



A More Competitive Hardwood Industry

Economic and Environmental Benefits



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DR. BRUCE HANSEN

Forest Service research economist, 2005

No aspect of modern life can escape the influences of the global economy. The small woodlot owner, the logging contractor, and the independent sawmill operator—all have become key players in the rapidly changing market of hardwood lumber and wood products.

Forest Service scientists in Princeton, WV, focus their research efforts on studying the economic and technological factors that affect the welfare of thousands of wood products manufacturing enterprises in the Northeast (see sidebar on page 5). The wide range of wood products manufacturers, with their varied raw materials requirements, helps secure the health of northeastern hardwood forest. Having utilization options for trees that will be removed when forests are thinned can ensure that those thinning activities, designed to increase tree vigor and reduce the impact of biologically damaging agents (such as gypsy moth), are carried out.

“Healthy forests and healthy forest industry are interdependent—higher quality lumber comes from healthy forests, and the desire for quality lumber can motivate owners to invest in promoting healthy forests,” said Dr. Bruce Hansen, project leader and economist at the Forest Service’s Northeastern Research Station laboratory in Princeton, WV.



NE Forest Science Review is dedicated to presenting clear and concise information on current problems and issues relating to forests and forestry in the Northeast and the role of the nearly 100 scientists in the USDA Forest Service's Northeastern (NE) Research Station in exploring these topics and finding solutions for problems.

We hope that land managers, policymakers, science communicators, extension specialists, environmental advocates, and educators, as well as conservationists and all others interested in the health and productivity of forests in the Northeast, will find our quarterly newsletter useful and informative.

The NE Research Station is part of the USDA Forest Service's Research & Development national network of 6 regional research stations, the Forest Products Laboratory, and the International Institute of Tropical Forestry. NE scientists work at research sites in 13 states—Hamden/Ansonia, CT; Newark, DE; Amherst, MA; Baltimore, MD; Bradley, ME; Durham, NH; Burlington Co., NJ; Syracuse, NY; Delaware, OH; Warren and Newtown Square, PA; Burlington, VT; and Morgantown, Parsons, and Princeton, WV.

NE scientists work in laboratories and a wide variety of field sites, including eight experimental forests (several of these maintain long-term data sets that are unique to science) and six research natural areas, sited on National Forest System lands. Two important research locations are the Forest Service's only primary quarantine laboratory on the continental United States (Hamden/Ansonia, CT), a facility certified for biological control research on non-native forest pests and their natural enemies as well as the Baltimore (MD) Long Term Ecological Research Site, where NE scientists and other cooperators study the ecology of an urban forest.

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Utilization alternatives provide landowners with forest management choices and incomes to fund healthy forest practices. Through their in-house research and their work with a variety of university partners, including

those at the recently established Sloan Forest Industries Center at Virginia Polytechnic Institute and State University at Blacksburg, these scientists are working to improve the viability and competitive position of the U.S. forest products industry.

Improving the health of the northeastern hardwood forest industry is challenging. Many of the small private holdings in the Northeast are lands owned by families for recreation, seclusion, and investment. As owners age, more and more of these small holdings may change hands, putting many lands at risk of division into smaller and smaller parcels and in some instances complete removal from forest inventory. Alternatively, these forest lands can provide income to their owners through timber production. Sustainable forestry practices to include timber extraction can help owners afford to keep these lands in forest cover while providing raw material to the wood products industry.

Much of the scientific research conducted at Princeton is devoted to providing information and analyses that allow local, state, and federal policy makers to develop programs for "slowing the spread" of forest fragmentation and the forest industry to remain competitive. Research aimed at improving materials distribution and manufacturing systems ultimately allows timber owners to receive more payment for their timber. Evaluations of mill operations can prevent waste of valuable wood fiber and help improve the efficiency of wood use, helping companies remain productive and profitable. Research to understand the interaction of biological and market processes and their influence on forest composition and sustainability is combined with economic and marketing information. When combined, the information can provide policy makers and mill managers insights they may use to develop rational incentives that will allow timber owners and processors to adopt financially feasible, resource-conserving technologies.

Hardwood Lumber Has Many Uses

Hardwood refers to deciduous, broad-leaved trees, such as red and white oak, black cherry, sugar (“hard” or “rock”) and red (“soft”) maple, and tuliptree (“tulipwood” or “yellow-poplar”). Softwood describes wood of conifer species, such as pine, fir, and spruce. Hardwood trees predominate in northeastern forests.

Although hardwoods and softwoods are interchangeable in some markets, high-quality (defect-free) hardwoods, particularly red and white oak, black cherry, and hard maple, are some of the most valuable lumber in the world and tend to be used for furniture, cabinets, and flooring. Softwoods are more typically used for construction lumber. Both types of wood are used in paper manufacture, with hardwoods typically used in higher percentages for making fine papers. Market values and demand for the various lumber species can fluctuate greatly with changing home fashion trends.

Red Maple Usage Predictions

It’s apparent from data compiled by Drs. Delton Alderman and William Luppold that the future eastern forest will have a bountiful supply of red maple to meet the growing demands of domestic and international markets. Red maple comprises about 20 percent of the total number of trees for all diameter classes in the Northeast and is even more dominant in the smaller diameter classes that will make up our future forests. Pennsylvania, New York, and Maine in particular have considerable quantities of red maple, which could supply low-cost raw materials for fiber or engineered wood facilities. Alderman and Luppold predicted that use of red maple sawlogs as a substitute for recently popular species, such as sugar maple and red oak, will increase. Since they made that prediction, the industry has pursued red maple much more aggressively, and the 2005 markets for red maple are stronger than ever; red maple lumber now costs more than red oak lumber. This was unimaginable just 3 years ago.

New Business Model Could Aid U.S. Furniture Industry

“Global economic change has greatly stressed and changed the hardwood lumber industry,” says Dr. Al Schuler, research forester with the Princeton lab. “Competition from parts of the world having abundant wood resources or lower cost manufacturing/labor

environments has resulted in an increasing supply of wood products, especially furniture from overseas, that cost considerably less than those made in United States.”

Even though there is record demand for new furniture in the United States due to the construction of larger homes and record rates of remodeling, the domestic furniture industry has not shared in this growth. Today more than half of wood furniture purchased in the United States is imported, a significant change from only a few years ago. Globalization, unfavorable exchange rates, insufficient capital investment in the United States, and low wages overseas are among the causes.

Schuler and cooperators have studied the domestic furniture industry and have proposed a new business model to improve competitiveness. They assert that the U.S. industry cannot compete on price alone. The keys, they say, are mass customization and speed of delivery.

Schuler’s new business model emphasizes a shift from traditional “one plant does it all” companies to “strategic supplier alliances” similar to the systems used by automakers, Italian chair makers, and Danish furniture makers.

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Forest Service research economist, 2005

Lean Manufacturing Good for Furniture Industry

Lean manufacturing systems that incorporate strategies such as just-in-time manufacturing and cellular plant layouts reduce production costs by increasing product quality and speed of delivery and by reducing inventory, rejects, and floor space requirements. Although lean manufacturing is widely used in many industries, implementation is relatively new to U.S. wood products manufacturers. Because the raw materials (logs and lumber) used in wood products manufacturing are highly variable and periodically unavailable, lean manufacturing implementation in the wood industry requires substantial planning, testing and new approaches. A major effort involving Jan Wiedenbeck, Al Schuler, and Matt Bumgardner from Princeton along with cooperators from Penn State, Virginia Tech, North Carolina State, and Mississippi State universities has assisted companies to better understand how to go about implementing lean manufacturing. These studies support the new business model, in which a network of strategic supplier alliances is likely to be more efficient and less wasteful (that is, leaner) than a vertically integrated company.



The Forest Service strives to ensure that the nation's forests are healthy, productive, and sustainable for this and future generations. A key to sustainable forests is the presence of a vibrant forest industry and product markets and the existence of forest policies that allow forest landowners to manage and profit from their timber. Princeton's research efforts are focused on providing information and tools that lead to informed decision-making in the areas of forest management, utilization, and marketing.

References

- Defining Hardwood Veneer Log Quality Attributes** by Jan Wiedenbeck, Michael Wiemann, Delton Alderman, John Baumgras, and William Luppold. Gen. Tech. Rep. NE-313. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. 2004.
- Primary Detection of Hardwood Log Defects Using Laser Surface Scan** by E. Thomas, L. Thomas, L. Mili, R.W. Ehrich, A.L. Abbott, and C. Shaffer. In: Machine Vision Applications in Industrial Inspection XI. Bellingham, WA: Society of Photo-Optical Instrumentation Engineers. 2003.
- Key Attributes Associated With Veneer Quality Timber That May Be Impacted by Forest Management Practices** by Delton Alderman, Jan Wiedenbeck, Paula Peter, and David Brinberg. In: Proceedings of the 14th Central Hardwood Forest Conference. Gen. Tech. Rep. NE-316. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. 2004.
- Identifying Future Competitive Business Strategies for the U.S. Residential Wood Furniture Industry: Benchmarking and Paradigm Shifts** by Albert Schuler and Urs Buehlmann. Gen. Tech. Rep. NE-304. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. 2003.

About the Northeastern Hardwood Industry

The hardwood industry is complex, comprised of landowners, logging operators, lumber, veneer, and plywood producers, and manufacturers of finished products.

Although often overlooked, the forest industry in the Northeast shouldn't be—the Northeast has 7 percent of the nation's land area (153 million of 2,263 million acres) 13 percent of the nation's forests (93 million of 737 million acres) and six of the nation's 10 most densely forested states. And, unlike other areas in the United States, 85 percent of the forest land is privately owned.



Current figures for the Northeast show that there are about 71,000 people employed in the primary lumber industries (excluding pulp) and another 61,000 in secondary industries (with kitchen cabinet manufacturing being the largest single sector with 31,000). A quarter of all wages paid out nationally from timber-related industries (\$47 million) go to workers in the Northeast.

Web Resources

USDA Forest Service, Northeastern Research Station, Forest Science Laboratory, Princeton, WV: homepage

www.fs.fed.us/ne/princeton

USDA Forest Service, Northeastern Research Station: publications requests

www.fs.fed.us/ne/newtown_square/publications

USDA Forest Service: timber prices on the web

www.srs.fs.usda.gov/econ/data/prices/

US Census Bureau: manufacturing, mining, and construction statistics

www.census.gov/cir/www/321/ma321t.html

USDA Foreign Agricultural Service: market and trade data

www.fas.usda.gov/markettradedata.asp

Sloan Forest Industries Center

www.forestindustries.vt.edu/index.html

American Hardwood Export Council

www.ahec.org/

Penn State WoodPro

www.woodpro.cas.psu.edu/

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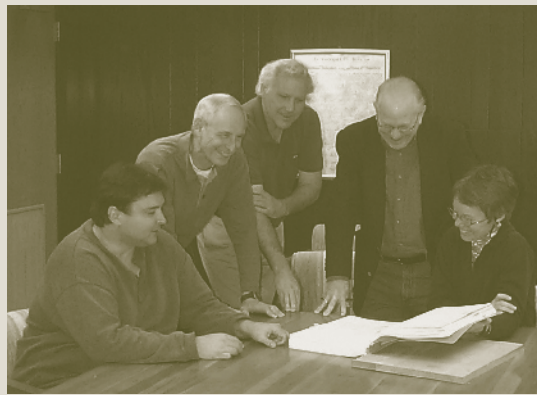
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Princeton, WV, staff, pictured from left:

Dr. Delton R. Alderman worked for Felt's Lumber Co. in Pinnacle, NC, during high school and college as a log scaler and timber cruiser. At Virginia Tech, he received his BS (1982) in industrial forestry operations. After college, he worked in private industry and was forest engineer for the Forest Service's AmeriCorp project in Wytheville, VA, where he designed and fabricated portable, stress-laminated timber bridges for logging operations. He received his MS (1998) and PhD (2001) in wood science and forest products marketing, respectively, and began work for the Princeton laboratory in 2001.

Dr. Albert T. Schuler is an FS research economist responsible for assessing the supply and demand for solid wood and engineered wood products and the forest products industry. Dr. Schuler received a BS in forest management from the State University of New York and a PhD in forest economics/marketing from Iowa State University. Before he joined the Forest Service in 1999, Al worked in private industry.

Dr. William G. Luppold has been with the USDA Forest Service's Princeton, West Virginia, laboratory for 24 years and has been a project leader for 21 years. Bill has an MS in resource economics from the University of



Florida and a PhD in Agricultural Economics from Virginia Tech. He has researched many aspects of hardwood lumber markets, nationally and internationally, most recently on how markets for hardwood products affect the forest composition and structure.

Dr. Bruce G. Hansen has been with the Princeton lab since 1968. He received both MBA (1978) and PhD (1990) degrees from Virginia Tech, Blacksburg, VA, and became project leader in 1996. He and members of his unit focus on developing estimates of wood use in major primary and secondary wood products industries and analyzing factors likely to alter use patterns and future consumption. They also explore opportunities to improve the use of forestry resources and sustain rural communities.

Dr. Jan K. Wiedenbeck began her career with the Forest Service in 1992 as a member of the Southeastern Research Station and moved to Princeton in 1994. She has a BS in forestry from the University of Michigan (1980) and an MS (1988) and PhD (1992) in wood science and forest products from Virginia Tech. Dr. Wiedenbeck is an adjunct faculty member at Pennsylvania State University and North Carolina State University. Jan's research focuses on improving efficiency in wood manufacturing operations and improving the quality of wood raw materials.