Waste paper recycling and the future timber market

by Peter J. Ince
and Joanne T. Alig

Peter J. Ince is a research forester and Joanne T. Alig is an economist with the U.S. Department of Agriculture's Forest Products Laboratory in Madison, Wisconsin. This article summarizes a detailed research paper.

Paper recycling reduces the need for wood fiber. Important research conducted by forest industry experts quantifies the future savings of this critical natural resource and indicates the substantial benefits from increased paper recycling in the U.S.

Research shows that the accelerated recycling of waste paper in the 1990s will likely have substantial timber market impacts, particularly in the Southern U.S., where more than half the U.S. pulp, paper and paperboard is produced.

Much of the projected increase in waste paper recycling will occur in unbleached kraft board and newsprint grades now produced mainly in the South from softwood pulpwood. Thus, recycling will tend to offset future demand growth for softwood pulpwood to a greater extent than that for hardwood, and it will mainly offset demand growth in the South.

Recycling will extend softwood timber supplies, leveling market differentials between hardwood and softwood pulpwood, and extending softwood sawtimber supply. As a result, there will be increased opportunity for domestic production of paper, paperboard and other forest products, particularly in the South. In this article, timber market implications are projected into the 21st century, and results are compared with implications of implementing a conservation strategy for the northern spotted owl.

Introduction

It is timely and appropriate to consider future timber market implications of a significant development that will unfold in the 1990s: acceleration in the rate of U.S. waste paper recycling. By all accounts, not only will waste paper recycling accelerate, but the use of recycled waste paper as a fiber input for production of paper and paperboard will continue to grow. With this increase in recycling, the consumption of pulpwood will grow more slowly than previously anticipated.

The objectives of this article are to present information on likely rates of waste paper recycling in the late 1990s by product grade and to show the anticipated timber market consequences in terms of regional timber consumption and prices.

In the past two years, another issue has been at the forefront of public attention and debate: the economic implications of protecting the northern spotted owl. Like the growth in waste paper recycling, the conservation of this species may have a large influence on future timber markets. A third objective, then, is to compare the effects of waste paper recycling and protecting the northern spotted owl on timber markets.

Methodology

Economic effects on timber markets of implementing a conservation strategy for the northern spotted owl have been projected by the Forest Service and the Bureau of Land Management (1). There is much uncertainty about the extent to which wildlife conservation strategies will be implemented in the future.

Our analysis, therefore, does not consider the ramification of all possible land or wildlife conservation strategies or technological developments. Rather, it projects timber market implications into the 21st century and compares results with the implications of implementing a conservation strategy for the northern spotted owl.

Our larger report includes a detailed explanation of this research methodology.

Recycling in perspective

The recycling issue has been brought home to nearly every American. Within the past few years, each of the 50 states has enacted some form of recycling legislation, and communities across the U.S. have developed programs for source separation and collection. People in most households now separate plastic bottles, aluminum cans and newspapers from other trash.

More than 50 million tons of waste

Waste paper recovery and utilization

The likely acceleration in waste paper recycling can be better visualized by examining paper and paperboard production figures along with waste paper utilization rates for selected product grades (Table 1). The utilization rate is a measure of how much recyclable paper is actually used in U.S. paper and paperboard mills in relation to paper and paperboard production. (By taking into account the export of secondary fibers and the domestic use of recovered paper in other applications, such as insulation and mulch, the recovery rate is much higher than the utilization rate.)

In 1988, the utilization rate was 25.2 percent; in 1989, 26.5 percent (2). According to Forest Products Laboratory projections, if the industry's waste paper recovery goal is achieved by 1995, the utilization rate for waste paper will be around 31 percent by 2000.

Table 1 lists actual data for 1988 and projections for 1995 and 2000. The projections for 2000 were designed to simulate the long-term consequences of technological developments in the 1990s.

Table 1 — U.S. paper and paperboard production and waste paper utilization, 1988-2000

Product grade	Utilization rate in percent 1988 (1)	1995 (2)	2000 (3)
Paper			
Newsprint	24	37	45.0
Printing and writing	7	7	8.9
Tissue and sanitary	46	49	50.0
Packaging and industrial	5	5	6.1
Paperboard			
Unbleached kraft	11	20	20.4
Semichemical	33	41	43.8
Bleached	0	0	0
Recycled	100	100	100.0
All grades (4)	25	30	30.9

(1) Actual.
(2) Franklin Associates, Ltd., *Paper Recycling: The View to 1995*, 1990.
(3) Forest Products Laboratory.
(4) Excluding construction paper and board.

Source: Forest Products Laboratory, 1991.

More significantly, in terms of timber markets, the projected increases in recycling are concentrated in product grades such as unbleached kraft board and newsprint, where waste paper utilization rates will nearly double by the end of the decade. In the U.S. these trends are particularly significant because those product grades are currently produced mainly from softwood

This is a very interesting result because it indicates that accelerated recycling will actually increase the long-term growth potential of the U.S. industry, by expanding fiber resources in terms of both pulpwood and recycled fiber.

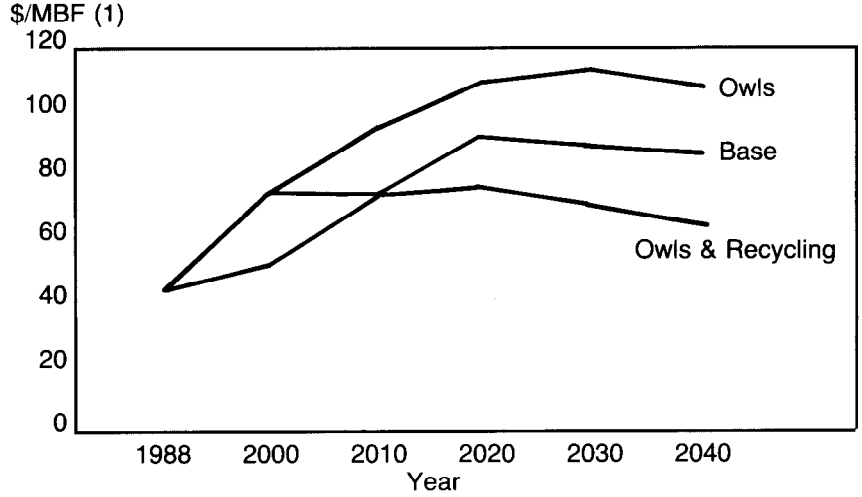
Although paper and paperboard production will increase, this new analysis nevertheless results in reduced growth in pulpwood consumption. Pulpwood consumption will continue to grow in the future, but consumption will grow more slowly than originally projected. Although pulpwood consumption climbed from around 90 million cords in 1986 to over 97 million cords in 1989, the consumption trend will not continue at the same pace in the 21st century. In the new scenario, pulpwood consumption will be 20 million cords lower by the year 2040 than in the earlier projection.

Impacts on sawtimber markets

Reduced pulpwood consumption in the decades ahead will extend timber supplies, particularly for softwood timber. Therefore, in addition to examining pulpwood markets, we examined how recycling will affect sawtimber markets. We considered three scenarios, placing the impact of recycling in the context of the northern spotted owl issue in the Pacific Northwest.

Figure 1 portrays the results of this

Figure 1 — Pacific Northwest sawtimber stumpage market, alternate projections



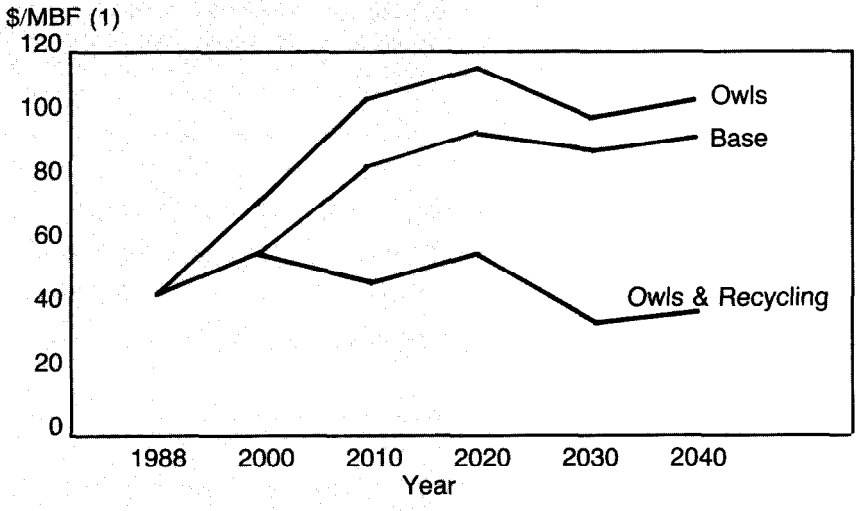
(1) Real price index in dollars per million board feet.

Source: Forest Products Laboratory, 1991.

analysis. The estimates in the top two lines ("Owls" and "Base") were obtained from the recent joint Forest Service and Bureau of Land Management study of the economic effects of implementing a conservation strategy for the northern spotted owl (1). The "Base" scenario addresses all issues except for the protection of the northern spotted owl, and the "Owls" scenario expands this case to simulate the impacts of a major conservation strategy for the northern spotted owl and related forest plans in the U.S. Pacific Northwest and Pacific Southwest regions. The "Owls" scenario assumed a substantial reduction in allowable sale quantities for timber in the national forests in those regions. Both the "Base" and the "Owls" scenarios assumed no acceleration in waste paper recycling in the 1990s.

To introduce the impacts of accelerated recycling, a third scenario was developed ("Owls and Recycling"). This scenario was identical to the "Owls" scenario except that it also included the projected pulpwood consumption levels derived in the research summarized above. This third scenario incorporated a substantial projected reduction in timber sales in the West, plus reduced growth in pulpwood consumption associated with accelerated waste paper recycling. ▶

Figure 2 — Southern softwood sawtimber stumpage market, alternate projections



(1) Real price index in dollars per million board feet.

Source: Forest Products Laboratory, 1991.

jected impacts of implementing a conservation strategy for the northern spotted owl included a reduction in U.S. softwood lumber production (because of increased scarcity of softwood sawtimber) and an increase in softwood lumber imports. The addition of the recycling projections to the "Owls" scenario had little near-term impact on projected lumber production and imports to the year 2000.

However, after 2010, the impact of the owl will be reversed, and projected U.S. lumber production will increase to levels above the "Base" case. Also, projected lumber imports will decline as a result of increased domestic supplies of softwood sawtimber.

Conclusions

Waste paper recycling will continue to grow in the 1990s, largely as a result of legislative developments favoring recycled products. Accelerated waste paper recycling will have many important implications for future U.S. timber markets.

Accelerated recycling will result in a smaller projected increase in future pulpwood harvest. This, in turn, will result in a substantial reduction of projected price increases for pulpwood and softwood sawtimber stumpage. Increased stumpage prices associated with preservation of habitat for some endangered species, such as the northern spotted owl, will tend to be offset in the long run. However, this offset effect may not avoid near-term impacts on timber supply, prices and employment in the Pacific Northwest.

In the South, accelerated waste paper recycling will cause prices for delivered softwood and hardwood pulpwood to approach equivalency by around 2000. Accelerated waste paper recycling will offset future demand growth for softwood pulpwood more than growth for hardwood, and it will mainly offset demand growth for decades to come as a result of accelerated recycling and projected growth rates for timber.

As a result, there will be increased opportunity for domestic production of paper, paperboard and other forest products, particularly in the South. **RR**

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Figure 2 shows projected softwood sawtimber stumpage prices for the Pacific Northwest as derived in the alternate scenarios. As reported previously (1), the "Owls" scenario resulted in a substantial rise in projected sawtimber stumpage prices with severe consequences for the timber industry in the Pacific Northwest. Sawtimber was projected to become much more economically scarce relative to the "Base" projection, resulting in higher projected prices, lower timber product output, and corresponding unemployment and loss of revenues in the timber industry.

When recycling projections were added to the "Owls" scenario, projected sawtimber prices did not return to "Base" levels until sometime after 2010, but prices then dropped below "Base" projections. Thus, in the Pacific Northwest, the severe near-term timber market impacts of implementing a conservation strategy for the northern spotted owl are unlikely to be avoided by accelerated recycling. Over the long term (beyond 2010), however, some timber market impacts could be reversed, because recycling will gradually extend sawtimber supplies in that region.

In contrast, the projected impact of recycling on sawtimber markets in the South is much more profound and immediate. Implementation of the spotted owl conservation strategy and forest plans designed to preserve old growth timber in the West were projected to cause a nationwide shortage of softwood sawtimber. This included the impact of increased softwood sawtimber prices in the South (Figure 2). The timber industry will move from the West to the South, and it will place increased demands on softwood sawtimber in the South.

In 1989, over 26 million tons of paper were recycled in U.S. paper and paperboard mills.

However, when the recycling projections were factored into the analysis, they largely cancelled out the softwood sawtimber shortage in the South as early as 2000, and after 2000 the result was a projected stabilization of sawtimber stumpage prices. Accelerated waste paper recycling will have the greatest timber market impact in the South because of more rapid timber growth rates and greater potential for substitution of mature pulpwood for sawtimber.

Also, as we have noted, much of the projected increase in waste paper recycling will occur in product grades produced mainly from softwood pulpwood and mainly in the South (such as unbleached kraft board and newsprint). Thus, accelerated waste paper recycling will largely offset the growth in pulpwood consumption (primarily softwood pulpwood) that otherwise would have occurred in the South.

Also, as reported previously, the pro-

pulpwood and primarily in the South from southern pine.

At the same time, we know that timber management and timber growth will yield larger softwood timber volumes in the future, because extensive timber planting programs are currently underway in the South and that timber matures in the early part of the next century.

Projected impacts on pulpwood markets

The estimates in Table 1 provide a stark contrast to the projections of several years ago. First, in terms of the U.S. waste paper utilization rate, we are now looking at a future in which we are likely to reach a 31 percent utilization rate in the 1990s. Beyond that, we project a 40 percent utilization rate by the year 2020 and a 45 percent rate by 2040. Although a future utilization rate of 45 percent may seem extraordinarily high by current U.S. standards, this rate has been achieved in Japan and West Germany.

Such an acceleration in waste paper utilization will have a substantial impact on pulpwood markets. In contrast to previous projections, we now see pulpwood prices stabilizing in the South for decades to come. In other words, in contrast to the rising pulpwood prices that had been projected, the future now promises timber growth that more nearly matches the growing demand for pulpwood. This will result in stable prices.

More than 50 million tons of waste paper end up in a landfill or an incinerator.

In addition, as hardwood pulpwood approaches 40 percent of pulpwood consumption in the 21st century, hardwood pulpwood prices will approach equivalency with softwood prices. With the increase in recycled fiber utilization, after 2000 hardwood and softwood pulpwood prices will move together as they become economical substitutes.

As pulpwood prices are stabilized over the long term and as the North American industry relies more heavily on recycled fiber, the combined effect will be a substantial increase in fiber supply. The relative advantage of the U.S. industry in world markets will be substantially enhanced as a result of extended fiber supply and other infrastructure advantages. As a result, U.S. paper and paperboard production is projected to be substantially higher in these new projections, while imports will be somewhat lower.

In the current scenario, U.S. paper and paperboard production will increase 5 percent by 2000 and 15 percent by 2030 compared with earlier projections.

paper go to landfills or incinerators annually. However, in 1988, compared to all solid waste materials, paper and paperboard had one of the highest rates of recovery for recycling — 30.7 percent (2). In 1989, the recovery rate increased to 32.6 percent. More than 26 million tons of paper consumed in the United States were recovered for domestic recycling or export, and more than 20 million tons were recycled in U.S. paper and paperboard mills. The United States has come a long way, but we still have far to go.

The paper industry recognized the value of recycling and has become a leader in this area. In a major commitment to recycling, the industry announced its national goal of 40 percent waste paper recovery for recycling by 1995. The recovery of waste paper has in fact been increasing, as reflected by sustained low prices for certain waste paper commodities.

Legislative activity

Much of the supply of waste paper raw material can be attributed to a flurry of national and state legislative activity. At the federal level, the Environmental Protection Agency has passed a number of regulations affecting waste paper recycling. In September 1991, it established regulations restricting the location, design and operation of all municipal landfills, making the disposal of materials in landfills more difficult. EPA has also passed guidelines for federal procurement of paper and paper products, setting minimum content standards for the purchase of these products by federal agencies.

At the state level, legislators across the nation are looking at nearly 1,000 recycling bills. On the supply side, most state legislative initiatives continue to be aimed at planning requirements for municipalities, waste reduction goals and mandatory source separation (3).

On the demand side, legislation continues to focus on recycled content standards; 10 states have mandated recycled content for newspapers (4). Landfill bans and procurement policies for state agencies are also popular legislative initiatives. In addition, by 1990, 40 states offered grants and loans, tax incentives or other financial assistance to manufacturers that develop technologies for using recovered materials in processing and that develop markets for the end use of recovered material (3).

With a steady supply of waste paper raw material and with legislation requiring manufacturers to use recycled materials, the total amount of waste paper used for recycling has increased steadily in recent decades. This had not always been the case. In fact, the waste paper consumption rate per ton of paper and paperboard actually declined after the World War II era and began to rise only in the mid-1970s.

Therefore it was reasonable to assume that the waste paper consumption rate would increase only gradually in the decades ahead. In previous research, the waste paper consumption rate was projected to increase in the 21st century, but no acceleration was seen in the 1990s. Until recently, this was the sort of projection included in most long-range analyses of the timber situation, including a major study of long-range timber trends in the South, known as the Southern Study (5).