United States Forest Sector

Country Brief

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U.S. Forest Sector

december,1999

The United States is the world's second largest forest products exporter, but imports still exceed exports, making it the world's biggest forestry importer. This reflects the enormous domestic market within the U.S. for wood products. Around 95% of homes in America use wood frame construction, and 40% of softwood consumption is used in this sector. The U.S. is also the world's largest net importer of furniture.

Over the last decade, environmental pressures have restricted harvesting in federal timberlands in parts of the U.S., hitting the Pacific Northwest states particularly hard. This has resulted in major shifts within the US forestry sector. Manufacturers have moved towards increased utilization of smaller diameter logs, growing substitution of solid wood with engineered wood products, and increased wood imports from New Zealand, and South America. Manufacturers now realize that a key to long-term survival is to secure fiber resources either from private timberlands in the US or plantations abroad. These trends are likely to continue as the restrictions on federal timberlands will not improve.

The Forest Resource Equation

The United States of America is the fourth largest country in the world with a total land area of almost 916 billion hectares (2 263 billion acres). The U.S. population is around 274 million people, the third largest in the world.

The U.S. forest land covers an area of 298 million hectares (737 million acres), about 31% of total land area. The U.S. forest area is the third largest forest area of any country in the world. In 1600, forest land covered 49% of total land area, around 1 billion acres. Most of the land clearing was for conversion to agricultural uses, and more than 75% of this conversion occurred in the 19th century.

Forest Area by Region

Region	1000 ha	1000 acres
Intermountain	54,836	135,499
Alaska	52,259	129,131
South Central	50,085	123,760
Southeast	35,645	88,078
Northeast	34,553	85,380
North Central	33,633	83,108
Pacific Northwest	19,620	48,481
Pacific Southwest	15,788	39,011
Great Plains	1,713	4,232
Total forest area	**298,132**	**736,680**

Source: USDA Forest Service

The U.S. is a federated republic and a constitutional democracy. There are 50 states. The government is highly decentralized. The 50 states are individually responsible for providing land management guidance for state-owned and private forests, which account for about 5% (15 million hectares) and 60% (180 million hectares), respectively of all U.S. forests. There are 10 million private forest owners in the U.S. whose land comes under State jurisdiction. State regulations and institutions vary widely based on state policies and priorities.

Forest land is widely distributed across the U.S. Every U.S. state has some forested land. Alaska is the most forested state with 52.3 million hectares (129 million acres), and Delaware the least forested state, 157 thousand hectares (389 thousand acres). Maine has the highest proportion of forest land with 89% of its total land area forested. Only 1% of North Dakota's land area is forested. On a regional basis, Alaska and the Intermountain region both have 18% of the total forest area. The Great Plains region has only 1% of the total forest area.

Forest Types

The species composition of the U.S forests is quite diverse, with pure stands of Douglas fir and ponderosa pine in the western forests and complex mixed species hardwood forests in the northeast. Softwoods dominate the western coast and the south, and hardwoods along the eastern coast.

Eastern forest types

Over 70% of all eastern forest types are hardwoods. The oak-hickory forests are the most widespread forest type, found throughout the south and the southern half of the north. The maple-beech-birch forests are found in the northeast and north central subregions. The oak-pine forests are found mainly in the south and have resulted from selective harvesting of the natural pine forests. The loblolly-shortleaf pine forests are the most extensive softwoods in the eastern forests accounting for about 50% of all softwood forest types. They are found in the southern pine region. Longleaf-slash pine forests are predominantly located in Georgia and Florida. The spruce-fir and white-red-jack pine forests are found in the northern regions.

Western forest types

Over 80% of the western forest type groups are softwoods. The most extensive forest type group is the other softwoods group, which is primarily black spruce stands in interior Alaska. This forest type group, along with the third most extensive forest type group, the pinyon-juniper forests, are rarely used for timber production. Douglas fir and ponderosa pine, two important commercial species, are found in all western subregions except Alaska. The main western hardwoods are red alder, the most abundant hardwood in the pacific northwest region, oaks in California and aspen in the Intermountain region.

Eastern Forest Types

Forest Type	1000 ha	1000 acres	% of Total
Softwoods			
White-red-jack pine	5874	14514	3.8
Spruce-fir	7967	19687	5.1
Longleaf pine	5780	14283	3.7
Loblolly pine	20098	49663	13
Total Softwoods	**39720**	**98147**	**26**
Hardwoods			
Oak-pine	13036	32212	8.4
Oak-hickory	52476	129668	34
Oak-gum-cypress	11823	29214	7.6
Elm-ash-cottonwood	5920	14628	3.8
Maple-beech-birch	20551	50781	13
Aspen-birch	6993	17279	4.5
Other forest types	2154	5322	1.4
Total Hardwoods	**112952**	**279104**	**73**
Nonstocked	2454	6063	1.6
Unknown	504	1246	0.3
Total	**155629**	**384558**	**100**

Source : USDA Forest Service

Western Forest Types

Forest Type	1000 ha	1000 acres	% of Total
Softwoods			
Douglas fir	17540	43342	12
Ponderosa pine	12738	31476	8.9
Western white pine	85	209	0.1
Fir-spruce	24150	59674	17
Hemlock-sitka spruce	6555	16197	4.6
Larch	873	2158	0.6
Lodepole pine	7191	17769	5.0
Redwood	534	1320	0.4
Other softwoods	28147	69552	20
Pinyon-juniper	19463	48094	14
Total Softwoods	**117277**	**289791**	**82**
Hardwoods			
Western hardwoods	19964	49330	14
Chaparral	2648	6542	1.9
Total Hardwoods	**22611**	**55872**	**16**
Nonstocked	2356	5821	1.7
Unknown	259	640	0.2
Total	**142503**	**352122**	**100**

Timberland

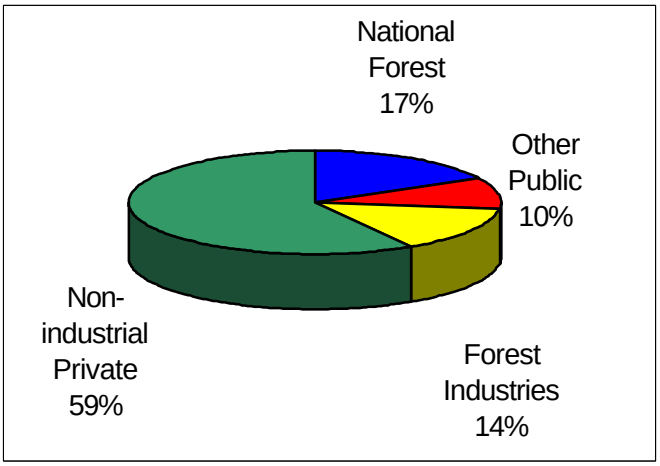
Two-thirds of U.S. forested land is classified as timberland. Timberland is defined as "forests capable of producing 20 cubic feet per acre (1.4 cubic metres per hectare) of industrial wood per year and not reserved from timber harvest". The U.S. has 198 million hectares (490 million acres) of timberland and an additional 14.4 million hectares (36 million acres) of productive forest land which is reserved from harvesting, and is managed as parks or wilderness. The majority of timberlands are located in the eastern states (73%).

Timberland Ownership

Almost three-quarters of timberlands are in private ownership, with 116 million hectares (288 million acres) held by nonindustrial private land owners and 28.5 million hectares (70.5 million acres) by forest industries. Nonindustrial private land owners includes individuals, trusts and corporations. Native American tribal timberlands are recorded in this group. There are millions of owners in this group, with around 30% identified as farmers. Forest industry timberlands are owned by operators of primary wood products manufacturing facilities. There are 34 million hectares (85 million acres) of National Forests timberland, and 19 million hectares (47 million acres) of timberlands on other public lands. Other public lands include lands administered by the Bureau of Land Management, state, county and municipal authorities. Around 60% of other public lands are administered by state agencies.

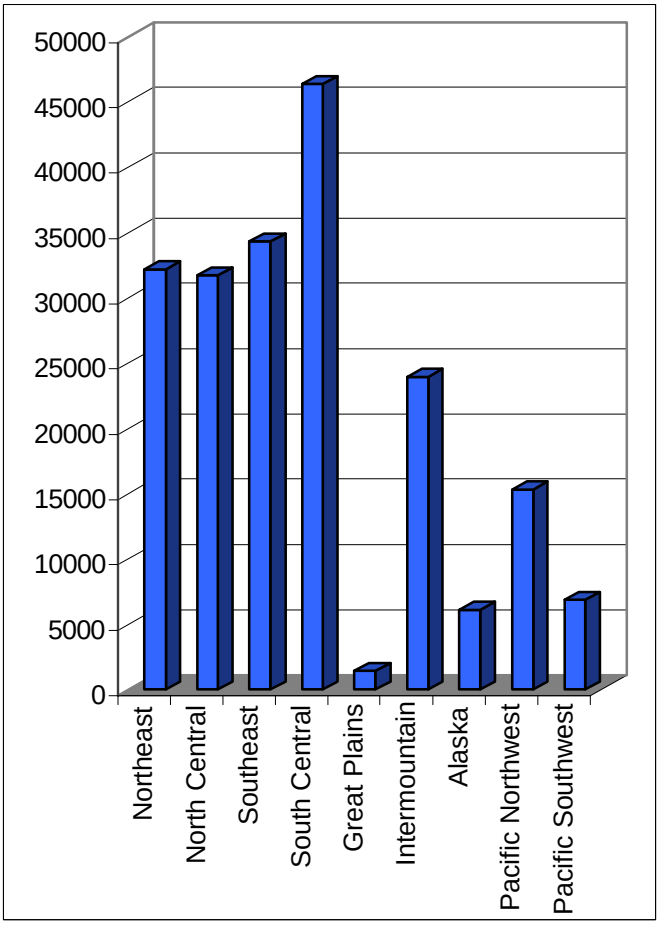
In the east, forests belong to millions of small owners. Over 86% of the eastern forests are in private ownership. By contrast, in the west, vast tracts of forest are managed by a wide variety of federal and state agencies and Native American tribes. Most National Forests were created from unclaimed public lands in the West, around the turn of the century. Three-quarters of all National Forests are in the West. When the National Forests were proclaimed, much of the more accessible, highly forested area was no longer in the public domain. As a consequence, National Forest timberland is generally on less productive and steeper terrain than are private timberlands.

Timberland Ownership



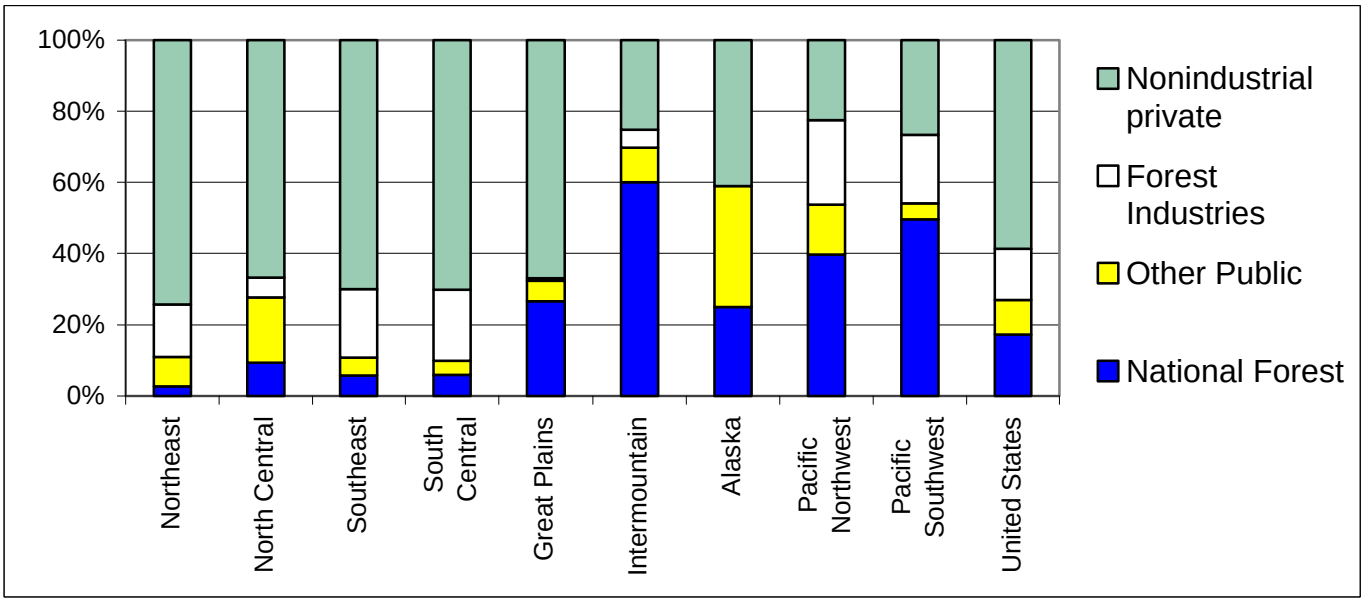
Source : USDA Forest Service

Timberland Area by Region (1000 ha)



Source : USDA Forest Service

Timberland Ownership by Region and Sector



Source : USDA Forest Service

Changes in Resource Availability

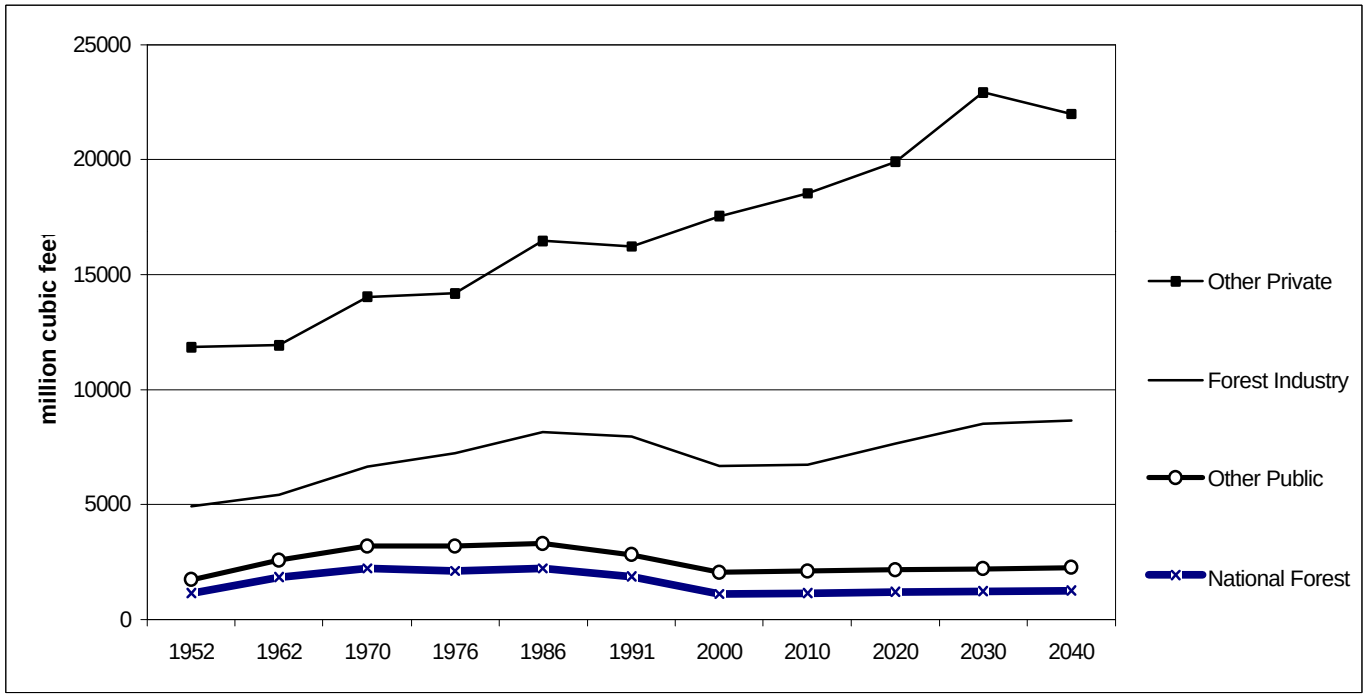
There has been a dramatic reduction in timber harvesting from National Forests in the last decade. A combination of factors including protection measures for endangered species, increased public involvement and changing public values, have resulted in changes in forest management policy. In the Pacific Northwest efforts to protect the northern spotted owl and the marbled murrelet, which are both dependent on old growth forest structures, have resulted in an 80% reduction in harvesting on federal forests. State and private land were affected to a lesser degree as old growth forests were largely found on federal forest land. The reduction in available timber had a large impact on the forest industries. The number of sawmills has been reduced by about half. Since 1989, there have been 230 sawmills close as well as 38 plywood/panel and 40 veneer mills close.

Private forest lands in the Pacific Northwest have assumed a much more important role as a timber supplier. Only around 10% of Oregon mills are dependent on federal timber now. Prior to the reduced timber harvest, around 60% of mills were dependent on federal timber. Timber harvest levels on nonindustrial private forest lands have more than doubled since 1981 and harvest levels on industry-owned forest lands have also increased during the same period. The overall softwood lumber production from the western forests has decreased by about 16 million cubic metres per year (6.8 billion board feet). More resource is anticipated to become available as industrial plantations mature.

As the production levels of the western regions have fallen, there has been increasing harvests from the southern pine region. In the southeast, the production of softwood lumber is expected to increase until 2010 and then decrease due to the projected decline in nonindustrial private timber availability, despite the maturing of industrial plantations. For the southcentral region, timber harvests are expected to increase until 2030.

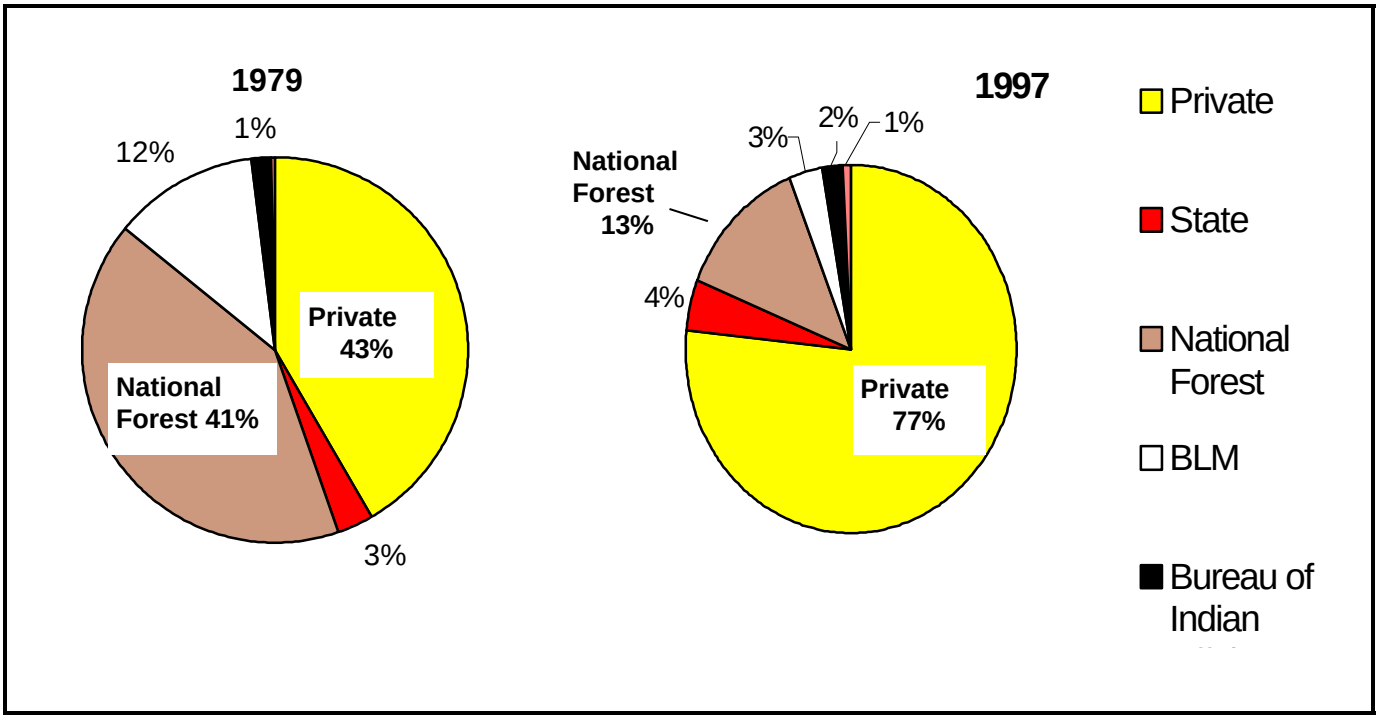
Hardwood lumber production has increased by over 70% in the last 20 years. It is expected that hardwood lumber production will continue to increase, particularly in the south.

Volume of Timber Harvested from All Forests (2000- estimated)



Source : USDA Forest Service

Oregon Timber Harvests by source, 1979 and 1997



Source : USDA Forest Service

Timber Markets

The U.S. is the world's single largest consuming country of forest products. Residential construction is the dominant market for most U.S. timber products.

Housing

Around 95% of the houses built in the U.S. are constructed using wood. Therefore the number of new housing starts is an important indicator of wood demand. The new home construction market is valued at $200 billion per year. The size of new housing units built is another important determinant of timber products used in housing. The average size of single-family housing units has risen from almost 107 square metres (1,150 square feet) in the early 1950s to about 190 square metres (2,080 square feet) in 1990. Single family house starts each use on average 32 cubic metres (13,500 board feet) of lumber and 10.3 cubic metres (11,600 square feet) of structural panels. In 1996, 40% of softwood lumber was used in new residential construction.

The renovation and repair of existing homes is also a large consumer of timber products. About 30% of lumber and structural panel products and 15% of nonstructural panel products are used each year for the upkeep and improvements of existing units.

The importance of the US domestic timber market should not be underestimated. A robust economy and strong housing market accounted for excellent softwood lumber sales in 1998-99 despite severe economic downturns in other parts of the world. Thus, while exports to key markets like Japan fell, strong domestic demand kept prices and sales high.

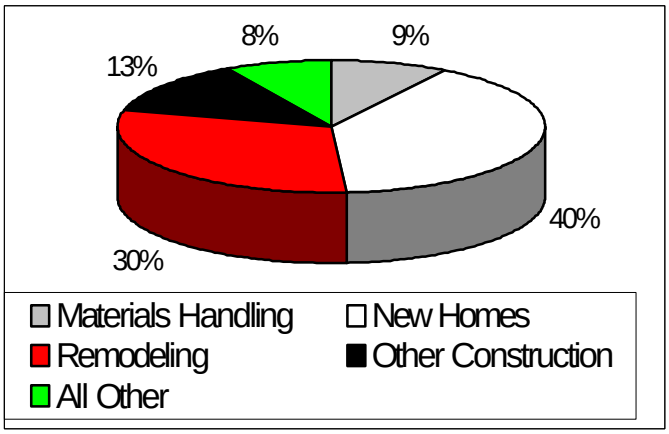
Non-residential markets

About 10% of lumber, plywood and other structural and nonstructural panel products are used in the construction of offices, stores, churches and a wide variety of other nonresidential buildings, and in other types of construction, such as roads, dams, and water and sewer systems.

Furniture, sports equipment, games and toys, and commercial and industrial equipment use about 10% of the lumber, 5% of the structural panel products and 25% of the nonstructural panel products. Of these products, furniture manufacturing is the largest end-use of sawn timber. Around 32% of sawn hardwood is used in furniture and cabinets.

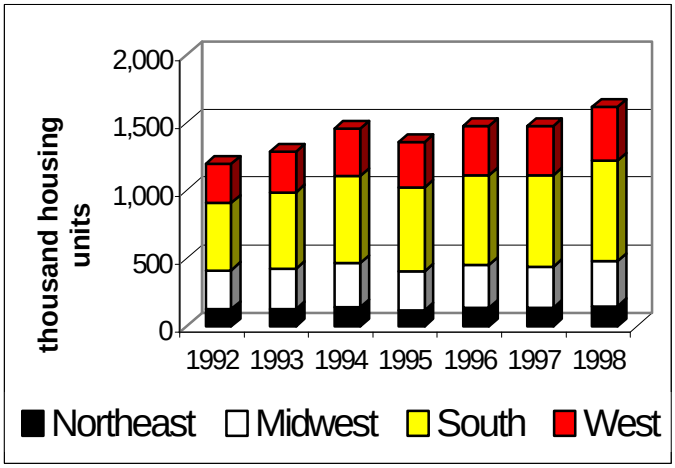
The production of wooden pallets, containers, and for dunnage, blockage and bracing of goods for shipping accounts for 18% of all lumber and about 3% of the structural and nonstructural panel products. Pallets account for about 75% of the lumber and 65% of the panel products consumed in shipping. Around 40% of sawn hardwood is used in pallets, packaging and railroad ties (sleepers).

Softwood Lumber Use



Source : Western Wood Products Association, 1996

New Housing Starts



Source : Census Bureau, 1999

Softwood Lumber Grading

Softwood lumber grading rules have been developed by regional grading agencies in conjunction with the American Lumber Standards Committee. These grading agencies are private associations, not government agencies. Member mills agree to abide by voluntary product standards. Thus the standards set by each grading agency only apply to lumber manufactured from timber grown in a specific region. For example, the West Coast Lumber Inspection Bureau has rules for lumber manufactured from timber grown in the West Coast region from the Cascade Mountains west to the Pacific Coast; the Southern Pine Inspection Bureau has rules for southern pine. Agencies establish standards and enforce compliance through product testing and auditing.

Each grade group is subdivided into grades that define the limiting characteristics that a piece of lumber may contain. For example, the West Coast Board Grades are superior finish, C and better, prime finish, D, E finish, select merchantable, construction, standard, utility and economy.

US Softwood Lumber Grade Groups:

- *Board grades* Graded more for appearance than structural application. Boards are typically used for paneling, shelving etc.
- *Dimension grades* Graded primarily for structural applications.
- *Factory grades* Usually factory lumber is sawn to make products such as furniture, door, window or moulding-type parts.
- *Timber grades* Graded primarily for structural application.

Hardwood Lumber Grading

The hardwood lumber market is separated into two broad categories: grade hardwood lumber and non-graded hardwood products. The grade lumber is graded under the National Hardwood Lumber Association (NHLA) rules or some variation of those rules. With some exceptions, hardwood lumber is graded on the basis of the size and number of cuttings (pieces) which can be obtained from a board when it is cut up and used in the manufacture of hardwood products. A higher grade will have a larger area of clear wood.

Nongraded hardwood products are lumber, cants or timber normally not sold under NHLA rules. Major uses of nongraded lumber include pallets, crossties, construction material, bridge timbers, and upholstered furniture frame stock. Some of these products are graded for strength and durability. Railroad crossties (sleepers) and bridge timbers usually are graded for strength and durability, however, there are no well defined sets of grading rules for pallet cants and frame stock. Additionally, an increasing proportion of hardwood lumber is being marketed under proprietary grades developed by individual producers.

US Hardwood Lumber Grades:

- *Firsts and Seconds* (FAS) Provides long, wide, clear cuttings. Best suited for high quality furniture, interior joinery and solid wood mouldings.
- *Number 1 Common* Provides clear cuttings of medium length and width. Best suited for furniture, cabinets, other solid wood manufactured products.
- *Number 2 Common* Provides short, narrow clear cuttings for use in unexposed furniture frames, picture frames, cabinet rails, parquet or strip flooring and many other smaller solid wood components.
- *Number 3 Common* Similar to No. 2 Common except has less clear wood.

Lumber Distribution & Pricing

Pricing
The U.S. forest products market is controlled only by supply and demand. The volume of lumber produced, the sizes of the lumber produced, and the prices at which these lumber products are bought and sold are all determined, on a daily basis, by thousands of individual transactions between buyers and sellers. Prices change daily. There are several publications or services—such as Random Lengths' Weekly Report, Yardstick, and Midweek Fax—that cite weekly or monthly prices paid for lumber and other forest products.

Lumber distribution chain
Rarely is lumber purchased directly from the sawmill by the end user. The lumber distribution chain includes some, or all, of the following: sawmill sales office; remanufacturing plants; national and regional office wholesale companies; cooperative buying groups; regional reload centres; large metropolitan distribution yards; and local lumberyards and retail outlets.

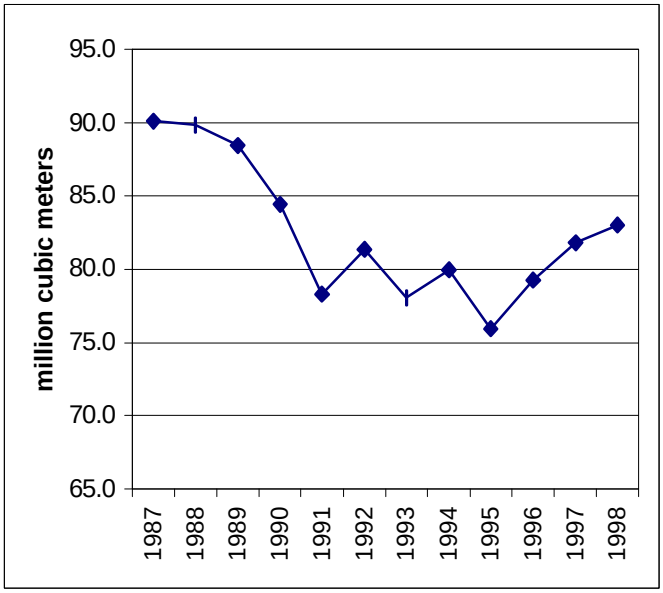
Wholesale and trading companies buy and sell large volumes of lumber, but are not manufacturers of the lumber and usually do not have lumber stocking yards. Trading is a well established practice in the market and it is often the trader that sets the price for sale. The biggest commodity traded is structural lumber, however all solid wood products are traded as well as plywood, oriented strand board and medium density fibreboard. Typically, engineered wood products are

Production & Consumption of Softwood Lumber

The US softwood lumber production has decreased over the past decade from a high in 1987 of 90 million cubic metres (38.2 billion board feet) to a low in 1995 of 76 million cubic metres (32.2 billion board feet). However, softwood lumber production has increased each year over the past three years. As mentioned previously, production decreased in the western regions as a result of changing management priorities on National Forests and lumber production has been increasing in the southern and northeast regions.

While production has decreased, softwood lumber consumption has been increasing. Both 1997 and 1998 were record years for softwood lumber consumption, 120 million cubic metres (50.8 billion board feet) and 124 million cubic metres (52.6 billion board feet) respectively. Prior to 1997, the record year for lumber softwood consumption was in 1987 when 119 million cubic metres (50.6 billion board feet) was used. The increase in consumption has been fueled by single housing starts reaching 1.27 million starts, the highest in 20 years.

Softwood Lumber Production



Source : Western Wood Products Association, WWPA

Softwood Lumber Imports

As softwood lumber consumption has been increasing, so too have the U.S. imports of softwood lumber. Softwood lumber imports in 1998 were a record high 43.6 million cubic metres (18.7 billion board feet). Canada has been the largest traditional trading partner with the U.S. and has over 95% share of the softwood lumber imports. Although the volume of lumber imports

from other countries is relatively small in relation to the U.S. consumption, their import volumes have increased dramatically. Softwood lumber imports from Brazil are southern yellow pine, Chile and New Zealand export mainly radiata pine and pines from Mexico. Softwood lumber imports from these countries are mainly used in moulding and millwork. Imports from Europe are generally nonstructural or appearance grade boards and a small quantity of studs.

Softwood Lumber Supply and Demand

	1994		1995		1996		1997		1998	
	Million m3	Billion bf	Million m3	Billion bf	Million m3	Billion bf	Million m3	Billion bf	Million m3	Billion bf
Production	79.9	33.9	75.9	32.2	79.2	33.6	81.8	34.7	83.0	35.2
Imports:										
Canada	38.0	16.1	39.9	16.9	40.8	17.3	41.0	17.4	42.4	18.0
Other	0.7	0.3	0.9	0.4	0.9	0.4	1.4	0.6	1.4	0.6
Total Imports	38.7	16.4	40.8	17.3	41.7	17.7	42.4	18.0	44.1	18.7
Exports:										
Japan	2.4	1.0	2.1	0.9	2.1	0.9	1.4	0.6	0.7	0.3
Other	2.8	1.2	2.6	1.1	2.4	1.0	2.8	1.2	2.4	1.0
Total Exports	5.2	2.2	4.7	2.0	4.5	1.9	4.2	1.8	3.1	1.3
Consumption	113.7	48.2	112.2	47.6	116.5	49.4	119.8	50.8	124.0	52.6

Source : WWPA

Top 10 Softwood Lumber Imports by Source (cubic meters)

Country	1994	1995	1996	1997	1998
Canada	37,457,026	39,602,000	41,519,906	40,675,739	42,097,724
Brazil	174,789	234,809	240,819	387,516	495,035
Chile	177,605	209,546	170,634	260,147	300,167
New Zealand	156,837	167,575	145,420	170,113	220,881
Mexico	121,286	250,567	277,534	283,237	157,008
Austria	0	65	2,112	51,251	135,886
Sweden	6,867	6,199	5,837	15,273	39,143
Finland	529	550	10,005	22,026	33,883
Argentina	705	5,759	19,565	31,650	25,508
Lithuania	0	0	1,596	5,752	15,217
All Others	53,946	42,872	53,942	72,044	51,816
Total	**38,149,590**	**40,519,942**	**42,447,370**	**41,974,748**	**43,572,268**

Source: Foreign Agricultural Service, FAS

Canada-U.S. Softwood Lumber Agreement

The Canada – U.S. Softwood Lumber Agreement came into effect in 1996 to limit the amount of softwood lumber which can be exported duty-free from Canada to the U.S. The agreement was formed because the U.S. and Canadian lumber industries were at loggerheads over the issue of Canadian lumber exports to the U.S. The U.S. industry has long perceived that the Canadian government subsidizes their industry through non-competitive allocations of timber, resulting in artificially cheap lumber export prices for the Canadian industry, creating a comparative disadvantage for the U.S. industry. Canada has repeatedly denied the charges. The issue is centered on crown ownership of the Canadian resource and the transparency of government in setting prices for timber.

The agreement allows for 14.7 billion board feet (34.7 million cubic metres) of softwood lumber to be exported each year from the Canadian provinces of British Columbia, Alberta, Ontario and Quebec without penalty fees. Lumber produced in other Canadian provinces is exempt from the agreement. Each of the affected provinces is allocated a percentage of the fee-free total. Individual companies within the provinces are in turn allocated a percentage of the provincial totals. Lumber exports may exceed the fee-free limit, however a sliding scale of fees will be applied above the agreement allocation.

The agreement has been complex to administer and has caused considerable friction in determining which lumber products are included in the agreement and which are excluded. Not all producers were allocated a percentage of the fee-free total, diminishing their ability to compete in the booming U.S. markets. No allowances were made in the agreement for changing market situations.

The current agreement is in effect for five years. The U.S. industry would like to keep the agreement in place until they are satisfied that the Canadian system of allocating timber is comparative to their market based pricing system.

Since the agreement has been in place there has been a marked increase in exports to the U.S. from producers in the Maritimes who are not subject to the agreement. The producers in British Columbia have been the most affected by the agreement. The costs incurred in harvesting in British Columbia are the highest in Canada and similar to the U.S. Pacific Northwest region, they have also had a dramatic reduction in exports to Asia in the past two years.

Softwood Lumber Exports

Softwood lumber exports from the U.S. have been decreasing over the last decade, with the most significant decrease being in 1998 when exports fell by around 30% from the 1997 exports. Part of the reason for the falling softwood lumber exports can be explained by the reduced harvesting in the western regions and increased domestic demand for lumber, resulting in less lumber available for exports. However, the Asian economic problems have significantly affected the U.S. softwood lumber export market over the past two years. Japan traditionally has been the largest importer of U.S. softwood lumber. U.S. lumber imports into Japan have decreased by 1.3 million cubic metres (564 million board feet) in the past two years. Around 20% of the U.S. softwood lumber exports are to Canada.

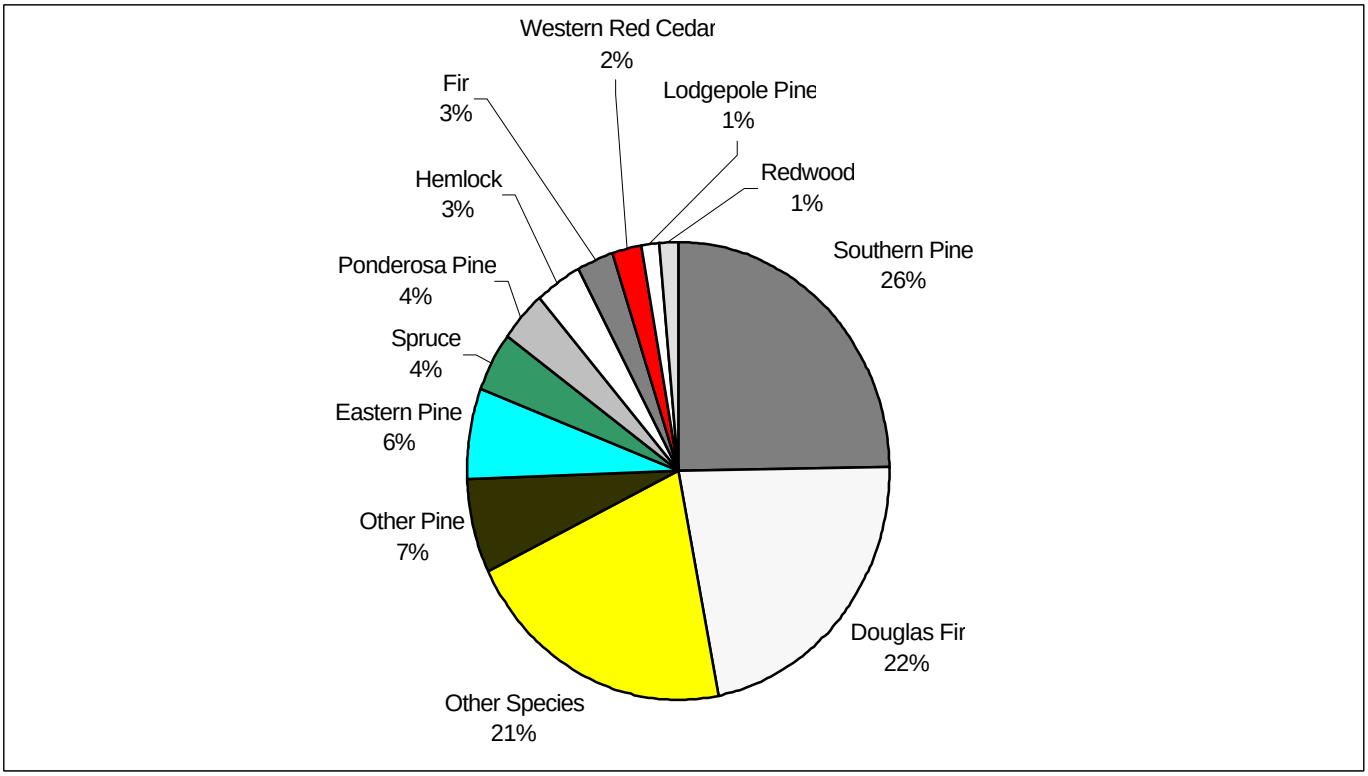
By volume, the southern pines are the major softwood lumber species exported (25% of total exports), followed by douglas fir (22%), other pines (7%), the eastern pines (6%), spruce and ponderosa pine (4% each). Japan receives about half of all the douglas fir lumber exports from the U.S. Canada imports over 80% of all eastern pine lumber exports. The Caribbean Islands and Spain import mainly southern pine lumber. U.S. softwood lumber exports to Australia, mainly douglas fir, have significantly reduced in the last decade as more of Australia's softwood lumber requirements are being met by radiata pine plantations in Australia and New Zealand.

Top 10 US Softwood Lumber Export Destinations (cubic meters)

Country	1994	1995	1996	1997	1998
Japan	2,261,779	2,056,941	2,031,283	1,484,865	702,127
Canada	673,882	737,525	737,066	777,116	544,162
Mexico	573,908	232,150	191,683	204,477	253,890
Dominican Republic	197,544	214,193	161,491	208,113	175,789
Spain	157,469	151,223	139,606	145,276	146,325
Italy	126,530	125,058	108,536	135,595	127,951
Germany	99,589	77,953	57,790	77,720	87,108
The Bahamas	45,950	46,576	33,220	75,764	49,703
Australia	156,751	222,470	137,150	106,531	48,702
Leeward-Windward Island	37,011	49,357	51,254	40,503	42,203
All Others	573,694	504,803	572,257	629,557	486,932
Total	**4,904,107**	**4,418,249**	**4,221,336**	**3,885,517**	**2,664,892**

Source: Foreign Agricultural Service, FAS

Softwood Lumber Exports by Species 1998



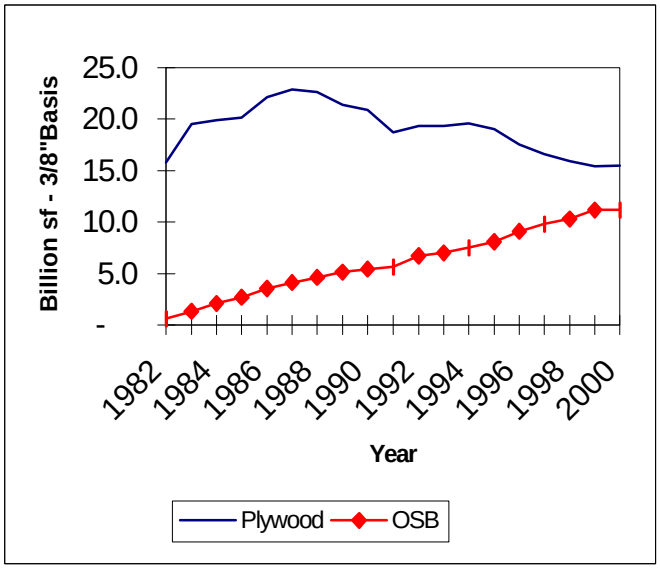
Source: Foreign Agricultural Service, FAS

Structural Panels

Over 60% of structural panels in the U.S. are used as sheathing and flooring for new residential houses and alterations to existing houses. As the housing starts and repair and remodeling of houses has increased, so too has the U.S. consumption of structural panels. Total consumption of structural panels in the U.S. has now reached over 30 million cubic metres (34.5 billion square feet). U.S. production of structural panels has been aimed mostly at the domestic market. A very small share, around 5%, of production is shipped to foreign markets.

The past decade has seen the emergence of OSB--Oriented Strand Board--as the dominant structural panel consumed in the US, surpassing plywood consumption in 1998. OSB is a lower cost, more fiber-efficient engineered wood alternative to plywood. The favourable market conditions for the housing sector have reversed the OSB oversupply situation of 1996 when supply grew much faster than demand, as evidenced by rising prices for structural panels. To meet demand, the US imports 6 mill m^3 per year of OSB, mainly from Canada.

U.S. Panel Production



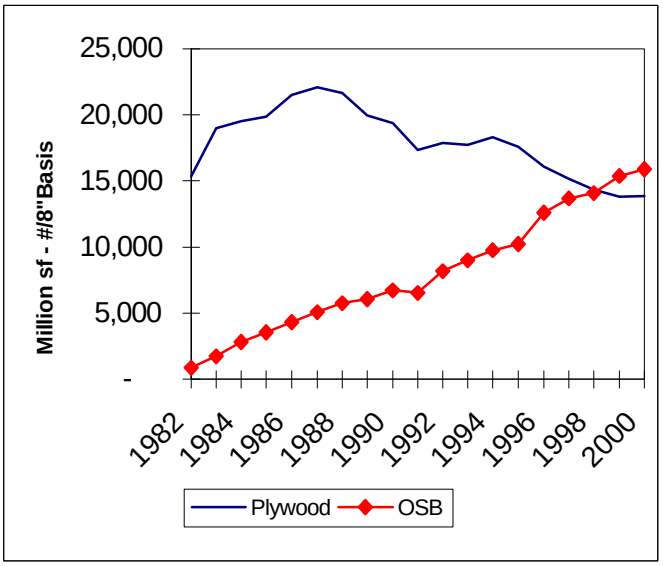
Source: The Engineered Wood Association (APA)
2000 is estimated

Imports and Exports

Structural panel imports have increased over 150% in the last five years. Most of the increase has been OSB from Canada, as OSB accounts for over 95% of the structural panel imports into the U.S. Around two-thirds of the structural plywood imports also come from Canada. Mexico is the second largest exporter of structural plywood into the U.S.

Plywood exports dominate the U.S. structural panel export market. About 90% of structural panel exports are plywood. Exports of structural panels reduced by 43% in 1998, partly due to the strong domestic demand and the U.S dollar. Plywood exports to Europe fell by 62% in 1998. European production of plywood and OSB has been increasing in recent years. Additionally, with the Asian economic downturn, plywood exports from Europe to Japan decreased significantly, and most of this plywood remained within the European market. Exports to other countries, predominantly the Caribbean, have remained relatively stable. Plywood exports to Japan fell dramatically in 1998. U.S. exports of OSB have also been reduced by the Asian economic downturn. After Canada, Japan is the next major destination for OSB. Over 85% of the OSB exports are supplied to these two countries. In 1998, exports of OSB to Japan fell by 75%.

U.S. Panel Consumption



Source: APA
2000 is estimated

Engineered Wood Products

The phenomenal growth of OSB in the US construction market is largely the result of declining sources of large-diameter trees, since OSB can utilize small diameter trees and process fiber more efficiently. The same catalyst is pushing the growth of other engineered wood products in the US market.

Products such as Laminated Veneer Lumber (LVL), Medium Density Fiberboard (MDF), I-joists, and Glued Laminated beams (Glu-lam) are experiencing rapid growth. U.S. production of glu-lams is expected to reach 320 million board feet by 2002, while LVL production will exceed 70 million cubic feet. I-joist production will reach 1 billion linear feet by 2002.

LVL is created by bonding together thin wood veneers in a large billet. The veneers are laid with the grain parallel to the long side of the billet. The billet is then sawn to required dimensions. Glu-lam is created by bonding together individual pieces of lumber with a thickness of 50 mm or less. Individual lumber pieces are end-joined to create long lengths known as laminations. The laminations are bonded together to produce the glu-lam. I-joists are widely used in residential flooring and roof beams. They are "I" shaped, where the top and bottom are usually composed of LVL, and the middle section from OSB or plywood.

These engineered wood products are more efficient in use of raw material, tend to be cheaper to produce than the solid wood products they replace, and sell for less. Each aims toward specific markets.

- MDF -- replaces shop lumber in moulding and furniture sectors
- OSB -- replaces structural plywood in residential construction, and in flooring and sheathing.
- I-joists -- replace wide-dimension lumber in flooring and roof beams
- LVL and Glu-Lam -- replace lumber in roof beams and I-joists. LVL is used in shorter beams, Glu-lam in longer beams.

Hardwood Lumber

The U.S. produces about 20% of the world's non-coniferous sawnwood. Production of U.S. hardwood lumber in 1997 was 31 million cubic metres (13 billion board feet). Most hardwood lumber products in the U.S. are used for household and office furniture, kitchen and bathroom cabinets, do-it-yourself products and a wide variety of other types of decorative wood products. Hardwood flooring consumption for new houses have tripled over the last decade.

Red and white oak account just over half of the total U.S. hardwood production. Poplar is the second largest species produced with 11%, maple 8%, ash 5%, cherry 4% and alder 3%. The other species group which account for 17% of the total U.S. hardwood production includes basswood, beech, birch, cottonwood, elm, gum, hackberry, hickory, pecan, tupelo, walnut and other hardwood species.

Imports of hardwood lumber into the U.S. have been increasing. Canada accounts for around 60% of U.S. imports. Tropical hardwoods account for the majority of other hardwood lumber imports. Brazil has the greatest share of the tropical hardwood lumber imports with around 10% share of the total U.S. hardwood lumber imports.

Only 10% of the hardwoods produced in the U.S. are exported. These hardwoods are of a higher grade and quality than those generally used domestically. Exports of hardwood lumber from the U.S. have generally been increasing. Although in 1998, exports fell by 13%. The U.S. exports over 50% more hardwood lumber volume than it imports. Almost one-third of U.S. hardwood lumber exports are sent to Canada. All other importing countries have less than 10% share of the total U.S. hardwood lumber exports. Some of the hardwood lumber exported to Canada is further processed for furniture manufacture and then exported back to the U.S. Red and white oak species each account for about 22% of the total exports by volume. Other main exports by species are red alder 8%, yellow poplar 7%, cherry and ash 5% each. The other species group would include maple, sweetgum, tupelo and blackgum, cottonwood and aspen.

Top 10 US Hardwood Lumber Import by Sources (cubic meters)

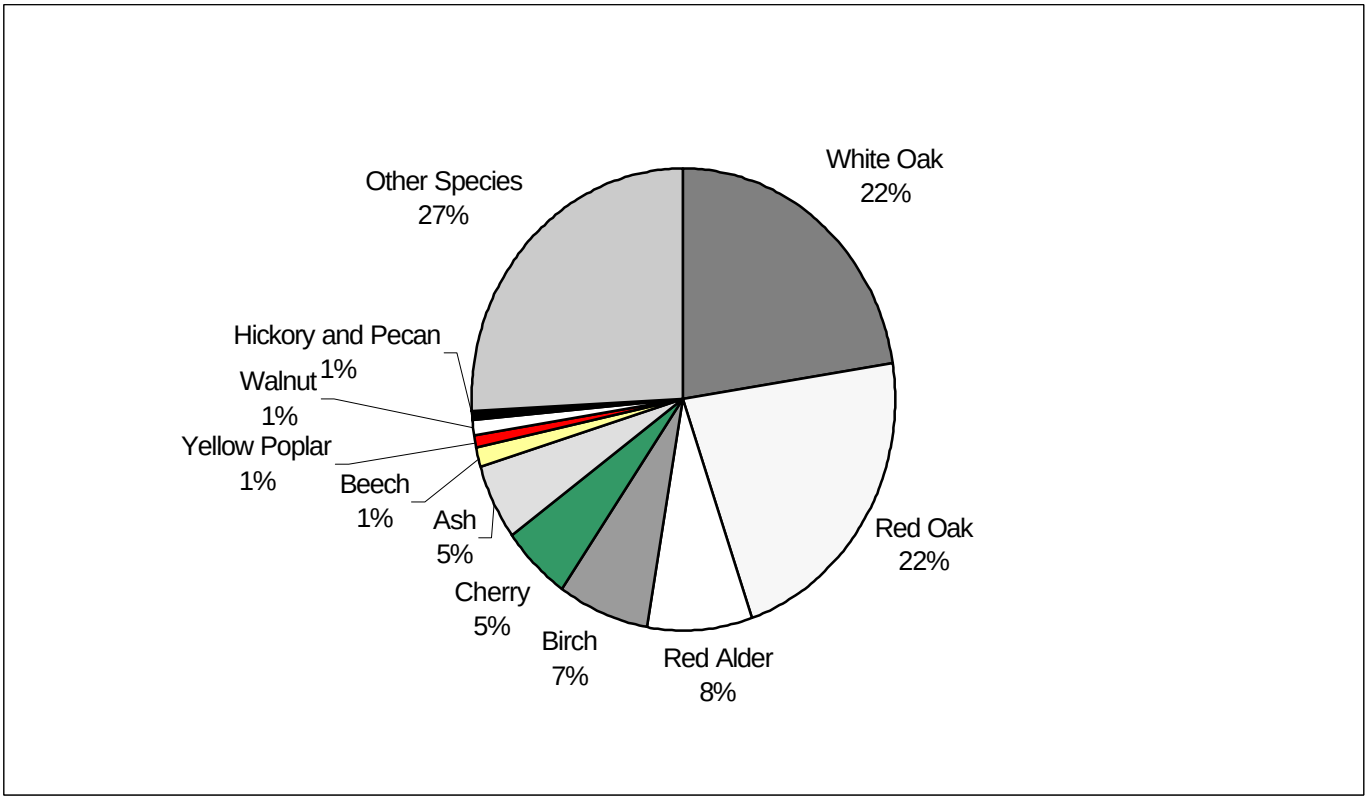
Country	1994	1995	1996	1997	1998
Canada	547,211	493,185	543,674	708,525	919,825
Brazil	107,472	114,076	97,916	86,731	129,872
Peru	14,739	14,635	17,664	30,798	42,652
Malaysia	45,061	41,059	37,329	51,656	41,332
Bolivia	47,846	55,117	46,573	36,639	23,424
Ecuador	10,781	15,498	20,389	16,292	22,158
Indonesia	15,261	12,463	20,069	21,679	21,898
Ghana	3,812	4,859	11,773	17,771	17,196
Mexico	566	6,292	7,901	10,357	8,374
Singapore	4,122	3,581	5,101	5,803	7,515
All Others	74,563	75,389	80,932	78,598	60,928
Total	**871,434**	**836,154**	**889,321**	**1,064,849**	**1,295,174**

Top 10 US Hardwood Lumber Export Destinations (cubic meters)

Country	1994	1995	1996	1997	1998
Canada	767,342	797,219	830,643	906,334	815,928
Mexico	141,984	154,319	180,776	170,994	199,812
Italy	163,342	165,444	161,499	208,384	180,081
Spain	90,422	93,633	113,210	148,937	160,258
Japan	231,739	251,661	237,340	246,443	136,731
United Kingdom	95,520	102,221	102,414	125,928	127,521
Hong Kong	45,072	71,655	97,792	125,912	119,102
Taiwan	188,970	171,582	153,174	151,579	115,173
Germany	144,016	143,279	125,905	168,872	109,004
Belgium-Luxembourg	98,308	100,670	79,344	82,182	80,847
All others	401,629	443,469	489,687	553,975	457,608
Total	**2,368,344**	**2,495,152**	**2,571,784**	**2,889,540**	**2,502,065**

Source: Foreign Agricultural Service, FAS

Hardwood Lumber Exports by Species 1998



Source: Foreign Agricultural Service, FAS

Top 5 Hardwood Plywood Trading Countries (1000m3)

Import Sources	Indonesia	Malaysia	Canada	Russian Fed.	Brazil	All others	Total
1994	633	165	162	62	299	136	1,456
1995	808	163	184	110	241	169	1,674
1996	725	275	220	144	216	210	1,790
1997	777	142	264	133	247	213	1,776
1998	902	314	285	169	118	204	1,992

Export Destinations	Canada	Mexico	Japan	Germany	Israel	All others	Total
1994	95	67	19	2	0	33	216
1995	119	28	25	4	3	42	222
1996	128	47	12	1	4	47	239
1997	114	41	13	3	6	48	225
1998	100	31	6	5	4	35	182

Source: Foreign Agricultural Service, FAS

Hardwood Plywood

Imports of hardwood plywood have increased, reaching almost 2 million cubic metres (2.2 billion square feet) in 1998. Indonesia accounts for about 45% of the total hardwood plywood imports. Canada and Malaysia had about a 15% share each of the 1998 hardwood plywood imports, with the Russian Federation 8% and Brazil 6%.

Exports of hardwood plywood in 1998 were 182 thousand cubic metres (206 million square feet), the lowest volume exported since 1990. The volume of hardwood plywood exported by the U.S. is generally around 10% of the volume of hardwood plywood imported. Canada receives about half of the U.S. hardwood plywood exports. Mexico receives the next highest export volume at around 20% of the total exports.

Specialty Wood Products

The US specialty or finished wood products market is valued at $27.5 billion. This includes furniture, moulding and millwork, flooring, beams, windows, doors, and frames. Only 6% of the specialty products market is imported, but imports have doubled since 1991. Much of this has occurred in the moulding and door sectors, where imports from South and Central America, as well as Asia have begun to substitute for traditional US softwoods.

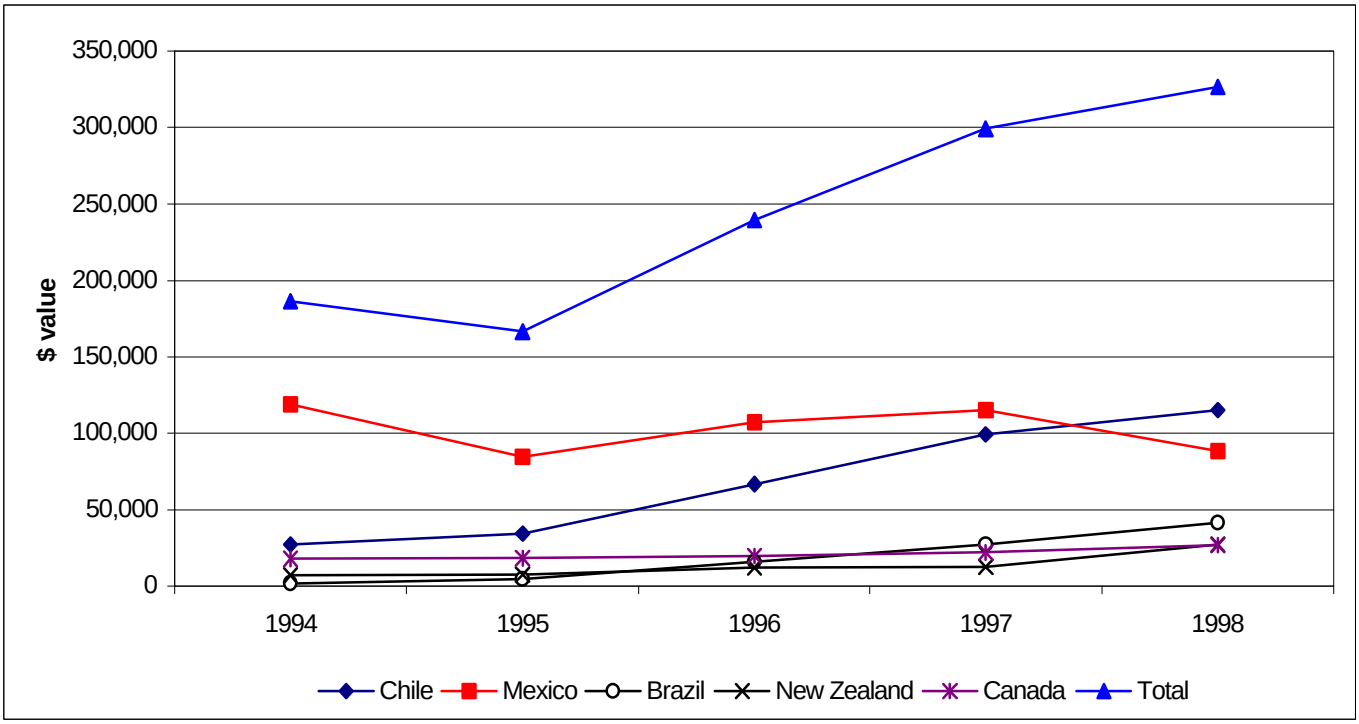
The moulding and millwork sector is the largest specialty wood category. Each year the U.S. moulding and millwork sector consumes almost 5 million cubic meters (2 billion board feet) of industrial or high grade pine lumber and other softwoods. US companies in this sector tend to be small, with 75% of firms employing fewer than 20 persons. This is because most of the products are geared towards high-end niche markets that specialize in various species, sizes and uses.

Traditionally, ponderosa pine accounted for 75% of western U.S. production of lumber used in the moulding and millwork industry. However, as timber harvests on Federal lands decreased, the availability of ponderosa pine has also decreased. Today, ponderosa pine has been increasingly substituted with *taeda, elliotti*, and *radiata* pines from Brazil, Mexico, New Zealand, and Chile. Other species increasing in use are yellow poplar and other hardwoods, as well as southern and eatern pines. The production trend is towards finger-jointing of smaller blanks instead of solid wood moulding. In addition to increased competition from softwood lumber imports, the moulding industry is also using more substitutes like medium density fiberboard and plastic mouldings.

US window and door demand is expected to grow 3.6% annually, reaching $27 billion by 2001. Products that utilize wood account for 55% of this market. Wood is still the preferred material for doors and windows in the U.S. Production of wooden doors is forecast to rise to 31 million units by 2001. The value of door imports reached $170 million in 1998. Hardwood doors account for a third of this segment, supplied mainly by Brazil and Asia. Wooden windows account for about 47% of US window production, or 21 million units. Wood window imports are very small, accounting for less than 1% of shipments. The reason is that wood windows are not painted but stained, and ponderosa pine remains the best wood for this use.

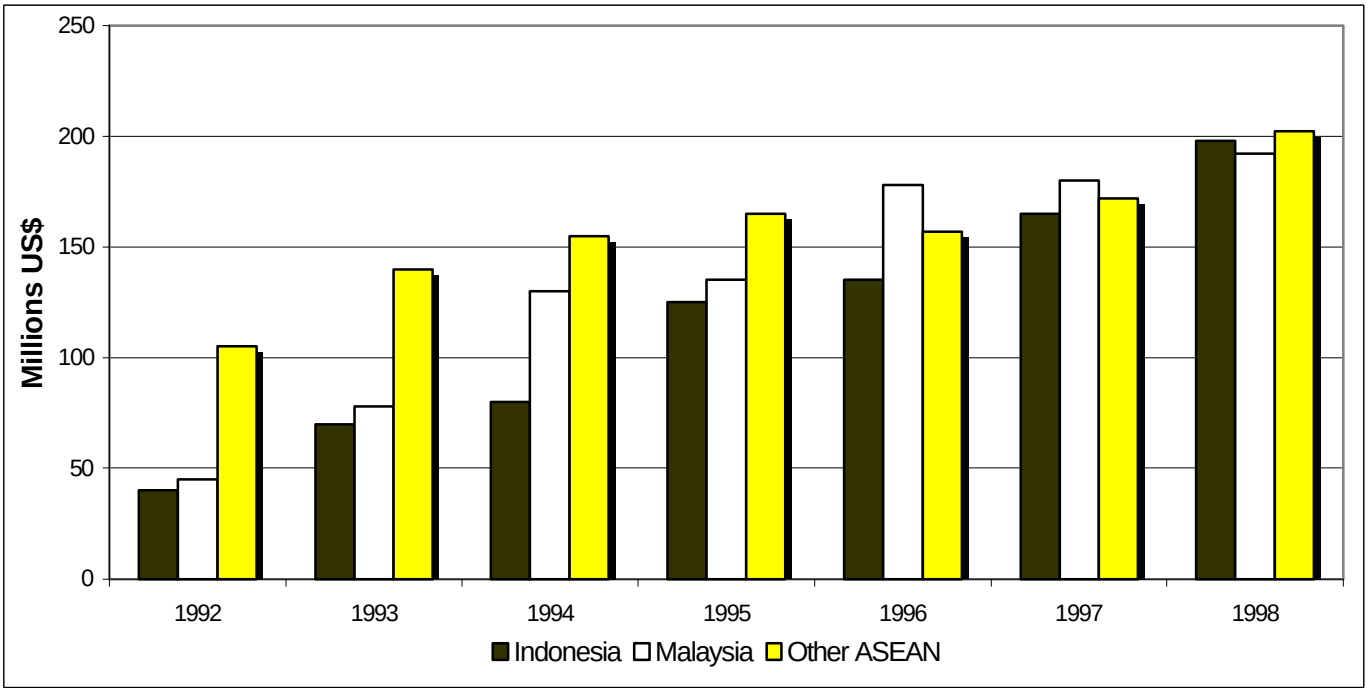
The US is the largest furniture market in the world, and is also the largest net importer of furniture. Household wooden furniture production reached $10.2 million in 1995. The Hardwood Manufacturer's Association forecasts that home improvement spending will grow to $5.42 billion by 2005, creating demand for kitchen and bath cabinets, of which 75% use either wood or wood veneer. Imports are expected to account for 40% of the of the furniture market, and 75% of furniture imports is composed of wooden furniture components and parts. Since 1992, the value of US wooden furniture imports from Indonesia and Malaysia have more than tripled. Asia is the world's biggest net exporter of wooden furniture.

U.S. Softwood Moulding Imports



Source: Foreign Agricultural Service, FAS

U.S. Wooden Furniture Imports from ASEAN



Source: Asian Timber

Outlook

U.S. production levels are generally expected to remain around the current level for the short term. Environmental concerns about harvesting in the western regions may impact on the future timber availability.

In August 1999, a coalition of 13 conservation groups won a law suit against the Forest Service and Bureau of Land Management for violating the Northwest Forest Plan by failing to properly survey areas subject to timber sales for dozens of species. Further timber sales from Federal lands affected by the Northwest Forest Plan (area within the range of the northern spotted owl) were put on hold pending a decision handed down by a District Court judge. In November, the Forest Service and other government agencies reached a tentative settlement with environmentalists to end the lawsuit and allow all currently operating timber sales to move forward. In return, the government agreed to conduct surveys for species on timber sales where timber harvest had not yet begun. However, a quick resolution to the lawsuit is unlikely as the forest industry has yet to reach a settlement, and the agreement must also be approved by the District Court.

In the latest national forest policy development, President Clinton announced that he would ask the US Forest Service to survey and recommend roadless areas in the national forest to be preserved. This would amount to more than 40 million acres, or 20 % of the total forest land in the US national forests. Because the president's decision is in the form of an administrative directive, so the plan does not have to go through the legislative process for approval, although a series of public hearings will be held prior to the Forest Service's recommendation. The directive is the largest land preservation effort in American history. It should be noted that much of this land, due to remoteness, inaccessibility, or lack of trees, are unlikely ever to be logged anyway. Nonetheless, the president's announcement is a clear indication that federal timber supplies are unlikely to improve.

Most restrictions in timber availability have so far occurred only on public land. However, it is anticipated that private land may be impacted by the recent additions of several species of salmon and trout to the endangered species list. The protection of streams and rivers may also affect the availability of water for irrigated plantations and the transportation of forest products along inland water courses.

Environmental concerns have also been used to temporarily halt imports of wood products into the U.S. In September 1997, three environmental groups won a case in the U.S. Federal Court to ban issuing new import licenses to New Zealand, Chile and Siberia. The ban included logs, chips and lumber, including kiln-dried lumber, on phytosanitary grounds. The law suit was brought against the U.S. Animal and Plant Health Inspection Service for failing to protect the country from unwanted pests and infestations and maintaining the country's bio-security. The ban has now been lifted for some wood products.

Despite increasing environmental concerns regarding the best management practices for U.S. forests, the huge demand for wood products in the U.S. will not diminish over the next few years. Housing starts are expected to remain high due to a buoyant economy and low interest rates. The U.S. will continue to be a net importer of wood products. In 1998, the value of U.S. imports of wood products was over $13 billion and the exports were valued at just under $6 billion. Negative trade balances for wood products have increased each year since 1993.

The U.S market is, and will remain, very attractive to wood product exporters. The large population, high per capita income, strong and consistent growth domestic product growth since 1992, low interest and inflation rates, strong currency and ability to purchase imports and high consumer appreciation of wood, provide exporters with tremendous market opportunities.

Selected List of U.S. Forestry Organizations

American Forest and Paper Association	www.afandpa.org
American Furniture Manufacturers Association	www.afmahp.org
American Hardwood Export Council	www.ahec.org
American Wood Preservers Association	www.awpa.com
American Wood Preservers Institute	www.awi.org
APA: The Engineered Wood Association	www.apawood.org
California Redwood Association	www.calredwood.org
Composite Panel Association	www.pbmdf.com
Hardwood Distributors Association	hardwooddistassoc.com
Hardwood Manufacturers Association	www.hardwood.org
Hardwood Plywood and Veneer Association	www.erols.com/hpva
International Wood Products Association	www.ihpa.org
National hardwood Lumber Association	www.natlhardwood.org
National Lumber and Building Material Dealer Association	www.dealer.org/nlbmda
National Wood Flooring Association	www.woodfloors.org
National Wooden Pallet & Container Association	pallet-mall.com/nwpca
North American Wholesale Lumber Association	www.lumber.org
Northeastern Lumber Manufacturers Association	www.nelma.org
Northwest Wood Products Association	www.wpcc.org
Railway Tie Association	www.rta.org
Softwood Export Council	www.softwood.org
Southeastern Lumber Manufacturers Association	www.slma.org
Southern Forest Products Association	www.sfpa.org
Southern Lumber Exporters Association	www.slea.org
Southern Pine Council	www.southernpine.com
Southern Pine Inspection Bureau	www.spib.org
The Hardwood Council	www.hardwoodcouncil.com
West Coast Lumber Inspection Bureau	www.wclib.org
Western Red Cedar Lumber Association	www.cofi.org/WRCLA
Western Wood Products Association	www.wwpa.org
Window and Door Manufacturers Association	www.nwwda.org
Wood Component Manufacturers Association	www.woodcomponents.org
Wood Moulding and Millwork Producers Association	wmmpa.com

Selected List of U.S. Forestry Publications

CROWS	www.crows.com
Hardwood Market Report	www.hmr.com
Random Lengths	www.randomlengths.com
Southern Lumberman	www.lumberman.com/magazine
Widman's Market Barometer	www.widman.com
Wood Markets Quarterly	www.woodmarkets.com
Wood Technology	www.woodtechmag.com

Note: List is not comprehensive

Conversion Table

unit	multiply by	to obtain
1,000 Board Feet (lumber, full sawn)	2.358	CUBIC METRES
1,000 Board Feet (logs, averarge)	4.530	CUBIC METRES
1 Bone Dry Ton (chips, solids)	2.400	CUBIC METRES
1 Cord (solid)	2.550	CUBIC METRES
1 Cord (stacked, including air space)	3.625	CUBIC METRES
1 Cunit (solid)	2.832	CUBIC METRES
1,000 Square feet (panels, 1/8 inch thickness)	0.295	CUBIC METRES
1,000 Square feet (panels, 1/4 inch thickness)	0.590	CUBIC METRES
1,000 Square feet (panels, 3/8 inch thickness)	0.885	CUBIC METRES
1,000 Square feet (panels, 1/2 inch thickness)	1.180	CUBIC METRES
1,000 Square feet (panels, 3/4 inch thickness)	1.770	CUBIC METRES
1 Unit (chips)	5.664	CUBIC METRES

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Western Wood Products Association

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