TRENDS IN THE USE OF MATERIALS FOR PALLETS AND OTHER FACTORS AFFECTING THE DEMAND FOR HARDWOOD PRODUCTS

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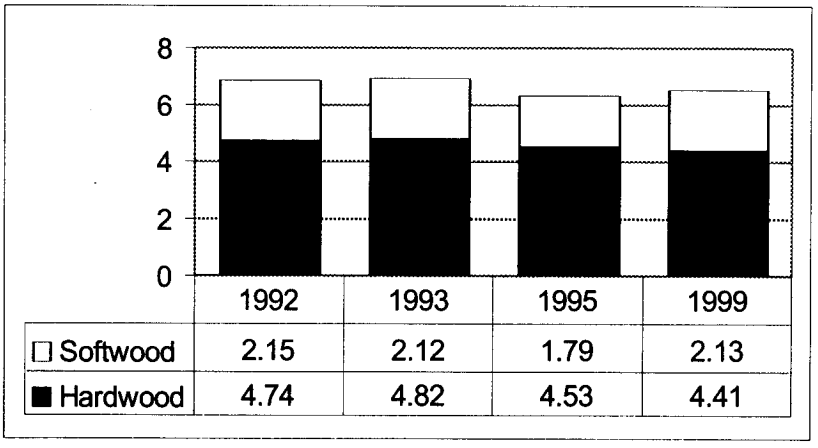
The pallet and container industry plays a critical role in the forest products industry and the U.S. economy. The industry provides a large market for low-grade wood, employs more than 50,000 in the U.S., and its products facilitate the shipment of goods within and outside the country. Due to the importance of this industry, the Center for Forest Products Marketing and Management, Department of Wood Science and Forest Products, at Virginia Tech and the U.S. Forest Service collaborated on a series of studies during the 1990s designed to track and report industry trends. These studies focused on the use of wood materials by the industry during the years 1992, 1993, 1995, and 1999, as well as the level of pallet recovery and reuse. This paper describes some of the trends suggested by the study results and identities factors that will affect future hardwood use by the industry.

The use of new solid wood (e.g., lumber, cants, and parts) fluctuated during the 1990s but ended the decade at a lower level than it began. The estimated 6.54 billion board feet of new solid wood utilized in 1999 represents a 5 percent decline from 1992. Hardwood species accounted for approximately two-thirds of total wood use for most of the 1990s (Figure 1).

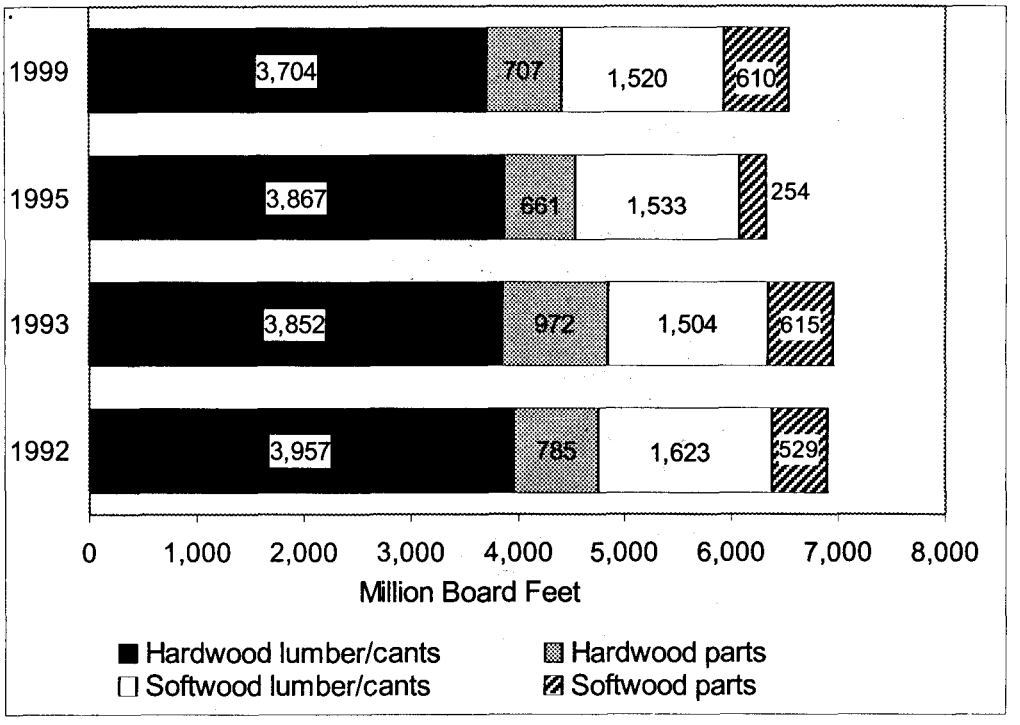
Figure 1. Estimated Use of New Solid Wood by the U.S. Pallet and Container Industry by Species Class (billion board feet)



	1992	1993	1995	1999
Softwood	2.15	2.12	1.79	2.13
Hardwood	4.74	4.82	4.53	4.41

The majority of the solid wood used by the industry is in the form of lumber and cants. However, some material is purchased as pallet parts (Figure 2).

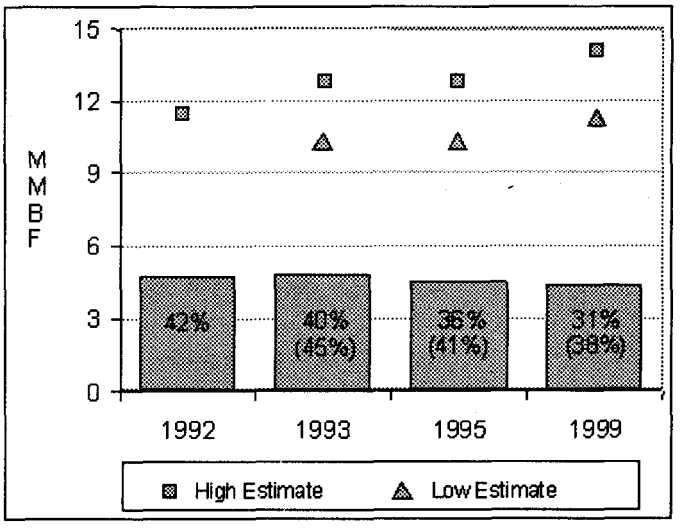
Figure 2. Estimated use of new solid wood by the U.S. pallet and container industry by form and species class (million board feet).



Of the 4.41 billion board feet of hardwoods used in 1999, 3.7 billion board feet was purchased or processed as hardwood lumber and cants and the remaining 707 million board feet as parts. In 1999, the industry utilized 1.52 billion board feet of softwood lumber and cants and 610 million board feet in parts. The small increase in new wood use between 1995 and 1999 was largely due to the industry's greater use of softwoods parts.

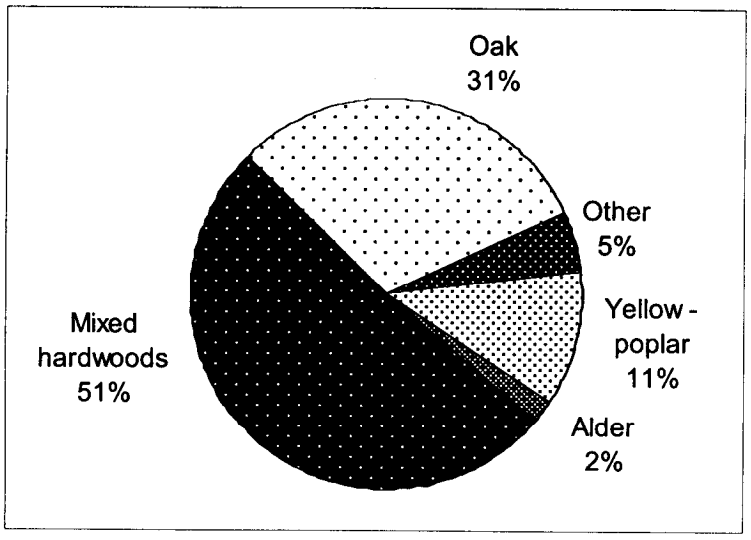
A significant trend in the 1990s was the decreasing proportion of hardwood used for the production of pallets and containers as compared to total U.S. hardwood production. As shown in Figure 3, estimates of U.S. hardwood lumber production vary. Using a "High" estimated production level series, the equivalent volume of hardwood used for pallets and container dropped from 42 percent in 1992 to 3 1 percent in 1999. Using an alternative "Low" series, the equivalent volume dropped from 45 percent in 1993 to 38 percent in 1999.

Figure 3. Solid Hardwood Use by the Pallet and Container Industry by Volume (billion board feet) and as a percentage of High and Low Estimates of U.S. Hardwood Lumber Production (High production estimates from U.S. Timber Production, Trade, Consumption, and Price Statistics 1965-1999 [Howard, J.L. 2001. USDA - Forest Service Research Paper FPL-RP-595]. Low estimates from Lumber Production and Mill Stocks [US Census Bureau. 2000. Current Industrial Reports MA321T(99)-1].



Approximately 5 1 percent of the hardwood used by the pallet and container industry in 1999 was either bought or processed as an unsorted mix of hardwood species (Figure 4). This was estimated to be the equivalent of nearly 2.26 billion board feet. Oak (red and white) made-up nearly 3 1 percent of the hardwood used by the industry, an estimated 1.35 billion board feet. Additional species used in pallet and container production included yellow-poplar (11 percent) and alder (2 percent) at 478 million and 92 million board feet, respectively. A number of different hardwood species were grouped as other and accounted for another 234 million board feet.

Figure 4. Solid Hardwood Use by the Pallet and Container Industry by Species: 1999



Throughout the 1990s, the pallet and container industry utilized unsorted hardwoods more than any other hardwood species or species group (Table 1).

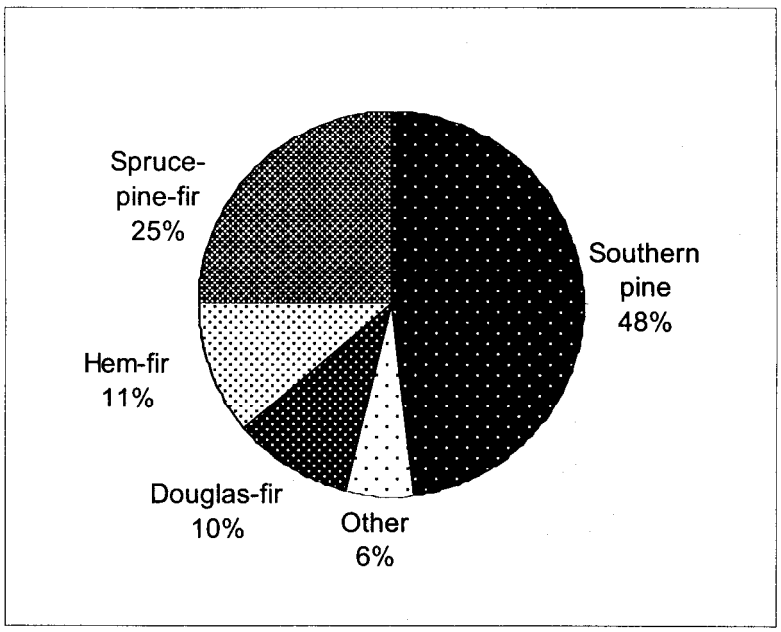
Table 1. Estimated Volume of Solid Hardwood Used by the Pallet and Container Industry by Species and Species Class

	MMBF			
Hardwood Species	**1992**	**1993**	**1995**	**1999**
Oak	1,879	1,511	1,221	1350
Yellow-poplar	601	574	379	478
Basswood /Aspen Cottonwood	204	267	*	*
Alder	361	393	165	92
Mixed Hardwoods	1,584	1,998	2,547	2,256
Other Hardwoods	114	81	216	234
Total	4,742	4,824	4,528	4,411

Note: Column and row totals may not equal reported totals as a result of rounding.

* Data not collected. Oak (red and white) was consistently the single most utilized hardwood species. Another notable trend was the decline in alder use. In 1993 the industry consumed an estimated 393 million board feet of alder, which was equivalent to 8 percent of its hardwood use. Approximately 92 million board feet of alder was utilized in 1999, representing only 2 percent of the industry's hardwood used. This decline was due, in part, to growth in other markets for alder lumber, including the export market.

Figure 5. Solid Softwood Use by the Pallet and Container Industry by Species or Species Group: 1999



Nearly half of the softwood consumed by the pallet and container industry in 1999 was southern pine (Figure 5). It was estimated that the industry utilized approximately 1 billion board feet for the year. Spruce-pine-fir was the next most utilized softwood species or species group (25 percent), at an estimated 539 million board feet consumed. Other species estimates included Hem-fir (11 percent), Douglas-fir (10 percent), and various other species (6 percent).

Table 2. Estimated Volume of Solid Softwood Used by the Pallet and Container Industry by Species and Species Class

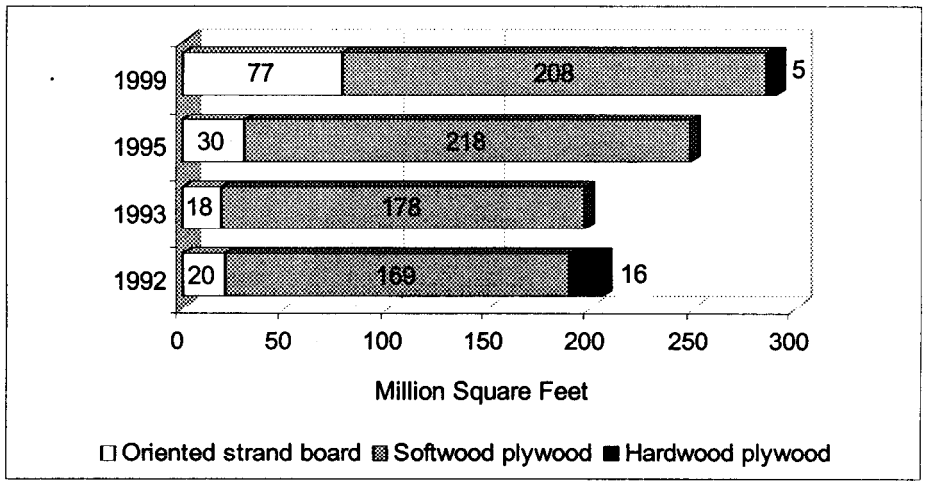
	MMBF			
Softwood Species	**1992**	**1993**	**1995**	**1999**
Southern pine	853	724	731	1,026
Douglas-fir	620	512	199	214
Hemlock-fir	N/A*	N/A*	178	233
Spruce-Pine-Fir	N/A*	N/A*	552	539
Other softwoods	679	883	126	117
Total	2,152	2,119	1,786	2,130

Note: Column and row totals may not equal reported totals as a result of rounding.

* Data not collected

After decreasing in the early 1990s both the volume of southern pine used by the industry and the percentage of total softwood use this volume represented increased between 1993 and 1999 (Table 2). Southern pine consumption increased from 724 million board feet and 34 percent of the softwoods consumed in 1993 to just over 1 billion board feet and 48 percent of the softwoods used in 1999. Douglas-fir use declined during the early 1990s before showing a slight increase in volume from 1995 to 1999. An estimated 620 million board feet of Douglas-fir was used by the industry in 1992 but this figure dropped to 199 million board feet in 1995.

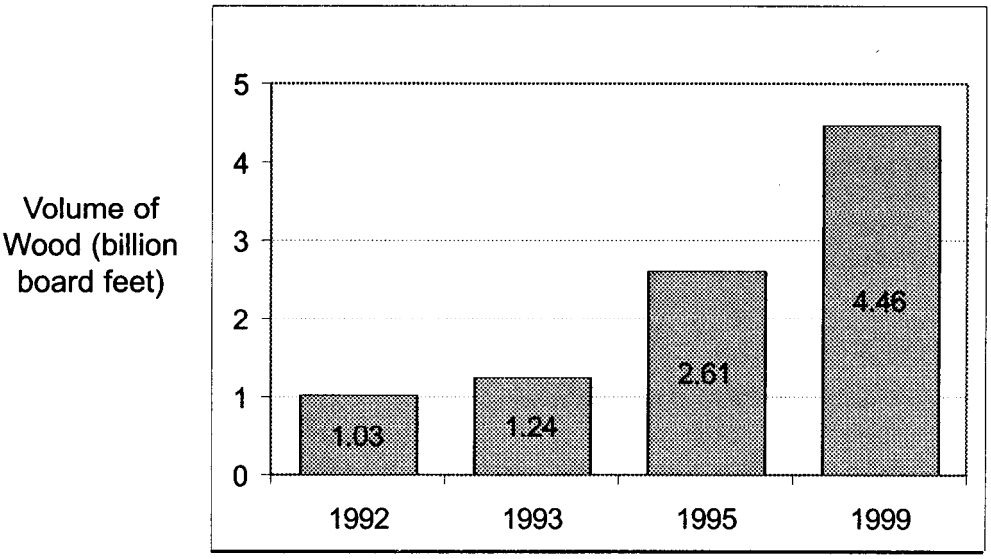
Figure 6. Estimated Wood Panel Consumption by the U.S. Pallet and Container Industry by Panel Type: 1992, 1993, 1995, and 1999



Note: Data for hardwood plywood not collected for 1993 and 1995. Panel volumes are reported without assigned basis or thickness

The industry's utilization of wood panels increased in the 1990s - primarily due to increased use of oriented strand board (Figure 6). Approximately 70 percent of panel use was by the container segment of the industry. However, panel products are used to build pallets and skids. It is predicted that this use will continue and will affect the demand for hardwood materials.

Figure 7. Estimated Volume of Wood Contained in Pallets Recovered for Reuse or Recycling by the U.S. Pallet Industry.



A factor contributing to stagnant levels of new wood use in the 1990s was the utilization of pallets and pallet material recovered from the waste stream. Figure 7 shows Virginia Tech estimates of the volume of wood recovered from pallets for potential reuse by the industry. This volume grew dramatically during the 1990s as pallet reuse and recycling became more common.

While not all of this wood is used again in a pallet, much of it is. In 1999, 69 percent of the recovered pallets were repaired and reused. An additional 8 percent were reused without repair and other pallets were un-nailed to recover parts. As a result, much of the growth in wood use for pallets has been recovered material. In 1995, recovered wood accounted for approximately 27 percent of total wood use (both new and recovered). By 1999, recovered wood use had grown to 36 percent of total use.

The factors that contributed to the rapid growth of pallet recycling by the industry in the 1990s included: increased awareness of the environment and activities that affect the environment causing a previously unconcerned public to question the use of new wood for pallets; pallet producers, concerned with the availability and price of new lumber and cants, found it economically advantageous to repair pallets and salvage material from used pallets; pallet users turned to recycled pallets as a way of decreasing their product handling costs; pallet

disposal costs were significant and increasing attention was paid to reducing or avoiding these costs; barriers to entry into pallet recycling were relatively low; and finally, public concerns over the capacity and cost of landfills resulted in some facilities encouraging recovery of pallets and/or banning pallets.

Several additional factors affected the pallet and container industry during the 1990s and are likely to continue to impact hardwood use in the near future. Alternative materials (both wood and non-wood) gained acceptance by some manufacturers and in some market segments. Non-wood alternatives include metal, corrugated paperboard and several types of plastic. In many cases, pallets made from these alternatives gained market share not solely on the material properties but because they were part of a total product offering that better served the needs of the customer. For example, corrugated paperboard pallets eased recycling/disposal problems and were aesthetically pleasing, properties valued by grocery retailers.

Wood alternatives include imported species (e.g., radiata pine and eucalyptus) sourced from countries such as New Zealand, Chile, and Brazil. Often, lumber from these sources can be imported at a cost advantage over domestic species. In some cases, the fact that it is dry has been an advantage.

In the near future, heat treating requirements may skew wood demand toward softwoods, panels and alternative materials. Environmental certification will become more accepted in the coming decade and user demands for certified pallets and containers will impact the industry.

Unless these demands are met, users may move to alternative materials.

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