The Northern Hardwood Resource: A Market Perspective

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The hardwood resource of the eastern United States often is associated with high quality sawtimber used in the production of lumber and veneer consumed in domestic appearance applications or exported. However, the high quality segment of the eastern hardwood resource accounts for approximately 20 percent of the cubic volume of merchantable trees (Luppold and Pugh 2016). In the northern regions of the eastern United States, the proportional volume of higher quality timber is discernably larger. Still, combined mid- and low-quality sawtimber size (11 inches d.b.h. and larger) tree volume exceeds the volume of high quality timber in the Northeast and Lake States regions and the quality characteristics of this resource are changing (Table 1).

Since 2009, 65 percent of the increase in volume in sawtimber-size trees in the Northeast has been in the low quality category (Table 1). Northeast hardwood poletimber (5 inches ≤d.b.h. ≤10.9 inches) volume also has declined (USDA Forest Service 2021). At the turn of the century, 37 percent of the Northeast merchantable timber was in the poletimber size class. By 2019, poletimber volume had decreased by 3 billion cubic feet from turn of the century levels and accounted for 29 percent of the merchantable timber volume. The quality of this poletimber also is decreasing, as cull volume of this tree-size has increased while growing stock poletimber volume has decreased (Luppold and Bumgardner 2019). The changes in poletimber volume could be indicative of an aging resource. One potential cause of the increase in low quality sawtimber-size tree volume is age-related degrade prior to mortality.

A large portion of the increase in Lake State hardwood sawtimber tree volume between 2009 and 2019 was in the mid-quality category (Table 1). This category includes smaller diameter but well formed trees as well as mid-quality trees of all diameter classes. The increase in mid-quality tree volume in the Lake States was, in part, the result of poletimber transitioning to sawtimber-size trees (USDA Forest Service 2021). While poletimber volume also is declining in the Lake States,

Table 1.—Volume of sawtimber-size hardwood trees in the Northeast and Lake States (developed using procedures presented in Luppold and Bumgardner 2019 for regions developed in Luppold and Bumgardner 2021a using data from USDA Forest Service 2021)

Tree quality	Northeast[a]		Lake States[b]	
	2009	2019	2009	2019
	---million cubic feet---			
High quality – tree grades 1 and 2	24,142	25,472	9,053	10,731
Mid quality – tree grade 3	20,405	21,898	9,832	11,676
Low quality – below tree grade 3 (and incl. cull)	16,222	21,469	10,212	11,166

[a] Includes the states of PA, NJ, NY, CN, RI, MA, VT, NH, and ME

[b] Includes the states of MI, WI, and MN

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it still accounted for 38 percent of the timber base in 2019 and poletimber decline has not occurred across all species groups. Two important species groups for which poletimber volume increased between 2009 and 2019 are soft maple (*Acer* spp.) and cottonwood and aspen (*Populus* spp.).

Another factor that will affect long-term timber supply is mortality (Luppold and Bumgardner 2021a). Increased mortality in the Northeast and Lake States is most evident in ash (*Fraxinus* spp.), a result of the emerald ash borer (*Agrilus planipennis*). However, mortality has been increasing in both the Northeast and Lake States as greater portions of the standing timber becomes mature. By contrast, hardwood sawtimber removals declined in all regions except the Lake States and Central regions. With the exception of ash, there were no indications of immediate declines in eastern sawtimber volume as a result of mortality. However, continual increases in mortality, a resurgence of removals, and reduced growth could cause sawtimber volume to plateau in the coming decades.

While changing timber quality is an issue that economists must examine when evaluating the long-term potential of the northern hardwood timber base, perhaps a more important issue currently affecting timber investment and management decisions is the decades long decline in hardwood lumber prices (Luppold and Bumgardner 2021b). After trending upward between 1980 and 2000, real (inflation-adjusted) hardwood lumber prices have trended downward this century. This decline is the result of declining domestic demand for lumber used in appearance applications including furniture, kitchen cabinets, flooring, and millwork (Luppold and Bumgardner 2016).

Hardwood lumber used in domestic appearance applications reached its highest level in the late 1990s (Luppold and Bumgardner 2016). The combined markets for appearance lumber and exports peaked at 7.25 billion board feet in 2000 (Luppold and Bumgardner 2021a). Declines in furniture production after 2000 in combination with the decline in home construction after 2006, followed by the Great Recession (December 2007 to June 2009), caused appearance lumber consumption plus exports to fall to less than 3.3 billion board feet in 2009. Since 2009, exports have become an extremely important market for higher quality hardwood lumber. By contrast, hardwood lumber consumption in the furniture industry, especially the wood and upholstered household furniture portions of this industry, has continued to decline.

The decline in lumber use by the furniture industry has been influenced by a decline in domestic furniture production (Luppold and Bumgardner 2022). Between 2000 and 2009, the wood consuming furniture manufacturers (WCFM, which includes wood household, upholstered household, and wood office and related products) experienced a 51 percent decline in the real value of domestic shipments. This decline was associated with a 75 percent decline in hardwood lumber use in furniture manufacturing during this period (Luppold and Bumgardner 2016). The larger decline in lumber consumption versus the decline in the value of WCFM shipments was the result of reduced use of hardwood lumber per unit value of furniture produced.

After 2009, WCFM shipments fluctuated but still were 48 percent below 2000 levels in 2019 (Luppold and Bumgardner 2022). A major contributor to the decline in the value of domestic household furniture shipments since 1997 has been furniture imports. In 1997, imports accounted for 6 and 23 percent of the upholstered household (UHF) and wood household furniture (WHF), respectively, available to U.S. consumers. In 2019, imports accounted for 35 and 78 percent of UHF and WHF, respectively, of these same markets.

Another factor influencing WCFM shipments is domestic consumption. Between 1997 and 2019, domestic consumption of UHF increased but since 2002 this increase has been satisfied through increased imports (Luppold and Bumgardner 2022) Since 2005, domestic consumption of WHF

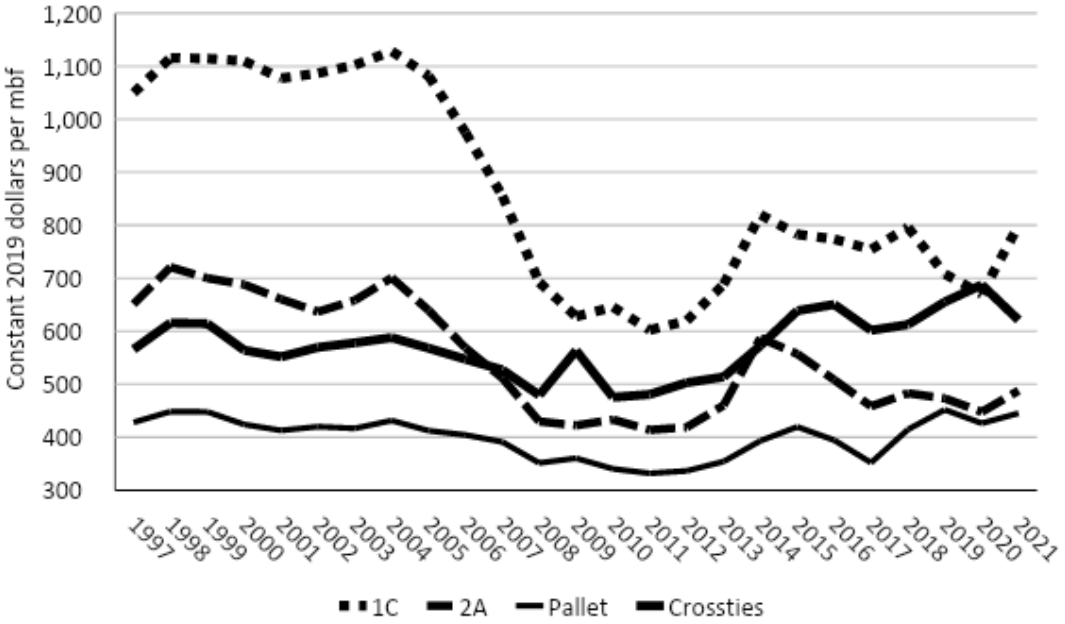

Figure 1.—Resource-weighted (aggregate) 1C and 2A lumber prices compared to pallet cants and crosstie prices in the Northeast U.S. region, 1997 to 2021.

declined by 45 percent. Consumptions of wood office furniture and related products declined by 40 percent between 2000 and 2019 but imports of these products have remained at a relatively low level since 1997.

The declines in lumber prices that resulted from reduced domestic demand in appearance applications have not been uniform across regions and species (Luppold and Bumgardner 2021b). The greatest declines in lumber price occurred in the Northeast and Lake States regions (with smaller declines occurring in the Central, Southern, and mid-Atlantic regions). With the exceptions of white oak (*Quercus* spp.) and walnut (*Juglans nigra*), prices of high value species have declined more than prices of low value species.

While hardwood lumber prices have declined, prices for pallet cants have remained relatively constant since 1997 and the price of crossties has trended upward (Fig. 1). In 2020, the price of pallet cants approached the aggregated price of grade 2A hardwood lumber in the Northeast and crosstie prices exceeded that of aggregate 1C lumber (Luppold and Bumgardner 2021b).

The hardwood industry adapts constantly to changes in market demand and utilizes the available timber resource in providing products in response to these demands. Still, there have been discernable longer term market trends. Hardwood timber managers must concurrently recognize these market trends and changes in the hardwood timber resource to maintain long term forest health and viability.

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