

CHANGES IN NATIONAL FOREST TIMBER SALES IN THE CENTRAL HARDWOOD REGION

William G. Luppold and John E. Baumgras¹

Abstract—National forests contain only a small percentage of the sawtimber inventory in the Central Hardwood Region but many have proportionately more high quality timber than adjacent private lands. As a result, these forests are important to sawmill and other primary processors in this region. In this paper we analyze timber sales from 14 national forests in the Central Hardwood Region to determine the impact of changing forest policies on the forest-products industry. Since the mid-1980's, sales of hardwood and softwood sawtimber have been declining steadily, while the relative volumes of higher value species have increased. Because of this change in the mix of products sold and increasing prices of higher valued hardwood species and pine, total revenue from timber sales have declined moderately, while physical volumes sold have declined by more than 50 percent.

INTRODUCTION

The National Forest System was established to provide timber and protect watersheds for the citizenry of the United States. In recent years timber sales from these forests have declined in large part because of increasing public and political pressures. Recent policy changes with respect to the management of national forests have placed greater emphasis on watershed health, sustainable forest ecosystems, and recreation.² Still, the eastern national forests may be an important source of quality timber for industries proximate to these forests (Luppold and others 1998). In this paper we analyze changes in timber sales from 14 national forests in the Central Hardwood Region to determine the impact of changing forest policies on the forest-product industry in this region.

Specifically we analyze the volume and value of sawtimber sold by the national forests in the Central Hardwood Region in 1997, the degree to which timber sales have changed since 1985, and whether the changes in sales volume and revenue are consistent among these forests. Although our primary focus is hardwood sawtimber sales, sales of pulpwood and softwood sawtimber also are examined as these products are part of the total mix of timber products sold.

THE DATA

The data used in this study were developed from reports on timber cut and sold on national forests under sales and land exchanges, issued by national forests in Region 8 (southern) and Region 9 (eastern). These reports contain timber sales volumes and revenue for sawtimber, pulpwood, and other products sold by species or species group. Sawtimber as defined by the USDA Forest Service is hardwood trees larger than 11 inches in diameter at breast height (dbh) and softwood trees greater than 9 inches dbh. Hardwood pulpwood is 6 to 11

inches dbh while softwood pulpwood is 5 to 9 inches dbh. The reports were collected for the period beginning in 1985 and ending in 1997. Inventory data were obtained from the Forest Service's Eastwide Forest Inventory Data Base and the Northeastern Research Station's Forest Inventory and Analysis Unit (Hansen and others 1992).

It should be noted that there are variations in the cut and sold reports. For this study reports, were obtained for separate forests except for the states of North Carolina and Georgia. Cut-and-sold reports for North Carolina contain sales from the Pisgah, Nantahala, Croatan, and Uwharrie National Forests. The Pisgah and Nantahala are large, predominantly hardwood forests located in the western mountains of North Carolina; the Croatan and Uwharrie are small and primarily softwood forests located in the Piedmont and Coastal Plain Region. The reports for Georgia combine the Chattahoochee and the Oconee National Forest. The Chattahoochee is primarily a hardwood forest while the Oconee is primarily pine.

All volumes from cut-and-sold reports are in thousand board feet (MBF) International scale though many products are sold using other units of measurement. Sawtimber traditionally has been sold using the Scribner or International scale and pulpwood has been sold by the cord or hundred cubic feet (CCF). Since 1996, most forests in Region 8 recorded sawtimber and pulpwood sales volumes in cubic meters (J. Kirk Eichenberger, pers. commun.). The exception is the Daniel Boone, which began reporting in cubic meters in 1997. During this transition, the conversion of pulpwood from CCF to MBF for the cut-and-sold report changed from 0.77 to 0.55 MBF/CCF. Thus pulpwood sales volumes in Region 8 since 1996 must be multiplied by 1.4 to be consistent with sales volumes prior to 1996.

¹ Project Leaders, USDA Forest Service, Northeastern Research Station, 241 Mercer Springs Road, Princeton, WV 24740.

² Developed from "A gradual unfolding of a national purpose: a natural resource agenda for the 21st century," by Michael P. Dombeck, Chief of the USDA Forest Service, March 2, 1998.

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NATIONAL FORESTS OF THE CENTRAL HARDWOOD REGION

The Central Hardwood Region as defined by Hicks and others (1997), includes 14 national forests. These forests are listed geographically in Table 1 starting with the most southern forest on the eastern boundary of the region and ending with the most southern forest on the western boundary of the region. Although Ouachita National Forest in central Arkansas lies at the southwestern edge of the Central Hardwood Region, it was excluded from this study because it is predominantly southern pine. Also, the national forests in Virginia (Jefferson and George Washington) and North Carolina (Pisgah and Nantahala) were combined in Table 1 because parts of these forests overlap Forest Service survey regions.

The national forests of the Central Hardwood Region vary considerably with respect to species mix. Although the Chattahoochee has large volumes of red and white oak, eastern white pine is the most predominant species (single species or species group with the greatest volume). The Cherokee contains significant volumes of select red oak, white pine, and yellow-poplar. The combination of oak, yellow-poplar, and pine is also the composition of the North Carolina forests while the predominant species of the Virginia forests are the oaks and yellow-poplar. The Monongahela National Forest may be the most unusual

national forest in the Central Hardwood Region because it includes relatively large volumes of black cherry, soft maple, and red spruce.

Although forest-survey statistics indicate that other red oaks (scarlet and southern red oaks) are the most predominant species group on the Daniel Boone, select white oak and yellow-poplar are the primary individual species. White oak and yellow-poplar also are the primary species on the Wayne while the Hoosier and Shawnee are oak/hickory forests with high proportions of select white oak.

The Mark Twain is the most fragmented forest in the Central Hardwood Region with nine noncontiguous districts. Although other red oaks account for 36 percent sawtimber volume, shortleaf pine is the most predominant species. Shortleaf pine is the most important species in the Ozark, though, select red and white oaks account for 34 percent of the sawtimber volume. The St. Francis is the only forest in the western portion of the Central Hardwood Region without a major pine component.

CHANGES IN NATIONAL FOREST TIMBER SALES

Volumes of hardwood timber sold from national forests in the Central Hardwood Region in 1997 are presented in Table 2.

Table 1—Sawtimber volume^a, hardwood component, and major species^b of national forests in the Central Hardwood Region

National forest	State	Sawtimber volume	Hardwood component	Major species
		<i>Million bf</i>	<i>Percent</i>	
Chattahoochee ^c	GA	4311.1	63.7	WP ^d , OWO, ORO, SRO
Cherokee	TN	3412.0	61.6	SRO, WP, YP, OP
Pisgah and Nantahala ^e	NC	7443.9	80.4	OWO, SRO, ORO, YP, SWO, WP, OP
Jefferson and G. Washington	VA	7803.0	83.9	OWO, SRO, ORO
Monongahela	WV	5181.6	83.7	SRO, BC, YP, SM, RS, OWO
Daniel Boone	KY	3437.2	85.0	ORO, SWO, YP, ORO
Wayne	OH	842.5	98.1	SWO, YP, OWO
Hoosier	IN	795.7	92.0	SWO, ORO, OWO, HK
Shawnee	IL	1020.0	95.9	ORO, SWO, HK
Mark Twain ^f	MO	3352.0	68.4	ORO, SLP
Ozark	AK	4030.2	70.9	SLP, SWO, SRO
St. Francis	AK	238.6	83.2	SWO, ORO, HK, YP

^a Sawtimber volumes based on survey unit data extracted from the Eastwide Forest Inventory Data Base. Estimates are approximate since small portions of national forests may be in adjacent forest survey units.

^b When combined, species equal or exceed 50 percent of the resource ranked in order of volume.

^c Does not include the Oconee National Forest.

^d SWO-select white oak, SRO-select red oak, OWO-other white oak, ORO-other red oak, YP-yellow-polar, HK-hickory, BC-black cherry, SM-soft maple, BE-beech, SLP-shortleaf pine, WP-eastern white pine, RS-red spruce, OP-other pine.

^e Mountain survey region of North Carolina.

^f Developed from Kingsley and Law 1991.

Table 2— National forest timber sales in 1997 and changes in sawtimber sales between 1985 and 1997 with respect to volume in the Central Hardwood Region

National forest	Volume of hardwood sawtimber sold in 1997	Change in volume of hardwood sawtimber sold	Volume of softwood sawtimber sold in 1997	Change in volume of softwood sawtimber sold
	<i>MBF</i>	<i>Percent</i>	<i>MBF</i>	<i>Percent</i>
Chattahoochee/ Oconee	1609.1	-73.5	2138.8	-92.7
Cherokee	3227.1	-75.6	7171.2	-36.7
Pisgah/Nantahala	6718.2	-74.7	7087.5	-38.5
Jefferson/ Washington	11136.5	-34.2	746.0	-88.0
Monongahela	9267.6	-50.1	211.4	-87.6
Daniel Boone	8070.0	-66.2	990.1	-87.2
Wayne/Hoosier	3802.2	-73.2	1870.3 ^a	3116.3 ^a
Shawnee	56.7	-96.1	8.4	-99.3
Mark Twain	25884.1	-36.9	12138.4	43.7
Ozark/St. Francis	5001.3	-30.5	34326.4	125.7

^a Volume of softwood sold and increases in softwood sales were influenced by a salvage sale in 1997.

The Wayne and Hoosier National Forests are combined in Table 2 because they were operated as a single forest for 11 of the 13 years covered by this study. Similarly, timber sales on the Chattahoochee and Oconee and the Ozark and St. Francis National Forests are reported jointly.

Hardwood sawtimber sales on the Chattahoochee/Oconee, Cherokee and North Carolina (southern Appalachian) National Forests have declined by nearly 75 percent between 1985 and 1997. Except for the Chattahoochee/Oconee, softwood sales have dropped less than hardwood sales. Much of the decline on the Chattahoochee/Oconee was caused by reduced sales on the Oconee. Although the southern Appalachian forests are predominantly hardwood, softwood timber was the major product sold from these forests in 1987.

Sales of hardwood sawtimber from the Jefferson/Washington, Monongahela, and Daniel Boone (mid Appalachian) also declined 34 to 66 percent. The volume of softwood sawtimber sold from these forests has declined by nearly 90 percent. In 1997, hardwood sales were 15 times greater than softwood sales in these forests.

Hardwood sawtimber sales for the Wayne/Hoosier declined by 73 percent while sales from the Shawnee have all but stopped. The large increases in softwood sawtimber from the Wayne/Hoosier resulted from salvage sales of uprooted and storm damaged trees. Prior to 1997, softwood sales were erratic but showed no downward or upward trend. Hardwood sawtimber sales also varied from year to year but have shown a decided downward trend; the decline

was greatest in the Ohio (Wayne) section. Similar to the decline in the Wayne section of the Wayne/Hoosier, softwood sawtimber sales have all but ceased on the Shawnee National Forest.

The two Central Hardwood forests west of the Mississippi (Mark Twain and Ozark/St. Francis) have shown a moderate decline in hardwood sawtimber sales and large increases in softwood sawtimber sales. The increases in softwood were almost entirely those of shortleaf or other southern pines.

In the southern Appalachian forests, sales of hardwood pulpwood declined by 77 to 87 percent (Table 3). Sales of softwood pulpwood have declined by 27.3 percent on the Chattahoochee/Oconee and have increased more than 100 percent on the Cherokee. Pulpwood sales are influenced by sawtimber sales because sawtimber and pulpwood are sold together. The relative decline in hardwood pulpwood sales was greater than that for softwood pulpwood because of the greater decline in hardwood sawtimber sales. Still, the decline in relative sales of hardwood pulpwood has been greater than that of hardwood sawtimber and the decline in sales of softwood sawtimber was greater than that of softwood pulpwood.

Hardwood and softwood pulpwood sales have declined by 58 to 71 percent on the Virginia and West Virginia forests. Similar to other Mid-Appalachian forests, sawtimber and pulpwood sales from the Daniel Boone have declined by 49 to 87 percent; the decline was greatest in volume of softwood sawtimber and pulpwood.

Table 3— National forest timber sales in 1997 and changes in pulpwood sales between 1985 and 1997 with respect to volume in the Central Hardwood Region

National forest	Volume of hardwood pulpwood sold 1997	Change in volume of hardwood pulpwood sold	Volume of softwood pulpwood sold 1997	Change in volume of softwood pulpwood sold
	<i>MBF</i>	<i>Percent</i>	<i>MBF</i>	<i>Percent</i>
Chattahoochee/ Oconee	879.9	-87.5	8867.6	-27.3
Cherokee	2769.1	-72.2	4875.5	114.1
Pisgah/Nantahala	4932.8	-76.8	6248.1	29.5
Jefferson/ Washington	15943.2	-57.8	1640.0	-70.9
Monongahela	2702.7	-67.1	91.7	-86.0
Daniel Boone	2129.1	-49.3	646.3	-69.1
Wayne/Hoosier	1414.2	-77.4	2188.9	597.6
Shawnee	0.0	-100.0	3.2	-99.9
Mark Twain	0.0	-100.0	1320.2	192.3
Ozark/St. Francis	3779.2	-61.0	10991.3	-13.4

Similar to most other eastern national forests, hardwood pulpwood sales from the Wayne/Hoosier declined by nearly 80 percent; the 600-percent increase in softwood pulpwood sales for these forest is the result of a salvage sale. Sales of hardwood pulpwood have ceased on the Shawnee

Although sales of hardwood pulpwood have ceased on the Mark Twain, sales of softwood pulpwood have increased by more than 190 percent. Pulpwood sales volumes for both hardwood and softwood declined on the Ozark/St. Francis with the greatest decline in hardwood. Pulpwood sales from these forests vary from year to year, but the largest increase in sales of softwood pulpwood from the Mark Twain probably is abnormal because sales of this product had approached zero between 1989 and 1996.

CHANGES IN NATIONAL FOREST TIMBER SALES REVENUE

Although timber sales have declined sharply for most national forests, timber sales revenue has not declined as sharply and actually have increased on some forests (Table 4). Only sawtimber sales are shown in Table 4 because pulpwood's contribution to timber sales revenue is small for most forests in the Central Hardwood Region.

An examination of sales in the Appalachian portion of the Central Hardwood Region found that the change in revenue was related to the volumes of economically important species sold and the price growth of these species. The oaks are the most important species on the national forests in southern Appalachia. The sales volume of oak species from these forests decreased at a rate similar to that of total hardwood sales while price increased by 90 percent (North Carolina and Chattahoochee/Oconee)

to 600 percent (Cherokee). These increases in price partially offset the decline in sales volume; still, revenues decreased by 30 to 54 percent between 1985 and 1997 (Table 4).

During the study period, red oak has been the most valuable species sold from national forests in Virginia. While total hardwood sawtimber sales declined by nearly 35 percent on these forests, sales of red and black oak increased by 44 percent. This increase in sales volume and a 391- percent increase in the price of red and black oak were the driving force behind the 191-percent increase in hardwood sawtimber revenues for these forests. Although red oak is the most predominant species on the Monongahela National Forest, most of the increases in sales revenue from this forest can be attributed to the steady sales volumes of black cherry and a 630-percent increase in the price of this species.

The oaks also are the most important species in the Daniel Boone National Forest, however, while the sales volume of white oak on these forests decreased by more than 50 percent, the sales volume of red oak increased by nearly 60 percent. The increase in red oak sales combined with increases of more than 300 percent in the prices of both red and white oak prices are the primary reasons why sales revenue did not decrease on the Daniel Boone.

The moderate increases in prices of red and white oaks on the Wayne/Hoosier and Shawnee forests were insufficient to offset a decrease in sales volume. By contrast, the 128-percent increase in the price of mixed oaks from the Mark Twain offset the 30-percent decline sales volume. The aggregate price of oak sold from the Ozark/St. Francis National Forests increased only slightly while prices of

Table 4—National forest sawtimber sales in 1997 and changes in sawtimber sales between 1985 and 1997 with respect to value in the Central Hardwood Region

National forest	Revenue of hardwood sawtimber sold in 1997	Change in revenue of hardwood sawtimber sold	Revenue of softwood sawtimber sold in 1997	Change in revenue of softwood sawtimber sold
	<i>\$1,000</i>	<i>Percent</i>	<i>\$1,000</i>	<i>Percent</i>
Chattahoochee/ Oconee	186.2	-38.3	254.4	-91.8
Cherokee	478.4	-30.1	973.1	8.6
Pisgah/Nantahala	658.9	-54.4	990.9	13.8
Jefferson/ Washington	2631.3	191.3	110.4	-64.6
Monongahela	3674.9	209.2	6.7	-85.1
Daniel Boone	872.1	6.3	78.1	-79.4
Wayne/Hoosier	589.1	-55.4	18.3	326.0 ^a
Shawnee	6.4	-93.1	.3	-99.0
Mark Twain	3704.0	51.2	1500.3	158.5
Ozark/St. Francis	512.0	-32.6	9333.8	531.5

^a Volume of softwood sold and increases in softwood sales were influenced by a salvage sale in 1997.

mixed hardwoods decreased by more than 50 percent. As a result, the decline in total sawtimber revenue was greater than that of sawtimber sales volume.

POTENTIAL IMPACT OF CONTINUAL REDUCTIONS IN SALES

A reduction or cessation of timber sales from national forests would seem to have little impact on the forest-products industry. In most of the states examined in this paper, the sawtimber volume on national forests is less than 10 percent of total sawtimber volume. However, national forest timber must be viewed not in aggregate but with specific users in mind.

Most of the national forests in the southern Appalachian Region are located near the North Carolina-Virginia wood-furniture industry. This industry is located in this region because of the availability of lumber. However, every southern Appalachian forest also is accessible by at least one interstate highway. Thus, the accessibility of these forests combined with their proximity to numerous urban centers may be another reason why this region has shown the greatest decline in timber sales.

Black cherry is the most valuable, commonly traded domestic hardwood species (Hardwood Market Report 1998) and rivals mahogany in importance in the manufacturing of traditional furniture. In the late 1980's the Monongahela National Forest contained about 4 percent of the nation's inventory of black cherry (Luppold and others 1998). All indications are that cherry has been harvested

on private lands at a much faster rate than the national forests. As a result, the supply of cherry on these forests has increased.

The national forests in Ohio, Indiana, and Illinois contain large quantities of higher grade white oak timber (Luppold and others 1998). Although white oak is used by domestic secondary timber processors, much of the higher grade white oak from this region is exported to Europe and Asia. Reduced supplies of national forest timber from this region may not affect facilities that serve domestic customers as much as sawmills that sell to international customers.

The two national forests west of the Mississippi have substantial volumes of hardwood sawtimber. However, the market value of this timber is not as high as that of timber in other parts of the Central Hardwood Region. Still, flooring, pallet, and other industries may be dependent on sustained quantities of lumber from these forests.

SUMMARY AND CONCLUSIONS

The forests of the Central Hardwood Region range from the pine/oak forest of southern Appalachia to the primarily oak forest of the Central Plains to the pine/oak forest west of the Mississippi River. The southern Appalachian forests in Georgia, North Carolina, and Tennessee have shown greater declines in hardwood sawtimber sales than the forests of the mid-Appalachian Region of Virginia, West Virginia, and Kentucky. This difference may be a function of the proximity of the forests in southern Appalachia to large urban centers.

National forests in the Central Plains have shown large declines in hardwood sawtimber sales with the Shawnee showing the greatest decline. The only increases in timber product sales have resulted from a salvage sale of white pine on the Hoosier National Forest. The two national forests west of the Mississippi River have shown relatively moderate declines in sales of hardwood sawtimber sales and large increases in sales of softwood sawtimber.

Although timber sales have declined sharply for most national forests, timber revenues from these sales have not decreased nearly as much and have increased in some forests. These increases in revenue were greater on the Jefferson/Washington and Monongahela National Forests, the result of increased sales volume and prices of select red oak from the Jefferson/Washington and increased sales of black cherry from the Monongahela.

The reduction in timber sales on national forests has had an adverse economic impact on the industries that process and use timber products. This economic loss may be offset somewhat by gains that result from allocating timberlands to alternative uses such as watershed protection or recreation. It is important that policymakers understand economic tradeoffs associated with their decisions, and

that future research focus on the impact of changing timber sales and management policies on recreational and ecological services. We believe that such analyses should be conducted on a forest-by-forest if not county-by-county basis to insure that the needs of rural communities located near national forests are considered.

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