

# Growth and Shifts in Eastern Hardwood Lumber Production

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**Abstract:** An analysis of recent trends in eastern U.S. hardwood lumber production indicates that total output increased sharply between 1977 and 1991. The increase, however, was much more pronounced in the East's northern tier of states than in the southern. This paper first examines recent hardwood lumber usage trends and historic hardwood lumber production trends. Changes in hardwood lumber production over the last 15 years are then related to changes in national hardwood lumber demand and regional differences in timber attributes.

## INTRODUCTION

The demand for eastern U.S. hardwood lumber products has changed constantly over the last 15 years. Perhaps the most significant change has been the increased demand for higher quality lumber by the millwork and export markets (Table 1). The species that appear to be the most desired by these markets are the select red and white oaks, ash, cherry, and, more recently, hard maple and yellow-poplar (Tables 1 and 2). Some other important changes shown in Table 1 are: (1) the increased use of hardwood lumber in the pallet, kitchen cabinet, and flooring industries; and (2) the decrease in lumber use by the household furniture industry.

The growth in hardwood lumber demand and the changes in the industries that use hardwood lumber affect lumber prices in general, and especially the prices of particular species. Changes in lumber price in turn affect hardwood lumber production. The remainder of this paper will examine historic changes in hardwood lumber production, and then relate changes in hardwood lumber production over the last 15 years to changes in hardwood lumber demand and regional differences in timber attributes.

## HARDWOOD LUMBER PRODUCTION TRENDS

Because of errors in official estimates of hardwood lumber production (Cardellichio and Binkley 1984, Luppold and Dempsey 1989), hardwood lumber production volumes used in this paper are based on procedures developed by Luppold and Dempsey (1989) and Dempsey and Luppold (in review). These procedures utilized information developed from U.S. Department of Agriculture, Forest Service Timber Product Output Studies, state severance tax records, and periodic state surveys of hardwood production. All data concerning hardwood inventories were developed from documents by the USDA Forest Service (1982) and Waddell, Oswald, and Powell (1989).

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Table 1.—Hardwood lumber consumption by major U.S. industries and exports, 1977 and 1991, and the species most commonly demanded (in million board feet)

Industry	1977	1991	Species used
Furniture group			
Wood household*	2,330	2,060	Red oak
Upholstered	254	286	Mixed hardwoods
Commercial	221	399	Oak/cherry/walnut
Construction products			
Millwork	372	627	Red oak
Kitchen cabinets	358	573	Red oak
Flooring	304	529	Red oak
Industrial products			
Pallets	2,627	4,624	Mixed hardwoods
Railroad crossties	1,000	636	Mixed hardwoods
Exports	240	850	Red & white oak

\*Wood household furniture figures include hardwood lumber use by the dimension industry.

Source: Dempsey and Luppold 1992. Periodic state surveys of hardwood lumber production. All data concerning hardwood timber inventories were developed from documents by the USDA Forest Service (1982) and Waddell, Oswald and Powell (1989).

Table 2.—Eastern U.S. hardwood lumber exports to major markets, 1981 and 1991, and the species most commonly demanded (in thousand board feet)

Major market	1981	1991	Species used
Asia			
Japan	7,769	114,346	Ash/poplar/oaks
Taiwan	9,855	85,744	Red oak
Korea	2,524	19,406	Hard maple
Others	1,256	31,228	Oaks
Northern Europe			
Belgium	22,572	56,085	White oak
Germany	20,897	39,506	White oak
Netherlands	22,845	20,438	White oak
United Kingdom	5,108	42,368	White oak
Others	571	3,849	White oak
Southern Europe			
France	13,150	21,915	Red oak, cherry
Italy	12,661	70,432	Poplar
Spain	2,638	35,119	White oak
Others	160	8,451	White oak
North America			
Canada	195,325	197,098	Red oak
Mexico	9,963	41,837	Red oak

Source: Luppold and Thomas (1991).

An examination of Figure 1 indicates that hardwood lumber production is cyclical, with the periodicity of the cycle (from top to top) declining from 7 years to 5 over the 27-year period. Much of the cyclical behavior of hardwood lumber production can be related to changes in the overall economy and the impact of these changes on hardwood lumber price. Another trend evident in Figure 1 is the upward movement of the cycle since 1975. This upward movement appears to be a direct result of growth in demand exhibited in Table 1.

Another trend shown in Figure 1 is the gradual shift in hardwood lumber production from the southern regions to the northern regions. Between 1965 and 1977, this shift exhibits itself as small increases in production in northern regions and a gradual production decrease in the southern regions. Production in all eastern regions has increased since 1977 with larger increases in northern regions and smaller increases in the southern regions.

## ESTIMATED HARDWOOD LUMBER PRODUCTION BY CENTRAL AND EASTERN REGIONS OF THE U.S.

MM bd.ft.

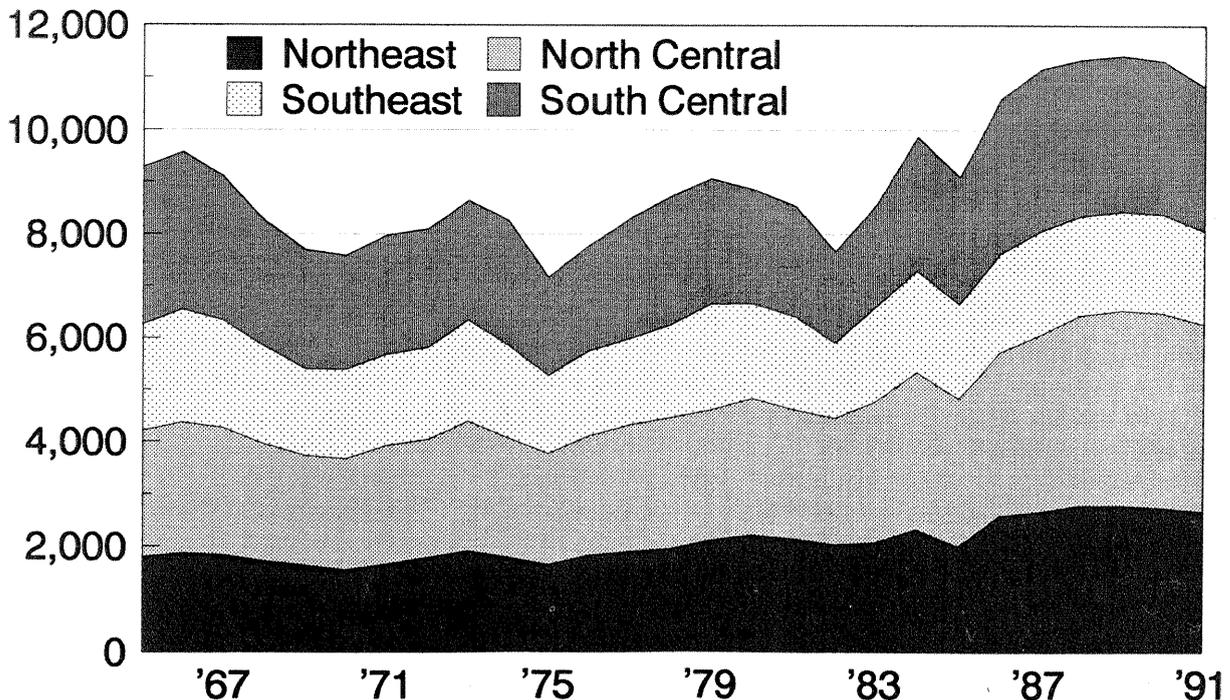


Figure 1.—Estimated hardwood lumber production by Central and Eastern Regions of the U.S.

An alternative way of looking at the shifts in regional production over the last 15 years is presented in Table 3. The information in this table contrasts actual shifts in regional production in 1991 against the shifts expected if all regions grew at the national rate. Although production in all four central and eastern regions increased over this 15-year period, the northern regions grew at a much faster rate than the southern regions and the central regions grew faster than their eastern counterparts.

Table 3.—Relative change in eastern U.S. hardwood lumber production, by region, 1977 and 1991

Region	Lumber production (MM BF)		Expected change (EC)	Actual change (AC)	Difference (AC - EC)
	1977	1991			
Northeast <sup>a</sup>	1,894	2,657	573.4	763	189.6
North central <sup>b</sup>	2,430	3,602	735.6	1,172	436.4
Southeast <sup>c</sup>	1,658	1,803	501.9	145	-356.9
South central <sup>d</sup>	2,339	2,778	708.0	439	-269.0

<sup>a</sup> Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.

<sup>b</sup> Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, and South Dakota.

<sup>c</sup> Florida, Georgia, North Carolina, South Carolina, and Virginia.

<sup>d</sup> Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas.

Perhaps the best explanation for the shifts in regional production is the increased demand for higher grade lumber from the select sawtimber species, combined with the higher proportion of these species in the northern regions (Table 4). The proportion of select species in the northern regions is twice the percentage of their southern counterparts. Another contributing factor is the higher total volume of hardwood sawtimber in the north-central as compared with the south-central regions. Although the northern regions appear to have ample supplies of the select species, their other attributes, such as average timber diameter and ratio of private to public land ownership, are less conducive to lumber production.

Table 4.—Attributes of the eastern U.S. hardwood timber resource, by region, 1987

Region	Total volume (billion bdf)	Select species (percent)	Average diameter (inches)	Ratio of private to public ownership
Northeast <sup>a</sup>	171.7	42.7	16.5	4.3
North central <sup>b</sup>	198.5	38.1	16.9	4.2
Southeast <sup>c</sup>	183.4	18.5	17.8	7.4
South central <sup>d</sup>	161.9	21.2	17.2	7.2

<sup>a</sup> Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.

<sup>b</sup> Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, and South Dakota.

<sup>c</sup> Florida, Georgia, North Carolina, South Carolina, and Virginia.

<sup>d</sup> Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas.

One of the most interesting aspects of Table 4 is that timber diameter is negatively correlated with the percentage of select species. The cause of this correlation is due probably to a more rapid harvest of the select species, the slower growth of timber in the northern areas, and the slower growth of many of the select species.

Even though the demand for select species has encouraged greater lumber production in the northern regions, the existence of a growing pallet market in these regions also helped facilitate this growth in production. Because the density of population and heavy industry are both higher in the north than in the south, pallet production and the subsequent use of hardwood lumber by the pallet industry is greater in the north. The existence of the pallet industry provides the grade lumber industry an outlet for log hearts and loggers a market for low-grade logs. The synergistic relationship between pallet production and high-grade lumber production probably allowed lumber output in the northern region to be higher than it would have been in the absence of the pallet industry.

One factor that may be affecting hardwood lumber production in the south is the increased demand for lower grade timber resources in this region by the pulp and paper industry. There is strong, but not fully substantiated, evidence that hardwood timber cut by the pulp and paper industry is exceeding growth in some areas of the south. This strong demand may be hindering log procurement for some southern hardwood sawmills that utilize lower grade logs for the production of pallets and railroad crossties.

## FUTURE CHANGES IN HARDWOOD LUMBER PRODUCTION

As stated earlier, hardwood lumber demand affects hardwood lumber production through price. Therefore, any demand factor that affects the price of hardwood lumber in general, or the price of a specific species, will have a corresponding impact on hardwood lumber production. In the last 15 years, lumber production has been very much influenced by increased hardwood lumber exports and by the increased demand for hardwood lumber by industries producing products for the construction market. However, the changes that occurred over the last 15 years may only slightly resemble the changes that may occur over the next 15 years.

Some demand factors that will affect hardwood lumber production in a positive manner are: the continued export demand resulting from the weakened dollar, increased demand for railroad ties, increased development and sales of prefinished hardwood flooring systems, continued remodeling and expansion of kitchens, and the increased desire of homeowners to purchase hardwood furniture and millwork.

Factors that will affect hardwood lumber production in a negative manner are: the reduced production of single-use pallets because of disposal problems, increased imports of wood furniture—with imports from Mexico increasing, and the reduced demand for millwork by the commercial construction industry. One other factor that could hinder hardwood production in the north is the increased regulation on nonprivate lands. However, hardwood lumber production in the south may be equally hindered by increased timber demands by the pulp and paper industry.

Although hardwood lumber production may increase in the 1990's, it will probably not increase at either the regional or national rates experienced over the last 15 years.

### LITERATURE CITED

- Cardellichio, P.A. and C.S. Binkley. 1984. Hardwood lumber demand in the United States: 1950 to 1980. *For. Prod. J.* 34(2): 15-22.
- Dempsey, G.P. and W.G. Luppold. 1992. The state of hardwood lumber markets. *North. Logger & Timber Proc.* 40(10): 22-24.
- Dempsey, G.P. and W.G. Luppold. In review. An historical examination of regional hardwood lumber production and sawtimber availability. *North. J. Appl. For.*
- Luppold, W.G. and G.P. Dempsey. 1989. New estimates of central and eastern U.S. hardwood lumber production. *North. J. Appl. For.* 6(3): 120-123.
- Luppold, W.G. and R.E. Thomas. 1991. New estimates of central and eastern U.S. hardwood lumber exports to Europe and Asia. USDA Forest Service NE-652, 22 p.
- USDA Forest Service. 1982. An analysis of the timber situation in the U.S., 1952-2030. *For. Resour. Rep. No. 23.* Washington, DC.
- Waddell, K.D., D.D. Oswald and D.S. Powell. 1989. Forest statistics of the United States, 1987. USDA Forest Service PNW-RB-168. 106 p.