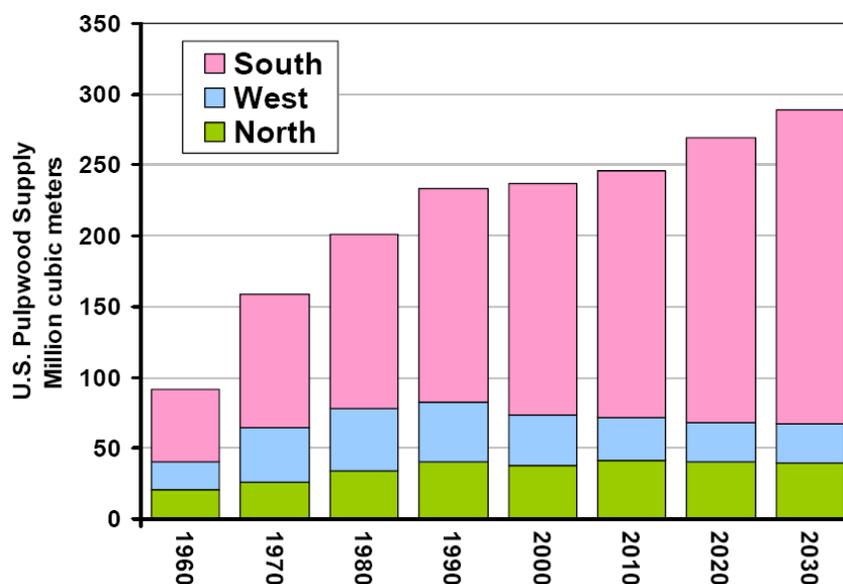


Figure 13. Historical and projected total annual pulpwood supply quantity by U.S. region, 1960–2030 (Haynes et al. 2007).

The 2005 RPA analysis included projections of conventional fuelwood demand but did not include projections of large-scale conversion of wood or biomass to biofuels. With the recent spike in oil prices and related policy responses, biofuels would appear to represent a potential emerging future demand for wood that could potentially compete for pulpwood. Nevertheless, technology for efficiently converting cellulosic materials such as wood into biofuels is yet to be demonstrated, and large-scale investment and R&D efforts would be needed to create competitive demands for pulpwood from biofuels. Also, the precipitous drop in oil price that occurred in the second half of 2008 suggests less impetus for rapid commercial expansion of biofuel production in the near term.

Based on recent average historical prices for various product alternatives, production of wood pulp still offers much higher revenue potential for pulpwood than does production of biofuels such as cellulosic ethanol. For example, in production of bleached kraft market pulp, the yield of pulp in dry tons per dry ton of pulpwood input is 45% to 50%, meaning that about 0.45 to 0.5 dry metric tons of wood pulp output can be produced per dry metric ton of pulpwood input. The market value of that pulp in 2007 was \$350 to \$440, with market pulp prices ranging from \$700 to \$800 per metric tonne air-dry (10% moisture). Cellulosic ethanol production from wood via hydrolysis and fermentation is generally thought to have a yield potential of 80 to 90 gallons per dry metric ton of wood input, and with ethanol prices recently around \$1.75 per gallon, the market value of the potential ethanol output from one metric ton of wood is \$140 to \$160 (or less than half the revenue from production of wood pulp). Taking into account total costs of production, the profit margins would be generally lower for conversion of pulpwood into ethanol than for production of wood pulp. Of course,

prices and costs vary over time for ethanol, wood pulp, and pulpwood. Higher future market prices for ethanol or other biofuels or improved production cost efficiency could increase competitiveness of biofuel production from wood. Also joint production of wood pulp and biofuels at integrated forest product biorefineries is a potentially more lucrative opportunity that is being explored by the forest industry.

The next RPA forest assessment (in 2010) will explore future timber supply and demand implications of scenarios that involve global expansion of wood use for energy. Although long-range future wood use for biofuel could be potentially quite large, for the next 5 to 10 years, consumption of pulpwood in the emerging biofuel industry is likely to remain just a small fraction of total U.S. pulpwood demand. This presents an economic and policy challenge in forest resource management, whether to sustain or expand pulpwood supplies in current times of relatively subdued timber demand when there may be much larger foreseeable needs, but only in the long run. This challenge must also be viewed in the context of ongoing structural changes in timberland ownership and shifts in land management objectives that are now being driven by other fiduciary interests (such as land development) in addition to timber production.

## 8. SUMMARY

Change occurred in the global distribution of growth for paper and paperboard production since the late 1990s, as growth shifted toward Asia and Europe and away from North America. U.S. paper and paperboard purchases peaked in 1999 and then sharply declined along with U.S. industrial production in 2000–2001. Comparatively modest growth was experienced from 2002 to 2007 (averaging less than 1% per year), and yet another downturn in industrial production and paper and paperboard demand occurred in 2007–2008 along with a more generalized global recession. The recent downturn was associated with declining retail sales and consumer spending.

Average historical growth rates before 1999 were well above 2% per year for U.S. production and consumption of paper and paperboard, but post-2001 growth rates have averaged 0% per year, and projected future growth rates are well below 1% per year. The status and trends of the U.S. pulpwood market are reflected by declining real prices for pulpwood in the United States over the past 25 years, and especially since the late 1990s, as pulpwood demand has receded while supply has expanded. The general implication is that growth in pulpwood supply has exceeded growth in demand. OSB has appeared as a growing demand for pulpwood in recent decades, but wood use at U.S. OSB mills remains relatively small compared with pulpwood consumption at wood pulp mills. The recent downturn in housing construction has also negatively affected OSB demand. On the positive side, improved competitiveness and a weaker U.S. dollar helped erase the deficit in net export tonnage of pulp, paper, and paperboard products, and OSB exports have also surged in the past couple years. According to the 2005 RPA Timber Assessment Update, the U.S. South is the only U.S. region with any projected expansion of pulpwood supply and demand in the decades ahead, but at a much slower overall growth rate than experienced in the late 20th century. The next RPA forest assessment (in 2010) will explore timber supply and demand implications of scenarios that involve large-scale future expansion of wood use for energy,

but for the next 5 to 10 years, consumption of pulpwood in the emerging biofuel industry is likely to remain a small fraction of total U.S. pulpwood demand. A challenge for forest management and policy is whether to sustain or expand pulpwood supplies in current times of relatively lean demand growth when there may be much larger foreseeable needs (such as for wood energy) but only in the long run.

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