

Global Markets and the Health of America's Forests: A Forest Service Perspective*

Sally Collins, David Darr, David Wear, and Hutch Brown



The United States is rich in forests, yet about 39% of the softwood lumber used by Americans in 2005 came from other countries (WWPA 2006). In fact, the United States has not been “self-sufficient” in lumber (with exports exceeding imports) for more than 40 years. According to Haynes et al. (2007), the trade deficit in lumber has grown from 4.1 billion board feet (bbf) in 1962 to 23.4 bbf in 2005, and it is projected to rise to 26.7 bbf by 2050.



Is this cause for alarm? It might be—not only for forest-dependent communities and families, but also for the Nation and the world. The United States faces growing ecological threats from fire and fuels, invasive species, loss of open space, and climate change (Bosworth 2003, 2006). All call for restoration work, often funded through silvicultural work, such as repairing disturbed areas, altering forest structure and composition, and replanting native vegetation. However, if foreign competition forces firms in the American forest-products industry out of business, how will the work get done? Moreover, if imports displace domestic forest products, American timber might lose profitability. More timberland might then be sold to developers, further shrinking open space.



For the sake of argument, we shall assume that a healthy forest-products industry is indeed necessary to sustain America's forests. Can domestic roundwood producers stay in business in the face of rising foreign competition? There are no simple answers, because there are at least two tales to tell—a tale of decline and a tale of opportunity.



A Tale of Decline

The tale of decline begins with the change in federal forest policy in the late 1980s. Federal timber available for harvest, particularly the lucrative giant trees once harvested from centuries-old forests in the Pacific Northwest, has greatly diminished. Annual timber harvests on national forests fell from a historic high of 12.7 bbf in 1987 to less than 1.7 bbf in 2002. Although there has been an uptick to about 2.3 bbf in 2006, national forest timber still accounts for only about 5% of total timber production in the United States, compared to a historic high of about 17% in 1963 (Haynes 2004). As the volume and value of federal timber offered for sale dropped, timber-processing capacity fell

across the West, declining by about 37% from 1986 to 2003 (Keegan et al. 2006).

At the same time, foreign competition has grown. Worldwide, the value of forest-product imports increased by 31% from 1996 to 2004 (Figure 1). World economic growth and the lowering of trade barriers facilitated the expansion of global trade in forest products. Concomitantly, imports have soared while exports have lagged. Imports of industrial wood climbed from 13% of US consumption in 1965 to 30% in 2004, whereas exports as a percentage of US production grew from 5% in 1965 to 17% in 1991, only to fall back to 11% in 2004 (Figure 2). At a time of booming international trade, the American forest-products industry has lost market share, both at home and abroad.

Four sectors of the industry have been most affected (Figure 3): pulp, paper, and paperboard; plywood and oriented strandboard; softwood lumber; and household furniture. From 1990 to 2002, each sector lost from 5 to 28% of the domestic market share to foreign competitors, with the most labor-intensive sectors (lumber and furniture) suffering the greatest loss (Ince et al. 2007). Overall, the US share of domestic markets fell by 29% from 1995 to 2001.

Why the decline? There are several reasons:

- With respect to paper and paperboard, the surge in the value of the US dollar from 1996 to 2002 undercut American production, whereas production expanded in Asia and Latin America, where wage rates are lower and wood fiber plantations are faster growing.
- With respect to wood panels used in housing construction and remodeling, oriented strandboard, made from low-value logs and tree species, has steadily displaced plywood made from more expensive softwood peeler logs. Although domestic production of structural panels has reached historic highs, demand has outstripped production, and imports, largely oriented strandboard from Canada, have captured much of the expanded US market (Spelter et al. 2006).
- With respect to softwood lumber, the Canadian share of the US market rose from 26% in 1990 to 33% in 2005 as Canadian producers invested in larger and more efficient mills. Non-Canadian imports have also risen, now accounting for more than 4% of the US market.
- With respect to wood furniture, China has leaped into the forefront of world production (White et al. 2006a). Cheap labor and raw materials (some illegally harvested) and China's entry into the World Trade Organization have attracted large-scale foreign investment in Chinese furniture production, partly at the expense of production capacity in the United States. For example, almost 40 North Carolina furniture plants have closed from 2001 to 2003 (Ince and others 2007). Imports now

*The authors acknowledge rapid changes in markets for forest products since this article was written, especially in the US housing industry and associated financial institutions. Indeed, markets sometimes change so quickly that the publishing process has trouble keeping up. However, we believe that the main points in the article are still valid.

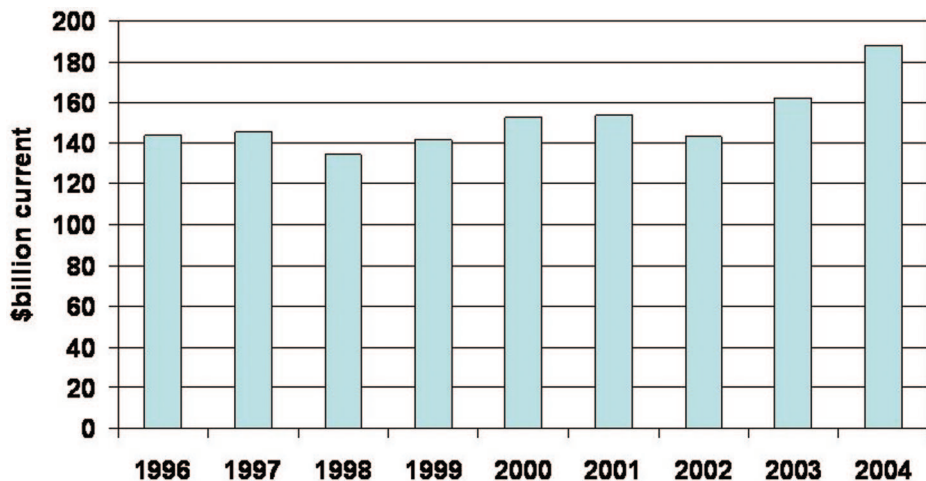


Figure 1. Value of world imports of forest products. Global trade in forest products has grown since 1996 (FAO 2006).

account for more than half of the US wood furniture market.

One factor that has weakened the market position for American forest products across the board is international currency exchange rates. From 1995 to 2005, the broad trade-weighted US dollar index remained above its long-term historical average, putting US wood producers at a competitive disadvantage. However, exchange rates are highly volatile, and they can also turn to the advantage of American producers, as we've seen in recent months.

A longer term advantage for overseas producers is the shift from natural forests to intensively managed plantations for growing timber. Plantations now supply about a quarter of the world's timber, and in 20 years it is expected to be half, with most of the growth expected to occur overseas (Bow-

yer 2006; Ince et al. 2007), where low land rents and growth potential make for a comparative advantage in timber growing. In Brazil and Indonesia, it takes a fraction of the land needed in the United States to produce a given quantity of wood fiber, thanks to faster growing trees and shorter harvest times (Sample and Wallinger 2006). In 2003, the delivered price of logs suitable for structural softwood plywood was about 20% lower in New Zealand and more than 50% lower in Brazil than in the United States (Ince and others 2007). Although shifts in currency exchange values since then (including a rise in the value of the Brazilian real relative to the US dollar) have partially offset these advantages, they are likely to persist over time.

Accordingly, the timber industry has grown much faster in some parts of the

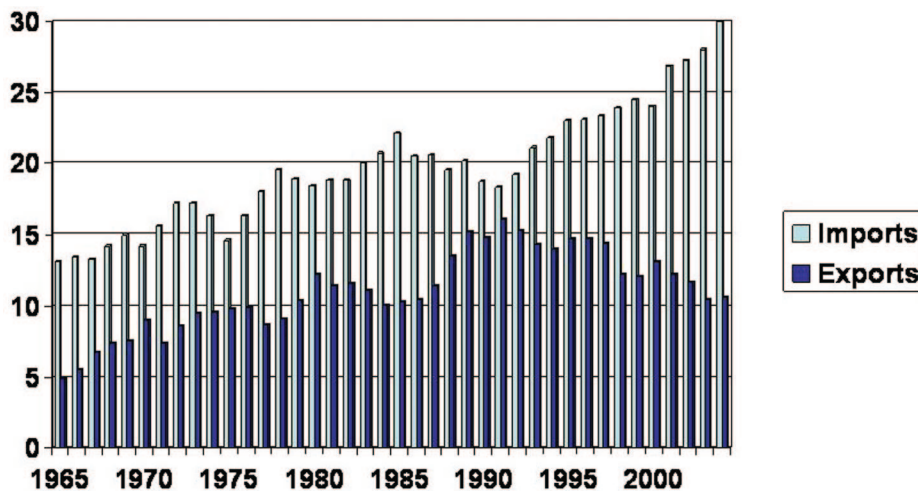


Figure 2. Imports as a percent of consumption and exports as a percent of production of industrial wood. Although imports of industrial wood have continued their long-term climb, exports have fallen since 1991 (Howard 2003).

world than in the United States. From 1990 to 2003, 70% of the world's growth in industrial roundwood production occurred in Latin America and Oceania, whereas North American production fell by 2% (Balter 2005). Asia now contains roughly 62% of the global forest plantation area. Southeast Asia in particular attracts huge investments in plantation development (Bowyer 2006). From 2000 to 2015, as its commercial enterprises continue to grow, Eastern Europe is expected to have one of the highest annual growth rates in timber production. After a drop following the breakup of the Soviet Union, Russian timber production is also on the rise, with the potential to expand to about 410 million ft^3/yr , almost as much as the entire US timber harvest in 2005 (Bowyer 2006). Cost-competitiveness now drives industrial investments on a global scale.

What's more, changes in the United States have affected regional wood products markets. As production shifted from large- to small-diameter timber, the share of production in the southeastern United States increased from about 40% of total US output in the 1970s to more than 60% in 2002 (Smith et al. 2002). Over the same period, output from the western United States, where the demand for fuels treatments and ecological restoration is especially high, fell from more than 40% to less than 20% of domestic production. Reductions in timber harvests from public lands have played a role in this trend, along with technological changes, and it remains an open question whether investment can be drawn to western regions where markets are no longer strong.

Global cost-competitiveness also drives undesirable behavior, such as illegal logging, which has given some overseas producers a market advantage. Illegal logging includes harvesting without authority in designated national parks or forest reserves; failing to obtain a concession permit or exceeding permit limits; failing to report harvesting activity to avoid royalty payments or taxes; and violating international trade agreements. According to the American Forest and Paper Association, illegal logging represents from 5 to 10% of global industrial roundwood production, much of it concentrated in Cambodia, Indonesia, Myanmar, and Papua New Guinea, all of which export illegal logs to China (AF&PA 2004). Depending on the product and market, illegal timber depresses global prices for wood products by 7–16% on average, reducing the ability of American producers to compete.

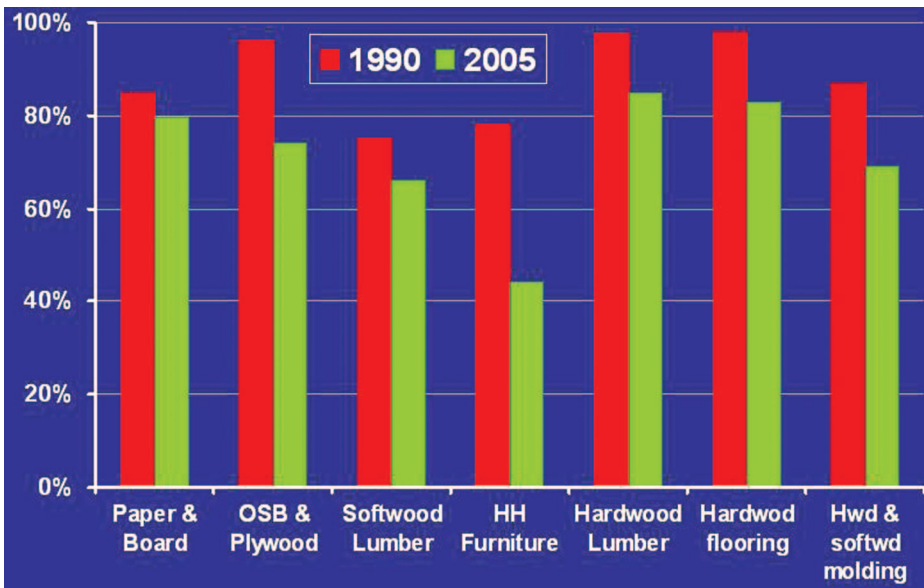


Figure 3. Supply to U.S. markets. Domestically produced shares of U.S. consumption declined for all major categories of wood products from 1990 to 2005, and especially for more labor-intensive products such as furniture (Ince et al. 2007).

On the demand side, most market growth has shifted overseas (Sample and Wallinger 2006). Demand for wood is booming in Africa, Asia, Eastern Europe, and Latin America but relatively flat in the developed world due to low population growth and greater wood-processing efficiency, use of wood substitutes, and waste-paper recycling (NCCSF 2005; Sample and Wallinger 2006). Nevertheless, developed countries still consume the vast majority of the world's wood, some 65% (Sample and Wallinger 2006). Therefore, global demand for roundwood has stagnated since the 1980s, with little increase expected in the future (NCCSF 2005).

As demand growth has concentrated in developing countries and the global supply of wood fiber has grown, especially in Asia and South America, capital has flowed to different parts of the globe. Timber production, both in the United States and around the globe, has shifted toward highly efficient planted forests. The US share of global wood products markets has declined, and any decision to replace aging wood products capital in the United States, especially in the pulp and paper sectors, must now take into account returns on potential investments around the globe.

A Tale of Opportunity

However, there is another side to the story, a tale of opportunity. The American forest-products industry is far from moribund. In fact, the United States consumes

and generates more wood products than any other nation (Turner et al. 2005). Although wood products markets in some regions of the country have declined, the American South, the Westside Cascades, and the Upper Midwest have maintained strong wood-products sectors, despite foreign competition. Surges in wood imports reflect an American housing boom in the 1990s and early 2000s as well as a huge and growing US economy. Open-trade policies kept the cost of building materials down while fueling growth.

In some ways, long-term prospects appear to be improving for the American forest-products industry as a whole. Large producers have adopted more capital-intensive operations while shifting away from the Interior West toward regions with greater comparative advantages for timber production. From 1995 to 2005, the number of softwood lumber mills operating in the United States fell from 862 to 664, whereas the average mill capacity rose by 60%. In the pulp and paper sector, annual output per employee jumped by almost 70% from 1992 to 2003. From 1997 to 2005, the pulp, paper, and paperboard industry cut one out of every three jobs at mills by closing less efficient mills and improving labor productivity at the rest (Ince et al. 2007). After more than a decade of downsizing and structural change, large forest-related operations in the United States have become leaner and more productive, renewing modest growth.

In 2005, the West produced 3% more lumber than in 2004 (19.4 bbf), the most since 1990, and the South posted an even bigger annual gain of 5.2% (18.99 bbf) (WWPA 2006).

Of course, the industry remains dependent on the housing market. Gains posted in 2005 were in large part due to a surge in new housing starts in 2005. A housing downturn in 2006 led to losses, with production down 2.5% in the South, 8.8% on the West Coast, and 8.9% in the Interior West.

Despite such fluctuations, however, long-term prospects for the US forest-products industry appear somewhat favorable. Haynes et al. (2007) project that the proportion of total US wood consumption met by imports will peak in 2010 at almost 29%, then gradually drop to less than 27% by 2050. Part of the reason is that some global competitors are not as daunting as they might seem. Canada currently accounts for more than 85% of American softwood lumber imports, but its capacity to expand production is limited. Already, the allowable annual cut in Quebec has been reduced to prevent overcutting. In the long term, Canada will likely lose market share in the global economy, much as the United States has in the past. Also, Canada is a net exporter of oil—in fact, it is the leading source of US oil imports. A surge in global oil prices has driven the Canadian dollar higher in value relative to the US dollar, depressing competitiveness and profitability for the Canadian forest-products industry.

Although China has claimed a large share of the US furniture market, it also imports wastepaper from the United States, along with substantial amounts of wood pulp, paper, and softwood lumber (White et al. 2006b). China has invested in extensive forest plantations, but its future demand for timber is likely to outstrip domestic supply. The main beneficiaries will likely be China's neighbors, particularly Russia, which currently supplies almost half of China's timber products. However, slow development and lack of transportation infrastructure in Russia point to the possibility of expanded North American exports of forest products to China, particularly if Russia imposes a log export tax to build its own value-added wood-products industry.

Accordingly, American timberland is considered such a sound long-term investment that financial buyers are snapping it up. Since the 1980s, financial management planners have targeted timberlands as rela-

tively low-risk, counter-cyclical assets for diversifying the portfolios of retirement funds and the like (Richard Smith, Forest Systems, Inc., personal communication, Jan. 16, 2007). From 1981 to 2004, according to one report, timber investment management organizations (TIMO) and real estate investment trusts (REIT) acquired almost half of all industrial timberlands in the United States (Woodard 2006). Although they might sell parcels to developers under certain market conditions, TIMOs and REITs focus primarily on long-term timber management through forest-operating companies (Richard Smith, personal communication, Forest Systems, Inc., Jan. 16, 2007). Their growing share of timberland ownership signals confidence in the long-term ability of America's forests to deliver a whole suite of lucrative products and services, including such ecosystem services as carbon sequestration, outdoor recreation, and water delivery (Richard Smith, personal communication, Forest Systems, Inc., Jan. 16, 2007).

Moreover, the American forest-products industry is hardly monolithic. The very term "industry," with its traditional emphasis on large-scale tree farming, is increasingly open to question under today's market conditions. After many decades of consolidation and vertical integration, many firms in the US forest-products industry have, since the 1990s, separated the generation of wood products from timber-growing operations. The trend has been toward more specialized business models. Without the dominance of vertically integrated firms, the industry is arguably becoming more nimble. Growing labor efficiency (Spelter and Alderman 2005) suggests that the sector is capitalizing on US skilled labor as a competitive advantage. In some sectors, such as millwork and wood furniture, the size of firms appears to be getting smaller (Kozak 2006) and growth potential seems high for "niche" and high-value-added products.

High-value-added operations might play a role in sustaining a wood products sector in regions such as the Intermountain West or the Northeast, which do not have comparative advantage in the major commodity markets. Rooted in small communities, successful firms in these regions are closely tied to suppliers of raw materials such as the Forest Service. They can tailor operations to meet local or regional demand for services and niche products from natural forests, such as custom-made furniture or

specialty woods (such as alder, cherry, or walnut). In such markets, producers can capitalize on the unique attributes of local resources and proximity to markets, giving local firms a distinct advantage.

Opportunities for such firms are growing. Although China has captured much of the market for mass-produced furniture, its imports of the necessary raw materials—North American hardwood lumber such as tuliptree, red alder, and sugar maple—have soared (White et al. 2006b). Meanwhile, the market niche for small-scale furniture manufacturers seems secure. From 1998 to 2003, their share of jobs in this sector rose from 77 to 80% (White et al. 2006b), mainly due to the decline of large-scale manufacturers.

The opportunities go beyond hardwoods. As a renewable resource, wood fiber takes far less energy to produce than steel, cement, plastics, or other industrial materials (Strigel and Meine 2001). With rising energy prices and growing concern about greenhouse gas emissions, wood could increasingly substitute for such materials. Moreover, the need to remove small-diameter fuels to reduce fire danger and restore forest health, particularly in long-needle pine forests, has not only produced opportunities for service and stewardship contracts on national forest land, but also led to broad new uses for the materials removed, ranging from structural lumber, to flooring and paneling, to pulp and biofuels (LeVan-Green and Livingston 2003, Sample and Wallinger 2006). Woody biomass could generate growing amounts of energy. Producing ethanol from cellulosic biomass could be about two to three times more energy efficient than producing ethanol from corn or biodiesel from soybeans (Hill et al. 2006).

Another potential area of opportunity is ecosystem services. Forests deliver a range of "public-good services" that are generally taken for granted, such as water delivery, biodiversity, and carbon sequestration. As these services become more scarce, interest grows in devising markets and other means for procuring their benefits. Compensating landowners for ecosystem services has the potential to enhance forest values, thereby reducing pressures to deforest and develop land. Buyers can already purchase carbon credits on the Chicago Climate Exchange to offset activities that emit greenhouse gases, such as a business flight for a company with a policy of carbon neutrality. In turn, the Chicago Climate Exchange buys credits

from projects that offset the accumulation of greenhouse gases in the atmosphere. Many forestry projects do just that, and some are already generating income for forestland owners.

The depth of such opportunities remains to be plumbed, partly because carbon offset projects can have multiple dimensions. For example, researchers are piloting a scheme on the Mendocino National Forest in California for measuring several kinds of carbon offsets from fuels treatments: (1) avoiding massive carbon emissions from a wildfire; (2) generating biomass that is sold to produce energy, thereby avoiding emissions from burning fossil fuels; and (3) stimulating carbon uptake by thinning vegetation and releasing new growth. In the conceivable future, forestland owners might command revenue streams from all three carbon offset paths, plus revenue from timber and biomass generated from fuels and forest health treatments.

A Role for the Forest Service

So is the glass half full or half empty? It depends. For the American forest-products industry, the challenges are daunting indeed. Global competitors appear to have decided advantages, particularly in the large-scale production of timber, lumber, and other mass-generated wood commodities. Yet large producers in the United States, after a decade or more of "right-sizing," appear to be making renewed gains, and indications are that long-term prospects for America's commercial timberlands might not be entirely unfavorable. Most promising of all appear to be the prospects for small and medium-size forest-products companies, particularly in markets for specialized woods and specialty wood products. Markets for ecosystem services also hold growing promise.

Whether the glass is half full or half empty depends, to some degree, on the help that American producers in forest-related industries get from their government. For more than a hundred years, the US Forest Service has delivered a full range of services in forest-related research as well as state and private forestry, such as studies on forest pests and diseases and various kinds of technical assistance to forest landowners. With all due modesty, we believe that today's high level of forestry knowledge and capacity, both nationally and worldwide, is due in

part to a century of Forest Service research and assistance.

That has been good for everyone, and the Forest Service will continue in the same vein. However, we have entered a new age—an age of global markets for wood products. Today, in addition to delivering its traditional research support and technical assistance, the Forest Service is seeking to help America's forest landowners and forest-related industries by:

- Fathoming the potential of markets for ecosystem services. The Forest Service has the Nation's premier conservation-related research capacity, some of which has been invested for decades in climate change research, including the development of techniques and technologies for using forests to sequester carbon and for mitigating the effects of climate change on forest and rangeland ecosystems. Although carbon is on the cutting edge, the Forest Service is also exploring opportunities for making other ecosystem services pay, such as water delivery.

- Developing new ways of using biomass and small-diameter trees. Many lands, both private and public, need fuels and other treatments, including the removal of small-diameter materials to reduce fire danger and restore forest health. The Forest Service's Forest Products Laboratory in Madison, WI, has taken the lead in developing new and profitable uses for low-value forest materials. For example, its researchers are working hard to find the scientific and technological keys to the large-scale use of biofuels.

- Using national forest land to pilot-test or showcase new techniques and technologies for gaining additional income from state and private forests. The carbon project on the Mendocino National Forest is a case in point, as is the pilot-testing of forest certification on several national forests through the Pinchot Institute for Conservation, an independent nongovernmental organization for conservation research and policy analysis.

- Delivering a steady stream of materials from national forest land. Many firms in the forest products industry rely on national forest land for raw materials. In turn, they provide essential services for reducing fuels, repairing ecological damage, and restoring forest health. The success of the Forest Service in enhancing the health of the National Forest System depends, to some degree, on supporting the development of markets where needs for restoration management are greatest. This ultimately requires ways to de-

liver biomass, small-diameter trees, and other materials to private industry on a basis reliable enough to justify investments in the industrial capacity needed to sustain forest health.

- Suppressing illegal logging in other countries. The Forest Service supports international agreements to foster sustainable forest management worldwide. Through overseas technical support, such as training and assistance in reduced-impact logging, the Forest Service can help rural communities in other countries find ways of making a living from forests rather than cutting them down illegally or converting them to crop- or pastureland.

Capitalizing on the Opportunities

America's producers face challenges in the global marketplace for wood. Today, capital is global in nature, easily moving across borders to where markets are booming and the factors of production are cheapest. Land, unskilled labor, and wood fiber are all relatively expensive in the United States, and the fastest growing markets for major commodities are all overseas, attracting investments away from American forests and forestry. Within the United States, wood products manufacturing has concentrated on a shrinking portion of forestlands, leaving broad regions in need of restoration but without strong local markets to support management.

In today's global marketplace, long-term survival means finding areas of comparative market advantage. In the United States, such areas might include certified wood, dimensional lumber, specialty wood products, and nontraditional forest products (Sample and Wallinger 2006, White et al. 2006b). A highly skilled workforce, strong transportation infrastructure, and proximity to demand centers also impart strong comparative advantages on parts of the sector. Moreover, government partnerships and support can help small to medium-size producers sustain and develop their natural advantages in local and regional markets.

Forest landowners might also be rewarded financially for furnishing ecosystem services such as carbon sequestration or water delivery. Certification schemes are established worldwide, and markets for ecosystem services are growing, particularly for carbon. There are also new opportunities to use small trees and biomass. The future of

America's forest-products industry depends on whether people can find ways to capitalize on such opportunities in an increasingly competitive global marketplace. Opportunities to restore and protect the health of American forests, in turn, will flow from markets for all types of services from forests—from the traditional lumber products that fueled US economic growth for centuries, to increasingly scarce ecosystem services ranging from biodiversity to carbon sequestration.

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References

- AMERICAN FOREST AND PAPER ASSOCIATION (AF&PA). 2004. "Illegal" logging and global wood markets: *The competitive impacts on the U.S. wood products industry*. Prepared by Seneca Creek Associates, LLC, Poolesville, MD. Available on-line at www.afandpa.org/Content/NavigationMenu/News_Room/Papers_Reports/Whitepapers.htm; last accessed Feb. 1, 2008.
- BALTER, K. 2005. *Global timber trends: Implications for the U.S. forest products sector*. Presentation at the Global Markets Forum conference, Feb. 15–17, 2005, Orlando, FL.
- BOSWORTH, D. 2003. *We need a new national debate*. Presentation at the Izaak Walton League 81st annual convention, 17 Jul. 2003, Pierre, SD. Available on-line at www.fs.fed.us/news/2003/speeches/07/bosworth.shtml; last accessed Feb. 1, 2008.
- BOSWORTH, D. 2006. *In the spirit of Earth Day: Connecting people to the land*. Presentation at the University of California, Apr. 22, 2006,

- Berkeley, CA. Available on-line at www.fs.fed.us/news/2003/speeches/07/bosworth.shtml; last accessed Feb. 1, 2008.
- BOWYER, J.L. 2006. *Global trends affecting the U.S. Forest Service*. Presentation at the conference on helping the wood products industry profit from the next ten years, Apr. 11–12, 2006, Princeton, WV.
- FOOD AND AGRICULTURE ORGANIZATION (FAO). 2006. *Yearbook of forest products, 2004*. United Nations FAO Forestry Series 189, Rome, Italy.
- HAYNES, R.W. 2004. *National forest harvest, 1952–2003*. Unpublished data on file with the US For. Serv. Pacific Northwest Res. Stn., Portland, OR.
- HAYNES, R.W., D.M. ADAMS, R.J. ALIG, P.J. INCE, J.R. MILLS, AND X. ZHOU. (2007). *The 2005 RPA timber assessment update*. Gen. Tech. Rep. PNW-GTR-699. US For. Serv. Pacific Northwest Res. Stn., Portland, OR. 212 p.
- HILL, J., E. NELSON, D. TILMAN, S. POLASKY, AND D. TIFFANY. 2006. Environmental, economic, and energetic costs and benefits of biodiesel and ethanol biofuels. *Proc. Natl. Acad. Sci.* 103(30):11206–11210.
- HOWARD, J.L. 2003. *U.S. timber production, trade, consumption, and price statistics, 1965 to 2002*. Res. Pap. FPL-RP-615. US For. Serv. Forest Products Lab., Madison, WI. 89 p.
- INCE, P., A. SCHULER, H. SPELTER, AND W. LUPOLD. 2007. *Globalization and structural change in the U.S. forest sector: An evolving context for sustainable forest management*. Gen. Tech. Rep. FPL-GTR-170. US For. Serv. Forest Products Lab., Madison, WI. 62 p.
- KEEGAN, C.E. III, T.A. MORGAN, K.M. GEBERT, J.P. BRANDT, K.A. BLATNER, AND T.P. SPOELMA. 2006. Timber-processing capacity and capabilities in the Western United States. *J. For.* 104(5):262–268.
- KOZAK, R. 2006. *Trends in labor statistics. Preliminary report—United States, 1998 to 2003*. Unpublished report, Rights and Resources Group, Washington, DC.
- LEVAN-GREEN, S.L., AND J.M. LIVINGSTON. 2003. Uses for small-diameter and low-value forest thinnings. *Ecol. Restor.* 21(1):34–38.
- NATIONAL COMMISSION ON SCIENCE FOR SUSTAINABLE FORESTRY (NCSSF). 2005. *Global markets forum*. Summary rep. of the NCSSF, Washington, DC. 20 p.
- SAMPLE, V.A., AND R.S. WALLINGER. 2006. Effects of global economic trends on sustainable management of U.S. Forest. *Pinchot Lett.* 11(1):6–11.
- SMITH, W.B., P.D. MILES, J.S. VISSAGE, AND S.A. PUGH. 2004. *Forest resources of the United States, 2002*. Gen. Tech. Rep. NC-241. US For. Serv. North Central Res. Stn., St. Paul, MN. 137 p.
- SPELTER, H. AND M. ALDERMAN. 2005. *Profile 2005: Softwood sawmills in the United States and Canada*. Res. Pap. FPL-RP-630. US For. Serv. Forest Products Lab., Madison, WI. 85 p.
- SPELTER, H., D. MCKEEVER, AND M. ALDERMAN. 2006. *Status and trends: Profile of structural panels in the United States and Canada*. Res. Pap. FPL-RP-636. US For. Serv. Forest Products Lab., Madison, WI. 41 p.
- STRIGEL, M., AND C. MEINE (EDS.). 2001. *Report of the Intelligent Consumption Project*. Wisconsin Academy of Sciences, Arts and Letters, US For. Serv. Forest Products Lab., Madison, WI. 30 p.
- TURNER, J.A., J. BUONGIORNO, S. ZHU, AND J. PRESTEMON. 2005. The U.S. forest sector in 2030: Markets and competitors. *For. Prod. J.* 55(5):27–36.
- WHITE, A., X. SUN, K. CANBY, J. XU, C. BARR, E. KATSIGIRIS, G. BULL, C. COSSALTER, AND S. NILSSON. 2006a. China and the global market for forest products: Transforming trade to benefit forests and livelihoods. *Forest Trends*, Washington, DC. 31 p.
- WHITE, A., A. MOLNAR, AND J. BULL. 2006b. *Transitions in the global forest industry and their domestic implications*. Presentation at the workshop on dialogue on issues and challenges for US Forests and the US Forest Service, Washington, DC, Dec. 11–12, 2006.
- WOODARD, C. 2006. Sale of the century. *Nature Conserv.* 56(3):20–25.
- WESTERN WOOD PRODUCTS ASSOCIATION (WWPA). 2006. *Another record year for demand pushes western lumber production higher in 2005*. News release, Sept. 12, 2006.

Sally Collins is associate chief of the US Forest Service, Washington, DC. David Darr is retired economics researcher, Resource Use and Valuation, Research and development, US Forest Service, Washington, DC. David Wear is forest economics and policy project leader, US Forest Service Southern Research Station, Research Triangle Park, NC. Hutch Brown is policy analyst, US Forest Service, Washington, DC.