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WASTEPAPER RECYCLING AND THE FUTURE TIMBER MARKET

Peter J. Ince, Research Forester
Joanne T. Alig, Economist
USDA Forest Service
Forest Products Laboratay[1]
Madison, Wisconsin, U.S.A.

ABSTRACT

The accelerated recycling of wastepaper in the 1990s will likely have substantial timber market impacts, particularly in the South where more than half the U.S. pulp, paper, and paperboard is produced. Much of the projected increase in wastepaper recycling will occur in unbleached kraft board and newsprint, grades now produced mainly in the South from softwood pulpwood. Thus, recyding 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 well. As a result, there will be increased opportunity for domestic production of paper, paperboard, and other forest products, particularly in the South. In this report, 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. wastepaper recycling. By all accounts, not only will wastepaper recycling accelerate but the use of recycled wastepaper as a fiber input for production of paper and board will continue to grow. With this increase in recyding, pulpwood consumption will grow more slowly than previously anticipated.

The objectives of this report are to present information on likely rates of wastepaper 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 2 years, another issue has been at the forefront of public attention and debate: the economic implications of protecting the northern spotted owl. Like wastepaper recycling, the conservation of this species may have a large influence on future timber markets. A third objective, then,

[1] The Forest Products Laboratory is maintained in cooperation with the University of Wisconsin.

is to compare the effects of wastepaper recycling and protecting the northern spotted owl on timber markets.

BACKGROUND AND METHODS

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 (USDA FS and USDI BLM 1990) 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 ramifications 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.

The methods used in our study were the same as those employed in the 1989 RPA Assessment of the Forest and Rangeland Situation in the United States (USDA FS 1989). Our results are based on projections developed using the Forest Products Laboratory (FPL) pulp and paper economic model, linked to the Forest Service Timber Assessment Market Model (TAMM). Alternative projections were derived by making appropriate adjustments to technical assumptions or parameters of the models.

Figure 1 compares previous pulpwood consumption projections developed by the Forest Service, including mid-level projections from the 1979 RPA, baseline projections from the Southern study, and baseline projections from the 1989 RPA (USDA FS 1982, 1988, 1989). These projections show that baseline projections of pulpwood consumption have been revised downward relative to the 1979 RPA projections, mainly because baseline projections of paper and paperboard production have been revised. The projections of paper and board production in the Southern study and 1989 RPA are more closely in line with recent industry growth expectations. However, baseline projections of wastepaper recycling in all three studies would now be regarded as quite conservative. Baseline projections of recycling in the 1989 RPA were held down to maintain consistency with projections in the Southern study, although the implications of increased recycling were examined (Haynes 1989, USDA FS 1989).

This report was initially presented about a year ago. Results of the analysis, while still in line with recent industry growth projections, are currently being revised. The issue of wastepaper recycling and its projected timber market implications continue to be the subject of RPA Assessment research. A further report on this issue is being developed for the 1993 RPA Assessment using the North American Pulp and Paper (NAPAP) Model developed by the USDA Forest Service.

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 United States have developed programs for source separation and collection. People in most households now separate plastic bottles, aluminum cans, and bundled newspapers from other trash.

The reports about municipal solid waste (MSW) have become familiar. In the United States, over 160 million tons of MSW are generated each year (Thurner and Ashley 1990). In 1986, according to the Congressional Office of Technology Assessment, only about 10 percent of all MSW was recycled and 10 to 15 percent was incinerated, leaving almost 80 percent or 130 million tons for disposal in landfills.

More than 50 million tons of wastepaper go to landfills or incinerators. However, in 1988, compared to all solid waste materials, paper and paperboard had the highest rate of recovery for recycling–30.7 percent (EPA 1990, API 1990b). 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 recognizes 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 wastepaper recovery for recycling by 1995 (API 1990a). The recovery of wastepaper has in fact been increasing, as reflected by sustained low prices for certain wastepaper commodities.

Legislative Activity

Much of the supply of wastepaper raw material can be attibuted to a flurry of national and state legislative activity. At the Federal level, the Environmental Protection Agency (EPA) has passed a number of regulations affecting wastepaper recycling. In September 1991, they established regulations restricting the location, design, and operations of all municipal landfills, making the disposal of materials in landfills more difficult (EPA, Subtitle D). The 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 (EPA 1988). Finally, the EPA has established guidelines for State recycling programs, which include specific recycling goals.

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 (NSWMA 1991). On the demand side, legislation continues to focus on recycled content standards; 10 states have mandated recycled content for newspapers (Raymond 1991). Landfill bans and procurement policies for State agencies are also popular legislative initiatives. In addition, by 1990, 40 states had offered grants and loans, tax incentives, or other financial assistance to manufacturers who develop technology for utilizing recovered materials in processing and who develop markets for end use of recovered material (NSWMA 1991).

With a steady supply of wastepaper raw material and legislation requiring manufacturers to use recycled materials, the total amount of wastepaper used for recycling has increased steadily in recent decades. This has not always been the case. In fact, the wastepaper consumption rate per ton of paper and paperboard actually declined after the World War II era and began to rise only in the mid-70s (Fig. 2). Therefore, until recently, it was reasonable to assume that the wastepaper consumption rate would increase only gradually in the decades ahead, as shown in the “Base” projections for the 1989 RPA Assessment. In those projections, the wastepaper consumption rate was projected to increase in the 21st century, but it was not projected to accelerate 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.

Wastepaper Recovery and Utilization

The likely acceleration in wastepaper recycling can be better visualized by examining paper and paperboard production figures along with wastepaper 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 board mills in relation to paper and board production. In 1988, the utilization rate was

Table 1–U.S. paper and board production and wastepaper utilization rates

Product grade	Production (millions of tons) [utilization rate (percent)] 1988 (Actual)	1995 (Franklin)[a]	2000 (RF–90)
Newsprint	6.0 [24]	7.4 [37]	6.8[45]
Printing and writing	21.8 [7]	28.8[7]	31.8[8.9]
Tissue and sanitary	5.5 [46]	6.4 [49]	6.9[50]
Packaging and industrial	5.0 [5]	4.8 [5]	4.8[6.1]
Unbleached kraft board	19.1[11]	22.0[20]	24.2[20.4]
Semichemical board	5.7[33]	6.4[41]	7.4[43.8]
Bleached board	4.5[0]	4.8[0]	4.6[0]
Recycled board	8.8[l00+]	11.0 [l00+]	9.8 [100+]
All grades[b]	76.4[25]	91.7[30]	96.3[30.9]

[a]Franklin Associates (1990).
[b]Excluding construction paper and board.

25.2 percent; in 1989, 26.4 percent (API 1990b). According to FPL projections, if the industry wastepaper recovery goal is achieved by 1995, the utilization rate for wastepaper will be around 31 percent by 2000.

Table 1 lists actual data for 1988 (API 1989) and projections for 1995 and 2000. The projections for 1995 were developed by Franklin Associates (1990), in a report released by the American Paper Institute. The projections for 2000 were developed using the FPL pulp and paper economic model, in a scenario called the Recycling Future 1990 Analysis (RF–90). The Recycling Future scenario was designed to simulate the long-term consequences of technological developments in the 1990s. In this scenario, paper and board production was projected to increase to 96 million tons by 2000, when the average utilization rate in U.S. mills (excluding construction paper and board products) will be around 31 percent (projections derived by FPL pulp and paper model).

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 wastepaper utilization rates will nearly double by the end of the decade (Table 1). In the United States, these trends are particularly significant because those product grades are currently produced mainly from softwood 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, as extensive timber planting programs are currently underway in the South and as that timber matures in the early part of the next century.

PROJECTED IMPACTS ON PULPWOOD MARKETS

The Recycling Future scenario provides a stark contrast to the previous RPA Base projections of several years ago. First, in terms of the U.S. wastepaper utilization rate, we are now looking at a future in which we are likely to reach a 31-percent utilization rate in the 1990s (Fig. 3). 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 wastepaper utilization will have a substantial impact on pulpwood markets (Fig. 4). In contrast to the RPA Base case, in the Recycling Future scenario pulpwood prices will be stabilized 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 price projections. In addition, as hardwood pulpwood approaches 40 percent of pulpwood consumption in the 21st century, hardwood pulpwood prices will approach equivalency with softwood prices. After 2000, hardwood and softwood pulpwood prices will move outward in tandem as they became economic substitutes with the increase in recycled fiber utilization.

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 comparative 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 board production is projected to be substantially higher in the Recycling Future scenario relative to the Base case, while imports will be somewhat lower (Fig. 5). In the Recycling Future scenario, U.S. paper and board production will increase 5 percent by 2000 and 15 percent by 2030 relative to the Base case. 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, the Recycling Future analysis results nevertheless in reduced growth in pulpwood consumption (Fig. 6). Pulpwood consumption will continue to grow in the future, but pulpwood consumption will grow more slowly. 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 Recycling Future scenario, pulpwood consumption will be 20 million cords lower by the year 2040 than in the Base case.

IMPACTS ON SAWTIMBER MARKETS

Reduced pulpwood consumption in the decades ahead will extend timber supplies, particularly for softwood timber. Therefore, in addition to pulpwood markets, we examined how recycling will impact sawtimber markets. We considered a set of three scenarios, placing the impact of recycling in the context of the northern spotted owl issue. Two scenarios were obtained from the recent Forest Service–Bureau of Land Management (FS–BLM) study of the economic effects of implementing a conservation strategy for the northern spotted owl (USDA FS and USDI BLM 1990). Those scenarios were the Base scenario (similar to the 1989 RPA Base) and the Owls scenario, which was designed 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 (previously denoted as Plans + Owls scenario in the FS–BLM report). The Owls scenario assumed a substantial reduction in allowable sale quantities for timber on the National Forests in those regions. Both the Base and the Owls scenarios assumed no acceleration in wastepaper recycling in the 1990s.

To introduce the impacts of accelerated recycling, a third scenario was developed. This scenario was identical to the Owls scenario except that it also included the projected pulpwood consumption levels derived in the Recycling Future scenario. This Owls + Recycling Future scenario incorporated a substantial projected reduction in timber sales in the West, plus reduced growth in pulpwood consumption associated with accelerated wastepaper recycling.

Figure 7 shows projected softwood sawtimber stumpage prices for the U.S. Pacific Northwest as derived in the alternate scenarios, using TAMM. (Projections were run under the supervision of Professor Darius Adams of the University of Washington, Seattle, and Richard Haynes of the Pacific Northwest Forest Experiment Station, Portland, Oregon.) As reported previously (USDA FS and USDI BLM 1990), the Owls scenario (Plans + Owls) 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 the Recycling Future was added to the Owls scenario, projected sawtimber prices did not return to Base levels until sometime after 2010, but prices then dropped below the 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 longer term (beyond 2010), however, some timber market impacts could be reversed as 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 was projected to cause a nationwide shortage of softwood sawtimber. This included the impact of increased softwood sawtimber prices in the South (Fig. 8). The timber industry will move from the West to the South, and it will place increased demands on softwood sawtimber in the South. However, when the Recycling Future was factored into the analysis, it largely cancelled out the softwood sawtimber shortage in the South as early as 2000, and afterwards it resulted in a projected stabilization of sawtimber stumpage prices. Accelerated wastepaper 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 wastepaper 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 wastepaper recycling will largely offset the growth in pulpwood consumption (primarily softwood pulpwood) that would otherwise have occurred in the South.

Also, as reported previously, the projected 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 Future to the Owls scenario had little near-term impact on projected lumber production and imports to the year 2000 (Fig. 9). 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

Wastepaper recycling will continue to grow in the 1990s, largely as a result of legislative developments favoring recycled products. Accelerated wastepaper 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 future 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 may not avoid near-term impacts on timber supply, prices, and employment in the Pacific Northwest. In the South, accelerated wastepaper recycling will cause prices for delivered softwood and hardwood pulpwood to approach equivalency by around 2000. Accelerated wastepaper recycling will offset future demand growth for softwood pulpwood more than growth for hardwood, and it will mainly offset demand growth in the South. Delivered pulpwood and sawtimber stumpage markets could be stabilized in the South for decades to come as a result of accelerated recycling and projected growth rates for timber in the South. As a result, there will be increased opportunity for domestic production of paper, paperboard, and other forest products, particularly in the South.

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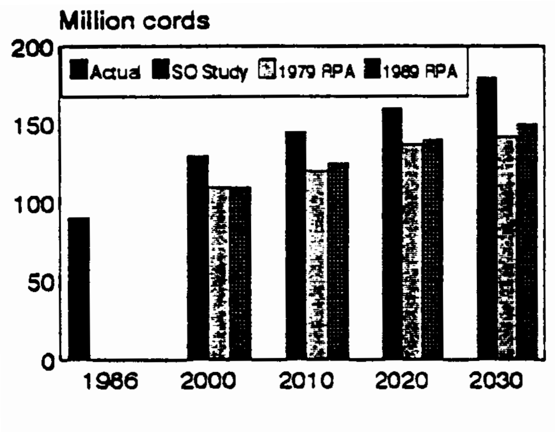

Figure 1–US. pulpwood consumption.

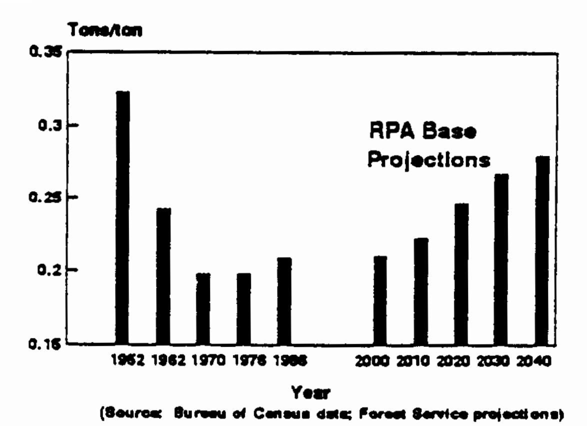

Figure 2–Wastepaper consumed per ton of paper and board produced in the United States (source: Bureau of the Census).

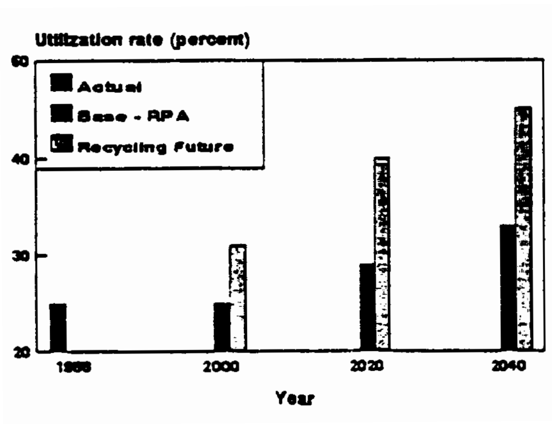

Figure 3–U.S. wastepaper utilization rates, alternate projections.

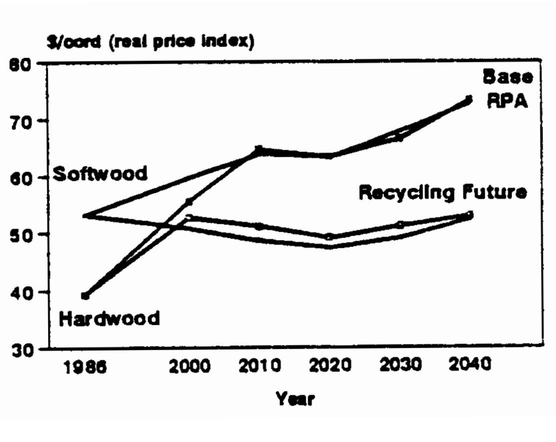

Figure 4-Delivered pulpwpod market in the South, alternate projections.

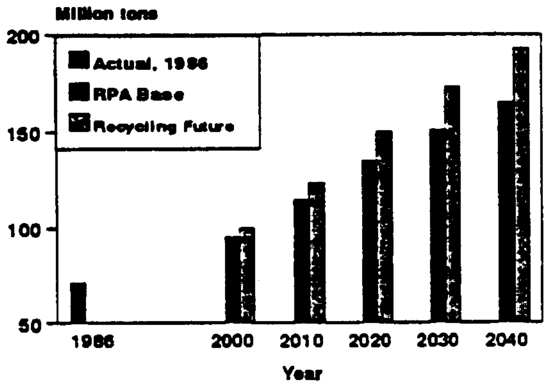

Figure 5-U.S. paper and board production, alternate projections.

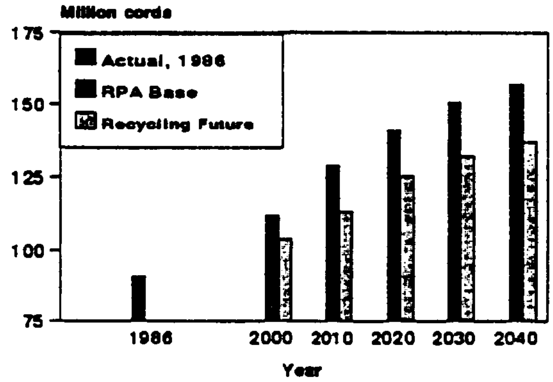

Figure 6–U.S. pulpwood consumption, alternate projections.

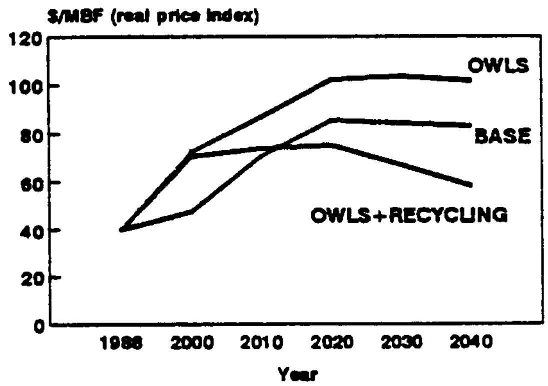

Figure 7–Pacific Northwest sawtimber stumpage market, alternate projections.

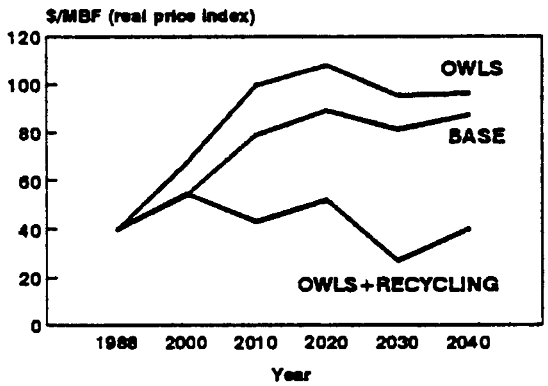

Figure 8–Southern softwood sawtimber stumpage market, alternate projections.

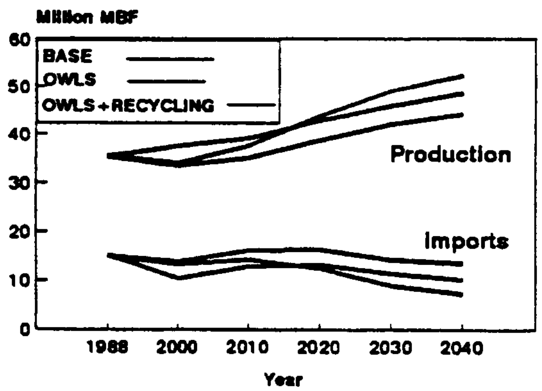

Figure 9-Softwood lumber production and imports.

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