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Fuelwood Consumption of Midsouth Pulpmills, 1987

Dennis M. May and John S. Vissage

SUMMARY

Results of the first fuelwood canvass of wood-using pulpmills in the Midsouth revealed that 46 pulpmills burned 12.5 million green tons of fuelwood in 1987. Mill residues were the primary form of fuelwood consumed. Bark comprised over half of the total consumption. In addition to mill residues, over 1 million green tons of roundwood were also burned as fuel. Fuelwood was consumed by pulpmills in all seven States of the region. Alabama alone accounted for one-third of the total consumption. Fuelwood consumption was concentrated in the larger pulpmills. Eleven states supplied fuelwood to the region's pulpmills.

Keywords: Bark, mill residues, roundwood.

INTRODUCTION

Interest in wood as a source of energy has been growing in the United States since the oil crisis of the early 1970's. Not only did the oil crisis make fuelwood costs competitive with those of fossil fuels, it also increased awareness of the finiteness of fossil fuels, resulting in legislation supporting energy self-sufficiency. These factors bolstered the demand for fuelwood, a renewable resource that was readily available. As a result, fuelwood consumption in the United States increased 53 percent between 1972 and 1983 and was the primary end use of this country's wood and bark resources in 1983 (Koning and Skog 1987).

The wood products industry burns a major portion of the fuelwood in this country. Both the solid-wood and pulp and paper sectors of the industry have increased their fuelwood use and made gains in energy self-sufficiency. In 1983, fuelwood provided more than three-quarters of the solid-wood sector's energy needs and more than half of the pulp and paper sector's needs (Goetzl 1985).

The significance of these national trends led to a regional assessment of fuelwood use in the pulp and paper sector of the wood products industry in the Midsouth. In a complete canvass of all wood-using pulpmills in the Midsouth, individual mills were surveyed as to the quantity, type, and source of fuelwood they consumed in 1987. This canvass was part of the annual survey of pulpwood production conducted by the USDA Forest Service and is the first in a continuing assessment of fuelwood use in the Midsouth's pulping industry. The results presented here are all from that survey.

CONSUMPTION BY FUELWOOD TYPE

In 1987, 46 of the 56 wood-using pulpmills in the seven States of the Midsouth (fig.1) consumed 12.5 million green tons of fuelwood (table 1) with an energy equivalent of 107.3 trillion BTU's.[1] Mill residues were the primary form of fuelwood consumed—a reflection of the extensive use of both internally generated and purchased bark. Bark comprised over half of the total fuelwood consumption in 1987. Bark internally generated from roundwood pulping furnish was widely used (85 percent of those mills using fuelwood burned their own bark) (table 2), and accounted for three-quarters of the total bark burned. As would be expected, the species composition of the internally generated bark mirrored that of the roundwood pulping furnish in the Midsouth, roughly 60 percent softwood and 40 percent hardwood. Sawdust, another mill residue and common form of industrial fuel, supplied 15 percent of the 1987 fuelwood consumption. Not surprisingly, three-quarters of the

[1]Based on U.S. Department of Energy conversion factor of 17.2 million BTU's per ovendry ton of fuelwood.

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sawdust burned was softwood, a reflection of the pine-dominated sawmill industry in the region. Chips comprised the smallest proportion of the total fuelwood consumption because only those chips unsuited for pulping were burned.

In addition to mill residues, over 1 million green tons of roundwood were also burned in 1987. This roundwood included whole trees and portions of trees harvested from forests for the sole purpose of being burned as fuel. As expected, over 90 percent of the roundwood consumed was hardwood. This species group generally has higher residual volumes following harvests of traditional timber products and is an available and under-utilized resource in many portions of the region. Although eight pulpmills in the region used this source of fuelwood (table 2), there should be little concern over its impact on supplies of traditional timber products. In 1987, roundwood fuelwood consumption was only about 2 percent of the region's roundwood pulpwood receipts.

A full 20 percent of the fuelwood consumed by the region's pulpmills was categorized as mixed. This included fuelwood that could not be broken down by type or types of fuelwood with volumes too insignificant to be mentioned separately. This category probably contains the types previously discussed as well as minor types such as particle board waste and wood shavings.

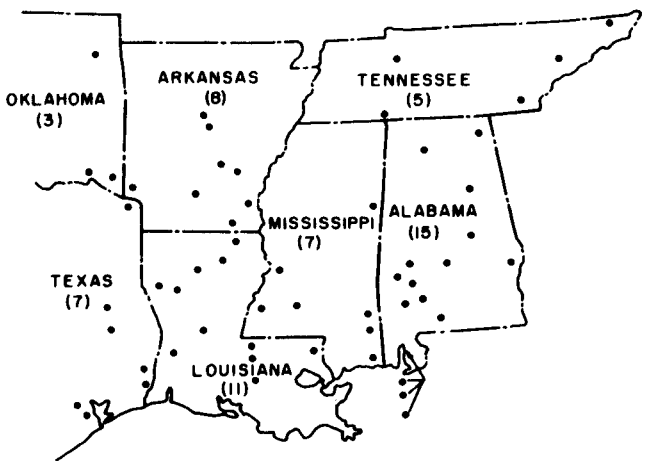

Figure 1.—*The seven Midsouth States and the number of pulpmills in each. Each dot represents the location of one wood-using pulpmill.*

Table 1.—*Fuelwood consumption of Midsouth pulpmills by type*

Type	Softwood	Hardwood	Total
		Green tons	
Bark—internal	3,201,054	2,057,140	5,258,194
purchased	752,318	713,571	1,465,889
Chips	198,790	144,050	342,840
Other mix	185,173	2,268,102	2,453,275
Roundwood	90,804	1,000,406	1,091,210
Sawdust	1,409,900	458,389	1,868,289
All types	5,838,039	6,641,658	12,479,697

CONSUMPTION BY STATE

Pulpmills in Alabama alone burned over one-third of the regional consumption (table 3). Alabama and Louisiana together accounted for over half of the total regional consumption. This is not surprising considering Alabama had the highest number of mills burning fuelwood and Louisiana the second highest. Both States also had a large proportion of high-capacity mills where fuelwood consumption was concentrated (table 4).

Of the 10 pulpmills that did not burn fuelwood in 1987, seven were in the lowest pulping capacity class (500 tons per day or less). Only three of the 10 mills in the lowest pulping-capacity class burned any fuelwood in 1987. Not only did fewer small mills burn fuelwood, but they also burned proportionately less fuelwood. The average consumption of the surveyed wood-burning pulpmills was more than a quarter million green tons in 1987. Pulpmills in the lowest pulping-capacity class burned less than half the average, whereas mills with pulping capacities in excess of 1,000 tons per day exceeded the average. This concentration of fuelwood consumption in larger pulpmills results from their higher energy requirements and their ability to bear the high costs associated with the startup or conversion to fuelwood energy systems. Interestingly, the trend of increased fuelwood consumption with increased mill size is reversed when calculated on the basis of units of pulping capacity (table 4).

The total fuelwood demand of the Midsouth pulpmills was supplied by 11 States—the seven within the region and four from outside (table 5). Each State in the Midsouth supplied at least 60 percent of its own fuelwood. The remainder for most States came from other Midsouth States; Alabama and Tennessee used fuelwood from the four outside States as well (table 6). The leading consumer of fuelwood, Alabama, was also the leading supplier, and Georgia was by far the leading supplier from outside the region.

Dennis M. May is research forester and John S. Vissage is forester, U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station, Starkville, MS 39759.

Table 2.—*Number of Midsouth pulpmills consuming fuelwood by State and type*

State	Number of mills		Fuelwood type					
			Bark					
	Consuming fuelwood	Total canvassed	Internal	Purchased	Chips	Sawdust	Other mixed	Roundwood
	Number of mills[2]							
Alabama	14	15	12	5	3	2	3	3
Arkansas and Oklahoma[1]	7	11	5	3	0	2	3	2
Louisiana	10	11	9	2	1	3	6	2
Mississippi	7	7	6	1	0	1	5	0
Tennessee	3	5	2	0	0	3	0	0
Texas	5	7	5	3	1	1	2	1
All States	46	56	39	14	5	12	19	8

[1]Oklahoma combined with Arkansas to avoid disclosing individual mill data.
[2] Rows are not additive.

Table 3.—*Fuelwood consumption of Midsouth pulpmills by State and type*

State	Fuelwood	Softwood	Hardwood	Total
		Green tons		
Alabama	Bark—internal	1,056,175	990,179	2,046,354
	purchased	157,201	163,949	321,150
	Chips	198,691	94,645	293,336
	Other mix	3,871	180,385	184,256
	Roundwood	0	507,283	507,283
	Sawdust	1,184,506	19,371	1,203,877
	State total	2,600,444	1,955,812	4,556,256
Arkansas and Oklahoma[1]	Bark —interal	318,561	235,925	554,486
	purchased	403,380	226,587	629,967
	Other mix	0	450,159	450,159
	Roundwood	0	159,425	159,425
	Sawdust	25,345	47,897	73,242
	State total	747,286	1,119,993	1,867,279
Louisiana	Bark—internal	621,021	320,385	941,406
	purchased	42,571	213,355	255,926
	Chips	99	20,702	20,801
	Other mix	162,302	790,523	952,825
	Roundwood	0	197,493	197,493
	Sawdust	68,132	44,136	112,268
	State total	894,125	1,586,594	2,480,719
Mississippi	Bark—internal	276,658	353,181	629,839
	purchased	72,000	86,000	158,000
	Other mix	19,000	681,543	700,543
	Sawdust	46,186	0	46,186
	State total	413,844	1,120,724	1,534,568
Tennessee	Bark—internal	482,294	16,942	499,236
	Sawdust	85,731	332,634	418,365
	State total	568,025	349,576	917,601
Texas	Bark—internal	446,345	140,528	586,873
	purchased	77,166	23,680	100,846
	Chips	0	28,703	28,703
	Other mix	0	165,492	165,492
	Roundwood	90,804	136,205	227,009
	Sawdust	0	14,351	14,351
	State total	614,315	508,959	1,123,274
	All States	5,838,039	6,641,658	12,479,697

Table 4.—*Fuelwood consumption of Midsouth pulpmills by mill size*

Pulping capacity	Number of mills	Softwood	Hardwood	Total	Consumption	
					Average per mill	Average per ton pulping capacity
Tons/day		*Green tons*				
1–500	3	20,387	352,824	373,211	124,403	1.2
500–1000	11	1,859,279	617,587	2,476,866	225,169	0.8
1000–1500	18	2,153,626	3,301,005	5,454,631	303,035	0.7
1500–2000	8	879,897	1,706,764	2,586,661	323,332	0.5
>2000	6	924,850	663,478	1,588,328	264,721	0.3
Total	46	5,838,039	6,641,658	12,479,697		
Average					271,298	0.6

Table 5.—*Sources of Midsouth pulpmill fuelwood by State and type*

State	Fuelwood	Softwood	Hardwood	Total
		Green tons		
Alabama	Bark—internal	937,834	781,167	1,719,001
	purchased	140,051	103,202	243,253
	Chips	198,691	94,645	293,336
	Other mix	6,871	169,203	176,074
	Roundwood	0	365,617	365,617
	Sawdust	1,175,195	22,050	1,197,245
	State total	2,458,642	1,535,884	3,994,526
Arkansas	Bark—internal	299,431	241,942	541,373
	purchased	383,380	189,809	573,189
	Other mix	0	284,576	284,576
	Roundwood	0	66,386	66,386
	Sawdust	30,209	47,897	78,106
	State total	713,020	830,610	1,543,630
Florida	Bark—internal	330	160	490
	Other mix	0	192	192
	State total	330	352	682
Georgia	Bark—internal	148,378	28,669	177,047
	purchased	9,310	9,569	18,879
	Roundwood	0	39,350	39,350
	Sawdust	11,757	7,994	19,751
	State total	169,445	85,582	255,027
Kentucky	Bark—internal	8,051	0	8,051
	Sawdust	0	7,799	7,799
	State total	8,051	7,799	15,850
Louisiana	Bark—internal	605,627	272,036	877,663
	purchased	57,581	230,817	288,398
	Chips	99	20,702	20,801
	Other mix	52,244	644,794	697,038
	Roundwood	0	157,297	157,297
	Sawdust	58,279	43,334	101,613
	State total	773,830	1,368,980	2,142,810
Mississippi	Bark—internal	541,035	500,522	1,041,557
	purchased	79,840	153,446	233,286
	Other mix	126,058	696,691	822,749
	Roundwood	0	102,316	102,316
	Sawdust	46,186	26,820	73,006
	State total	793,119	1,479,795	2,272,914

Table 5.—*Sources of Midsouth pulpmill fuelwood by State and type—Continued*

State	Fuelwood	Softwood	Hardwood	Total
		Green tons		
North Carolina	Bark—internal	4,477	0	4,477
	State total	4,477	0	4,477
Oklahoma	Bark—internal	15,356	12,698	28,054
	Other mix	0	210,115	210,115
	Roundwood	0	131,635	131,635
	State total	15,356	354,448	369,804
Tennessee	Bark—internal	195,831	78,223	274,054
	purchased	0	3,048	3,048
	Sawdust	83,285	287,342	370,627
	State total	279,116	368,613	647,729
Texas	Bark—internal	444,704	141,723	586,427
	purchased	82,156	23,680	105,836
	Chips	0	28,703	28,703
	Other mix	0	262,531	262,531
	Roundwood	90,804	137,805	228,609
	Sawdust	4,989	15,153	20,142
	State total	622,653	609,595	1,232,248
	All States	5,838,039	6,641,658	12,479,697

Table 6.—*Destinations and origins of Midsouth pulpmill fuelwood*

Destination	Origin	Softwood	Hardwood	Total
		Green tons		
Alabama	Alabama	2,375,509	1,464,795	3,840,304
	Florida	330	352	682
	Georgia	96,364	85,582	181,946
	Louisiana	50	1,253	1,303
	Mississippi	110,489	331,276	441,765
	Tennessee	17,702	72,554	90,256
	State receipts	2,600,444	1,955,812	4,556,256
Arkansas and Oklahoma[1]	Arkansas	654,207	649,489	1,303,696
	Louisiana	30,794	50,838	81,632
	Mississippi	0	183	183
	Oklahoma	15,317	354,268	369,585
	Texas	46,968	65,215	112,183
	State receipts	747,286	1,119,993	1,867,279
Louisiana	Alabama	0	106	106
	Arkansas	41,307	106,359	147,666
	Louisiana	674,135	1,243,252	1,917,387
	Mississippi	140,790	106,909	247,699
	Texas	37,893	129,968	167,861
	State receipts	894,125	1,586,594	2,480,719
Mississippi	Alabama	10,491	57,434	67,925
	Louisiana	9,873	54,032	63,905
	Mississippi	393,480	1,009,258	1,402,738
	State receipts	413,844	1,120,724	1,534,568
Tennessee	Alabama	72,642	13,549	86,191
	Georgia	73,081	0	73,081

Table 6.—*Destinations and origins of Midsouth pulpmill fuelwood—Continued*

Destination	Origin	Softwood	Hardwood	Total
		Green tons		
	Kentucky	8,051	7,799	15,850
	Mississippi	148,360	32,169	180,529
	North Carolina	4,477	0	4,477
	Tennessee	261,414	296,059	557,473
	State receipts	568,025	349,576	917,601
Texas	Arkansas	17,506	74,762	92,268
	Louisiana	58,978	19,605	78,583
	Oklahoma	39	180	219
	Texas	537,792	414,412	952,204
	State receipts	614,315	508,959	1,123,274
	Total receipts	5,838,039	6,641,658	12,479,697

[1]Oklahoma combined with Arkansas to avoid disclosing individual mill data.

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