

Paper: Old Magazines

COMMODITY PROFILE

North Carolina Department of
Environment and Natural Resources
DIVISION OF POLLUTION PREVENTION AND
ENVIRONMENTAL ASSISTANCE

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OVERVIEW

Until recently, magazines and catalogs were often recovered as mixed paper; however, the demand for these materials as a unique recovered paper grade has begun to emerge. Minimum recycled content laws and the introduction of new deinking technology at newsprint mills has influenced this trend.¹

Magazines and catalogs are collectively referred to as old magazines (OMG), because they are made of the same materials (coated groundwood or coated free-sheet papers) and are equally useful to the primary end users (newsprint mills). According to the Institute of Scrap Recycling Industries, OMG is defined as consisting of "baled coated magazines, catalogs, and similar printed materials," with total outthrows (i.e., contaminants) not exceeding three percent.²

Limited information is available about the generation and

recovery of OMG at national and state levels. Using national data concerning the generation of coated groundwood and coated free-sheet papers, North Carolina's generation in 1997 has been estimated to exceed 138,000 tons. Based on these calculations, OMG constitutes more than six percent of the total paper generated in the state. Recovery has been extrapolated from studies conducted in other regions of the country and is estimated to be about 11 percent.

During the past five years, demand for OMG has increased, due primarily to the new flotation deinking technology at newsprint mills. Additionally, recycled content legislation has inspired mill consumption of old newspaper (ONP) and OMG, and future demand for OMG is likely to increase in parallel with demand for ONP. With further increases in mill production efficiency in the short term, demand for OMG is expected to continue to increase slightly during the next five years.

Figure 1: National Generation of OMG 1993-1997 and 2002

	1993	1994	1995	1996	1997	2002
Magazines (tons)	2,738,594	2,864,473	2,865,456	2,617,655	2,856,902	2,980,225
Catalogs (tons)	1,932,186	2,090,980	2,104,186	1,924,288	2,121,293	2,212,862
Total OMG	4,670,780	4,955,453	4,969,642	4,541,943	4,978,195	5,193,087

Source: Calculations based on data from the Pulp and Paper 1998 North American Factbook

SUPPLY OF OMG

Generation

In North Carolina, the generation of OMG in 1997 was estimated to be more than 138,000 tons, up from 125,000 tons in 1993. Given constant per capita levels for the next five years, OMG generation in North Carolina is projected to exceed 147,000 tons in 2002.

These figures were derived from the total production of coated groundwood and coated free-sheet papers by applying percentage composition ratios for magazines and catalogs established by Jaakko Poyry.³ The generation figures for magazines and catalogs between 1993 and 1997 were calculated by applying the ratios of 33.4 percent for magazines and 24.8 percent for catalogs to the total shipment data (domestic production plus imports minus exports) for coated groundwood and coated free-sheet paper. The remaining 41.8 percent of coated groundwood and free sheet paper are used to produce inserts and direct mail materials.⁴

The national generation of OMG has increased slightly during the past five years (Figure 1). In fact, despite a decline in 1996, the overall generation of OMG has increased seven percent from 1993 to 1997. This five-year increase in total generation of OMG is a result of growth in both magazine and catalog shipments. Because of the strong economy and advertising climate in 1997, shipments of coated groundwood paper increased 13 percent, while coated free-sheet shipments increased six percent from 1996 levels.⁵

National generation figures were used to calculate per capita OMG generation rates. The per capita generation rates were then applied to the North Carolina population to estimate the total amount of magazines and catalogs generated in the state from 1993 to 1997. According to those calculations, 138,000 tons of magazines and catalogs were generated in North Carolina in 1997. Of the total OMG generated, 79,000 tons consisted of magazines and almost 59,000 tons were catalogs. Figure 2 illustrates the North Carolina generation of OMG from 1993 (125,000 tons) to 2002 (more than 147,000 tons).

This method of estimating OMG generation in North Carolina assumes that the state and national per capita averages are equal. As a result, this approximation may slightly overestimate the OMG generation in North Carolina.⁶ Furthermore, based on research conducted by the Northeast Recycling Council, it is also assumed that 66 percent of OMG is generated from residential sources.⁷ Therefore, more than 92,000 tons of OMG was generated from North Carolina residences and 46,000 tons of OMG from commercial sources in 1997.

Similar to the national and North Carolina trends, the generation of OMG is expected to increase for North Carolina's border states and the southeast region. Because of a lack of data, however, quantitative estimates for border states and regional OMG generation and recovery were not available.

Recovery

Local government recovery of OMG has been increasing steadily during the past five years. From 1993 to 1997, local government recovery of OMG has increased from 1,300 to more than 4,000 tons.⁸ According to a recent survey of the private sector, an additional 600 tons of recovered OMG was collected in 1997.⁹ These figures probably underestimate the total amount recovered, because magazines and catalogs continue to be included as a part of residential mixed paper (RMP) collections and are sometimes included as part of ONP. Because of difficulty in separating the OMG portion from the total RMP tons reported, no attempt has been made to adjust the recovery figures from local governments.

News stand returns have also been calculated to account for the largest portion of OMG that is recovered in North Carolina and sold to newsprint mills. These calculations assume that 33 percent of all magazines are sold to newsstands and that 50 percent of those magazines are unsold and returned to the distributors.¹⁰ Based on anecdotal evidence, approximately 90 percent of the magazines returned to distributors in North Carolina are recovered and sold as OMG to newsprint mills. The remaining 10 percent of

Figure 2: Generation of OMG in North Carolina, 1993 to 1997 and 2002

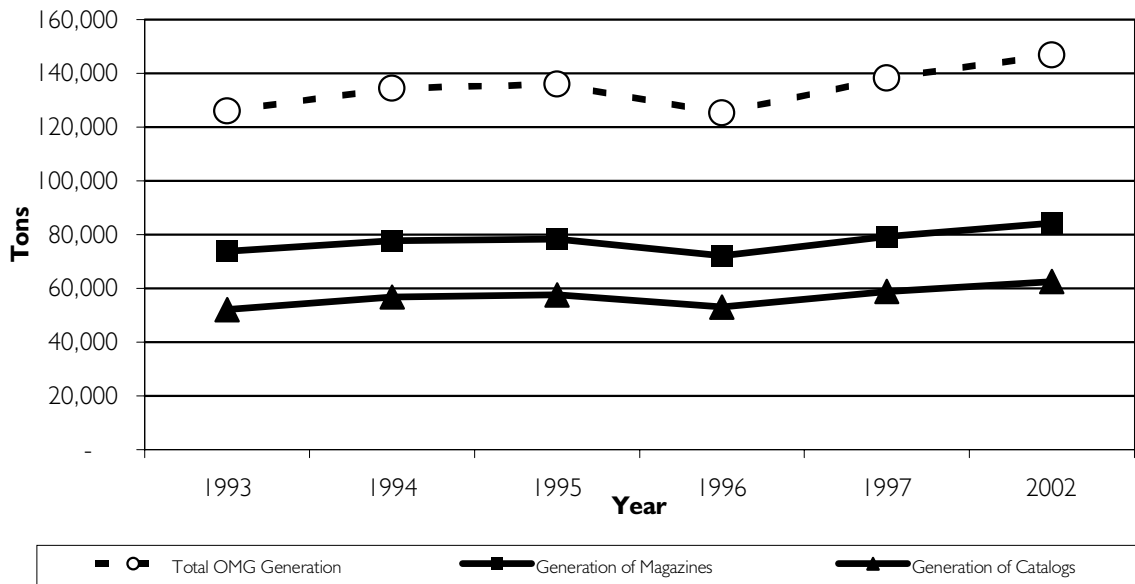


Figure 3. OMG Recovered in North Carolina 1993-1997 and 2002¹²

	1993	1994	1995	1996	1997	2002
OMG Generation	125,255	134,213	136,157	124,981	138,169	146,782
Local government	1,289	2,739	2,749	3,643	4,018	4,268
Private sector	10,675	11,438	11,604	10,652	11,788	12,509
Total Recovery	11,964	14,177	14,353	14,295	15,806	16,777
Percent Recovered	9.6 %	10.6%	10.5%	11.4%	11.4%	11.4%

unsold magazines do not return to distributors and are discharged by newsstands directly into the municipal solid waste stream.

Overall recovery of OMG has increased to more than 30 percent from 1993 to 1997. Nevertheless, despite improved local government collection, only 11.4 percent of the OMG generated in North Carolina is recovered. In comparison, this recovery rate is well below the 22 percent recovery reported for the 10 states comprising the Northeast Recycling Council region.¹¹ Figure 3 summarizes recovery in North Carolina for the past five years and 2002. Estimates for 2002 assume that per capita recovery remains at the 1997 level.

DEMAND

Similar to other mixed papers, OMG has traditionally been used as a low grade paper supply for the production of paperboard and tissue paper. Because they are highly interchangeable with respect to their end use contributions, the

demand for any single paper type within the mixed paper category has remained relatively low compared to other paper grades with more specific end uses, such as newsprint and corrugated cardboard. However, with the increased prevalence of flotation deinking processes at newsprint mills in the United States and the southeast, in particular, OMG has become a valuable ingredient in recycled newsprint production. As a result, it is increasingly collected as an independent grade of recovered paper. Because of difficulty in isolating OMG from RMP, the following discussion focuses primarily on the demand for OMG from newsprint mill end users.

Flotation deinking technology has only recently become prevalent in the United States.¹² With the widespread installation of flotation deinking systems during newsprint mill upgrades in the early to mid 1990s, there has been an increase in demand for clay coated papers (primarily OMG). During the flotation deinking process, OMG is used to stabilize the foam bubbles that bond to the newsprint ink and

rise to the surface of the flotation chamber.¹³ In addition to stabilizing the flotation process, the long fiber strands and the brightness of OMG also contribute to a higher quality recycled newsprint pulp.¹⁴

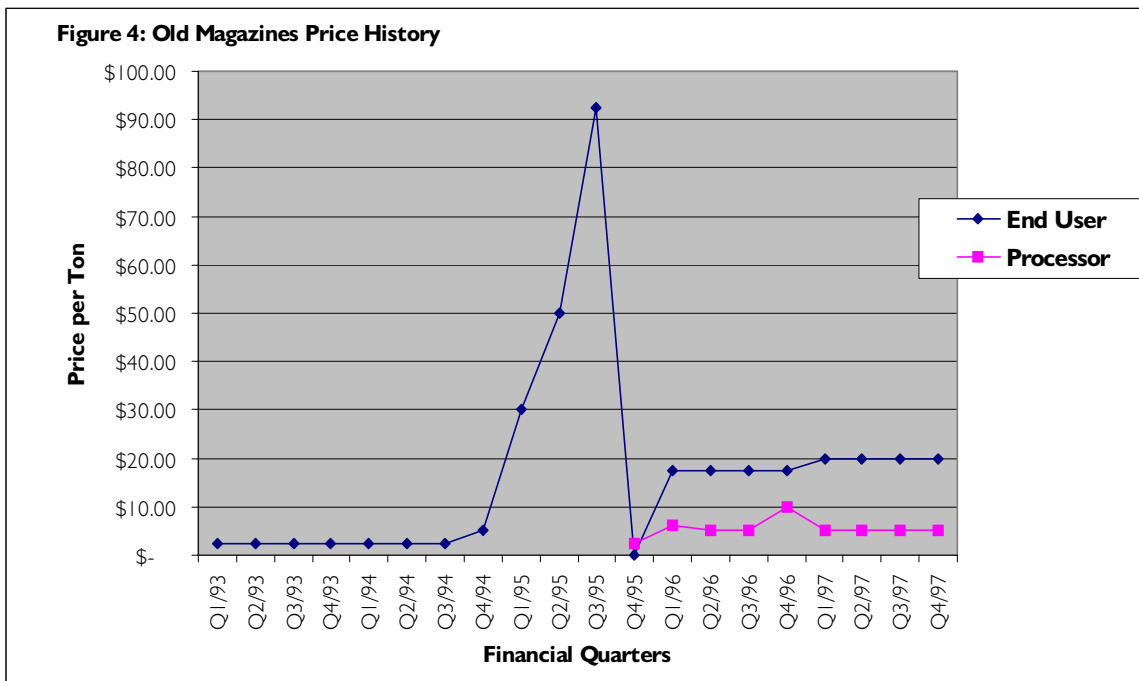
According to some newsprint mills surveyed, the most efficient ratio of OMG to ONP in the floatation deinking process is 30:70, respectively. However, the precise ratio of OMG to ONP varies based on the mill technology and production procedures. Moreover, many mills vary the ratios of OMG and ONP based on price, quantity, and availability of supply.¹⁵ Insufficient data were available to estimate quantities of OMG consumed in North Carolina or the southeast region. As a surrogate measure of the demand for OMG in North Carolina, the following section describes the consumption patterns of some of the largest newsprint mills in the Southeast that reported using OMG in their flotation deinking systems. These descriptions do not imply endorsement by DPPEA or DENR of any company or its products.

- **Alabama River Newsprint Co., Perdue Hill, Alabama,** In 1997, the Perdue Hill mill produced 245,000 tons of newsprint sheet with approximately 115,500 tons of recovered paper feedstock. Nine percent of the recovered feedstock consisted of OMG. The mill reports using 10,500 tons of pre-consumer coated groundwood as its clay feedstock in 1997. The remaining 91 percent of the recovered feedstock consisted of No. 8 ONP. In 1997, only about 2.5 percent of the recovered feedstock was obtained from North Carolina. The mill does not have any plans to expand recovered paper capacity. However, the Perdue Hill mill estimates that, on average, mills in the Southeast increase their recovered paper capacity by roughly 2.5 percent per year due to improvements in process efficiency.
- In 1997, **Augusta (Georgia) Newsprint Company,** produced 35 percent recycled content newsprint with approximately 60,000 tons of OMG and 160,000 tons of Number 8 News. Approximately 27 percent of the recovered paper feedstock consisted of OMG in 1997. Approximately 15 percent of the recovered ONP was supplied by North Carolina sources. Less than one percent of the OMG feedstock was obtained from North Carolina. Augusta plans to increase recycled content to 40 percent by 2002 given the possibility that minimum content legislation may expand or increase in the southeast states. As a result of the increase to 40 percent and the annual 2.5 per-

cent increase in production due to efficiency improvements, the mill's demand for OMG will increase to approximately 77,000 tons in 2002.

- In 1997, **Bear Island Paper Co., L.L.C., Ashland, Virginia,** produced newsprint with approximately 28 percent recovered paper feedstock. Bear Island's recovered paper composition consists of 10 percent OMG and 90 percent ONP. In 1997, Bear Island obtained 12 percent of its total 92,000 tons of recovered feedstock from North Carolina. Specifically, North Carolina provided 19,700 OMG and ONP in 1997. Bear Island plans to expand recovered paper capacity to 34 percent by December 1998, with long term plans to achieve a 40 percent recovered paper feedstock.
- **Bowater, Calhoun, Tennessee,** produces newsprint using an average feedstock ratio of 80 percent virgin and 20 percent recovered paper. The mill currently produces newsprint sheets to different states varying its range of recycled content from 80 percent virgin and 20 percent recycled to 60 percent virgin and 40 percent recycled. The mill used approximately 200,000 tons of recovered paper in 1997. In 1997, the recovered paper feedstock ratios were approximately 30 percent OMG and 70 percent ONP. Although exact figures were not available, the News Group magazine distributors reported sending most of their magazine returns from North Carolina to the Calhoun mill. Currently, there are no plans for mill expansion in Calhoun, but increased mill efficiencies are expected to increase the demand for recovered paper.
- Despite being the largest supplier of recycled content newspaper in the southeast region, **Southeast Paper Manufacturing Company & Southeast Recycling Corporation, Dublin, Georgia,** did not consume any OMG in 1997 because of their reliance on washing deinking technology.

During the past five years, there has been an unprecedented increase in the demand for OMG primarily because of the new flotation deinking technology at newsprint mills. Additionally, recycled content legislation has galvanized mill consumption of ONP and OMG and should be recognized as an essential stimulant for OMG demand. Future demand for OMG is likely to increase in parallel with demand for ONP.



Source: Recycling Times South Region; Processor prices not available prior to April 1996

SUPPLY / DEMAND RELATIONSHIP

The demand for OMG has increased during the past five years because of increased production in recycled content newsprint and the use of clay-coated papers in the deinking of ONP. With further increases in mill production efficiency in the short term, it appears that demand for OMG will continue to increase slightly during the next five years. In summary, demand for OMG in the southeast region could be characterized as consistent and growing.

As a result of the relatively recent emergence of newsprint demand, OMG collection in North Carolina has yet to evolve as a recovered paper commodity with consistent supply sources. However, as the price for OMG rose throughout 1994 and 1995, source separated OMG collection became increasingly popular. Because of increased collection efforts in surrounding states, the supply of OMG increased in the region and the price stabilized in 1996 and 1997. Due to its proximity to several flotation deinking mills and the steady increase in production of recycled content newsprint during the next few years, North Carolina has an opportunity to satisfy the slight increase in regional demand for OMG through increased recovery levels.

Price History

As illustrated in Figure 4, the price for OMG has remained at approximately \$20 per ton for processed OMG since the third quarter of 1996. The dramatic fluctuation in price from late 1994 to the end of 1995 reflects the sudden increase in domestic demand for OMG due to the installa-

tion of deinking technology at several mills as well as an increase in demand for exports. Prior to 1995 and the installation of deinking mills, the low price reflected the lack of demand for OMG as a discrete paper grade and its inclusion in the mixed paper collection category.

CONCLUSION

North Carolina has strong potential to increase its recovery of OMG from the current rate of 11 percent, despite the recent stability between supply and demand reflected in the consistent price for OMG in the southeast region. By focusing on long-term strategies that stimulate demand, North Carolina can achieve sustainable increases in recovery levels. Examples of such demand stimulants include encouraging the regional newsprint mills to increase total recovered paper consumption through increased recycled content mandates or cooperative agreements. In some cases, it might be equally effective to encourage mills to link OMG purchases with current ONP supplies from North Carolina. Given such assurances of end user demand, local governments would be more likely to allocate the resources necessary to achieve higher recovery of OMG.

RECOMMENDATIONS

Since OMG is just beginning to emerge as an independent paper grade, North Carolina should identify the largest sources of OMG throughout the state. Once the primary sources of OMG have been identified, end users must be contacted to determine the potential for increasing demand. To stimulate demand, both cooperative and mandatory in-

centives for higher recycled content newsprint should be investigated. Finally, and most importantly, local governments must establish long term relationships with end users to determine the demand potential and financial return on their investment in OMG collection efforts.

The following actions would lead to improvements in the recovery of OMG in North Carolina:

- The state should support additional research to determine the greatest sources of generation and to identify the most effective areas for increased OMG recovery efforts.
 - Newsprint mills should be consulted about the possibility of increasing OMG purchases from North Carolina. Such discussions should involve local communities and mills. In order to support potential increases in the recovery of OMG, the state should facilitate seminars between the two groups.
 - Local communities with source separated ONP collection should be targeted for further development of OMG collection systems, and collection of an ONP / OMG mix should be encouraged, especially where the end users are newsprint mills. Based on national averages, the ratio of OMG to ONP *generated* is roughly 15:85, while the ratio of OMG to ONP *collected* is only 5:95.¹⁶ State-level grant programs as well as partnerships with end users could provide incentives and support for local communities attempting to increase OMG collection.
- Current OMG collection systems should be expanded to achieve additional efficiency, especially in larger metropolitan areas (i.e. the Triad, Charlotte, and the Triangle).
 - In large metropolitan areas, increased emphasis should be placed on commercial sources of generation, especially larger office building complexes and mall outlets with bookstores.
 - To increase the quantity of OMG collected throughout North Carolina, equitable, waste reduction programs, such as pay-as-you-throw (PAYT), should be encouraged. Pay-as-you-throw systems charge users based on the amount of waste generated, creating financial incentives to reduce and recycle.

¹ In addition to containing similar physical properties, the clay coatings in magazines and catalogs serve equivalent functional purposes in the newsprint deinking process.

² Institute of Scrap Recycling Industries, Inc. *Scrap Specifications Circular 1998*, p. 34

³ Miller Freeman, Inc., *Pulp & Paper 1995 North American Factbook*, "Paper Grades: Coated Papers," p.187. The ratios of 33.4 and 24.8 are based on logarithmic projections of Jaakko Poyry percentages for the distribution of magazines and catalogs respectively. Total production of coated groundwood and coated free-sheet is equal to domestic production plus imports minus exports.

⁴ Miller Freeman, Inc., *Pulp & Paper 1995 North American Factbook*, "Paper Grades: Coated Papers," p. 187.

⁵ Miller Freeman, Inc., *Pulp & Paper 1998 North American Factbook*, "Paper Grades: Coated Papers," k - *Paper Grades: Coated Papers*. p. 200-201

⁶ Franklin Associates, Ltd. *Old Newspaper and Old Magazines Supply in the Northeast*. Prepared for the Northeast Recycling Council, April 1996. P.3-1. Based on limited research it is hypothesized that consumption of magazines increases as income levels rise. Furthermore, the average income level in North Carolina is below the national average.

⁷ Ibid, p.B-2

⁸ Department of Environment and Natural Resources, *North Carolina Solid Waste Management Annual Report July 1996- June 1997*. p. 29

⁹ DPPEA, spring 1998.

¹⁰ Franklin Associates, Ltd. *Old Newspaper and Old Magazines Supply in the Northeast*. Prepared for the Northeast Recycling Council, April 1996. Appendix B. p.B-2

¹¹ Ibid. p.B-21

¹² John Ettore, "Magazines Recycling May Boom as New Technology Increases", *Fiber Market News, Annual Paper Stock Issue, 1990*. P.47

¹³ David Westenberger, "What is the role of clay in flotation deinking?", *Recycled Paper Technology, An Anthology of Published Papers* Editor Mahendra Doshi. 1994. p. 133.

¹⁴ Based on personal conversations with newsprint mill end users in the Southeast region. It should be noted that the quality of fiber and level of brightness depends on the composition of the basestock of the publication paper. Coated publication papers range in quality from No.1 which is used for annual reports and is very bright with long fibers to No.5 which is used for most catalogs and some magazines and contains a higher groundwood content which is less bright. While clay is a common ingredient in the coating of all the grades of publication papers, the amount of clay is generally highest in the No.4 grade coated paper which is the most grade used to produce magazines.

¹⁵ While there is some substitution between ONP and OMG depending on price, quality, and availability, the flotation deinking process requires some clay coated papers (or clay additives) in order function most efficiently. The five newsprint mills surveyed for this report estimated the range of OMG required for optimum deinking efficiency between 10 and 30 percent.

¹⁶ Communication with Moore and Associates. September 1998.