

Recent Economic Downturn and Pulpwood Markets

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Abstract

The U.S. economy entered a period of slow growth in 2000, tilting toward economic recession in 2001, the first broad economic downturn in a decade. This recent downturn was associated with a recession in U.S. industrial output from 2000 through 2001. U.S. paper and paperboard production declined from 1999 to 2001, with total production 8% lower in 2001 than the historical peak in 1999. The recession in manufacturing and downturn in paper and paperboard were linked to an exceptionally strong U.S. dollar, which attracted a flood of imported goods, limited growth in exports, and contributed to an exceptionally large U.S. trade deficit. The slowdown in the overall U.S. economy offset domestic demand for paper and paperboard and compounded the trade effects of the strong dollar. Mill closures and capacity reductions helped forestall what might otherwise have been a complete market rout for paper and paperboard commodities, but wood pulp and pulpwood prices all but collapsed. A turnaround in the economy was widely anticipated and appeared to be underway in the first half of 2002, but the downturn has already had a fairly profound impact, particularly in terms of expectations for growth in the pulp and paper sector, and also for pulpwood markets of the South. Longer-term economic issues and implications for pulpwood markets are discussed in this paper.

Keywords: pulpwood, markets, pulp, paper.

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Introduction

The Forest Service 2001 RPA timber assessment provides a framework within which to consider longer-term implications of the recent economic downturn and trends in pulpwood markets. To a large extent, the 2001 timber assessment outlook for pulpwood markets reflected impacts of the recent downturn, and thus it captured some of the apparent implications for pulpwood markets. However, as is usually the case with long-range resource assessments, unfolding events may alter timber market conditions in the years ahead. Thus, forest economists should be cognizant of not only how market trends are evolving but also what are the key issues to analyze among the unfolding events that influence future market conditions.

The recent downturn and trends in pulpwood markets help elucidate some strategic economic issues for forestry and timber management in the South. Several issues surface in the general area of market trends and fiber needs, including (1) long-range paper and paperboard demand, (2) industry competitiveness and trade, and (3) emerging fiber supply options and needs. Trends and developments within these issue areas are likely to be key determinants of future pulpwood market trends as well as to influence the economics of intensified timber management and plantation forestry in the South. As such, these issue areas should be of general concern to Southern forest economists and perhaps present focal points of research, although identifying the forestry issues of critical importance in the South remains an open-ended question.

Recent downturn

The U.S. pulp and paper sector recently endured a fairly significant economic downturn. This downturn can be traced initially to a leveling out of paper and paperboard exports and expansion in U.S. paper and paperboard imports that began around 1997. This was associated initially with the Asian financial crisis, followed by a continued sharp upturn in the exchange value of the U.S. dollar relative to other world currencies, which dampened competitiveness of U.S. producers and attracted a flood of imports. Since 1999, domestic demand for paper and paperboard has also declined, a trend associated with a recession in U.S. industrial production and reduced demand for paper and paperboard in advertising, packaging, and other key markets.

Various broader short-run phenomena of the late 1990s contributed to the recent downturn in industrial production and corresponding downturn in the pulp and paper sector. A surge in consumer spending in the late 1990s led to increased credit purchases, higher debt, and a drop-off in household savings rates. In general, business investment, business growth, and business spending increased during this period, absorbing a flood of foreign investment capital attracted by the higher value of the U.S. dollar. However, the strong dollar and relatively weaker foreign currencies also attracted an influx of cheaper foreign commodities, resulting in a significant erosion of domestic prices and profits for industries that produce internationally traded commodities, such as steel and the pulp and paper sector. In 2000, weaker industrial profits, excess capacity, and higher short-term interest rates led to an abrupt downturn in U.S. industrial production, overall business investment, and business growth, contributing to a drop in stock market values, rising unemployment, and a generalized economic slowdown that lasted for more

than a year. For U.S. paper and paperboard producers, the recent downturn rivals the last major multi-year downturn that occurred during the energy crisis of the early 1970s.

The recent decline in domestic demand for paper and paperboard is illustrated in Figure 1 by the trends in monthly U.S. purchases of paper and paperboard since the mid-1990s. Figure 1 shows the 5-month moving average of monthly purchases, reported by the American Forest & Paper Association (AF&PA 2002). Domestic purchases increased with demand along an upward trend line in the late 1990s, a period of generally sustained economic growth and economic activity characterized by a 22% rise in U.S. gross domestic product (GDP) between 1995 and 2000. As Figure 1 indicates, U.S. purchases of paper and paperboard peaked in 1999 and then dropped rather significantly over the next 2 years. Domestic purchases of paper and paperboard in 2001 were more than 7% lower than purchases during the peak year of 1999, while domestic production was 8% lower. Although a broad but gradual U.S. economic upturn is widely anticipated in 2002, demand for paper and paperboard will likely be at least 12% below expectations of the late 1990s, relative to the trend of the late 1990s (Fig. 1).

The U.S. GDP actually rose by over 4% between 1999 and 2001, although GDP growth slowed significantly in 2001. Nevertheless, the drop in paper and paperboard production and consumption was a significant short-run departure from U.S. GDP growth trends and expectations of the late 1990s. This was primarily the result of declining industrial production, business investment, and business growth. The overall U.S. industrial production index fell by about -7%, from a peak in early 2000 to its recent low point at the end of 2001 (U.S. Federal Reserve). The higher GDP growth is explained by the fact that consumer spending, consumer confidence, and housing construction all remained relatively robust in recent years, providing buoyancy to the GDP despite the sharp drop in U.S. industrial production in 2000 and 2001.

The decline in U.S. production of containerboard and packaging grades in 2000 and 2001 mirrored the downturn in overall U.S. industrial production, but a somewhat larger decline in newsprint and printing paper production reflected a significant fall down in print advertising activity and lower demand for paper in business applications. The decline in paper demand for printing was greater than the decline in demand for paper and paperboard packaging because of the broad decline in advertising. The decline in advertising was linked to a broad downturn in business investment and business growth as well as the downturn in industrial production. Thus, in general, the recent downturn in U.S. paper and paperboard markets has been somewhat camouflaged by overall GDP growth trends and is understood as more closely linked to a sharp downturn in industrial production, business investment, business growth and advertising.

The more prolonged expansion in the U.S. trade deficit for paper and paperboard is illustrated in Figure 2, which shows annual exports and imports of paper and paperboard since 1996. The trade deficit in tonnage of paper and paperboard (net imports) expanded from 2.5 million short tons in 1997 to 6.7 million short tons in 2001 (AF&PA 2002). The expansion of the trade deficit in paper and paperboard corresponds to a period when the exchange value of the U.S. dollar rose, as did the overall U.S. trade deficit in manufactured goods.

With receding domestic consumption and production, coupled with weak exports and a flood of imports, capacity growth in the U.S. pulp and paper sector ground to a halt in recent years.

Whereas capacity growth averaged 2.5% per year from 1981 to 1997, capacity growth plummeted to less than 1% per year from 1998 to 2000, and in 2001, for the first time in many decades, capacity actually declined (AF&PA 2001). The downturn in capacity reflects the permanent closure of production capacity at dozens of mills, typically thought to be older or higher cost production facilities (Fig. 3). Employment at U.S. pulp, paper, and paperboard mills dropped by approximately 13,000 workers (from 206,000 to 193,000) between 1999 and 2001, while employment in the broader paper and allied products sector dropped by 48,000 from 1999 to the first quarter of 2002 (AF&PA 2002).

Anticipated recovery

The 2001 RPA timber assessment is the most recent Forest Service assessment of historical and projected trends in timber resources and forest product markets. The RPA timber assessment projects the market equilibrium for wood products decades into the future based on projected trends in population, GDP, timber supply, and wood product production capacity. The population projections are based on the U.S. Bureau of Census 1996 middle series projections of U.S. population. Growth in real GDP is projected to average 2.0% per year over the next 50 years, based on assumed levels of labor force participation, productivity growth, and other macroeconomic assumptions. Note that the projected gain in U.S. GDP over the next 50 years exceeds the gain over the past 50 years, but the annual rate of growth is slower (2% in the next 50 years versus more than 3% in the past 50 years) because of the higher current basis for GDP.

The 2001 RPA timber assessment took into account the recent downturn in paper and paperboard demand and capacity growth (Ince and Durbak 2002).¹ The overall U.S. industrial production index (reported by the Federal Reserve) shows a steady year-over-year decline in production from early 2000 into 2001, but an upturn since September 2001. Given projected growth in U.S. population and per capita GDP, the RPA timber assessment projects a recovery in production and consumption of pulp, paper, and paperboard products in the decades ahead. However, recovery is projected to be relatively slow or gradual in the near term.

Although many elements of the recent economic downturn are short run in nature and likely to be transitory, such as fluctuations in interest rates or the exceptionally high exchange value of the dollar, other elements have long-run implications for recovery, such as the decline in business investment in industrial capacity utilization. Since overall U.S. industrial capacity utilization fell to a low of less than 75% in 2001, it will take some time before capacity utilization can recover to the levels associated with profits and growth of the late 1990s, when capacity utilization was typically 83% to 84% for all U.S. industry. In addition, although the dollar weakened against foreign currencies in the first half of 2002, broad dollar indexes have a long way to go before falling below the historical average of recent decades.

¹ The 2001 RPA timber assessment is in process of publication. A draft of the text can be accessed via the RPA timber assessment web page at <http://www.fs.fed.us/pnw/sev/rpa/>. In addition, the findings of the 2001 timber assessment are highlighted in a series of articles published in the March 2002 issue of the Journal of Forestry (Society of American Foresters, Bethesda, MD).

Figure 4 illustrates long-term historical and projected trends in the tonnage of U.S. paper and paperboard production, consumption, and trade. With a projected upturn in domestic demand over the next and subsequent decades, U.S. production of paper and paperboard is projected to increase, but production is projected to recover slowly as imports continue to gain and exports remain weak. In addition, growth in per capita demand for paper and paperboard has been decelerating for decades, and consumption in tons per million dollars of real GDP has been declining since the 1950s. The patterns of decelerating demand are projected to continue into the future.

Thus, the recovery from the recent downturn is projected to be gradual, with a slow and gradual recovery in U.S. paper and paperboard capacity growth over the next decade. Wood pulp capacity growth is projected to remain subdued over the next decade, turning upward again after 2010 as recycled fiber rates of recovery and utilization gradually reach anticipated peak levels (at around 50% paper recovery for recycling). Positive capacity growth is projected to resume for paper and paperboard before 2010 and for wood pulp shortly thereafter, but growth rates in general are projected to be lower than those in the period of rapid capacity expansion that occurred from the 1960s to mid-1990s.

Recent comments of leading industry experts, announced trends in overseas capacity growth, and trends in domestic pulpwood markets reflect the nature of the recent downturn and anticipated gradual recovery. Speaking at the Paper Summit in March 2002, Rod Young of Resource Information Systems Incorporated (RISI) forecast a near-term rebound in U.S. paper and paperboard markets but said that “demand is predicted to remain well below the 1999 peak, even in 2003” (Pulp & Paper Week 2002). Speaking at the same event, Mr. Zhao Wei, Secretary General of the Chinese Paper Association, announced that China would be adding around 10 million metric tons of new paper and paperboard capacity over the next 5 years (suggesting that China will become more self-sufficient and less dependent on imports). Meanwhile, the *International Wood fiber Report* noted in February that residual pulpwood chip prices in the U.S. Northwest dropped to levels last seen in the mid-1960s (on a real dollar basis).

Product prices and pulpwood markets

Although economic recovery is widely anticipated in 2002 and 2003, the recent downturn has had a deep impact on U.S. pulp and paper product prices and industry profits and has contributed to a significant drop in Southern Pine pulpwood stumpage prices since the peak in 1998. For a period in 1999 and into 2000, the industry was able to hold prices up for paper and paperboard commodities through consolidation, downtime, and closures of mill capacity, but production steadily waned from the third quarter of 1999 onward. The downturn in U.S. industrial production, decline in domestic demand, erosion of export markets, and generalized global economic slowdown eventually overpowered the markets, and prices for paper and paperboard commodities generally declined through 2001. Industry-wide earnings in 2001 fell to about half their 2000 level (AF&PA 2002). Nationwide, pulpwood receipts at wood pulp mills peaked in the mid-1990s, in 1994 according to the Forest Resource Association (2001), and by 2001 pulpwood receipts at U.S. wood pulp mills were 15% lower than those at the historical peak.

A review of U.S. paper and paperboard product price trends in 2000 and 2001 revealed that prices for most commodities dropped by amounts equivalent to substantial fractions of total wood raw material input costs for such products (or in some cases by amounts that were probably greater than total cost of wood raw material inputs). The reported price of coated groundwood paper (No. 4), for example, was on a plateau in early 2000 but dropped \$135/ton by the end of 2001 (Pulp & Paper Week 2002). Similarly, the price of reprographic bond paper (20-lb) peaked in early 2000 but dropped by \$160/ton by January 2002, and the price of newsprint in eastern U.S. markets dropped \$160/ton and that of linerboard \$70/ton by March 2002 (Pulp & Paper Week 2002).

While U.S. producers of paper and paperboard were able to mitigate price impacts with downtime and capacity reductions, prices for market pulp virtually collapsed in 2001. Between the second half of 2000 and March 2002, the price of Southern bleached softwood kraft pulp dropped by \$270/ton and the price of bleached hardwood kraft pulp dropped by \$280/ton (Pulp & Paper Week 2002). The price declines for market pulp were roughly equivalent to double the average costs of delivered wood raw material input per ton of pulp (assuming roughly two cords pulpwood per ton bleached kraft pulp, and delivered Southern pulpwood prices of about \$60/cord in 2000). Given that the pulp and paper industry is by far the largest consumer of wood fiber in the U.S. economy and that costs of other major inputs (labor, energy, chemicals) did not decline appreciably during the same period, the recent drop in product prices and reduced demand levels were bound to have a negative impact on U.S. markets for wood fiber inputs.

Therefore, not surprisingly, delivered pulpwood and wastepaper prices also declined in 2000 and 2001. Southern pulpwood stumpage prices virtually collapsed. By 2001 Southern Pine pulpwood stumpage had dropped to about half the peak price levels of early 1998 (Timber Mart–South 2001). The recent trend in pulpwood markets reflects impacts of the downturn in pulp and paper, weakness in export markets since 1997, mill ownership consolidation and closures, and increased paper recycling, along with continued expansion in pulpwood supply from managed pine plantations. Figure 5 illustrates the trend in average South-wide real stumpage prices for Southern Pine pulpwood (deflated by Producer Price Index). In real prices, Southern Pine pulpwood stumpage has fallen near to historical lows, at levels last experienced in the late 1980s. The supply/demand analysis of the 2001 RPA timber assessment was reasonably on target in tracking the downturn since the mid-1990s in overall U.S. wood pulp production and pulpwood receipts at wood pulp mills as well as the downturn in Southern Pine stumpage prices since 1998. Figure 6 shows historical and projected trends in U.S. wood pulp production and pulpwood receipts at U.S. wood pulp mills. Note that both wood pulp production and pulpwood receipts at wood pulp mills peaked in the mid 1990s and both are declining, along with greater use of recycled fiber and inorganic fillers in papermaking. However, as rates of paper recycling are projected to plateau in the next decade, both wood pulp production and pulpwood receipts at wood pulp mills are projected to increase again in the decades ahead. Of course, this outlook depends also on the evolution of demand, trade, and fiber supply options.

The 2001 timber assessment projected that pulpwood stumpage prices would stabilize in the near term with a gradual economic recovery, but they would not increase appreciably for several decades into the future (Fig. 7). Indeed, with anticipated expansion in Southern Pine pulpwood supply from maturing plantations, pine stumpage prices were projected to further subside after

2015 before turning upward again after 2030. In any case, the 2001 RPA timber assessment did not project that pine pulpwood stumpage prices would return to peak levels of the late 1990s in the foreseeable future.

This outlook is somewhat of a departure from historical market trends, and it could change under various circumstances that may arise in the years ahead. Therefore, an important question in the economics of forestry (particularly in the South) is what are the circumstances under which this outlook could change significantly? Alternatively, what are the important economic issues that will affect the future outlook for pulpwood markets in the South and how will forest economists approach those issues? In addition to reflecting on the recent economic downturn and timber market trends, one purpose of this paper is to identify the key economic issues surrounding pulpwood markets in the South in the next decade.

Perspective on key issues

The recent economic downturn and latest RPA timber assessment serve to highlight several key issues related to future pulpwood markets, which include (1) long-range paper and paperboard demand, (2) industry competitiveness and trade, and (3) emerging fiber supply options and needs. Again, it should be emphasized that these are not the only issues of economic importance, and identification of other key issues should remain an open inquiry. However, given recent market trends and long-range projections, these are apparently important economic issue areas in relation to future trends in pulpwood markets. Each of these areas presents topics for consideration in forest economics research and in modeling or analysis of future timber market trends.

Paper and paperboard demand

Growth in total U.S. paper and paperboard demand has been decelerating in recent decades, with decelerating growth in per capita consumption and declining consumption per unit of real GDP. However, the demand trends vary by product category. Figure 8 shows historical and projected trends in per capita U.S. consumption of paper and paperboard for four principal product categories: newsprint, printing & writing paper, containerboard, and all other paper & board. Newsprint consumption per capita has been declining in the United States since the late 1980s, while consumption of containerboard and printing & writing paper grades has been generally increasing. Per capita consumption of all other paper and paperboard products (including packaging papers, tissue & sanitary paper, and other paperboard grades) has held relatively constant, but even this observation obscures the fact that consumption of products such as tissue & sanitary paper has increased while consumption of some packaging paper grades, such as kraft bag paper, has declined.

Moreover, not only do demand trends vary by product, but also there is significant regional variation in fiber input and production capacity by process type among various products (Ince et al. 2001). In some processes, wood fiber input includes relatively high proportions of virgin softwood fiber, such as in newsprint based on groundwood pulp or linerboard based on unbleached kraft pulp (within the containerboard category). Some printing & writing paper grades utilize high proportions of virgin hardwood fiber, while other product grades such as

tissue & sanitary paper utilize high proportions of recycled fiber. The point is that an understanding of the implications of trends in paper and paperboard demand for pulpwood markets requires an understanding of how demand trends (and fiber needs) vary among the principal product and process categories.

Figure 9 illustrates historical and projected U.S. paper and paperboard consumption in aggregate tonnage by principal commodity category. Despite that fact that growth in per capita consumption is decelerating, the aggregate tonnage of consumption is projected to increase along with rising population and rising per capita GDP. Insofar as projected growth in demand for pulpwood is concerned, two commodity categories dominate, containerboard and communication paper grades (including printing & writing papers). Within those categories are unique strategic issues that concern future domestic demand. For example, in the case of containerboard (used primarily for corrugated boxes and other shipping containers) the issues include the relationship of demand for boxes to overall GDP growth, the shifting structure of the box market (related to shifts in U.S. manufacturing, agriculture, etc.), and the potential for substitution by alternative shipping or packaging materials such as plastics. In the case of communication papers, key demand issues include substitution by electronic communication and information storage media and shifts in advertising expenditures from print to alternative advertising media such as television or the Internet.

In both cases, demand for communication paper and demand for containerboard, overall trends in the U.S. economy and in manufacturing sector competitiveness are important, since communication papers are used heavily for advertising and business applications, and paperboard containers are used to package and ship well over 90% of all goods that move in U.S. commerce. This broad relationship to manufacturing was shown by the connection between the recent decline in domestic paper and paperboard purchases and declines in U.S. industrial output and advertising activity. Since domestic demand for paper and paperboard is by far the largest element of U.S. demand for pulpwood, issues related to demand for paper and paperboard are likely to remain central economic issues for pulpwood markets. The recent economic downturn, the departure of trends in U.S. paper and paperboard purchases from GDP growth trends, and the drop in U.S. paper and paperboard growth expectations (Fig. 1) accentuate long-range issues in demand for pulpwood as well as issues in domestic demands for paper and paperboard.

Trade and competitiveness

Issues of international trade and competitiveness in pulp, paper, and paperboard are also important, accentuated by the exceptional increase in the exchange value of the U.S. dollar since 1996 and associated impacts on the U.S. balance of trade, prices, and industry profitability. The strength of the U.S. dollar is by no means the only challenging issue facing the U.S. pulp and paper industry. Other issues of competitiveness have been cited by industry commentators, such as higher taxes, higher costs of environmental compliance, overseas capacity expansion, declining domestic investment, and overseas tariffs on U.S. products. However, the exceptional strength of the U.S. dollar has become an overriding issue because of its large and generalized impact on competitiveness and profitability for U.S. producers.

As shown in Figure 10, the trade-weighted value of the U.S. dollar has increased significantly since 1996. The J.P. Morgan broad index, for example, had an average index value of 107 over the past 32 years (since 1970), but it climbed in recent years to a level above 120, a level exceeded previously for only a brief 30-month period in the mid-1980s. In February 2002 the index reached 130, more than 20 index points above the historical average and more than 30 index points above the 1996 index level. Thus, since 1996 the strong upturn in the value of the U.S. dollar has effectively placed added cost burdens of around 30% on U.S. producers selling in foreign markets while granting foreign producers roughly 30% currency advantages selling into the U.S. market.

Not surprisingly, the exceptional strength of the U.S. dollar in recent years contributed to an exceptional increase in the overall U.S. trade deficit. These correlated trends are illustrated in Figure 11, which compares the increase in the trade-weighted dollar index since 1996 with the trend in the U.S. monthly trade deficit on current accounts. The U.S. trade deficit in goods actually exceeded the total trade deficit by a fairly wide margin in recent years. Whereas the total annual U.S. trade deficit (goods and services, as shown in Fig. 11) averaged around \$350 billion ($\times 10^9$) in 2000 and 2001, the annual trade deficit in goods alone averaged approximately \$440 billion. The U.S. trade deficits in 2000 and 2001 were vastly higher than at any time in previous history, more than double the previous peak deficit in 1987 and more than ten times higher than trade deficits in the early 1990s.

Indeed, the U.S. trade deficit in paper and paperboard also widened dramatically since 1996 (Fig. 2), while paper and paperboard capacity continued to expand overseas (particularly in Europe and China) along with expansion globally in fiber plantations (particularly in China and elsewhere in Asia). The U.S. paper and paperboard trade outlook in the 2001 RPA timber assessment is based on an assumption that the U.S. dollar may weaken but not substantially, contributing to further expansion of imports and limited growth in exports (Fig. 4). This means that the dominant element of projected growth in pulpwood demand at U.S. wood pulp mills will be the projected growth in domestic demand for paper and paperboard, and not export demand. The assumption that the dollar will remain relatively strong is of course speculative, although it is characteristic of underlying macroeconomic conditions and also reflects recent trends. Any appreciable decline in the dollar value must be matched by corresponding gains in foreign currencies, likely to occur only if significant economic expansion occurs in foreign countries. Since economic growth has slowed in other leading economic regions of the world, including both Europe and Asia, it does not appear likely that overseas growth will outstrip U.S. economic growth in the near future, and thus only a modest decline in the dollar value would appear imminent.

Even if the dollar were to weaken in 2001 by 15% in the broad indexes, as some analysts have recently suggested, the dollar would still remain relatively strong (at around 1999 levels in relative index value). In any case, the significance of a strong dollar assumption for paper and paperboard trade is illustrated in Figure 12, which shows projections of total annual U.S. paper and paperboard imports and the share of imports from non-Canadian sources. Non-Canadian sources account for most projected growth in U.S. paper and paperboard imports, and most projected imports from non-Canadian sources consist of printing & writing paper. If U.S. industry competitiveness were boosted by a very substantial reduction in the value of the dollar

(25% or more), the projected trend in U.S. paper and paperboard imports might be reduced by 10 million tons or more, with an increase in exports and corresponding increase in domestic production.

However, prospects for restoring U.S. industry competitiveness in trade hinge not only on the dollar value but also on maintaining the efficiency and productivity of U.S. mills. The closure of dozens of mills in recent years may enhance U.S. industry competitiveness, if the surviving mills within the industry are generally more efficient (e.g., larger and more modern facilities). Maintaining mill efficiency and productivity also depends on continued capital investment within the industry. Unfortunately, the recent period of market volatility and weak profitability within the industry resulted in not only a significant decline in capacity growth but also an overall decline in capital investment within the industry. As shown in Figure 13, in recent years capital project spending within the U.S. pulp and paper industry dipped well below annual depreciation. In some mills, capital spending is reportedly less than half the annual depreciation. Given that equipment and production technology continues to advance within the industry, and that facility improvements and equipment upgrades are continuous needs in modern pulp and paper mills, the declining trend in capital spending is an ominous trend for U.S. industry competitiveness in the years ahead.

The readily apparent linkages among trade, competitiveness, the broader U.S. pulp and paper sector, and Southern pulpwood markets should serve as an appeal to forest economists for further research into competitiveness issues based on trade theory. The recent trends in the U.S. pulp and paper sector provide a rich empirical basis for exploring some fundamental issues related to competitiveness and trade theory, but attention should be primarily focused on competitiveness of the industry in the U.S. South.

For example, one of the neoclassical and perhaps most commonly cited economic models in trade theory is the so-called Heckscher–Ohlin model, in which competitive advantage is said to derive from abundant input factor or resource endowments in industries that make intensive use of those inputs or resources.¹ The Heckscher–Ohlin theorem asserts that countries will tend to export goods that use their most abundant factors of production (or their most abundant resources) relatively intensively.

The U.S. pulp and paper industry, by far the largest in the world, makes very intensive use of wood resources. More than 99% of fiber input for the production of pulp and paper in the United States is virgin or recycled wood fiber. In addition, the United States is regarded as having a fairly abundant endowment of wood fiber resources (particularly pine pulpwood in the South and recycled fiber nationwide). However, some other countries, such as Canada, have even larger per-capita forest resource endowments. It is natural for forest economists to focus on the

¹ The Heckscher–Ohlin model was originally formulated by Eli Heckscher (1919), extended by Bertil Ohlin (1933), and later refined mathematically by Paul Samuelson (1948, 1949, 1953). The simplest exposition of the Heckscher–Ohlin model involves two countries and two goods, each with different input requirements varying along a production isoquant curve. This model can be distinguished from the more simple and classical economic model of trade introduced by David Ricardo (1772–1823), in which patterns of trade are explained only in terms of comparative advantage, assuming perfect competition and a single factor of production with input requirements that do not vary within a country but differ from one country to another.

endowment of wood resources (or the abundance of wood) as an indicator of comparative advantage following the Hecksher–Ohlinmodel or other neoclassical trade models. In fact, the broader recognition of multiple inputs along a production isoquant is also appropriate, as in the Hecksher–Ohlinmodel, because the pulp and paper sector uses a broad array of inputs, including energy, labor, chemicals, capital, and recycled fiber, all of which are important cost elements. Furthermore, cost competitiveness and the variable input requirements themselves are influenced in the long run by capital investment within the industry (at home and abroad).

The United States has been recognized as having an “import competing” forest product sector (Bonnefoi and Buongiorno 1990), which means that it is an industry that competes with imports, chiefly imports from Canada but increasingly imports from other world regions as well. For decades the U.S. pulp and paper sector has imported a larger tonnage of products each year than it has exported, and trends of recent years show imports of paper and paperboard rising relative to exports (Fig. 2). Nevertheless, the South has had comparative advantages in timber productivity and in development and capital investment in forest industry relative to other U.S. regions (Prestemon and Buongiorno 1997). Thus, although U.S. trade and competitiveness in pulp and paper have suffered in recent years (particularly under the weight of the strong dollar), the South retains the best prospects among U.S. regions for growth and recovery in the future.

As the world emerges from the recent downturn, and as U.S. dollar exchange rates come down from their recent peak levels, the central questions of U.S. competitiveness and trade in pulp and paper will revolve not so much around the competitive position of the United States as a whole, or the U.S. pulp and paper industry as a whole, but rather around the competitiveness of the pulp and paper industry in the South (vis à vis other regions and the world as a whole). In summary, economic issues of competitiveness and trade have been accentuated by an exceptional gain in the exchange value of the U.S. dollar, placing U.S. manufacturers at a comparative disadvantage and contributing to overall weakness in U.S. manufacturing and a bulging U.S. trade deficit. Loss of growth in paper and paperboard export markets since 1996, followed by a recession in domestic demand since 1999, has resulted in weak and volatile industry profitability, declining capital investment, and consolidation and closure of many older mills. Meanwhile, capacity expansion has continued overseas (particularly in China and Europe) along with continued expansion in fiber plantations globally.

Emerging fiber supply options and needs

Throughout much of the 20th century, timber resource and fiber supply issues were often dominated by concern about resource scarcity or limits on available supply. Such concerns were so prominent until the 1990s (e.g., economic issues concerning reduced harvest of old-growth timber in the West) that many foresters may find it impossible to conceptualize a future in which scarcity, limited resource supply, or rising prices may not be dominant concerns. Nevertheless, that is the sort of future projected in the 2001 RPA timber assessment. According to the RPA assessment, the future of wood fiber supply and demand will be characterized by resource adequacy, dominated by an expanding output of wood fiber from highly productive plantations that will occupy a relatively small percentage of forested land in the United States. Productivity gains will afford more abundant supply and lower cost of wood inputs, and indeed higher productivity will be needed for the industry to remain competitive in fiber supply. Already, part

of the reason why Southern Pine pulpwood stumpage prices have dropped in recent years (Fig. 5) is the expansion in fiber supply from managed pine plantations.

In the 2001 RPA timber assessment, Southern Pine pulpwood supply is projected to continue to expand over the next 50 years, with gradual expansion in pine plantations and more intensified timber management. The area of managed pine plantations in the U.S. South is projected to increase from the mid-1990s estimate of 24.5 million acres (10 million hectares) to 39.6 million acres (16 million hectares) by 2050. The projected expansion in Southern Pine plantation area in the 2001 RPA timber assessment is about forty percent less than the expansion of plantation area projected in the recent Southern Forest Resources Assessment, reflecting the impact of the recent economic downturn and slower projected growth in pulpwood demand. The projected expansion in timber output from plantations is nevertheless sufficient to supply most projected growth in U.S. wood fiber needs, while managed softwood plantations will occupy just a small fraction of total timberland area (20% in the South and 9% nationwide by 2050).

Nationwide, the increase in annual timber harvest on managed softwood plantations over the next 50 years (mostly in the South) is projected to just exceed projected growth in nationwide timber harvest from all sources (Fig. 14). Total hardwood and softwood timber harvest on the 91% of other timberland area (apart from managed plantations) is projected to decline slightly. Furthermore, timberland (or land area that can be potentially harvested) accounts for only about two-thirds of all forested land area in the United States; the remainder is in parks, monuments, wilderness areas, or other protected natural areas and is off limits or closed to harvesting. Thus, RPA projections indicate a future with expanding timber inventories nationwide and relatively abundant forest resources and wood fiber supplies, with no net increase in nationwide harvest intensity on the vast majority of forested areas (primarily naturally regenerated forest areas).

As the pulp and paper industry is projected to become increasingly dependent on fiber supply from intensively managed plantations, new fiber supply options will likely become available through advances in biotechnology. In recent decades, tens of millions of acres of agricultural land have been idled in the United States (some having been placed in reserve under the Conservation Reserve Program), and these lands offer a potential for future expansion in wood fiber or agrifiber supply. The 2001 RPA timber assessment evaluated the market outlook for genetically improved hybrid poplars grown on agricultural land to provide hardwood agrifiber supply, but the RPA analysis found that expansion in the supply of hardwood agrifiber would be offset for several decades by the relative abundance of conventional pulpwood supply and expansion of pine plantations. Thus, although fast-growing hybrids of poplars and cottonwoods have been planted as fiber crops on thousands of acres of agricultural land, and other agrifiber crops such as kenaf are available, future expansion and development of such crops are likely to be inhibited by the relative abundance and low price of pulpwood from conventional sources.

Nevertheless, in recent years biotechnology research has demonstrated a potential for genetic selection or modification of the lignin structure in trees such as poplar and loblolly pine. Modified lignin structure could potentially increase efficiency of pulping and pulp bleaching (delignification) with fewer by products, and thus potentially increase demand for such fiber crops. Thus, biotechnology and the vast amount of available agricultural land in the United States offer a potential for significant new fiber supply options in the future.

Recycled fiber remains another option for fiber supply, and indeed expansion of recycled fiber supply in the 1990s also played a significant role in limiting the growth in pulpwood demand in recent years. However, the 2001 RPA timber assessment projected that the rate of paper recovery for recycling in the United States would reach a plateau in the next decade, at 50% (Fig. 15). With limited projected expansion in paper and paperboard production capacity over the next decade, fairly limited expansion is anticipated in the rate of paper recycling. This outlook could change through further advances in recycling technology or shifts in public policy.

Figure 16 shows total annual U.S. wood fiber supply quantities, including pulpwood receipts and recovered paper use at pulp and paper mills, pulpwood exports, and pulpwood roundwood receipts at wood panel mills, chiefly oriented strandboard (OSB) mills. Recovered paper usage for recycling increased dramatically in the 1990s, but the projected leveling out of paper recycling will contribute to projected growth in pulpwood demand in the decades ahead.

The South is projected to account for virtually all projected growth in U.S. pulpwood supply and demand (Fig. 17).

Little or no growth is projected in the North or West. The projections take into account the recent economic downturn and the nationwide decline of 15% in pulpwood receipts at wood pulp mills that has occurred since the mid-1990s. The annual pulpwood supply quantities shown in Figure 17 include pulpwood receipts at wood pulp mills, pulpwood exports, and roundwood pulpwood receipts at panel mills (e.g., OSB mills). Although pulpwood generally refers to wood that is intended to be made into pulp to produce paper and other pulp-based products (Forest Resources Association 2001), the RPA timber assessment included roundwood used for panel products in the pulpwood supply/demand analysis because of overlapping raw material characteristics and market values. In the South, softwood pulpwood is projected to account for the bulk of expanded roundwood needs for OSB in the decades ahead.

Figure 18 shows projected U.S. pulpwood supply by source (hardwood and softwood, roundwood and residues) and destination, including pulp mill receipts, pulpwood exports, and roundwood receipts at wood panel mills such as OSB mills. The dominant source of projected growth in U.S. pulpwood supply is softwood roundwood, primarily from managed softwood plantations (and primarily in the South). Wood residue supplies are projected to diminish with increased product recovery efficiency in lumber mills, declining plywood production, and expansion in wood products (such as OSB) that produce little or no wood residues for pulping. As shown in Figure 18, pulp mills are projected to remain the primary destination for pulpwood supply in the decades ahead, but nearly half of the projected future growth in U.S. pulpwood supply is destined for wood panel (e.g., OSB) mills.

In summary, the 2001 RPA timber assessment indicates a future with relatively abundant wood fiber supply, derived primarily from productive plantations that will nevertheless occupy only a small fraction of forested land area in the United States. Issues related to fiber supply options and fiber needs include the potential of biotechnology (e.g., lignin modification) and agrifiber supply, the recycled fiber supply, and the expanding needs for pulpwood in wood panel products such as OSB. Overlapping these issues are all the conventional issues of pulpwood supply and demand, including expansion and intensification of management in Southern Pine plantations,

limited expansion in pulpwood demand in the North and West, and long-term consequences for timber management of generally lower pulpwood prices.

Concluding remarks

The recent economic downturn, led by a recession in U.S. industrial output, was the first broad U.S. economic downturn in a decade. Paper and paperboard demand and production declined from 1999 into the first quarter of 2002, and production in 2001 was 8% below the historical peak of 1999. An upturn in the trade-weighted value of the U.S. dollar since 1996 has limited growth in U.S. exports and attracted a flood of imports, leading to an exceptionally large U.S. trade deficit in goods (as well as expanded trade deficit in paper and paperboard). For U.S. paper and paperboard producers, the recent downturn rivals the last major multi-year downturn that occurred during the energy crisis of the early 1970s. A gradual turnaround in the economy is widely anticipated, but the recent downturn has already had a profound impact on near-term expectations for growth in the pulp and paper sector, and in pulpwood markets of the South.

Despite the effects of the recent economic downturn, “fiber products” (pulp, paper and composite products such as OSB) account for most projected growth in U.S. industrial wood resource consumption (Fig. 19). Furthermore, projected growth in domestic demand for fiber products accounts for most of the projected volume growth in U.S. wood resource consumption, according to the 2001 RPA timber assessment. Projected growth in supply of wood from plantations, chiefly Southern Pine, also accounts for most projected growth in U.S. wood resource supply. Obviously, future demand for fiber products is a crucial element of long-range wood resource supply and demand. Also of importance is the potential for shifts in U.S. trade and competitiveness, further shifts in fiber supply options (biotechnology and recycling,) and shifts in fiber needs (e.g., in wood composites).

The recent economic downturn and impact on pulpwood markets help to elucidate some long-term strategic economic issues for forestry and timber management in the South. Among the economic issue areas identified are the following:

- Ø Long-range domestic paper and paperboard demand
 - o Relationship to GDP
 - o Substitution by electronic media and plastics
 - o Structural changes in end-use markets
- Ø Industry competitiveness and trade
 - o Value of U.S. dollar and cost competitiveness
 - o Foreign versus domestic capacity expansion
 - o Industry capital investment trends
- Ø Emerging fiber supply options and fiber needs.
 - o Biotechnology and agrifiber options
 - o Expanding fiber needs (e.g., composite wood panels, OSB)
 - o Conventional issues in paper recycling and pulpwood supply

Trends and developments among these issue areas are likely to be key determinants of future pulpwood market trends, influencing, for example, the economics of intensified timber management and plantation forestry in the South. As such, these issue areas should be of general concern and perhaps focal points of research to forest economists in the South, although identifying forestry issues of importance in the South remains an open-ended question.

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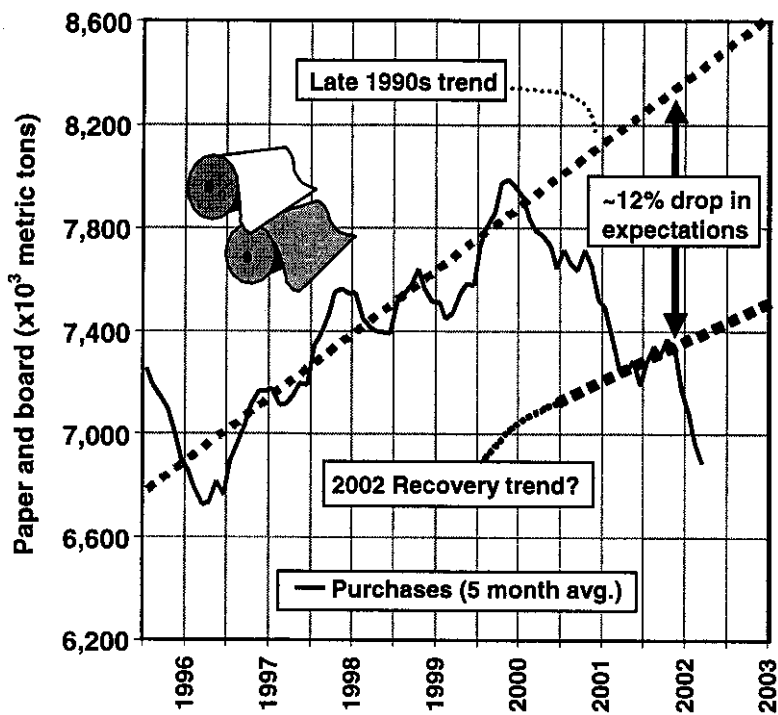


Figure 1. Monthly U.S. paper and paperboard purchases (5-month moving average), based on monthly data published by AF&PA (2002).

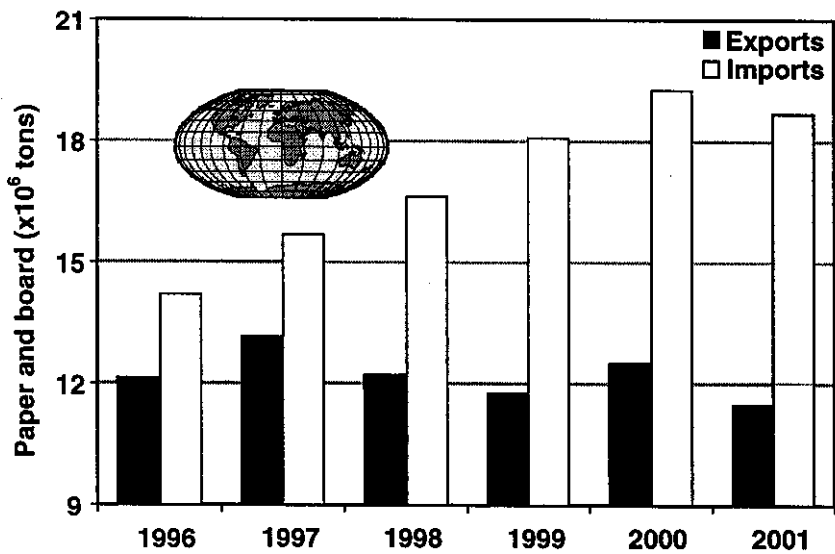


Figure 2. Annual U.S. exports and imports of paper and paperboard (AF&PA and Commerce Department). Data include paper, paperboard, and products.

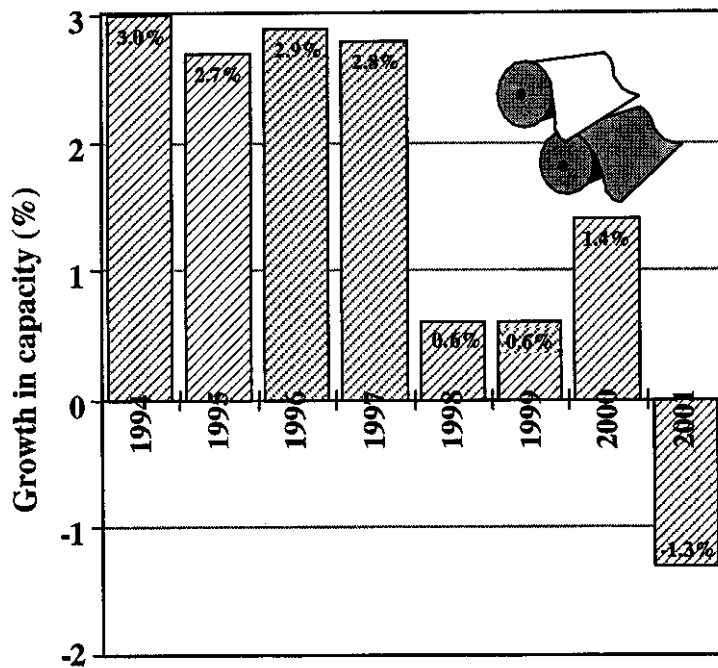


Figure 3. Annual capacity growth for U.S. paper and paperboard mills, 1994 to 2001 (AF&PA 2001).

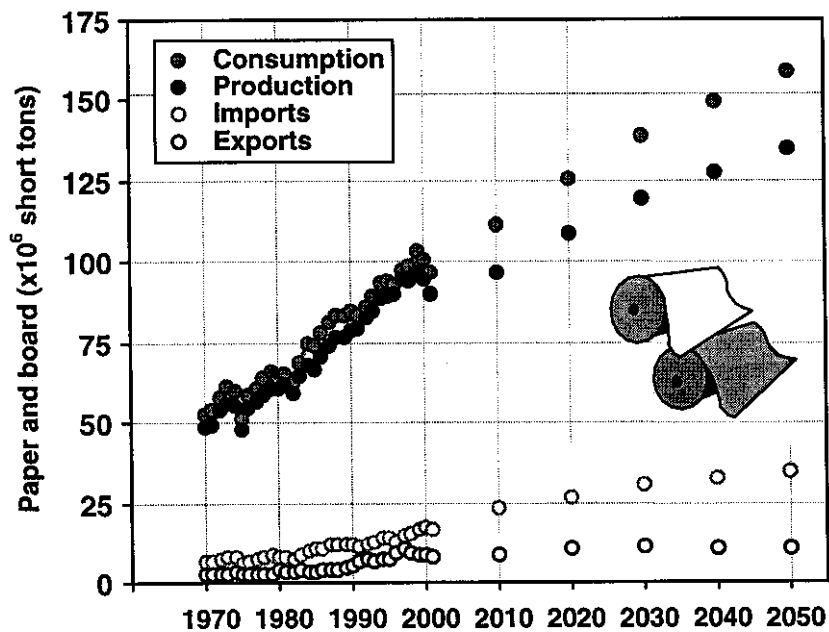


Figure 4. U.S. annual paper and paperboard consumption, production, and trade; historical (AF&PA) and projected (2001 RPA timber assessment).

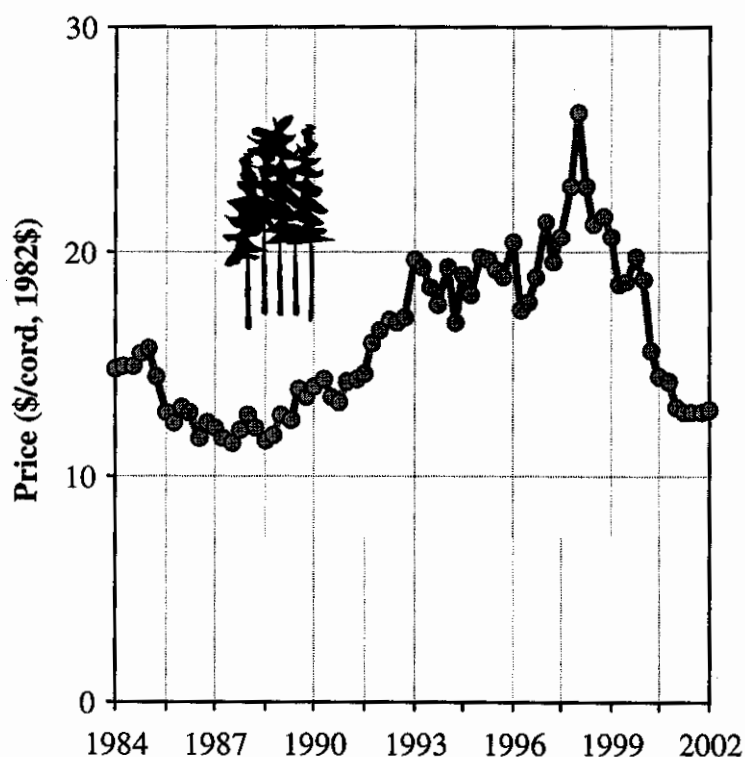


Figure 5. Real Southern Pine pulpwood stumpage prices, quarterly. Based on South-wide average reported by Timber Mart–South(2001), deflated by PPI.

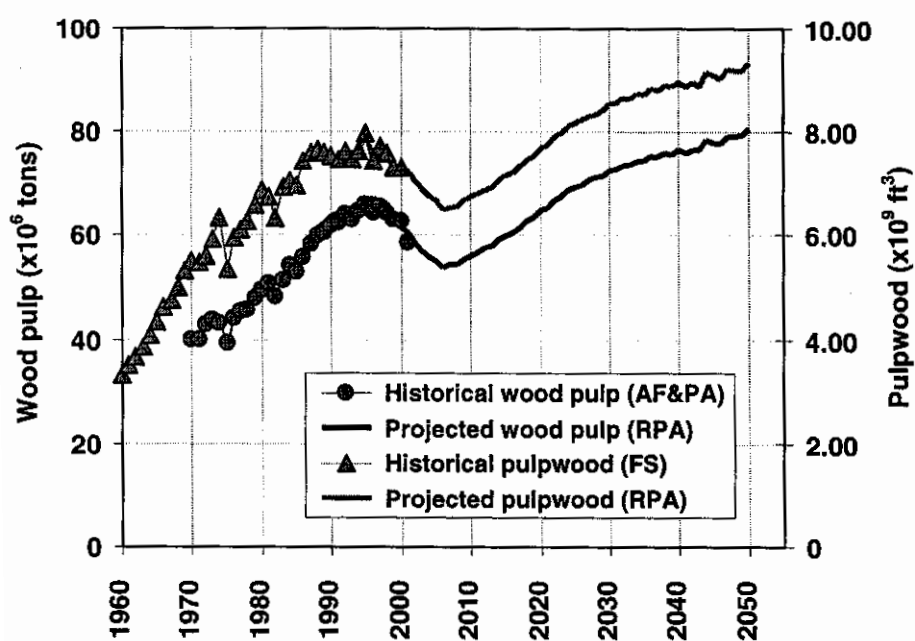


Figure 6. Annual pulpwood receipts at U.S. wood pulp mills and wood pulp production, historical (AF&PA) and projected

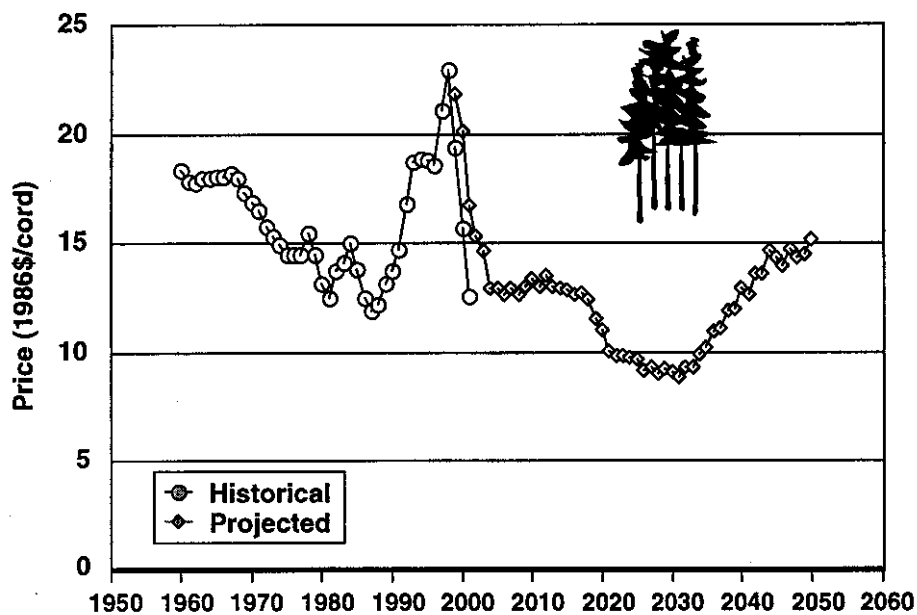


Figure 7. Real Southern Pine pulpwood stumpage prices, annual average, historical (Timber Mart–South2001 and Forest Service) and projected (2001 RPA timber assessment).

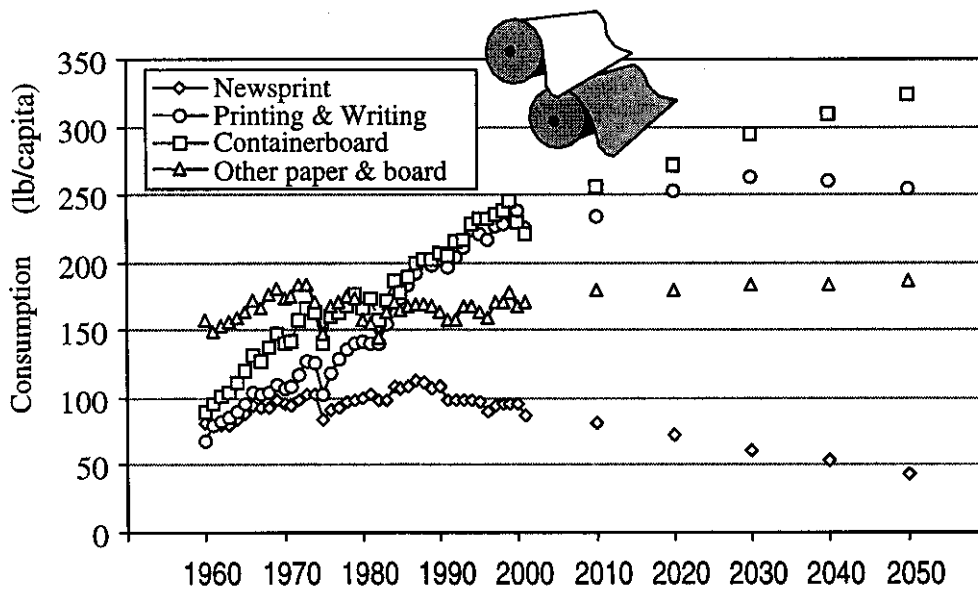


Figure 8. Trends in U.S. per capita consumption of paper and paperboard commodities, historical (AF&PA) and projected (2001 RPA timber assessment).

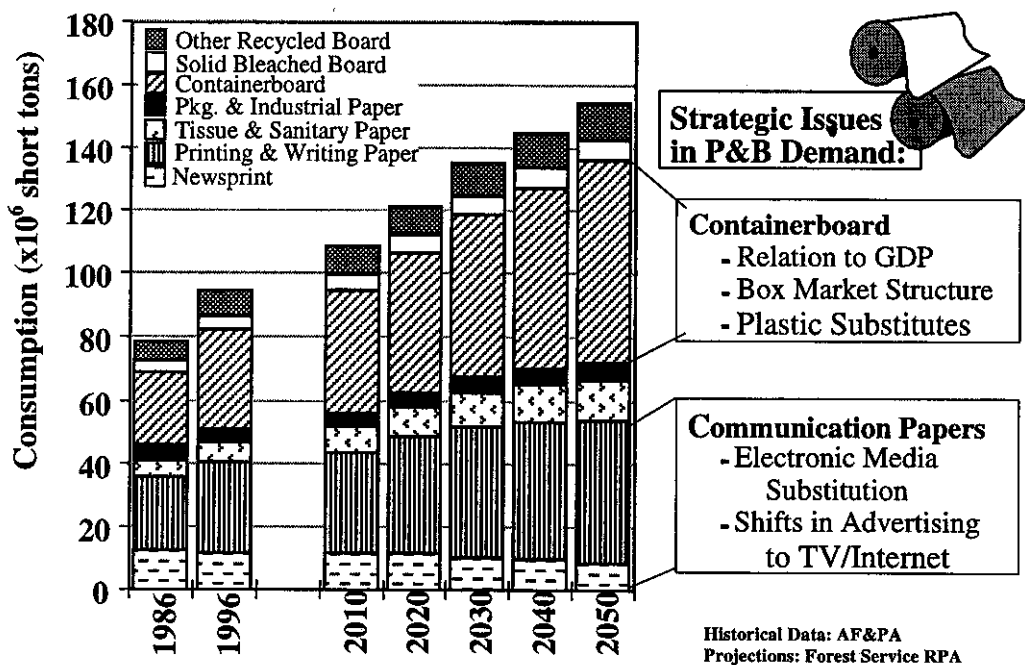


Figure 9. U.S. paper and paperboard annual consumption (aggregate tonnage) by commodity category.

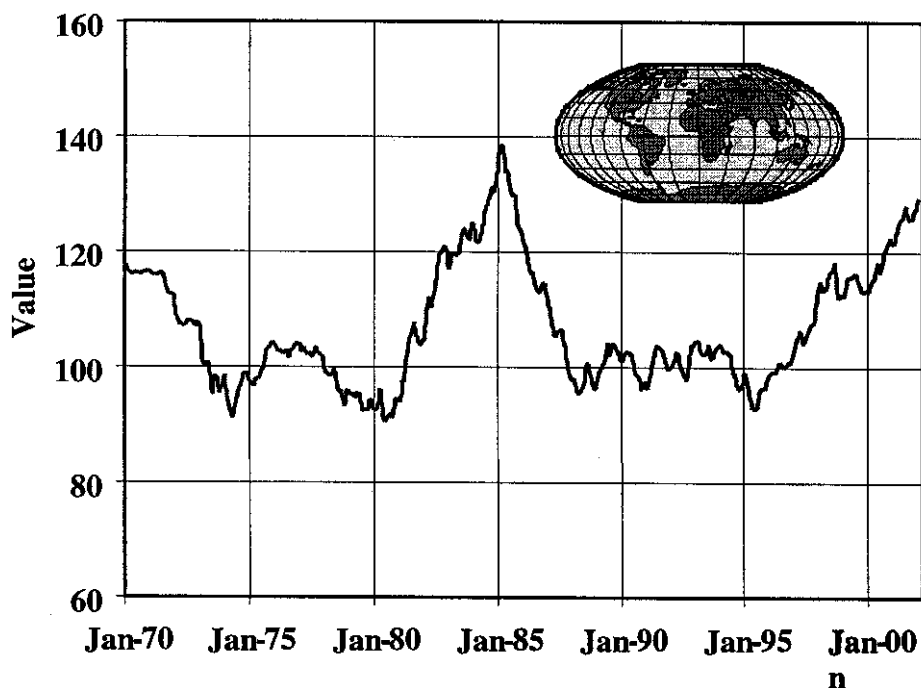


Figure 10.30-year trends in trade-weighted value of U.S. dollar, J.P. Morgan broad index.

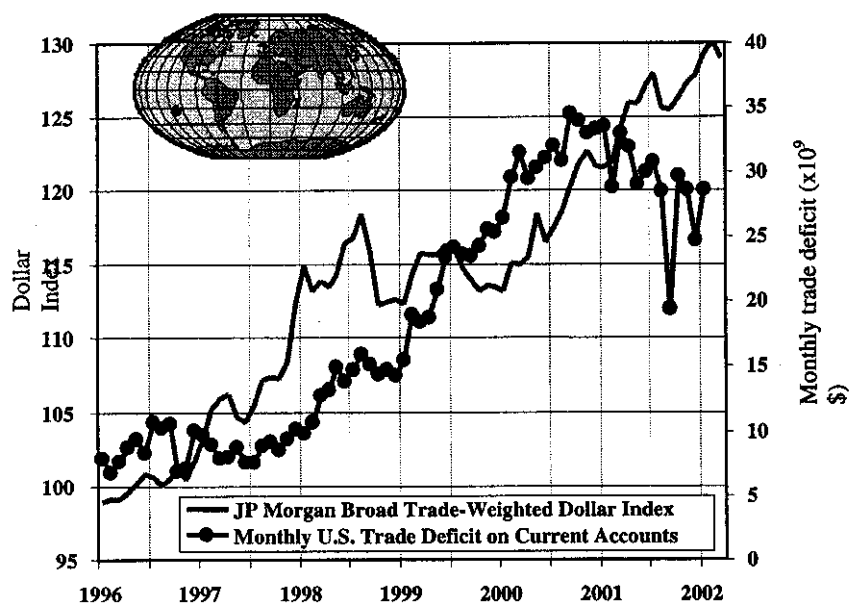


Figure 11. Trends in trade-weighted dollar index and U.S. trade deficit, monthly. J.P. Morgan broad index; U.S. trade deficit, goods, and services, Bureau of Economic Analysis.

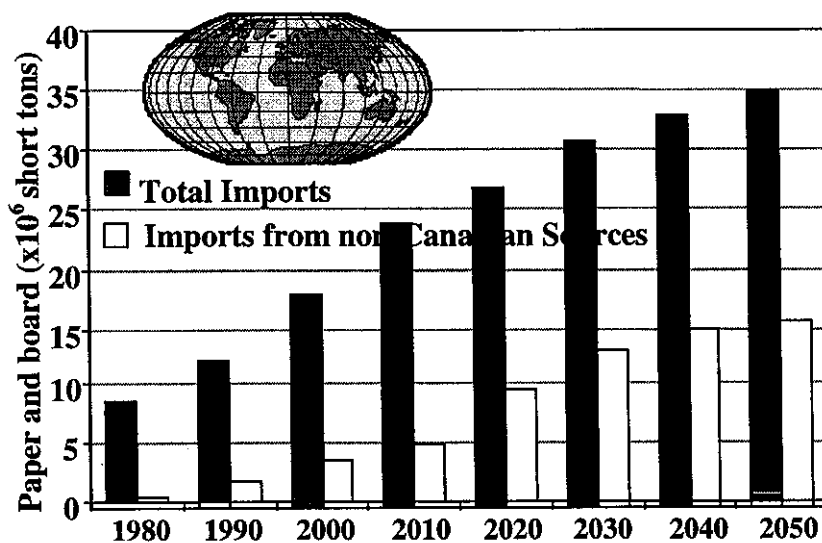


Figure 12. Historical and projected total annual U.S. imports of paper and paperboard, and imports from non-Canadian sources.

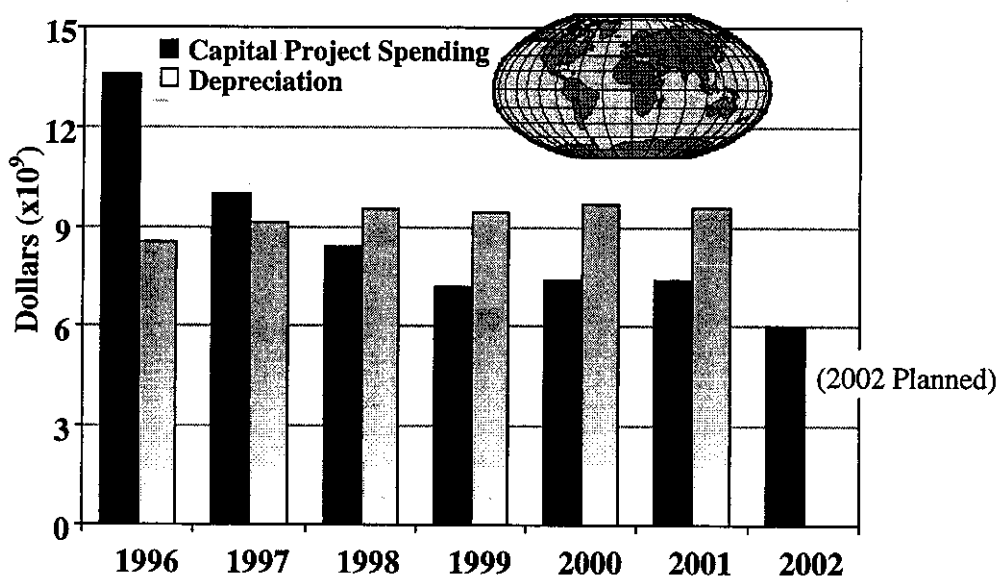


Figure 13. Annual capital spending (Pulp & Paper Project Report) and depreciation (Bureau of Census) in U.S. paper industry.

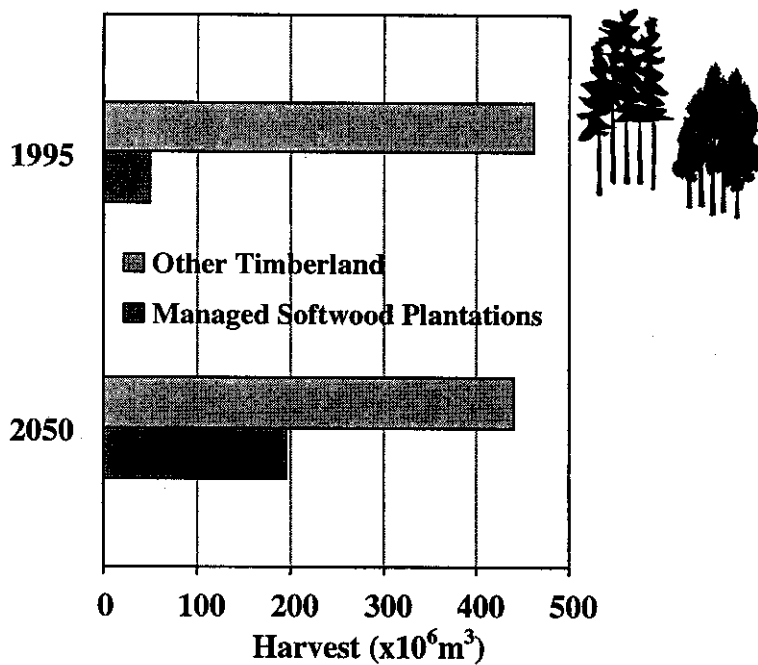


Figure 14. U.S. annual timber harvest from managed softwood plantations versus other timberland, including both softwood and hardwood timber harvest (2001 RPA timber assessment).

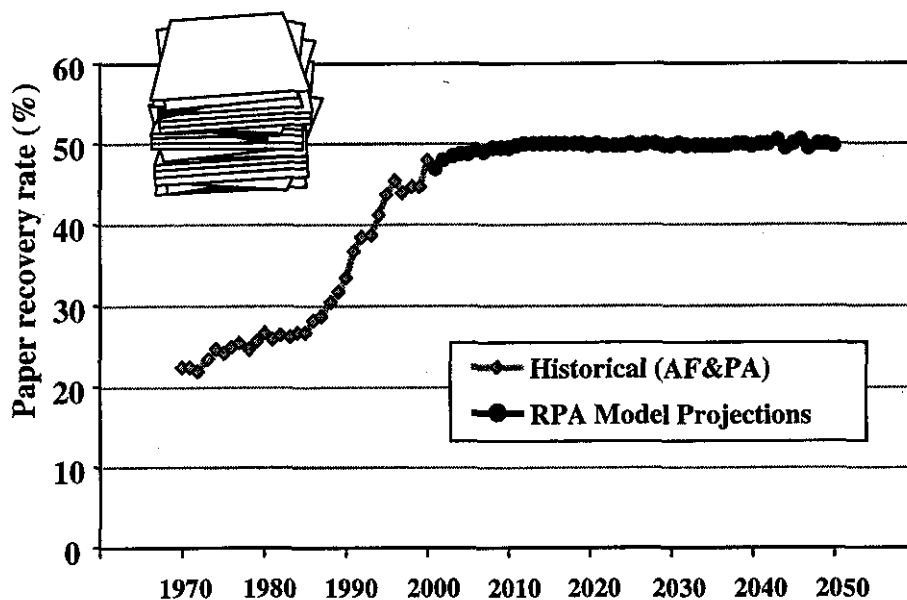


Figure 15. U.S. paper recovery rate for recycling, as percentage of total domestic paper product consumption (historical data, AF&PA projections, 2001 RPA timber assessment model).

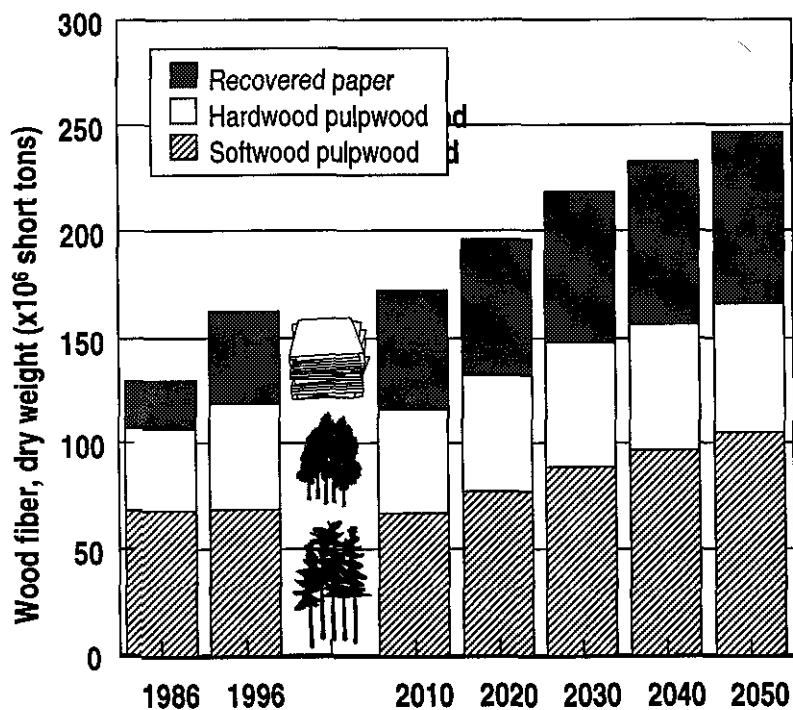


Figure 16. U.S. annual wood fiber supply quantities including pulpwood receipts and recovered paper use at pulp and paper mills, pulpwood exports, and pulpwood roundwood receipts at OSB/panel mills.

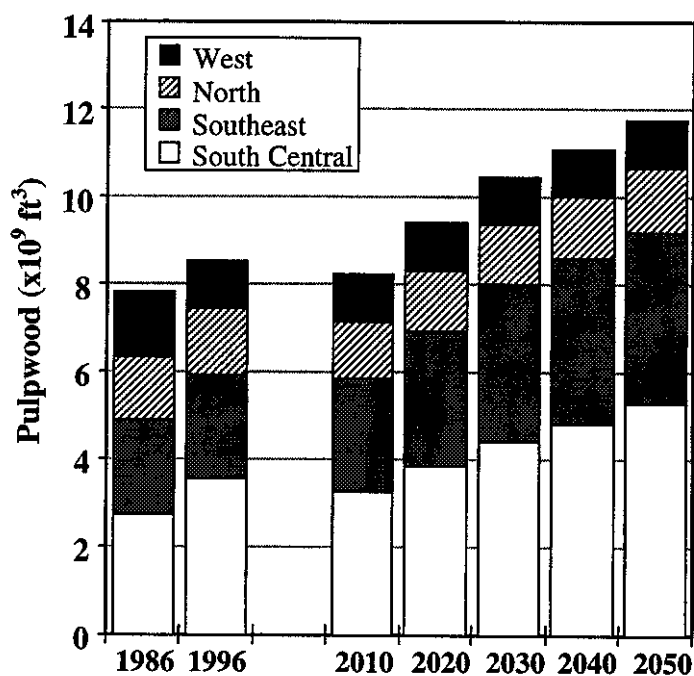


Figure 17. U.S. pulpwood supply by region (including pulpwood receipts at wood pulp mills, pulpwood exports, and roundwood pulpwood receipts at OSB/panel mills).

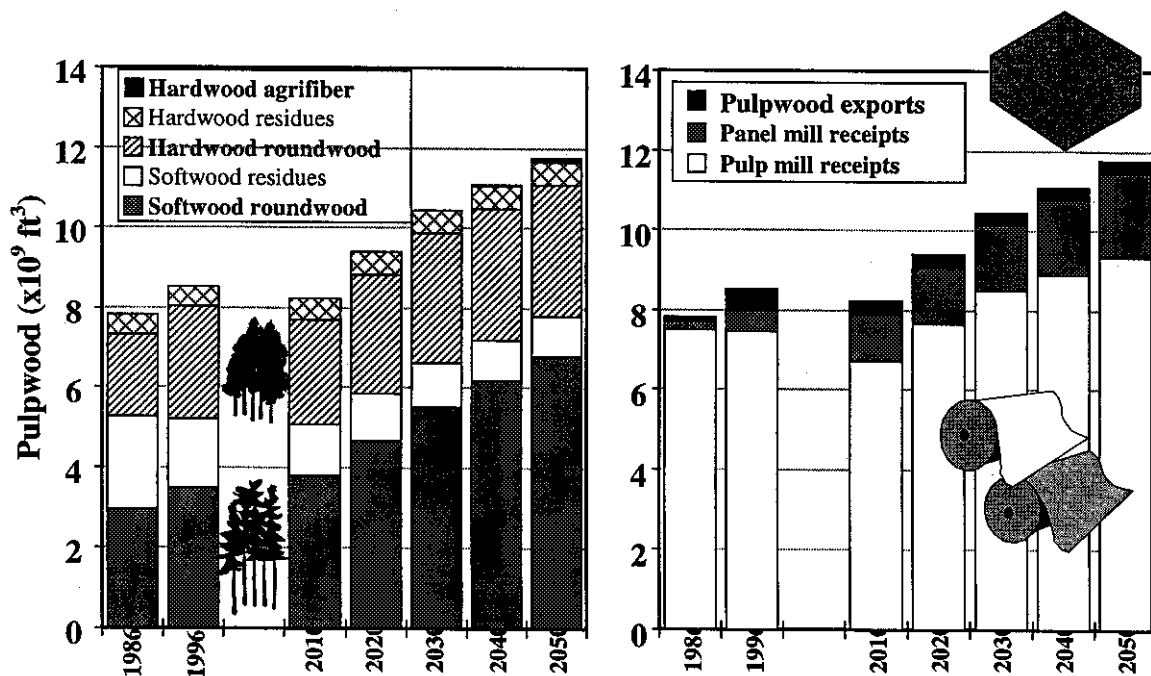


Figure 18. U.S. pulpwood supply by source and by destination (2001 RPA timber assessment).

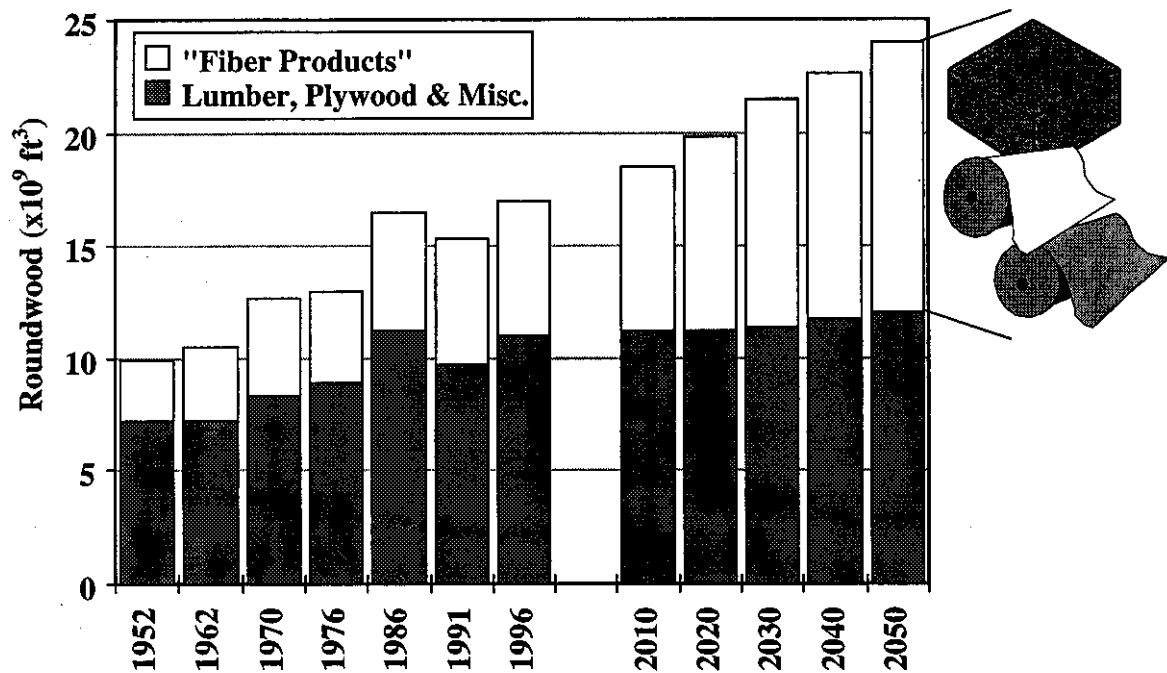


Figure 19. Apparent annual U.S. roundwood consumption by forest product category, comparing "fiber products" (pulp, paper, and composite wood panels such as OSB) with lumber, plywood, and miscellaneous products (2001 RPA timber assessment).

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