Hardwood Lumber and Wood Product Market Analysis for Hawaii
or
Hawaii Hardwood Market Study

for

The State of Hawaii

Department of Land and Natural Resources

by

Hawaii Agriculture Research Center
Nicklos S. Dudley
&
JQuinn Company
James E. Quinn

December 9, 2004

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Executive Summary:

The market for higher value hardwood products in Hawaii is increasing significantly and consistently as it is in most areas of the country. Most of the high value applications are in hardwood flooring, furniture, cabinetry and other fixtures including doors, windows and moldings. The usage of high value or "appearance" type woods is focused largely in upper end housing and in repairs and remodeling.

Virtually all of the companies and individuals that were interviewed in this study expressed recognition of the demand for Hawaiian grown woods in the market place. Essentially all of the respondents also reported that the principal reasons for the relatively small amount of product in the marketplace are (1) inconsistent supply and (2) inconsistent quality. The inconsistency of supply comes about from the lack of committed resource to the potential producers. The inconsistencies in quality are predominantly the result of lumber drying issues, limited technology, lack of competitive processing facilities and the tendency for producers to force lower grade materials into the sales mixture to achieve the volume and additional revenue that is needed to survive as a business.

It has proved to be very difficult to capture a totally accurate number for hardwood imports. This is due to protection of proprietary and competitive information from retailers and distributors and it is also due to gross generalizations in units of measure from shippers. Nonetheless, we have found evidence of wood importation numbers and this is supplemented by selected information from our interviews. The net result being that we believe that total annual hardwood imports are in the range of 7,000,000 to10,000,000 Board Feet (BF). Additionally, we have opinion inputs and computed equivalents that cause us to believe that high quality locally grown products could displace as much as 2,000,000 board feet per year of this market segment.

The current principal imports from North American temperate hardwoods include Oak, Cherry, Ash, Maple and Poplar. The principal foreign imports are African Mahogany, Genuine Mahogany, Meranti, Teak and several Eucalypts. Weyerhaeuser is promoting Lyptus which is a Brazilian Eucalyptus hybrid with an appearance similar to *E. grandis* (Grandis) and *E. saligna* (Saligna). Generally speaking, the Hawaiian grown Robusta and Saligna display better color and character than does the Lyptus product. The characteristics of the African Mahogany (*khaya nyasica)* appear to be quite similar to Hawaiian grown *Toona ciliata* (Toon), which is not surprising since they are both relatives of the true Mahogany *(Swietenia macrophylla).* It may also be possible to substitute some Hawaiian Eucalypts for African Mahogany if the processing and quality control are improved. Most of the foreign hardwoods are imported into mainland distributors initially and then they are reshipped to Hawaii.

The potential for the development of a significant forest products industry in Hawaii will be influenced to a great extent by the following:

Opportunities:

- There is a demand for Hawaiian grown woods in the market place.
- Significant quantities of hardwood lumber are being imported into the State.
- The demand for distinctive hardwood lumber is increasing.

Constraints:

- Sufficient sustainable supply of forest resource to ensure economically efficient processing.
- Inconsistent supply.
- Inconsistent manufacturing quality.
- Underdeveloped infrastructure for forest product processing.

Recommendation:

The limited amount of Hawaiian hardwood products that currently enter the marketplace display the potential to be as good as, or better than, many similar species from other areas. The State forest reserves possess the largest mature inventory of such timber. These stands of non-native species such as Robusta and Saligna also appear to possess the potential for very high quality "appearance grade" lumber.

The process of replacing imported hardwood lumber with locally grown and processed Hawaiian lumber is occurring now, however the scale is very limited. Presently, the demand for hardwood products exceeds the locally produced supply. For this imbalance to change several critical factors must be addressed. These factors are:

- Sufficient sustainable supply of forest resource to ensure economically efficient processing.
- Properly sized manufacturing facilities to match resource availability.
- Strong commitment to the technical issues of product quality.
- Effective marketing which will place high-value end use products in the market place.

The market for certified forest products is increasing in the US and in most other countries. Certification, particularly under the Principles and Criteria of the Forest Stewardship Council (FSC), carries with it the benefit of priority selection in the market and in some cases a premium over non-certified products. It also provides a generally effective means for social and environmental acceptance of proactive timberland management. FSC certification could enhance the access to forest resources in State forest reserves and ensure sustainable timber supply.

Introduction:

There are well-established markets within and outside of Hawaii for lumber products from native Koa. Currently there are no substantial sales of the products from introduced species that represent the largest mature timber inventory in the state. These introduced species include *Eucalyptus robusta* (Robusta*)* and *Eucalyptus saligna* (Saligna*).* Where these species grow in other regions of the world, there is evidence that they can be converted to good quality products. In Hawaii, however, converting these species to useful products has proved to be elusive, at best. There are no current converters of timber to solid wood products who can operate in a manner that would lead to competitively priced products in the open market. Those who are processing Eucalyptus are doing so at extremely low prices for the raw material, which means that they only process lumber when a free or nearly free log is available. Therefore, there is neither any consistency in the supply nor any way to build a business on repetitive orders. A draft report for the Hawaii Forest Industry Association entitled "The Economic Value of Hawaii's Forest Industry in 2001" estimates the revenue to be approximately $30,700,000. Meanwhile, products are being imported into Hawaii from nearly identical wood species.

Because of the lack of competitive primary forest products processing, the absence of markets for by-products in the State and the challenges of achieving access to a sustaining supply of timber, nothing has happened to elevate these excellent resources into higher value products and to provide a nucleus for sustainable forest product development. Any potential investor or entrepreneur must have finite information on the scope of the market for the products that can come from the primary mature eucalyptus timber volume. The information that is being requested by the Division of Forestry and Wildlife should prove to be of critical and significant value in the creation of a sustainable forest products industry in Hawaii.

This study was commissioned by the Division of Forestry and Wildlife of The Department of Land and Natural Resources (DLNR) because of their interest in increasing the proportion of locally grown hardwood

lumber used in the hardwood lumber "economy" of Hawaii. To begin addressing this goal, the Department has asked for an evaluation of the consumption, importation, local production, quality assessment and other features that can lead to a better understanding of the scope or scale of opportunity that may exist in the Hawaiian market place for locally produced hardwoods. In pursuit of this goal, the Department has asked specifically that the following areas be addressed:

A. *Interviews and data collection. Conduct interviews with various organizations and concerns to collect data regarding annual hardwood production and consumption in Hawaii*

B. *Hardwood lumber volumes and distribution channels.. Separately for both Hawaii-produced and imported solid hardwoods.*
    1. *Quantify annual solid hardwood lumber sold into Hawaii*
    2. *Breakdown by industry, lumber type/dimensions, retail versus wholesale, and species.*

C. *Perceptions of locally grown woods. Interview or consult with sellers, processors, architects and consumers of wood to determine knowledge and perceptions of locally grown solid wood products versus comparable imported materials.*

D. *Scenarios for Expanded Hawaiian Production. Develop analyses or scenarios evaluating how various fraction of imported hardwood could be replaced by locally produced solid hardwood products.*

Methods:

A. Interviews and data collection.

To meet the objectives of this study, a listing of potential contacts was developed through initial interviews with the Department of Business Economic Development and Tourism and with Dave Rinell of Rinell Wood Systems, and with members of the Hawaii Forest Industry Association (Table 1). Additional interviews were held with University of Hawaii Manoa Business Program, Bank of Hawaii, Building Industry Association of Hawaii, and Foreign Trade Zone 9. Field visits were also made to new construction on three major tract home builders on Oahu including Castle & Cooke, Schuler and Gentry. The Internet and library sources were also used to review information that can be associated with hardwood usage trends.

In addition, research was conducted to better understand utilization of hardwoods in the marketplace. This included end-user perceptions of the use of locally grown woods. Finally, based on these finding, scenarios for the expanded production of locally grown and processed hardwoods forest products were developed.

Results:

B. Hardwood lumber volumes and distribution channels.

The assessment of volumes of lumber and the means of distribution have been researched through direct interviews and by accessing published data on imports. Most of the import data is in broad categories that are associated with tariffs. It became necessary to resort to a variety of means of assessment and upon the use of certain critical assumptions and comparisons of usage and applications from nationally published sources. This section of the report describes those methods and their results. First, it is important to recognize certain trends both in Hawaii and in the US, in general.

Over the last several years remodeling and building permit values in Hawaii have generally increased, while forecasts for housing starts have nearly doubled (Table 2). The value of an average new home in Hawaii is comparable to the average home on the mainland (Table 3). Construction methods and land cost vary between

these locations. Nonetheless, it appears that many of the industry wide averages for materials usage that are published for mainland homes could be used for Hawaiian homes as well.

Statistical information on materials usage in an average home on the mainland includes a notable hardwood category (Table 4). However, visits to new tract homes on Oahu did not reveal evidence of such widespread use of solid hardwood lumber. Therefore, we conclude that the major use of high value and appearance grade hardwoods is going to come about primarily in higher market value homes and in the repair and remodeling sector.

1. Quantification of Solid Hardwood Lumber Sold into Hawaii.

Lumber importation data from Matson, The US Corps of Engineers and from Foreign Trade Zone #9 suggest that a large volume of wood comes to Hawaii by barge from other shippers (Table 5). This wood is primarily construction grade lumber and does not contain high-grade hardwoods. All Hawaii distributors of hardwood lumber reported that their material comes in by container via Matson. Therefore, the disparity between the Matson numbers and the Corps of Engineers total wood volumes may be accounted for by the fact that much of the framing lumber arrives in Hawaii via barge shipments while hardwoods will most likely arrive in containers.

Table 6 summarizes the statistical data on imports of tropical hardwoods into Hawaii. Most tropical woods were Teak, Mahogany, Meranti and similar species. These species retail in the range of $3.00 to $8.00 per board foot. If we assume an average of $4.00 per board foot, then the annualized imported volume for 2004 would be approximately 600,000 board feet.

Several of the distribution companies that were interviewed reported imports of all hardwood species volumes in the range of 500,000 to 1,000,000 board feet per year, each. The importation by large retailers such as The Home Depot and Lowes is not readily traceable via the shipping companies. Their displays of flooring products are much heavier to engineered floors than to solid hardwoods. Their sales of rough or semi-finished hardwoods are more likely to be to the shoulder trade (small scale do-it-yourself) than to the commercial millwork and major remodeling activities. Nonetheless, there are at least six distributors and importers that that bringing in lumber in the range of 500,000 board feet or more per year.

The only full time producer of non-native woods in Hawaii is Hal Brauner of Brauner Molding and Millwork in Hilo. Mr. Brauner focuses primarily on hardwood flooring and at least 60% of his production is in varying species of Eucalyptus. We estimate Mr.Brauner's production to be in the range of 100,000 board feet per year. Mr. Brauner has told us that he believes he is only serving about 5% of the potential market for flooring.

Sales of forest products from State of Hawaii forest reserves averaged less than $50,000 in the 1990's. (Cannarella, 1998)

A report from the International Tropical Timber Organization (Table 7) shows a volume of 1,500,000 cubic meters of tropical woods were imported into the US in 2001 (Market Access of Tropical Timber, March 2003 (see http://www.itto.or.jp/live/PageDisplayHandler?pageId=203). One cubic meter contains 424 board feet of lumber. Therefore, the imported volume to the US in 2001 would be 636,000,000 board feet. By comparison, the US production of hardwood lumber in 2004 has been projected by Hardwood Review to be 11,000,000,000 board feet (see Table 8). The total hardwood market in the US could then be estimated to be 11,636,000,000 board feet.

Conversion and Reconciliation of Volumetric Information:

We conducted multiple analyses to estimate annual hardwood consumption in the Hawaii market. These estimates required the use of some assumptions and extensions of base data. The Corps of Engineers waterborne tonnage report is accessible on the internet. This report covers all wood imports but the categories are limited. Matson represents a large portion of the container imports but they too have limited tariff categories and data collection.

a. In our first analysis we use Corps of Engineers and Matson data assuming an average wood density of 40 pounds per cubic foot and an average of 12 board feet per cubic foot then 381,000 short tons represent 762,000,000 pounds and 19,050,000 cubic feet for a total of 228,600,000 board feet equivalent of lumber.
    - The consumption of softwood lumber in the US in 2004 is being projected by the Western Wood Products Association to be 59,738,000,000 board feet. This would create a ratio of hardwood to softwood of .194.
    - If this ratio is applied to the conversion from shipping weights then the hardwood volume into Hawaii would be .194 X 228,600,000 or 44, 348, 000 board feet.

b. Table 10 provides an analysis by Dr. John Shelley of the Matson and COE data that yields an assessed estimate that places the volume in the range of 7,000,000 board feet of higher grade hardwood imports and utilization.

c. A third calculation was conducted using a percentage of population basis.
The population of Hawaii in 2003 has been estimated to be 1,257,608 - which is 0.43% of the US total of 290,809,777.
If this ratio is applied to the total hardwood market for the US it will yield a quantity of .43% X 11,636,000,000 or 50, 000,000 board feet.

d. A fourth approach uses estimates of imports by distributors and large retailers.
    - Let us assume that there are 6 large distributors and 10 big box home centers (The Home Depot, Lowes, HPM etc) who are direct importers of mixed hardwood products. Additionally there are numerous companies and builders who do direct importing for conversion and construction. Then, it is quite possible that the higher value hardwood importation could be in the range of 12,000,000 to 20,000,000 board feet.
    - It is important to realize that an inconsistency of using total production or consumption on the mainland in the ratio indicators is not typical of Hawaii. This is due to construction differences and due to the fact that Hawaii does not possess any substantial wood conversion and exportation business. Much of the wood on the mainland is being converted to products and shipped to other areas. This is not the case in Hawaii.
    - In follow up discussions with selected distributors, retailers and producers we found that most feel the scope of the market to be on the conservative side. Most would instinctively go with a volume that is between 7,000,000 and 12 million board feet of solid and higher grade hardwoods. In summary we believe that total annual hardwood consumption in Hawaii is approximately 10,000,000 board feet.

The current annual consumption of locally grown non-native hardwoods in Hawaii is presently very low. Discussions with several producers on the Big Island (including Hal Brauner at Brauner Molding and Woodworks, Ted Gomes at Honomolino Mill, and Ed Winkler at Winkler Wood Products) yielded the following estimate of wood production on Hawaii Island:

- Koa – 300,000 + to 400,000 BF/Yr
- Ohia – 100,000 to 200,000 BF/Yr
- Mango – 50,000 to 100,000 BF/Yr
- Robusta – less than 100,000 BF/Yr
- Ash, Toon, Saligna, Grandis, Queensland Maple, Silver Oak, Monkeypod, and Chocolate Heart Albizia all less than 25,000 BF/Yr each.

2. Utilization of Hardwoods in the Marketplace.

North American hardwood utilization trends between 1994 and 2000 increased most notably in the hardwood flooring sector (Table 9). By contrast, the largest decrease was noted in the furniture sector. The decrease in lumber going to furniture from US producers is mainly the result of outsourcing of production to Asian countries.

Most distributors are sourcing for millwork and cabinetry shops. Predominant size is 4/4 (60%) with 5/4 and 8/4 following at about 20% each, and the grade is FAS (1) [1]and Select. There is no apparent market for lower grades at this time. Predominant lengths are 8' through 12', heavy to the 12'. Imports from the mainland include the normal US domestic woods such as Oak, Cherry and Poplar. Foreign imports are heavy to African Mahogany. Teak and Honduran Mahogany are also imported. Honduran or "genuine" mahogany is difficult to source. A summary of wholesale prices is shown in Table 10.

Most retailers buy imported wood from distributors. This is due to the shipping and sourcing issues. It is more likely, however, for them to buy local production directly from the producers. Wholesalers and distributors would prefer to have significant routine supplies of local wood to sell to retailers and wood workers if the supply was to be more consistent. Furniture makers, cabinet makers, flooring contractors and other finishing operations are likely to buy imports through distributors and local woods more directly from the producers. This is particularly the case for Koa and Ohia.

A price list from a retailer who deals in both imported and local woods on Hawaii Island is displayed in Tables 11 and 12.

C. Perceptions of locally grown woods.

There was widespread awareness of most of the major Hawaiian woods. Everyone was aware of Koa and it is a niche market heavy to furniture and fixtures. Some are currently using O'hia in various applications from posts to flooring. Numerous groups and individuals have tried Robusta and other nonnative species. Much of the experience with the product has been inferior. Drying has been inconsistent and the quality of the sawing and presentation has been suspect as well. Continuity of sourcing is another issue. Virtually no one has been able to repeatedly supply a quality product in reliable and significant quantities over a prolonged period of time. Even with the problems of the past, the individuals interviewed all expressed interest in trying Hawaiian grown woods when supply and quality issues could be shown to have been solved.

A Leadership in Energy and Environmental Design (LEED) seminar was conducted in Honolulu in 2003 for architects. This seminar was sponsored by the Department of Business and Economic Development and Tourism and by the Certified Forest Products Council. LEED http://www.usgbc.org/leed/leed_main.asp is a program developed by the US Green Building Council. It gives points and ratings for sustainable activities. The use of certified (Forest Stewardship Council / FSC) wood is one means for earning points in LEED. Kim Hum of the Nature Conservancy, James Quinn, Steve Smith and Peter Simmons each gave presentations about Hawaiian wood to the 25 architects in attendance. Samples of four species *Eucalyptus robusta, E. saligna, E. globulus* and Tropical Ash (*Fraxinus uhdei*) were circulated amongst the attendees. The architects were asked if they would specify these woods in their designs if they knew that it could be supplied regularly. The response was a unanimous yes. Most people who have seen Toon believe that it has great potential if it

[1] FAS is a lumber grade that comes from the National Hardwood Lumber Association. It refers to Firsts and Seconds. Please see Exhibit A for details or visit http://www.natlhardwood.org.

could be sourced consistently. Few are aware of tropical ash. Robusta is well appreciated for its potential. This is due primarily to its darker color and the fact that most Robusta that has been harvested is older and therefore more stable. There has not been any significant commercial harvesting of eucalyptus for solid wood products. That which has been logged has come in many cases from over-mature timber from roadside rights of way and other more urban extraction. Most of this has been Robusta. Saligna/Grandis will require more extensive marketplace development work because the color is a bit lighter and the species have not been as available for processing and are not as well known in the marketplace at this time.

D. Scenarios for Expanded Hawaiian Production.

It will be extremely important to solve the continuity of supply and the lumber drying and other processing issues for any significant expansion of Hawaiian production. It will then be critical that the improved quality is effectively displayed to potential buyers and distributors. There will need to be a multi-phased approach to the development of expanded production. Determination of accessible and sustainable forest resources is a must. A well designed and coordinated study for the assessment of variation of wood quality and yield for a variety of species and tree sizes will be of great assistance in projecting the opportunities for marketing these species.

In the next phase, it will be important to install and effectively operate a lumber drying facility that will ensure that the wood reaches 160 degrees F for 75 minutes during the kiln schedule. This may require the introduction of totally new and different technology to Hawaii. Another key ingredient will be the adaptation to or definition of product grades. There are standard lumber grades for hardwoods under the National Hardwood Lumber Association. These rules have not been used in totality with Hawaiian products. This is because most of the business has been with Koa and there are special features for Koa that transcend standardized grading rules. Flooring will need to be a major product for the utilization of Eucalyptus. This will in turn require a fairly significant investment in finishing equipment such as molders and end matchers. Some semi finished lumber will be marketable into the millwork and furniture markets in Hawaii and abroad. To achieve optimal utilization of mill equipment and maximize economic return, it will be necessary to export some product to the US mainland or to Asia.

Distributors that we interviewed in Hawaii expressed a strong interest in locally grown products. They also expressed a strong desire for some form of preferential alignment or exclusive relationship with forest product producer for unique species or product lines. They have all experienced problems in the past with market place confusion. This occurs when the same products that they are trying to distribute will also appear on the market from a different direction such as a direct sale from the mill to a retailer or converter. This is a perennial issue in the wood business and one that requires careful handling by all producers.

Ramping up a business can be a very costly experience. Pre-marketing will be very helpful in the early phases of expanded production. One suggestion presented by one of the marketing survey respondents during this study was to conduct tours and educational sessions with architects, distributors and retailers to display the resource and the technology for the new forest products production business. This process would enable end-users to become familiar with this Hawaiian produced product line. The anticipated result would be that end-users would start to consider substituting Hawaii grown and produced forest products with products that are now imported.

Summary remarks, conclusions and recommendations:

- There is an increasing demand for solid hardwood products for appearance applications nationally and survey conclusions indicate the same for Hawaii. The largest opportunity could materialize in hardwood flooring.
- There is a reasonably good awareness of the beauty and potential for Hawaiian grown woods, but the requests for products cannot be met by current producers.
- Koa supply is at a level that existing smaller scale operations can satisfy the current demand and maintain good economics even though mill efficiencies are not globally competitive.
- There have been problems in quality and consistency of supply of non-native but locally grown woods.
- The largest inventory of timber appears to be in the form of Grandis, Saligna and Robusta.
- The Hawaiian grown eucalypts appear to have the potential to display superior characteristics and qualities to related species from imported sources.
- It is extremely important to focus any industry efforts in Hawaii on the upper end products that can be differentiated in the market place by their appearance, value and usefulness. Koa does this now. Several of the non-native species can also be elevated in this market by displacing other imports. It will be important to focus marketing efforts on applications that do not disrupt or denigrate the Koa reputation.
- Forest Certification for the State forest reserves should be investigated. Certification carries with it the developing benefit of priority selection in the market and in some cases a premium over non-certified products. It also provides a generally effective means for social and environmental acceptance of proactive timberland management. This could enhance the access to forest resources in State forest reserves and ensure sustainable timber supply.
- The State of Hawaii statewide experimental forest and forest reserves appear to possess the highest concentration of Grandis, Saligna and Robusta when considering all the major land owners.
- The future for the development of a larger forest products industry lies with the successful processing and marketing of mature and over-mature eucalyptus into the highest value products possible.
- There does not appear to be enough inventory of timber in Hawaii to allow commodity type products to be competitive with imports from more sizeable resource bases and higher capital and more efficient operations.
- Creation of a larger scale operation and more employment opportunity in the state will require a continuous supply of timber.
- There are questions to be resolved on the potential yields from the mature eucalyptus trees. Some reports indicate that the hearts of these trees (the original fast growth or juvenile wood) do not exhibit good stability and usefulness.
- There appears to be a very good opportunity to develop a processing and marketing program which can match with the resource and the local market. It will be imperative, however, to verify sustainable timber inventories, solve the quality and consistency issues, and find uses for low grade portions of the timber.
- Finally, it is going to be important to take the resource to its highest potential value. This will require some portions of the wood to be sliced into veneers for paneling and overlaid moldings and trim.

References:

Cannarella, R. 1998. Forest Industry In: Atlas of Hawaii, Ed. S.P. Juvik and J.O. Juvik., Dept. Geography, Univ. Hawaii, University of Hawaii Press., p249.

Hardwood Utilization, Hardwood Review-Annual Forecast 2004, http://www.hardwoodreview.com

International Tropical Timber Organization (ITTO) – Market Access of Tropical Timber 2004, http://www.itto.or.jp

National Association of Home Builders - Housing Facts, Figures and Trends 2004 – http://www.hahb.org

State of Hawaii – Data Book - http://www2.hawaii.gov/dbedt/index.cfm?section=READ_Databook445

Draft Report for Hawaii Forest Industry Association "The Economic Value of Hawaii's Forest Industry in 2001" – University of Hawaii – J.F. Yanagida

Personal Communication

Eric Bello, Bello's Millwork

Hal Brauner, Brauner Molding and Woodworks

Ted Gomes, Honomolino Mill

Karen Nakamura, Building Industry Association of Hawaii

C. Barton Potter, C. Barton Potter Company

Dave Rinell, Rinell Wood Systems

Steve Rubin, Matson Navigation

John R. Shelley, PhD. Forest Products Laboratory, Richmond, CA

Steve Smith, Hawaii Forest Industry Association

Ed Winkler, Winkler Wood Products

Kent Untermann, Pictures Plus

Table 1
Listing of Contacts

Pacific American Lumber
JE Higgins
Architectural Woods
Honsador
Plywood Hawaii
C.S. Wo
Hardwoods Inc
Eric Bello
Martin and MacArthur
King and Zelko
Hardware Hawaii
Woodcraft
Aloha Wood (Kona)
Rinell Wood Systems
Ed Winkler
Brauner Woodworks
Honolulu Hardwoods

Nine of those listed in Table 1 were contacted and interviewed directly. Individual quotes and data are not always displayed in the report because of the sensitivity to proprietary information and competitive data. Other retailers were visited for assessment of product types being stocked and sold including The Home Depot, Lowes and HPM.

Table 2
Building Permits and Housing Starts:

Number and Value of Building Permits, By Counties (source: The State of Hawaii Data Book 2002 – Table 21.01)

Year	Permits	Estimated Value	Housing starts in Hawaii:
1998	16,058	$1,054,281	
1999	17,381	$1,320,218	
2000	19,074	$1,513,073	
2001	19,466	$1,585,739	2,300
2002	14,172	$1,772,027	2,700
2003			4,200
2004			4,500 + Est.
2005			6,000 Est.
2006			6,000 Est.

(estimates are per interviews with Karen Nakamura at Building Industry Association of Hawaii.)

Table 3
Economics of Home Construction

Home prices per square foot:

	Median		Average	
	US	West	US	West
2002	$70.39	$82.56	$75.68	$89.31

Estimated Value of a 2,272 square foot Single Family Residence:

$159,926	*$187,576*	*$171,944*	*$202,912*

(Extension of NAHB Data)

Accepted Value per Housing Unit in Hawaii in 2002 (source DEBDT Data Book 2002 – Table 21.03: $172,027

Value of Building Permits by county in Hawaii in 2002 (source: DEBDT Data Book 2002 – Table 21.02):

State	Honolulu	Hawaii	Kauai	Maui
	(Thousands of dollars)			
Residential				
$1,112,912	$433,841	$319,788	$172,660	$186,622
Additions and Alterations				
$404,921	$319,836	$36,375	NA	$48,710

Table 4
Materials Used in Single-Family and Multi-Family Homes:

(Source: National Association of Home Builders)
(note: these are national averages and will not apply directly to Hawaii style buildings)

Item	Single Family	Multifamily
Finished Area: (square feet)	2,272	1,268
Total board feet of framing lumber 13,837		
Cabinets: (number)		
Kitchen	15	11
Vanity	3	2
Other	2	0
Floor Coverings: 2,269 square feet		
Carpet (percent)	63%	60%
Hardwood	11	8
All other	26	33
Doors: (percent)		
Patio Door Materials		
Wood	32%	17%
All other	68	83
Exterior Door Materials		
Wood	18	28
All other	82	72
Windows: (average number)	19	8
Wood - No Clad (percent)	5 %	1%
Wood – Aluminum or vinyl clad	23	16
All other	72	83
Decking: (percent)		
Treated Wood	56	66
All other	44	34
Interior Wall Finish (square feet)	6,050	4,047
Lumber/boards (percent)	0.5	0.7
All other	99.5	99.3
Beams (linear feet)		
Solid wood (percent)	9	11
All other	91	89

Table 5
Import Statistics

Matson

	10/1/2001	- 9/30/2002	10/1/2002	- 9/30/2003	10/01/03	- 9/30/2004
Commodity	Units**	Pounds	Units**	Pounds	Units**	Pounds
Cabinets	74	1,313,204	64	1,140,480	61	1,073,844
Wooden Shingles	217	6,816,404	194	6,350,396	229	7,865,921
Millwork/Molding/Fencing	13	447,681	19	502,474	39	835,128
Lumber/Plywood/Bldng Brd	5,019	222,251,358	5,208	230,792,520	4,431	200,648,897
Engineered Wood/Flooring	384	15,111,168	199	7,975,522	147	6,139,896
Wooden Doors	57	867,426	27	395,091	77	931,007
	5,764	246,807,241	5,711	247,156,483	4,984	217,494,693
Short tons		123,404		123,578		108,747

Corps of Engineers

	Short Tons
Wood in the rough (code 4170	2,000
Lumber (code 4189)	381,000
Primary Wood Products (code 5540)	28,000

** Units are containers

Notes: Steve Rubin of Matson states that he believes that Matson carries about 2/3rds of the container shipments of the target products of the study.

Table 6
Foreign Trade Zone # 9

Tongue/grooved/Molded – nonconiferous		$849,395	$846,519	$883,047	$492,811
Sawn, sliced - over 6mm – nonconiferous		$145,306	$246,280	$551,638	$356,612
Other tropical wood		$61,704	$246,644	$563,650	$321,492
	Total	$1,056,405	$1,339,443	$1,998,335	$1,170,915
	2004 annualized				$2,341,830

Table 7

Import Statistics

International Tropical Timber Council

(Market Access of Tropical Timber)
March24,2003)
USA

	1997	1998	1999	2000	2001
		(1,000 cubic meters)			
Imports of tropical sawn wood	325	352	284	330	340
Imports of tropical logs	4	1	1	2	2
Imports of tropical veneer	53	43	25	25	26
Imports of tropical plywood	1396	1559	1708	1525	1500

Table 8

Estimating Consumption

By: John R. Shelley PhD

1. Hawaiian housing starts -- 2700 in 2002, 4200 in 2003, est. 6000/year by 2006
2. 2002 - residential value == $1,112,912,000
   average= $412,190 per house
3. Hardwood uses in new house construction
   - Flooring -- Nationwide, about 10% of flooring is hardwood
   - Cabinets --
   - molding/millwork --
   - Doors/windows --
   - Siding --
   - roofing --
   - Exterior decking --
4. Furniture construction in Hawaii

   Are there any furniture manufactures in Hawaii — 6 to 10 regular but mostly small

   Estimate Hawaii potential for furniture made from non-koa Hawaiian woods. — Mostly Mango

Estimating current shipments of hardwood into Hawaii (2003/2004)

Matson	all wood (tons)	hardwoods (tons)	BF Hardwoods	Assumptions
Cabinets	540	135	81,000	20% of solid hardwood box have solid hardwood doors
Molding/millwork/fencing	410	164	98,400	60% is fencing
Lumber/composite panels	100,000	10,000	6,000,000	10% is hardwood lumber
Engineered Wood/flooring	3,000	1,500	900,000	50% is flooring
Wooden Doors	450	225	135,000	50% is hardwood
TOTAL	104,400	12,024	**7,214,400**	

ton to BF conversion = 12BF/cubic foot, 40 lbs/cubic foot)

Corps of Engineers	all wood (tons)	hardwoods (tons)	BF sftwds	BF Hardwd	
Lumber	383,000	?	229,800,000	16,837,524	~40% of national hardwood consumption is in cabinets, furniture, flooring (the possible Hawaiian markets)
Primary Wood Products	28,000	?			

Hawaii Hardwood Consumption Based on National Hardwood Consumption Figures

18,920,000 — By population (0.43%)

Tropical hardwoods imported into Hawaii (in US $) -- Foreign Trade Zone #9

	Value	BF	
Lumber	$360,000	90,000	average value of $4/BF
Molding/millwork/flooring	$500,000	83,333	average value of $6/BF

Table 9

Hardwood Utilization

from
Hardwood Review - Annual Forecast 2004
http://www.hardwoodreview.com
page 19

	2004 Estimate		1994		Trend %Change
North American Production (BBF)	11.35		13.00		
Utilization by Sector (BBF)					
Furniture	1.40	12.74%	3.02	23.14%	- 46.36%
Cabinets	0.74	6.73%	0.52	3.98%	142.31%
Dim/Mill/Mldg	0.70	6.37%	0.75	5.75%	93.33%
Flooring	0.89	8.10%	0.41	3.14%	217.07%
Pallet/Crating	3.08	28.03%	4.70	36.02%	65.53%
Lbr/Dist Yds	1.50	13.65%	1.30	9.96%	115.38%
Railroads	0.89	8.10%	0.70	5.36%	127.14%
Exports	1.20	10.92%	1.00	7.66%	120.00%
Misc.	0.59	5.37%	0.65	4.98%	90.77%
Total	10.99	100.00%	13.05	100.00%	84.21%

Note: *2003 actual was very close to the total and the distribution of 2004 estimate. Actual 2003 total was 10.32 and flooring was .85 BBF*

Table 10

Product Prices

Species	Size/Thickness (Prices noted in the interview process)		Price /SF
Acacia koa (see Table 12 for grades)	BF		$4.50 to $65.00
African Mahogany	4/4		$3.5 to $6
Teak	4/4		$10 +
Maple/Cherry/Oak	4/4		$3.5 to $5
Paint grade Poplar	4/4		$1.5
Eucalyptus flooring [imported]	3/4	Tongue and grooved	$3.80 to $4.90
(Wholesale Prices from Hardwood Review for October 22, 2004)			
Mahogany – Genuine	4/4		$3.80 KD
Mahogany – Genuine	4/4		$3.49 Grn
Mahogany – African	4/4		$2.75
Strip flooring	¾”		
Red Oak		Select	$2.4
		#1 Common	$2.33
		#2 Common	$1.72
White Oak		Select	$2.29
		#1 Common	$2.08
		#2 Common	$1.56

See Table 11 for Hawaiian grown species prices.

Table 11

ALOHA WOODS. INC.

(808) 329-5189 Fax (808) 329-5168
73-4770 Kanalani St.
Kailua-Kona. HI 96740

SPECIES	CODE	4/4=1" THICK	8/4=2" THICK	LOGS
ALBIZIA LEBBECK (CHOC HEART)	AL	$6.50	$6.50	*
AUSTRALIAN RED CEDAR	ARC (TOON)	$4.25	$4.60	*
AVOCADO – SPALTED	AVS	$16.00	$16.00	*
COFFEE	COFFEE			*
EUCALYPTUS:				
DEGLUPTA	ED	$4.95	$5.30	*
GRANDIS	EG	$4.95	$5.30	*
ROBUSTA	ER	$4.95	$5.30	$3.00
SALINGA	ES	$4.95	$5.30	*
HAU	HAU	*	*	$8.00
KAMANI	KA	$8.50	$8.50	$3.00
KIAWE	KE	$12.00	$12.00	$6.00
LYCHEE	LY	$16.00	$16.00	$6.00
MACADAMIA NUT	MN	$12.50	$12.50	$3.00
MILO	MI	$18.25	$18.75	$6.00
MANGO	MO	$8.00	$8.00	$3.00
MANGO – Figured	MOC	$12.00	$12.00	$3.00
MANGO. PREMIUM	PMOC	$16.00	$16.00	$3.00
MONKEY POD	MP	$6.50	$6.95	$3.00
NORFOLK PINE	NP	$2.25	N/A	$3.00
OHIA	OH	$8.50	$8.50	$2.00
OLIVE		$8.50	*	$6.00
PALMWOOD	PALM	*	*	*
PHEASANT WOOD	PW	$33.00	$33.00	*
QUEENSLAND MAPLE	QM	$3.25	$3.25	*
SILVER OAK	SO	$8.50	$8.50	$3.00
SUGI PINE	SP	$4.95	$5.60	*
SANDALWOOD	SW	$16.00lb	$16.00lb	$16.00lb

Logs are priced per inch of diameter x linear foot
Except Sandalwood which is a per pound price

* Call for availability and pricing

ALL PRICES SUBJECT TO CHANGE

11/30/04

Table 12

KOA PRICES

* PRICED PER BOARD FOOT - 144 CUBIC INCHES*
1" X 12" X 12" = 1 BF

GRADE		4/4 1" THICK	8/4 2" THICK
#2 COMMON	2C	$4.50	$4.50
#1 COMMON	1C	$10.00	$10.00
SELECT/BETTER	SB	$18.00	$18.00
SELECT CURL LIGHTLY FIGURED	SC	$25.00	$25.00
FULL CURL MEDIUM FIGURED	FC	$30.00	$30.00
PREMIUM CURL HIGHLY FIGURED	PFC	$45.00	$45.00
PREMIUM CURL INSTRUMENT QUALITY	PFCI	$65.00	$65.00
KOA LOGS		$6.00	$6.00

KOA logs are priced per inch of diameter x linear foot

ALOHA WOODS, INC.
(808) 329-5189 Fax (808) 329-5168
73-4770 Kanalani St.
Kailua-Kona, HI 96740
e-mail: alohawoods@msn.com
web: www.alohawoods.com
Toll Free: 1-877-HIWOODS
1-877-449-6637

Table 13
Acknowledgements:

Anderson, Mark - Hawaii Foreign Trade Zone 9
Barber, Andy - Hardwoods Inc.
Bello, Eric – Bello's Millwork
Borseth, Gary – AWI
Brauner, Hal - Brauner Molding and Woodwork
Brewbaker, Paul - Bank of Hawaii
Cheshire, C.L. - UH Manoa Business Program
Gillespie, David - UH Manoa Business Program
Higginson, Tom - Aloha Woods – Kona
Jensen, Eric - J.E. Higgins Lumber
Jones, Gail Susuki – State of Hawaii, Department of Business and Economic Development
Jones, Lloyd - Martin & MacArthur
Kane, Roberta "Bobbie" – Architectural Wood Incorporated (AWI)
Masai, Dean - State of Hawaii, DBED
Nakamura, Karen - Building Industry Association of Hawaii
Onichi, Janice - Pacific American Lumber Co.
Bart Potter – C. Barton Potter Company
Rinell, Dave – Rinell Wood Systems
Smales, Fred - Plywood Hawaii
Steven Smith - Forestry Management Consultants
Untermann, Kent – Pictures Plus
Whalen, Stephanie - Hawaii Agriculture Research Center
Ed Winkler – Trees Inc.
Yanagida, John - University of Hawaii

Appendices

A. National Hardwood Lumber Association Lumber Grades

The Illustrated Guide to

American Hardwood Lumber Grades

AMERICAN HARDWOOD EXPORT COUNCIL

Introduction

The purpose of this publication is to provide a simplified but thorough explanation of the grading rules for American hardwood lumber. They were established over 100 years ago by the newly formed National Hardwood Lumber Association (NHLA). Today the NHLA has over 2000 members worldwide, and the NHLA rules are still the national standard for the US hardwood industry and form the basis for grading of export lumber.

Wood is a natural material and by its very nature may contain different characteristics and defects that need to be understood and allowed for in any given application. The grading of sawn wood into categories as it is processed helps to determine to a large extent the value and potential use possible for each board of sawn lumber.

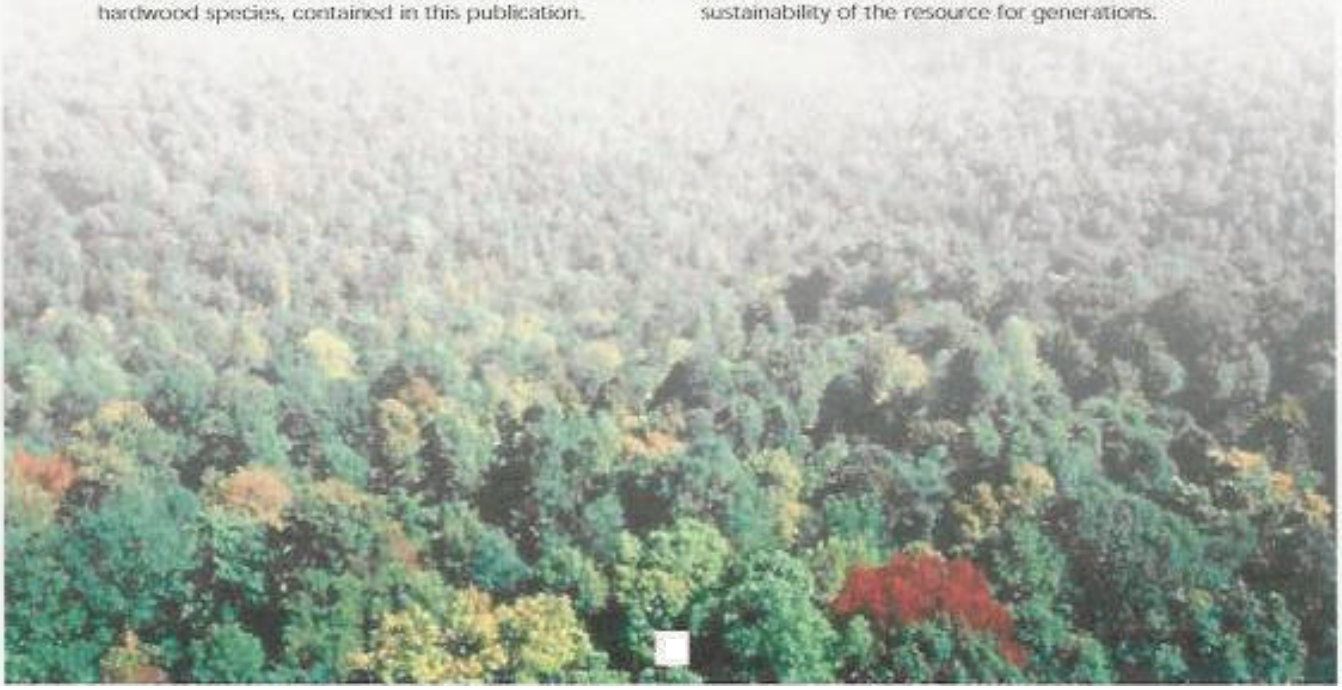
The NHLA grading rules provide both the buyer and seller with a consistent language to use in specifying hardwood lumber transactions. Although the NHLA grading rules are targeted for the US marketplace, a reasonable knowledge is essential for buyers worldwide in order to attain their expected degree of quality. The grade of lumber purchased by a manufacturer will determine both the cost and waste factor that is achieved. Because the grades are based on the percentage of clear wood in the board, many of the beautiful, natural characteristics found in hardwoods are not considered in calculating the clear yield. This fact is highlighted by photograph illustrations of the main grades, for 10 important US hardwood species, contained in this publication.

Hardwood lumber is usually graded on the basis of the size and number of cuttings (pieces) that can be obtained from a board when it is cut up and used in the manufacture of a hardwood product. The NHLA rules were designed with the furniture trade in mind to provide a measurable percentage of clear, defect-free wood for each grade. The upper grades provide the user with long clear pieces, while the Common grades are designed to be re-sawn into shorter clear pieces.

The upper grades, which will include FAS, FAS-One-Face (FAS/1F) and Selects, are most suitable for long clear mouldings, joinery products such as door frames, architectural interiors; and furniture applications, which require a heavy percentage of long wide cuttings.

The Common grades, primarily Number 1 Common (No. 1C) and Number 2A Common (No. 2AC), are likely to be most suitable for the kitchen cabinet industry, most furniture parts, and plank and strip flooring. Worth noting is the fact that once re-sawn, the cuttings obtained from the Common grades will be the same clear wood as the upper grades but in smaller (shorter and/or narrower) cuttings. The grade name simply designates the percentage of clear wood in the board, not the overall appearance.

The American hardwood temperate forest resource is the largest of its kind anywhere in the world, with a significant history of sustainability. Exploring the Common grades, where possible, is invaluable in achieving the most value both in lumber cost and yield. These efforts will also help to ensure the sustainability of the resource for generations.



Measurement

The NHLA lumber grading rules adopted by the US hardwood industry are based on an imperial measurement system using inches and feet. In contrast most export markets are more familiar with a metric standard. Additionally, the grade rules were developed with random width and length lumber in mind. Any selection for particular specifications should be discussed prior to ordering.

Board foot

A board foot (BF) is the unit of measurement for hardwood lumber.
A board foot is 1 foot long x 1 foot wide x 1 inch thick. (1 foot = 0.305 metres, 1 inch = 25.4mm)

The formula for determining board feet in a board is:

(Width in inches x length in feet x thickness in inches) divided by 12

The percentages of clear wood required for each grade are based on this 12" unit of measure.

Surface measure

Surface measure (SM) is the surface area of a board in square feet. To determine surface measure, multiply the width of the board in inches by the length of the board in feet and divide the sum by 12 rounding up or down to the nearest whole number. The percentage of clear wood required for each grade is based on the surface measure, not the board feet, and because of this all boards, no matter what the thickness, are graded in the same way.

Some examples for surface measure calculations are as follows:

6½" x 8' ÷ 12 = 4⅓ = 4' SM

8" x 12' ÷ 12 = 8' SM

10" x 13' ÷ 12 = 10⅚ = 11' SM

Example of SM and BF:

The board above is a 2" thick, 6¼" wide, and 8' long.

6¼" x 8' ÷ 12 = 4⅙, thus the SM is 4'. Multiply the SM by the thickness 2" and the BF is 8'.

When preparing a bundle tally for export, the boards are recorded by their width and length. Random widths above or below the half inch are rounded to the nearest whole inch. Board widths falling exactly on the half inch are alternatively rounded up or down. Lengths that fall between whole foot increments are always rounded down to the nearest whole foot. For example a board 5¼" width and 8⅞' long is tallied 5" and 8'.

Standard thickness for rough sawn lumber

Standard thickness for rough sawn lumber is expressed in quarters of an inch. For example 1" = 4/4. The majority of US hardwood lumber production is sawn between 1" and 2", although other thicknesses are available in more limited volumes. The standard thicknesses and their exact metric equivalent are shown below.

3/4	(¾" = 19.0mm)	8/4	(2" = 50.8mm)
4/4	(1" = 25.4mm)	10/4	(2½" = 63.5mm)
5/4	(1¼" = 31.8mm)	12/4	(3" = 76.2mm)
6/4	(1½" = 38.1mm)	16/4	(4" = 101.6mm)

Standard thickness for surfaced (planed) lumber

When rough sawn lumber is surfaced (planed) to a finished thickness, defects such as checks, stain, and warp are not considered when establishing the grade of a board, **if they can be removed in the surfacing (planing) process.** The finished thickness for lumber of 1½" and less can be determined by subtracting 7/16" from the nominal thickness. For lumber 1¼" and thicker, subtract ½".

Measurement of kiln dried lumber

Net tally: The actual board feet of kiln dried lumber measured after kiln drying.

Gross or green tally: The actual board feet measured before kiln drying. When kiln dried lumber is sold on this basis, the buyer can expect to receive approximately 7% less board feet because of shrinkage in the kiln drying process.

Estimating board feet in a bundle of lumber

To determine the board feet of one board, the procedure is to multiply the surface measure by the thickness. A bundle of lumber can be estimated in much the same manner. First, calculate the surface measure of one layer of boards. Do this by multiplying the width of the bundle, minus gaps, by the length of the bundle and divide the sum by 12. If there are several lengths in the bundle, use an average length. Once one layer is estimated, multiply this sum by the total number of layers.

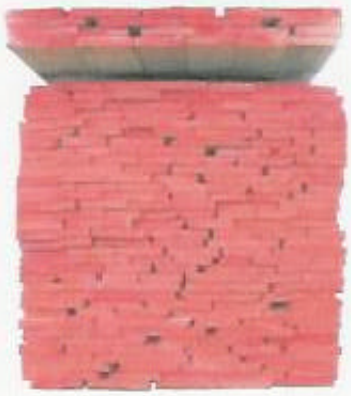
Example:

Average width of unit 40"
(lumber only, after allowing for gaps between boards)

Length of unit 10'

40" x 10' = 400 ÷ 12	= 33.33
Thickness of lumber 8/4	x 2
	= 66.66
Number of layers	x 10
	= 666.67

Estimated board feet of the bundle 667 BF



Conversion factors

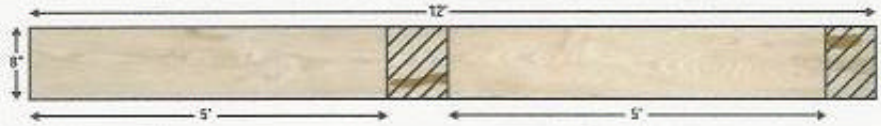
1":	*25.4 millimetres (mm)*	**1m³:**	*424 board feet (BF)*
1m:	*3.281 feet*	**1m³:**	*35.315 cubic feet (cu.ft)*
1,000BF: (1MBF)	*2.36 cubic metres (m³)*		

FAS and FAS One Face (Selects)

FAS

The FAS grade, which derives from an original grade "First And Seconds", will provide the user with long, clear cuttings - best suited for high quality furniture, interior joinery and solid wood mouldings. Minimum board size is 6" and wider and 8' and longer. The FAS grade includes a range of boards that yield from 83⅓% (⅚ths) to 100% clear-wood cuttings over the entire surface of the board. The clear cuttings must be a minimum size of 3" wide by 7' long or 4" wide by 5' long. The number of these cuttings permitted depends on the size of the board with most boards permitting one to two. The minimum width and length will vary, depending on species and whether the board is green or kiln dried. **Both faces of the board must meet the minimum requirement for FAS.**

Note: Minimum yield 83⅓% clear wood cuttings on the poor face of the board.



FAS One Face (F1F)

This grade is nearly always shipped with FAS. The better face must meet all FAS requirements while the poor face must meet all the requirements of the Number 1 Common grade, thus ensuring the buyer with at least one FAS face. Often export shipments are assembled with an 80-20 mix, 80% being the percentage of FAS boards and 20% being the percentage of F1F boards. These percentages are strictly left to individual buyer and seller agreement.

Selects

This grade is virtually the same as F1F except for the minimum board size required. Selects allow boards 4" and wider and 6' and longer in length. The Selects grade is generally associated with the northern regions of the USA and is also shipped in combination with the FAS grade.

Often export shipments of upper grades are simply referred to as FAS. The conventional business practice for American hardwoods is to ship these upper grades in some combination. Working closely with the supplier will enable the buyer to be sure that the expected quality will be received. Whether FAS is combined with F1F (Face And Better) or Selects (Sel And Better) every board in the shipment must have a minimum of one FAS face.

Prime grade: This grade has evolved from the NHLA grade of FAS for the export market. It is square edged and virtually wane free. The minimum clear yield will be select and better with appearance being a major factor. Minimum size of the boards varies, depending on the species, region, and supplier.

Comsel grade: This grade has evolved from the NHLA grades of Number 1 Common and Selects. For the export market the minimum clear yield should be Number 1 Common or slightly better with appearance a main factor. Minimum size of the boards varies, depending on the species, region and supplier.

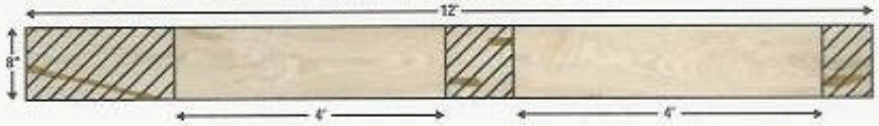
Note: The terms Prime and Comsels are not standard NHLA definitions and therefore fall outside the official range of the NHLA grading rules.

No. 1 Common and No. 2A Common

Number 1 Common (No. 1C)

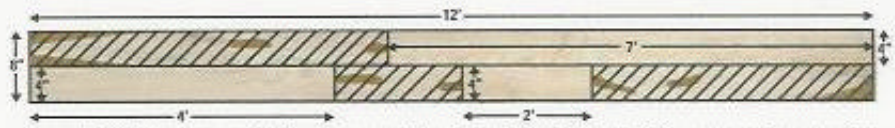
The Number 1 Common grade is often referred to as the Cabinet grade in the USA because of its adaptability to the standard sizes of kitchen cabinet doors used throughout the United States. Number 1 Common is widely used in the manufacture of furniture parts as well for this same reason. The Number 1 Common grades includes boards that are a minimum of 3" wide and 4' long and will yield clear face cuttings from 66⅔% (⅔ths) up to, but not including, the minimum requirement for FAS (83⅓%). The smallest clear cuttings allowed are 3" by 3' and 4" by 2'. The number of these clear cuttings is determined by the size of the board. **Both faces of the board must meet the minimum requirement for Number 1 Common.**

Note: If the better face meets the requirements for FAS and the poor face meets the requirements for Number 1 Common, the grade has the potential of being a F1F or Selects.

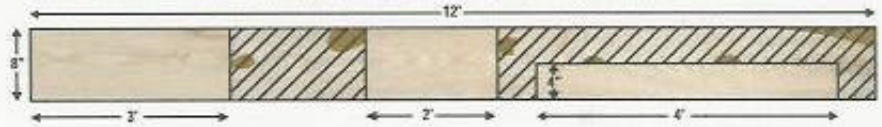


Number 2A Common (No. 2AC)

The Number 2A Common grade is often referred to as the Economy grade because of its price and suitability for a wide range of furniture parts. It is also the grade of choice for the US hardwood flooring industry. The Number 2A Common grade includes boards that are a minimum of 3" wide and 4' long that yield from 50% (½ths) up to, but not including, the minimum requirement for Number 1 Common (66⅔%). The smallest clear cutting allowed is 3" by 2' and the number of these cuttings depends on the size of the board. If the poorest face meets the minimum requirements for Number 2A Common, it does not matter what the grade of the better face is.



Note: If the better face meets the requirements for either FAS or Number 1 Common and the poor face grades Number 2A Common, the grade of the board is Number 2A Common.



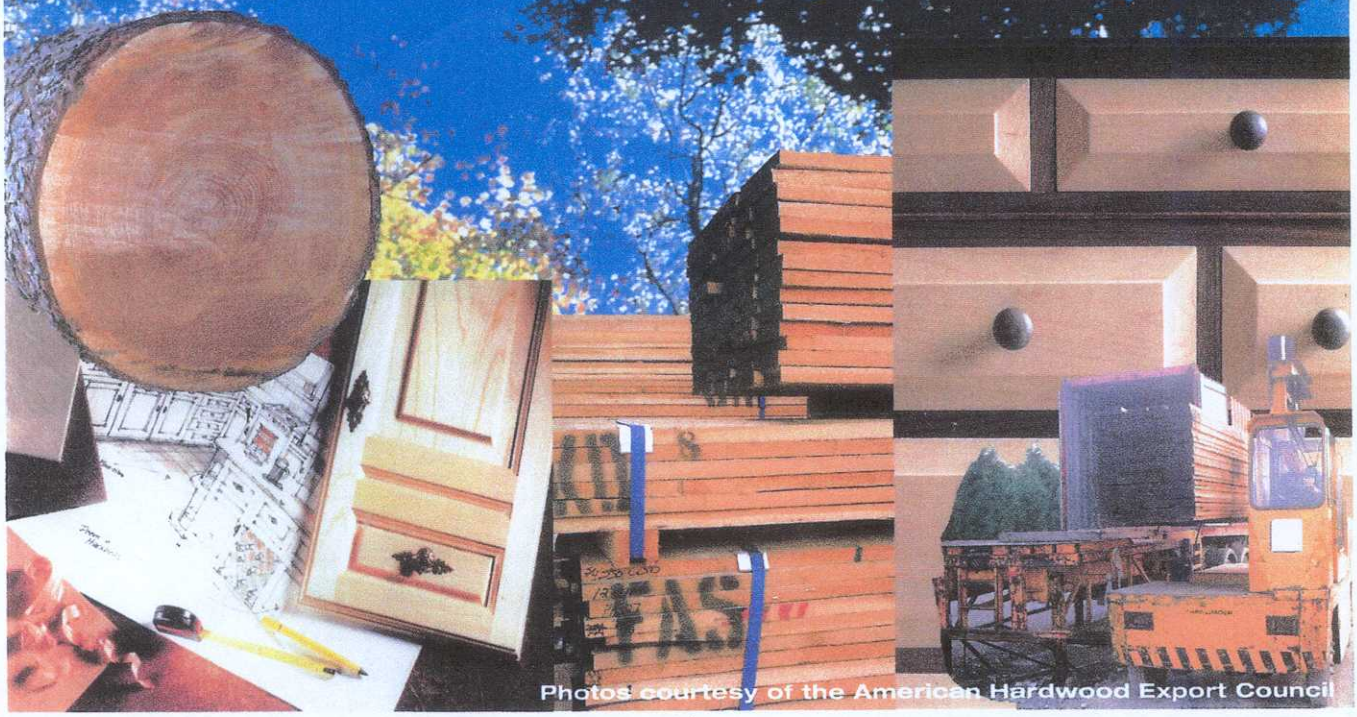
There are lower NHLA grades than Number 2A Common but they are usually converted into dimension parts, flooring parts, or used domestically in the USA.

These Standard Grades form the framework by which all American hardwoods are traded. It is important to note that between buyer and seller any exception to these rules is permissible and even encouraged. For a complete description of the NHLA grades, consult the NHLA's "Rules for the Measurement and Inspection of Hardwoods and Cypress".

B. Excerpts from Hardwood Review

Hardwood Review

Annual Forecast 2004



Photos courtesy of the American Hardwood Export Council

Selected Quotations
From
Hardwood Review – Annual Forecast 2004

The Annual Forecast by Hardwood Review is a document that can be purchased from HR. A copy was purchased by the Hawaii Hardwood Market Study team.
The Hardwood Review focuses primarily on U.S. produced temperate hardwoods. Only a few tropical woods and imports are tracked by this subscription periodical. Following are some quotations taken from the 2004 forecast document:

Executive Summary

"The U.S. economy will continue its slow, steady upswing in 2004. The hardwood industry will experience less growth than the U.S. economy in general. Demand for hardwood products will rise and we expect hardwood lumber sales to increase slightly. However, in many hardwood-using sectors, especially furniture and mouldings, the goods necessary to meet the demand will be imported."

The Economy

Housing Markets
"Three major barometers of housing activity broke new records in 2003: new housing starts, new home sales, and existing home sales."
Currency Valuation
"The value of the U.S. dollar fell sharply through the first half of 2003 against such major world currencies as the euro and Canadian dollar."

Hardwood Lumber Markets

The Forecasted Winners and Losers: (Page 13)
Paraphrasing the forecasts:
The Winners:

- Demand for flooring to stay strong
- The lower value of the dollar may boost sales to Europe
- Ash will be a good item.
- Continued strong markets for railroad ties, pallet cants and pallet boards
- "In general, producers that supply lumber that is width, length and color-sorted according to customer requirements will find better business than those that don't. Getting paid for performing those services? Now that's a story."
- "Almost anything with character marks or a rustic appearance will be in good demand in 2004 ------."
- "Veneer logs and sawlogs will exit the country more rapidly, with a rising percentage of them bound for China."

The Losers:

- Cherry demand will remain sluggish
- Maples will decline
- Kiln-dried random-width and length lumber sales will decline.

Species Analysis:

Genuine Mahogany

"Genuine Mahogany demand slowed after Brazilian supplies were placed on the Convention on International Trade of Endangered Species (CITES) list. A fair volume of Genuine Mahogany flowed from Peru, but oftentimes it was shorter *(lengths)* than millwork manufacturers and other end-users preferred. Genuine Mahogany has a poor future. Environmental pressures, production problems and declining specifications will compel end-users in other directions. More U.S. manufacturers and importers will exit the Genuine Mahogany business this year."

African Mahogany

"African Mahogany increased in use last year, including greater acceptance by millwork manufacturers that had previously resisted buying it. The unreliability of Genuine Mahogany supplies was given as the main cause for the increased African Mahogany demand. African Mahogany prices climbed significantly in the U.S. because most of it was traded in euros and because production did not increase in response to higher demand. We believe demand for African Mahogany will exceed supply, as more distribution yards and manufacturers buy it. Due to poor infrastructure, antiquated manufacturing methods and political problems in Africa, supply will be an ongoing concern."

Export Markets

2004 Forecast

"Global consumer demand no longer favors North American hardwoods. Buyers around the world are looking at color and overall appearance in the wood products they buy rather than for a particular species from a particular region. Improved economic conditions will propel global hardwood usage higher, but U.S. exporters won't benefit as much as producers in other regions because of relatively high prices. Our forecast is that U.S. hardwood lumber exports will total 1.20 BBF *(Billion Board Feet)* in 2004, a 4.0 percent increase over 2003. In the face of increased foreign competition, prices paid for North American hardwoods will likely decline later in the year."

Hawaii Hardwood Market Study note: It must be understood that Hawaiian subtropical hardwoods would not even be on the radar screen for Hardwood Review and that Hawaii and its resources should be viewed as being more parallel to those that come from developing countries.

Flooring Industry

2004 Forecast

"Last year we predicted 2003 flooring industry consumption of hardwood lumber might surpass 1 billion board feet, and it very well could have if the lumber was available. For 2004, our estimate of lumber utilization is tempered by the fact that it may be mid-year before log and lumber availabilities return to levels that allow flooring manufacturers to produce at desired levels."

EXECUTIVE SUMMARY

The U.S. economy will continue its slow, steady upswing in 2004. The hardwood industry will experience less growth than the U.S. economy in general. Demand for hardwood products will rise and we expect hardwood lumber sales to increase slightly. However, in many hardwood-using sectors, especially furniture and mouldings, the goods necessary to meet increased demand will be imported.

Profits in the hardwood industry may be marginally better in 2004 than last year. However, increased production could severely impact profitability during the second half of the year. Overproduction will be felt more quickly than in the past because domestic consumption is smaller and a growing abundance of substitutes are available, including imported hardwoods, non-solid wood products and non-wood products. The impact of imports will surprise many people in 2004, as they increasingly show up in every area, from flooring to pallets to millwork.

Economic drivers external to the industry will be mixed. We don't anticipate interest rates to rise more than one percentage point this year, if at all. Two factors will keep the value of the U.S. dollar low against other world currencies. First, the U.S. Treasury is printing new money like it's going out of style. Second, the U.S. budget deficit and the cost of financing it are growing. We expect the value of the U.S. dollar to decline an additional ten percent against the euro and five percent against the Canadian dollar in 2004. Moderate job growth is likely, but job creation will lag previous recoveries because industrial employment will be level at best. The industry will face higher freight rates, both domestic and export, due to rising fuel costs, reduced trucking capacities and tighter regulations. Truck availability in the U.S. and Canada may decline further. Energy prices will also be a major issue in lumber drying. Those who depend on oil and natural gas to fire their boilers will look harder at alternatives, especially wood waste-fired boilers.

We expect that timber and log prices will continue to rise—driven as much by export demand as domestic utilization—and the controversy over log exports will come to a head. One New England sawmill owner, for example, told us that 60 percent of the timber harvested in the Connecticut River Valley is now processed outside of that region, mostly in Canada. Over the long-term, timber prices are likely to decline because of competition from cheaper timber in other parts of the world, but that won't happen for several years.

Sawmill modernization is becoming more expensive, but sawmills will find it increasingly difficult to secure working capital to make needed improvements. Current tax incentives that provide companies the opportunity to modernize facilities and frontload depreciation will soon expire. 2004 will be a decisive year for many business owners trying to decide whether to spend money on their operations or close the doors. The lack of profitable exit strategies will keep many hardwood sawmill and concentration yard owners in the industry long after they would like to sell.

High workers' compensation insurance rates and poor returns on investments have decimated the logging profession, creating a near-crisis situation in several states like West Virginia and Kentucky. These issues must be addressed for the sake of the entire forest products industry, whether through free market solutions or, perhaps, legislation. One idea put forth to reverse declines in the number of loggers is to provide incentives for Hispanics to enter the profession. Until something is done about the larger issue, however, loggers will broaden their businesses to include excavating, landscaping and construction—anything to disguise the logging part of their operations and lower workers' compensation rates.

The hardwood flooring industry will continue to expand in 2004. According to flooring industry contacts, however, they can't raise flooring prices much higher without losing additional

market share to competing products and suppliers. Therefore, they maintain, raw material costs cannot go any higher. If hardwood lumber production increases, as we believe it will, they will probably get their wish. This will be another banner year for domestic hardwood strip and plank flooring sales, but imports dampen longer-term prospects.

Low-grade lumber markets will be even busier in 2004, with demand strong from the flooring industry as well as other users. Pallet demand will increase, but it will lag growth in the general economy because the industrial sector will be stagnant. Robust railroad tie sales will continue.

The cabinet industry is doing quite well and seems to be better positioned than any other sector to fend off imports. Its strategy of delivering custom and semi-custom products to customers quickly and efficiently has been very effective. Cabinet sales should remain quite strong even if housing starts slow, because the majority of cabinet sales are to remodeling markets, which are expected to remain very strong.

There will be a bit less upheaval in the furniture industry this year. Large furniture companies may see improved profits because of increased imports, which tend to have higher margins. Small and medium-sized furniture companies will struggle to find niches; many will open up their own retail stores and offer extremely quick delivery. We will see more furniture plant closings, but not as many as in 2001-2003. The anti-dumping action filed by a group of U.S. furniture manufacturers has a better than 50-50 shot at passing. If tariffs are enacted, they will reduce wood bedroom furniture imports in the short-term, but will be utterly ineffective over the long run.

U.S. hardwood lumber exports in 2004 will be at or near 2003 levels. Economic improvement will stir worldwide hardwood demand, but woods from other parts of the world will meet the extra demand. Overseas customers will more narrowly define width, length, color and a host of other specifications. Many firms will exit the export business due to what they consider to be onerous requirements and insufficient prices for performing those services.

Exports to Southern Europe may grow slightly, but any gains will be offset by continued erosion of northern European markets. European Union (EU) expansion in May will increase the flow of eastern European lumber into Western Europe due to reduced impediments at the borders. China will produce more of almost every manufactured good in 2004, including furniture, flooring, mouldings and cabinet doors. U.S. hardwood exports to China may grow slightly. China's high unemployment, emerging overcapacity in manufacturing and troubled banking system are major concerns. China's economy is more fragile than many people realize and the potential for crisis is growing. If China has no major problems, other Asian markets should be relatively stable through 2004.

Non-tropical hardwood imports to the U.S. will grow and, while still relatively small in volume, will have an increasing impact on markets. Baltic and Russian Birch, for example, are already affecting Yellow Birch sales to the cabinet industry.

As a result of increased worldwide manufacturing and trade, U.S. companies now face intense competitive challenges that require innovative solutions. To effectively compete against lower-cost imports, U.S. companies will give increased attention to lean manufacturing, mass customization and extremely fast delivery. Recent remarks from one very frank lumberman, we believe, accurately sum up our industry's present situation: "At this juncture, the industry does not need 'business as usual,' we need innovative, forward-thinking, brutally honest, bold thinkers."

Lumber Markets by Industry Sector

Table 1 shows our estimates of both hardwood lumber production and usage by industry sector. The sub-sections below analyze hardwood lumber utilization by each sector.

	Estimated Hardwood Production & Use											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Est. 2004	Est. Change
North American Production (BBF)	**13.00**	**13.75**	**11.90**	**13.00**	**14.00**	**14.25**	**14.00**	**11.50**	**11.20**	**10.32**	**11.35**	**+1.03**
Utilization by Sector (BBF)	**13.05**	**13.26**	**12.36**	**13.06**	**13.54**	**13.43**	**14.32**	**11.73**	**11.22**	**10.73**	**10.99**	**+0.27**
Furniture	3.02	3.14	3.00	3.10	3.40	3.40	3.45	1.80	1.70	1.56	1.40	-0.16
Cabinets	0.52	0.50	0.50	0.56	0.56	0.56	0.55	0.58	0.61	0.64	0.74	+0.10
Dim/Mill/Mldg	0.75	0.78	0.75	0.50	0.60	0.60	0.86	0.85	0.70	0.67	0.70	+0.03
Flooring	0.41	0.44	0.48	0.55	0.58	0.62	0.49	0.83	0.84	0.85	0.89	+0.04
Pallet/Crating	4.70	4.70	4.23	4.40	4.40	4.20	4.93	3.75	3.30	2.99	3.08	+0.09
Lbr/Dist Yds	1.30	1.30	1.10	1.20	1.40	1.40	1.43	1.40	1.40	1.40	1.50	+0.10
Railroads	0.70	0.70	0.65	0.90	0.90	0.80	0.70	0.78	0.85	0.88	0.89	+0.01
Exports	1.00	1.05	1.05	1.10	0.95	1.10	1.20	1.10	1.17	1.15	1.20	+0.05
Misc.	0.65	0.65	0.60	0.75	0.75	0.75	0.72	0.65	0.65	0.60	0.60	+0.00

Table 1. Estimated hardwood lumber production and utilization by sector, 1994-2004.

Kitchen Cabinet Industry

2003 Year in Review

#1 Common lumber was in heavy demand in 2003, especially towards the latter half of the year, when flooring and export buyers joined the hunt for Oaks and Hard Maple. Red Oak and Cherry lumber prices climbed sharply and steadily throughout the year, while Hard Maple prices, which had fallen throughout the spring and summer, only climbed back to levels seen earlier in the year (Figures 17a-d).

Despite tightening supplies and rising prices, none of the cabinet plants we contacted lost any production time in 2003, namely because these plants can and will pay higher prices for lumber than competing sectors. Several manufacturers took advantage of the growing popularity of rustic looks and increased their utilization of #2 Common lumber.

2004 Forecast

We expect hardwood lumber shipments to the cabinet industry to rise 15.6 percent to 740 million board feet. Watch for Red Oak to regain some market share in 2004. Manufacturers are promoting it as a product with lots of versatility—from dark and rustic finishes to neutral tones—and it will remain a mainstay in the stock cabinet sector. As lumber production picks up throughout the year, it may also become a much more economical choice than Hard Maple, Cherry and Yellow Birch.

Despite the rapid rise in Cherry lumber prices in 2003, most manufacturers announced plans to increase their Cherry utilization in 2004. One manufacturer shared plans to introduce new lines in Cherry and Hard Maple in April, and indicated they would be stockpiling these species over the next couple of months. Cherry is, quite simply, hot and it remains the species of choice for higher-end consumers. Manufacturers may be able to capitalize on the "rustic" theme by incorporating lower grades of Cherry lumber, thereby offsetting some of the raw material costs. We expect Cherry prices to be firm to slightly higher at least through the first half of 2004.

Hard Maple lumber will continue to be a very good seller for naturally finished cabinet lines. With the growing popularity of dark finishes, paints and glazes, Soft Maple will find increasing

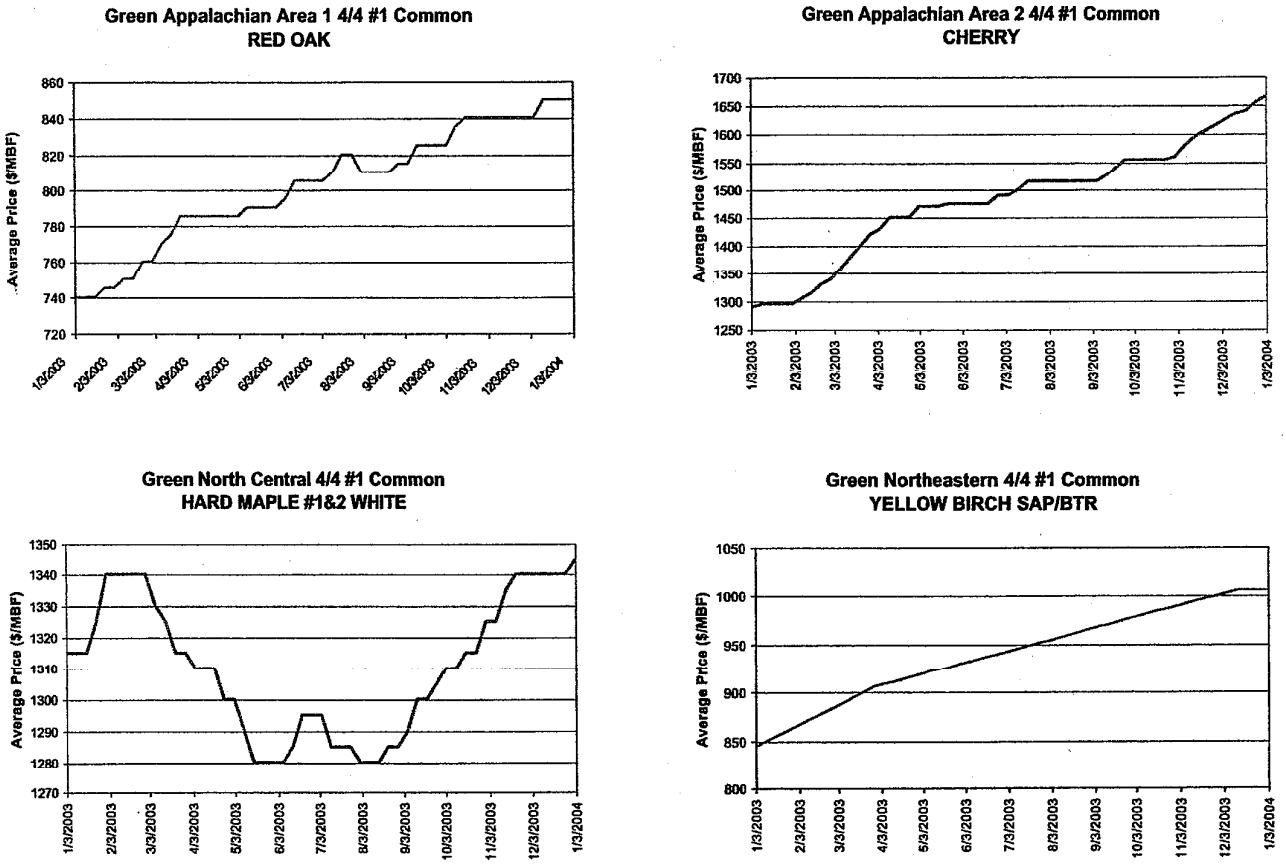


Figure 17a-d. Green 4/4 #1 Common lumber prices, 2003.

acceptance among manufacturers and consumers as a Hard Maple substitute. Continued supply problems and price volatility with Hard Maple also make Soft Maple an attractive alternative. For business planning purposes, many manufacturers have told us that raw material price stability is as important as the price itself. With the ready availability of Soft Maple as a substitute, Hard Maple utilization will likely go down in 2004, which may result in declining prices for #1 Common lumber.

Yellow Birch will hold its own as a preferred cabinet species in 2004. While its usage remained a distant fourth to Oak, Cherry and Hard Maple, there was sufficient demand to pull Yellow Birch prices up sharply through the third quarter of 2003. While prices leveled out in the last quarter, supply and demand seemed to plateau at a new, much higher level than in 2002. Even if demand for Yellow Birch strengthens in 2004, production is not likely to respond much. Yellow Birch timber does not occur in very dense concentrations on the landscape. It would take the promise of sustained high demand and strong prices for producers to reach out and invest in additional Yellow Birch supplies. We suspect cabinet industry consumption of Yellow Birch will remain at current levels throughout 2004 at firm or slightly higher prices.

Flooring Industry

2003 Year in Review

Sales & Market Share

Record home sales and new home starts helped pull hardwood flooring sales up as much as 10 percent in 2003, surpassing the $2 billion mark (sales value at the first point of distribution). Ed Korczak, executive director of the National Wood Flooring Association (NWFA), estimates that hardwood floors now represent over 10 percent of total U.S. floor covering sales (in dollars). Hardwood flooring comprised 9.2 percent of all floor covering sales in 2002 and 8.9 percent in 2001, according to Catalina Research and *Floor Covering Weekly (FCW)*.

In 2002, hardwood flooring sales increased 8.1 percent to $1.87 billion (total floor covering sales grew only 4.8 percent) and overtook vinyl as the second leading solid-surface floor covering in sales dollars. 2003's estimated 10 percent sales growth will also far outpace total floor covering industry growth.

On a volume basis, hardwood flooring sales climbed 6.6 percent to 885 million square feet in 2002, although the percentage of the floor coverings market that this represented was unchanged at 3.5 percent. *FCW* estimates that 58 percent (513 million square feet) of the hardwood flooring sold in 2002 was in engineered products; the balance presumably was solid goods. While the final statistics for 2003 are still 6 months off, based on the disproportionate growth of solid flooring imports, we suspect the percentage of solid wood grew throughout 2003.

Hardwood flooring sales were not consistent throughout the year. "The first 4-5 months were difficult, with extremely tight margins," noted one producer. "During the remaining 7-8 months, prices for finished products escalated at a rapid pace, making the year as a whole reasonably profitable."

"Factory-finished products were still approximately 60 percent of the hardwood flooring sold in the U.S.," according to the NWFA's Korczak, the same as in 2002, "but it's 60 percent of a bigger pie." Because most engineered flooring is classed as "factory-finished," much of the past several years' rise in factory-finished flooring sales can be attributed to the growing popularity of engineered flooring. Even within the solid wood category, however, the percentage of factory-finished flooring is growing. One California distributor noted a 15-20 percent growth in factory-finished sales and a corresponding decline in unfinished sales in 2003. "The reality," according to one major manufacturer, "is that nobody, absolutely nobody, knows how much factory-finished flooring there is. The best estimates range from 35 to 50 percent of all solid hardwood flooring is now factory-finished."

Armstrong Wood Products, Inc. (Bruce Hardwood Flooring, Hartco Flooring and Robbins Hardwood Flooring) converted most of Bruce's production to factory-finished in 2003 (some estimate Bruce manufactured 45 percent of the unfinished strip-flooring prior to 2003). Although it is still operating one unfinished plant, Armstrong's move further boosted the volume of domestically manufactured factory-finished flooring. It also boosted the outlook of the remaining unfinished flooring producers, who were happy to fill in the production gaps.

Production

While hardwood flooring sales volumes and revenues grew significantly in 2003, domestic shipments did not. According to Stan Elberg, executive director of NOFMA-The Wood Flooring Manufacturers Association, domestic solid unfinished and factory-finished production in 2003 was up less than one percent over 2002 levels to 476 million square feet (633 million board feet) (Figure 28). While NWFA's Korczak believes production was probably a bit higher than NOFMA's estimate, several factors held production down in 2003.

Lumber availability and profitability were the most oft-cited problems for domestic flooring manufacturers in 2003. It is not clear, however, that the first contributed to the latter. In fact, the weighted average of Red Oak flooring prices published in the

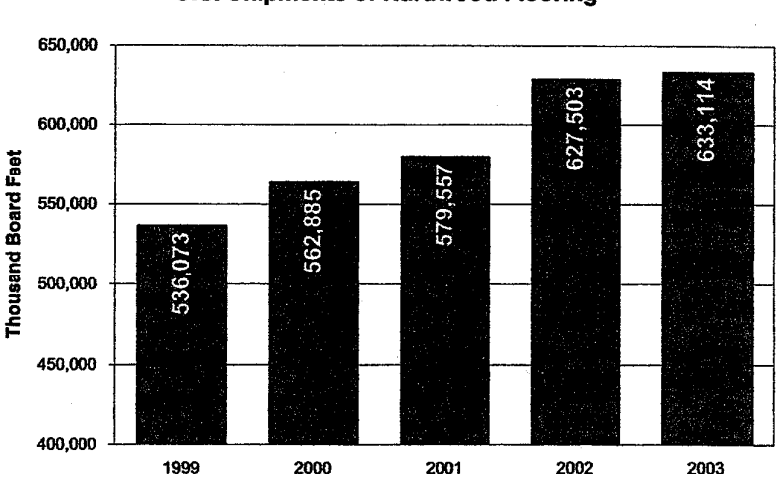


Figure 28. U.S. shipments of solid-strip hardwood flooring, 1999-2003.

Weekly Hardwood Review across all regions rose faster in 2003 than the weighted average of green Red Oak lumber prices. Likewise for White Oak flooring versus White Oak lumber prices (Figures 29 and 30). *(NOTE: The weighted average flooring price assumes 55 percent Sel/Btr production; 35 percent #1 Common and 10 percent #2 Common. The weighted average lumber price assumes the plant utilizes 15 percent #1 Common lumber, 55 percent #2A and 30 percent #3A.)* On a nationwide basis, all other things

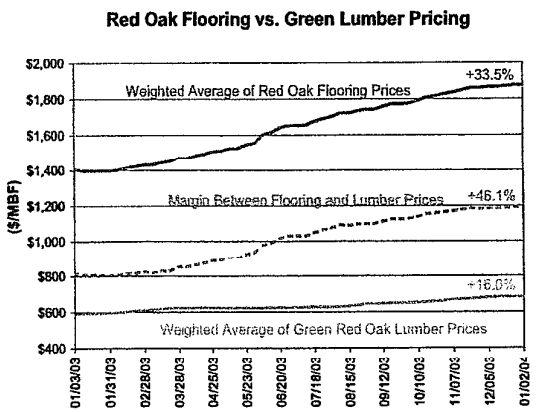


Figure 29. Weighted average Red Oak flooring vs green lumber prices, 2003.

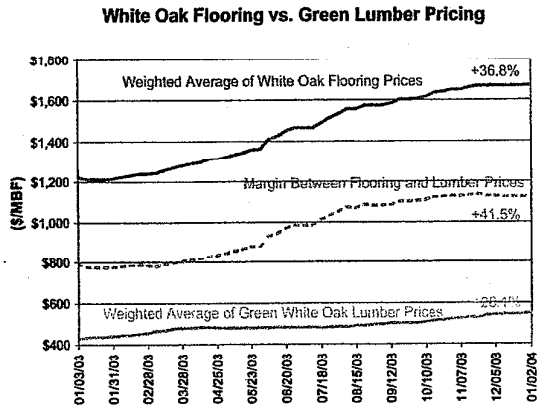


Figure 30. Weighted average White Oak flooring vs green lumber prices, 2003.

equal, flooring manufacturers should have become more—not less—profitable during 2003. Yes, they paid significantly more for lumber, but they also were able to raise their selling prices more than enough to offset increased raw material costs, especially during the latter half of the year.

That said, profitability was still a major concern voiced by those companies we talked with in preparing this report. Obviously the national data may mask certain local or regional profitability concerns. At the same time, lumber is but one cost associated with the manufacture of flooring. Increased labor, energy and transportation costs likely also kept the bottom line profitability of most flooring manufacturers from achieving the 50 percent profit gains suggested by these simple price analyses.

We suspect, however, that the physical availability of lumber, tightened by lower production and heightened demand from other low-grade industries, including the revitalized truck flooring industry, had a larger role in slowing flooring production in 2003 than rising lumber prices.

Imports/Exports

With hardwood flooring sales up as much as 10 percent and domestic production steady, imported hardwood flooring is obviously playing a larger role in domestic flooring markets. Nevertheless, many domestic manufacturers and industry representatives show little or no concern about imported flooring. One suggested imports are chiefly a threat to engineered flooring manufacturers. Another said imports are just filling gaps in demand that domestic producers can't meet. It wasn't too long ago, however, that the U.S. furniture industry said, "the Chinese are only interested in and capable of taking low-end production." Either way it is clear, as one producer aptly noted, "sales of wood flooring are up in 2003; it just ain't being made around here."

When we visited the National Wood Flooring Association Expo in April 2003, we were, quite honestly, shocked at the prevalence of displays containing or dedicated to imported flooring products. Imported products were clearly the focus of much of the industry's promotional efforts.

A word of caution on import statistics: Imported wood products are tough to track and reporting systems and methodologies change. While some of the numbers may be off, we believe that the trends in these import statistics over time are generally accurate.

In 2002, the United States became a net importer of solid-strip flooring, importing almost a million more square feet than it exported. By the end of 2003, the U.S. imported twice as much solid flooring as it exported, even though exports continued to grow (Table 6). Also in 2003, solid flooring import volumes surpassed imports of laminate/engineered products. Based on the domestic production estimates of NOFMA and those that could be derived from *Floor Covering Weekly* research, imports accounted for between17 and 22 percent of the solid hardwood flooring purchased in the United States in 2003.

Hardwood Flooring	2001 m^2	2002 m^2	2003 m^2
Imports			
Solid Strip	2,017,057	3,995,301	7,372,750
Laminate/Engineered	5,933,231	6,630,741	7,142,508
Total	7,950,288	10,626,042	14,515,258
Exports			
Solid Strip	3,040,642	3,060,226	3,681,723
Laminate/Engineered	313,479	274,199	233,397
Total	3,354,121	3,334,425	3,915,120

Table 6. Volume of U.S. flooring imports vs. exports, 2001-2003.

In 2003, China appears to have tripled its shipments of solid hardwood flooring to the U.S., surpassing Canada as the largest source of imported solid wood flooring (Table 7). That's not only surprising, but should effectively quell the notion that Chinese producers are not interested or actively targeting U.S. solid flooring markets. Even if the Chinese figures are overstated by 50 percent, Chinese imports doubled. Further, Canada, Brazil, Italy, Thailand and Taiwan all more than doubled their shipments of hardwood flooring to the U.S. in 2003.

Solid Hardwood Flooring Imports

Country	2002	2003	% Change
	-- m^2 --		%
China	633,293	1,983,625	+213.2%
Canada	735,394	1,866,340	+153.8%
Brazil	531,900	1,338,035	+151.6%
Indonesia	318,225	354,520	+11.4%
Malaysia	328,595	351,791	+7.1%
Italy	52,460	325,201	+519.9%
Paraguay	112,432	211,550	+88.2%
Germany	144,971	159,267	+9.9%
Thailand	33,103	109,811	+231.7%
Taiwan	15,531	87,033	+460.4%
WORLD TOTAL	**3,995,301**	**7,372,750**	**+84.5%**

Table 7. Volume of solid hardwood flooring imports by country, 2002-2003.

Indonesia remained the largest provider of engineered hardwood flooring products in 2003, shipping almost twice the volume as China, the second leading provider. Indonesia's volume was flat, however, while China's volume doubled.

2004 Forecast

Sales & Market Share

The overwhelming sentiment expressed by flooring manufacturers and industry representatives is that flooring demand will hold strong as long as interest rates stay low and housing stays strong. Of course, that kind of goes without saying. The real question is: how long will interest rates stay low and housing stay strong? By and large, most industry representatives expect the boom to continue at least through the first half of 2004. Economists concur that housing markets and interest rates will remain essentially unchanged through at least the second quarter.

It's important to note, however, that new housing starts are not the largest driver of hardwood flooring sales. *Floor Covering Weekly* estimated that 55 percent of the hardwood flooring sold

in 2002 went for residential renovation and repair. Only 31 percent was sold with new home construction, and only 21 percent was for single-family home construction. It will take continued strong new home sales as well as existing home sales to keep flooring markets humming in 2004, since it is likely the existing home buyers that are doing much of the remodeling and hardwood flooring installation.

Based on the last three years' growth trends, solid and engineered hardwood flooring sales should surpass the one billion square foot mark in 2004, and sales should exceed $2.25 billion (Table 8).

Long-term, put your money on engineered flooring to grow faster than solid wood flooring. The declining quality and the increasing value of the resource suggest we will continue to move towards products that allow manufacturers to meet consumers' appearance expectations with a smaller percentage of high-dollar fiber. But, that's long term. The market share of solid hardwoods held steady in 2003, and solids should hold their own again in 2004, if not improve slightly. Armstrong shut down two engineered flooring plants in 2003, and most of the new production that came online in 2003 was in solid strip flooring.

	2001	2002	2003*	2004*
	--million square feet--			
Hardwood Flooring Sales	**830**	**885**	**945**	**1,002**
Floor Covering Industry Sales	24,000	25,340	25,500	26,447
% of Square Footage in Hardwood	3.5%	3.5%	3.7%	3.8%
	--million dollars--			
Hardwood Flooring Sales	**1,731**	**1,871**	**2,100**	**2,270**
Floor Covering Industry Sales	19,373	20,281	20,792	21,568
% of Sales $ in Hardwood	8.9%	9.2%	10.1%	10.5%

*2003 estimated, 2004 projected based on 3-year trend.

Table 8. Volume and value of solid and engineered hardwood flooring sales vs. total floor covering industry sales, 2001-2004.

Several unfinished strip-flooring manufacturers indicated that the outlook for 2004 was good, but that their fortunes are always subject to the possibility that factory-finished lines can be readily converted back to unfinished production.

Consumer Preferences

Watch for the growth trend in 2004 to favor higher-end and specialty flooring products. Consumer advertising and trade show displays indicate increased consumer interest in wider planks, non-traditional species and exotic looks. One industry observer noted increased usage of alternative species (Hard Maple, Hickory and Cherry) as well as strips wider than 2-1/4 inch.

Ed Korczak, executive director of NWFA, also reported increased usage of borders and medallions. Simple borders have become commonplace now, he says. Korczak also notes that "just a few years ago we had 10-12 species; now the consumer can choose from 50-55."

"Factory finished remains the choice for remodeling in 2004," according to Korczak, "while job-site finished is still the floor covering of choice for upscale new homes."

Many manufacturers and distributors noted that high-quality hardwood flooring continues to be a great selling product. With the economy rebounding, "cheaper" isn't turning out to be a better seller.

Production

With logging conditions already improving in the first weeks of 2004, flooring manufacturers were looking forward to ramping up production. One manufacturer told us it was planning for a 40 percent increase beginning in April, with unfinished the biggest focus of its growth. Again,

2004 will be a good year for unfinished strip-flooring manufacturers. Long-term, however, the unfinished market will grow only slowly, if at all, meaning that this burst of unfinished activity will only last a short time.

Of major concern for many flooring manufacturers, especially coming off the heels of 2003, is whether the lumber supply will be sufficient to allow them to grow production enough to meet demand. While most manufacturers say they are operating profitably at today's lumber and flooring prices, several worried that they would not be able to ramp up their product prices fast enough or high enough to offset significant lumber price increases.

While logging conditions had improved in January 2004, an early arrival of spring breakup could make the 2003-2004 winter logging season one of the shortest on record. That had several manufacturers predicting that the industry would be facing another log crisis come March and April. "Already, many major flooring manufacturers are feeding off the same supply," noted one southern manufacturer, "the sharks are circling."

It appears that there will be few changes in domestic flooring production during the first six months of 2004. While several sawmills have announced intentions to build flooring plants, and at least one dimension manufacturer is making the conversion to flooring, there doesn't seem to be enough lumber in the pipeline to allow significant production increases until mid-year.

Profitability

Poor profit margins will continue to plague flooring manufacturers. Flooring manufacturers have told us that there is going to be real problems if flooring prices keep going up. "Builders and consumers won't stomach another 7-8 percent hike in flooring prices," one noted, "we'll see a shift away from Oak and maybe even hardwoods if this continues." While our earlier price analyses suggests there is some room for lumber prices to rise without shipwrecking the entire flooring industry, real or perceived, margins will continue to be a concern.

On the positive side, increased lumber production in 2004 will reduce the volume of #1 Common lumber that manufacturers need to buy. Additionally, if lumber production increases after mid-year, as we expect it will, prices for #2&3A Common lumber could fall.

At the same time, the ability of producers to raise prices will diminish throughout the year due to the increasing availability of imports and the likelihood of additional domestic manufacturing capacity coming online.

Imports/Exports

For many hardwood flooring manufacturers, a significant part of their growth in 2003 resulted from increased sales of imported lines. Many manufacturers' brochures, in fact, currently showcase imported and domestic flooring side-by-side, and retail outlets are featuring more imported species at price points at or near domestic Oaks. One major flooring manufacturer/distributor acknowledged that the margins on exotic imports are much better than for either manufacturing or reselling domestic species, and they sell for about the same price. Only time will tell whether such co-marketing of domestic and imported production will eventually come to haunt these domestic manufacturers.

There are still those companies that do not believe imports will have much of an effect. Because high-priced flooring products are currently selling so well, one manufacturer forecasted it would be quite a while before Asian flooring (whose most attractive advantage is price) found success in the U.S. The owner of another manufacturing firm who had just returned from China observed that most Chinese flooring manufacturers are "mom and pop" operations in the countryside employing 100 or more laborers. "With that many manual laborers," he noted, "they will always

be better able to patch up knotty lumber and do things like hand scraping, but those are minor items in the marketplace."

However, if you are one of those alarmed by 2003's near doubling of imported solid hardwood flooring shipments, expect 2004 to induce cardiac arrest. One manufacturer, already in the early stages of panic, noted, "the worst is yet to come in Chinese flooring imports. Right now they are just dabbling—aligning markets and distribution channels. The big push is coming soon." This same manufacturer, however, also noted that, while it will increase its domestic production capacity in 2004, it will also increase its import of exotic species. Apparently the strategy is to capitalize on the cheaper imports rather than fight them head-on.

Imports of engineered flooring will also increase, although domestic demand for engineered flooring is not expected to grow much in 2004. By 2004 or 2005, China should surpass Indonesia as the leading supplier of engineered hardwood flooring materials.

C. Housing Facts, Figures and Trends 2004
(National Association of Home Builders)

Housing Facts, Figures and Trends 2004

Public Affairs
National Association of Home Builders
1201 15th St., N.W.
Washington, D.C. 20005-2800
(800) 368-5242
(202) 266-8254
NAHB.org

Housing Facts, Figures and Trends 2004
is published by NAHB Advocacy/Public Affairs in cooperation with the NAHB Economics Group.

NAHB Public Affairs—KEY CONTACTS

Robert Pflieger
Senior Staff Vice President
(202) 266-8403

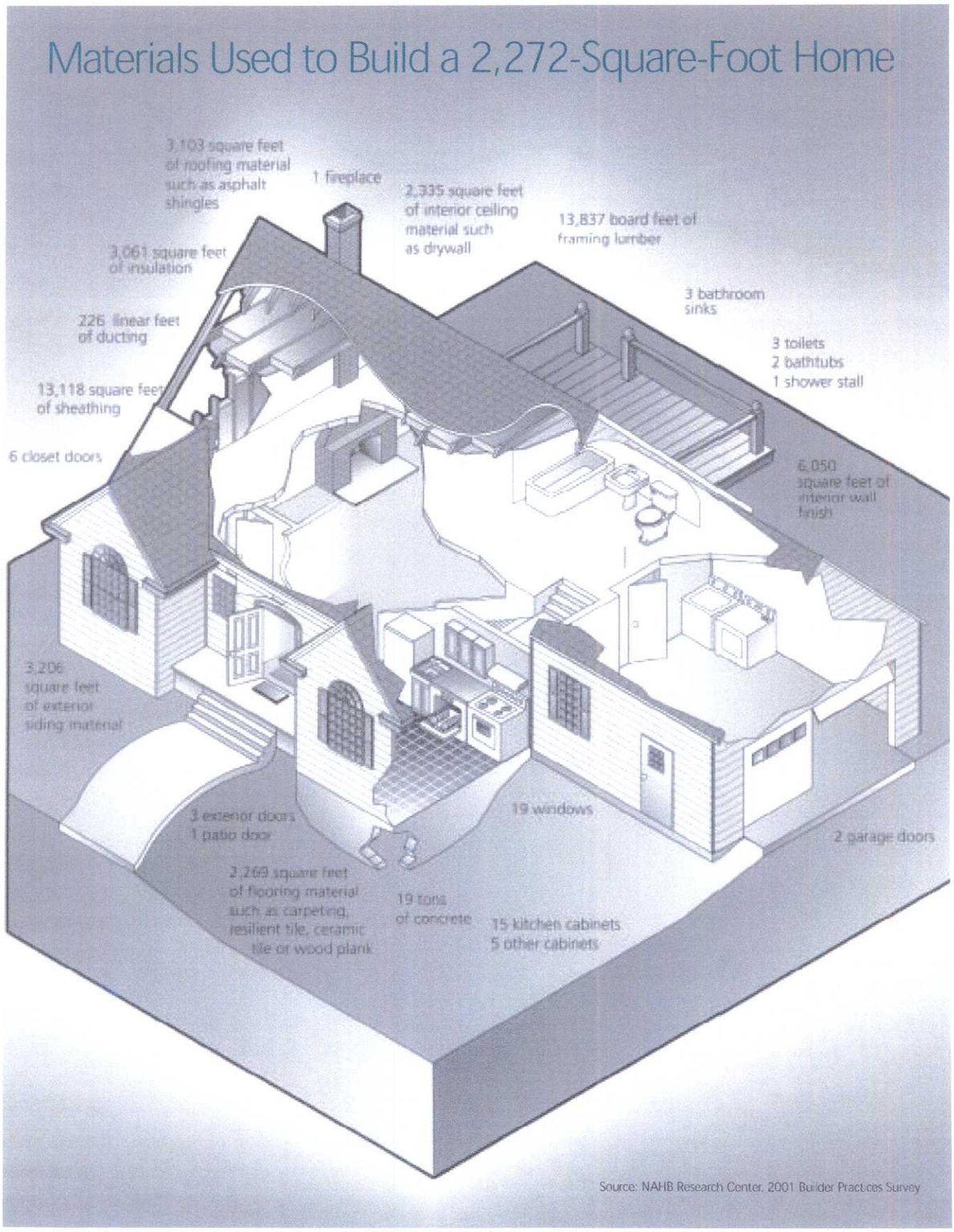
Donna Reichle
Staff Vice President
(202) 266-8473

Jay Shackford
Staff Vice President
(202) 266-8406

Materials Used in New Single-Family and Multifamily Homes

ITEM	SINGLE FAMILY	MULTIFAMILY
Finished Area (square feet)	2,272	1,268
Kitchen Appliances		
Ranges, cook tops and ovens	95%	100%
Microwave	72	57
Refrigerator	40	83
Dishwasher	93	91
Clothes dryer and washer	19	60
Garbage disposer	77	74
Trash compactor	5	7
Hot water dispenser	5	7
Central vacuum	10	2
Kitchen Counter Tops		
Average Linear Feet per Home	23	17
Laminate	56%	70%
Solid surface	17	20
Granite	15	8
Ceramic tile	9	2
Other	3	—
Kitchen Sinks		
Stainless steel	57%	72%
Enameled cast iron	24	15
Enameled steel	10	8
Other	9	5
Cabinets (average number)		
Kitchen cabinets	15	11
Vanity cabinets	3	2
Other rooms	2	0
Roofing		
Roofing Material (square feet)	3,103	—
Roofing Material (percent)		
Asphalt shingle	80.0%	—
Cedar shake	1.6	—
Clay roof tiles	2.6	—
Concrete roof tiles	14.0	—
Other	1.9	—
Floor Coverings		
Floor Covering Materials		
Carpet	63%	60%
Hardwood	11	8
Vinyl	13	16
Ceramic Tiles	12	16
Other	1	<1

continued on page 8


Materials Used to Build a 2,272-Square-Foot Home
3,103 square feet of roofing material such as asphalt shingles
1 fireplace
2,335 square feet of interior ceiling material such as drywall
13,837 board feet of framing lumber
3,061 square feet of insulation
3 bathroom sinks
226 linear feet of ducting
3 toilets
2 bathtubs
1 shower stall
13,118 square feet of sheathing
6 closet doors
6,050 square feet of interior wall finish
3,206 square feet of exterior siding material
3 exterior doors
1 patio door
19 windows
2 garage doors
2,269 square feet of flooring material such as carpeting, resilient tile, ceramic tile or wood plank
19 tons of concrete
15 kitchen cabinets
5 other cabinets
Source: NAHB Research Center, 2001 Builder Practices Survey

Security and Home Automation Systems		
Intercom/entrance phone	5.8%	12.6%
Video entrance phone	1.0	3.1
Whole home control or automation system	1.9	1.4
Security system—sounds alarm in house	17.3	14.2
Security system—alerts protection service	23.3	25.5
Lighting control system	2.1	4.5
Programmable thermostat	40.1	33.1
Communicating thermostat	0.6	0.1
Whole-house audio system	7.2	3.1
Whole-house video system	4.6	3.3
Built-in home theater	4.6	1.3
Electrical load-monitoring system	0.6	1.8
Multi-line phone system	38.4	41.8
Structured wiring	31.0	45.0

Doors		
Patio Door Materials		
Aluminum	19%	23%
Vinyl	25	30
Steel	19	1
Wood	32	17
Aluminum clad wood	5	27
Other	2	1
Exterior Door Materials		
Steel	66%	64%
Fiber glass	16	8
Wood	18	28

Windows		
Average number of windows	19	8
Window Materials		
Vinyl	44%	59%
Aluminum	26	23
Wood-aluminum or vinyl clad	23	16
Wood-No clad	5	1
Other	1	1

Exterior Siding		
Exterior Siding (square feet)	3,206	977
Exterior Siding Materials		
Vinyl	28%	33%
Brick	19	20
Cement stucco	19	13
Synthetic stucco	2	1
Hardwood	4	5
Fiber cement	13	5
Lumber	4	3
Cedar shingles	2	2
Manufactured stone	2	4
Plywood panels	1	1
Natural stone	2	<1
Oriented strand board	2	<1
Other	2	2

continued on page 9

Sheathing		
Floor, wall and room sheathing (square feet on 3/8 basis)	13.118	4.940
Sheathing Materials		
Plywood	3.276	1.676
Oriented strand board	8.619	2.951
Solid board	132	313
Foam	1.091	—
Heating, Ventilation and Air Conditioning		
Cooling equipment	88%	89%
Heating equipment	98	98
Outdoor Features		
Deck Materials		
Treated wood	56%	66%
Cedar	12	14
Wood/plastic components	10	6
Redwood	9	4
Other	13	10
Driveways (linear feet)	57	—
Poured concrete	60%	—
Asphalt	19	—
Gravel	9	—
Garage Doors		
Garage Door Materials		
Steel	88%	77%
Wood	7	10
Fiberglass/plastic	2	6
No answer	3	7
Cement/Conrete Usage		
Tons of Cement	19.00	8.87
Basement and crawl space: foundation wall	3.04	0.88
Basement floor	1.65	0.59
Foundation footings	1.85	0.61
Above grade walls	1.16	0.50
Slabs and floors	3.48	1.91
Concrete products	2.53	0.86
Fireplaces, hearths and chimneys	0.12	0.04
Landscaping and paving	5.17	3.49

continued on page 10

Walls		
Exterior Wall Framing Material (linear feet)	301	141
Wood	88%	85%
Masonry	11	14
Steel	1	1
Interior Wall Finish (square feet)	6,050	4,047
Gypsum drywall	98.4%	99.2%
Cement bound	0.6	0.4
Lumber/boards	0.5	0.2
Other	0.5	0.3
Interior Ceiling Finish (square feet)	2,335	1,286
Gypsum drywall	98.0%	97.0%
Cement bound	0.5	0.7
Lumber/boards	0.8	0.2
Other	0.8	1.1
Beams		
Beams (linear feet)	113	75
Built-up dimensional lumber	43%	24%
LVL	22	22
Steel	7	7
Solid wood	9	11
Glulam	8	8
Parallam	4	6
Open web joist	2	9
I-joist	2	9
Other	2	4

Source: NAHB Research Center, 2001 Builder Practices Survey—Analyzed by NAHB's Economics Group

Population by Race and Hispanic or Latino Origin, for the United States, Regions, Divisions, and States, and for Puerto Rico: 2000 *(continued)*

U.S. REGION/DIVISION/ STATE	TOTAL POPULATION	WHITE	BLACK OR AFRICAN AMERICAN	AMERICAN INDIAN AND ALASKA NATIVE	ASIAN	NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER	SOME OTHER RACE	TWO OR MORE RACES	HISPANIC OR LATINO (OF ANY RACE)	WHITE ALONE, NOT HISPANIC OF LATINO
West Virginia	1,808,344	1,718,777	57,232	3,606	9,434	400	3,107	15,788	12,279	1,709,966
North Carolina	8,049,313	5,804,656	1,737,545	99,551	113,689	3,983	186,629	103,260	378,963	5,647,155
South Carolina	4,012,012	2,695,560	1,185,216	13,718	36,014	1,628	39,926	39,950	95,076	2,652,291
Georgia	8,186,453	5,327,281	2,349,542	21,737	173,170	4,246	196,289	114,188	435,227	5,128,661
Florida	15,982,378	12,465,029	2,335,505	53,541	266,256	8,625	477,107	376,315	2,682,715	10,458,509
East South Central	17,022,810	13,113,106	3,418,542	57,850	136,378	5,741	121,441	169,752	299,176	12,967,670
Kentucky	4,041,769	3,640,889	295,994	8,616	29,744	1,460	22,623	42,443	59,939	3,608,013
Tennessee	5,689,283	4,563,310	932,809	15,152	56,662	2,205	56,036	63,109	123,838	4,505,930
Alabama	4,447,100	3,162,808	1,155,930	22,430	31,346	1,409	28,998	44,179	75,830	3,125,819
Mississippi	2,844,658	1,746,099	1,033,809	11,652	18,626	667	13,784	20,021	39,569	1,727,908
West South Central	31,444,850	22,422,698	4,536,428	434,877	684,064	19,714	2,592,442	754,627	7,043,574	18,384,207
Arkansas	2,673,400	2,138,598	418,950	17,808	20,220	1,668	40,412	35,744	86,866	2,100,135
Louisiana	4,468,976	2,856,161	1,451,944	25,477	54,758	1,240	31,131	48,265	107,738	2,794,391
Oklahoma	3,450,654	2,628,434	260,968	273,230	46,767	2,372	82,898	155,985	179,304	2,556,368
Texas	20,851,820	14,799,505	2,404,566	118,362	562,319	14,434	2,438,001	514,633	6,669,666	10,933,313
WEST	63,197,932	43,274,074	3,076,884	1,187,989	5,003,611	304,246	7,622,844	2,728,284	15,340,503	36,911,587
Mountain	18,172,295	14,591,933	523,283	614,553	353,429	38,508	1,541,704	508,885	3,543,573	12,883,812
Montana	902,195	817,229	2,692	56,068	4,691	470	5,315	15,730	18,081	807,823
Idaho	1,293,953	1,177,304	5,456	17,645	11,889	1,308	54,742	25,609	101,690	1,139,291
Wyoming	493,782	454,670	3,722	11,133	2,771	302	12,301	8,883	31,669	438,799
Colorado	4,301,261	3,560,005	165,063	44,241	95,213	4,621	309,931	122,187	735,601	3,202,880
New Mexico	1,819,046	1,214,253	34,343	173,483	19,255	1,503	309,882	66,327	765,386	813,495
Arizona	5,130,632	3,873,611	158,873	255,879	92,236	6,733	596,774	146,526	1,295,617	3,274,258
Utah	2,233,169	1,992,975	17,657	29,684	37,108	15,145	93,405	47,195	201,559	1,904,265
Nevada	1,998,257	1,501,886	135,477	26,420	90,266	8,426	159,354	76,428	393,970	1,303,001
Pacific	45,025,637	28,682,141	2,553,601	573,436	4,650,182	265,738	6,081,140	2,219,399	11,796,930	24,027,775
Washington	5,894,121	4,821,823	190,267	93,301	322,335	23,953	228,923	213,519	441,509	4,652,490
Oregon	3,421,399	2,961,623	55,662	45,211	101,350	7,976	144,832	104,745	275,314	2,857,616
California	33,871,648	20,170,059	2,263,882	333,346	3,697,513	116,961	5,682,241	1,607,646	10,966,556	15,816,790
Alaska	626,932	434,534	21,787	98,043	25,116	3,309	9,997	34,146	25,852	423,788
Hawaii	1,211,537	294,102	22,003	3,535	503,868	113,539	15,147	259,343	87,699	277,091
PUERTO RICO	3,808,610	3,064,862	302,933	13,336	7,960	1,093	260,011	158,415	3,762,746	33,966

Source: U.S. Census Bureau, Census 2000 Redistricting Data (P.L. 94-171) Summary File for states and Census 2000 Redistricting Summary File for Puerto Rico, Tables PL1 and PL2.

SECTION 7

Remodeling

Expenditures for Maintenance and Repairs and Improvements

Seasonally Adjusted Annual Rate in Millions of Dollars

	TOTAL EXPENDITURES	MAINTENANCE AND REPAIRS	TOTAL IMPROVEMENTS	ADDITIONS AND ALTERATIONS	MAJOR REPLACEMENTS
1975					
First Quarter	$ 22,600	$ 9,100	$13,500	$ 9,900	$ 3,600
Second Quarter	24,700	9,100	15,600	10,800	4,800
Third Quarter	25,800	9,600	16,100	11,600	4,500
Fourth Quarter	27,500	11,200	16,200	11,400	4,800
1980					
First Quarter	48,100	15,800	32,300	21,800	10,500
Second Quarter	44,700	15,100	29,600	20,200	9,400
Third Quarter	45,900	15,000	31,000	21,300	9,700
Fourth Quarter	47,100	15,100	32,000	22,100	9,900
1985					
First Quarter	79,200	33,900	45,400	29,700	15,600
Second Quarter	79,500	39,200	40,200	26,000	14,200
Third Quarter	76,300	33,200	43,100	28,400	14,600
Fourth Quarter	94,400	39,200	55,200	33,700	21,500
1990					
First Quarter	120,900	52,900	67,900	44,200	23,800
Second Quarter	113,600	55,700	57,900	40,100	17,900
Third Quarter	112,800	55,400	57,400	38,800	18,700
Fourth Quarter	115,800	58,500	57,300	37,900	19,400
1995					
First Quarter	131,200	49,100	82,100	55,300	26,800
Second Quarter	133,200	48,700	84,500	56,200	28,300
Third Quarter	127,900	48,800	79,100	48,300	30,900
Fourth Quarter	107,200	41,600	65,600	44,300	21,200

Expenditures by Type of Job, Owner-Occupied Properties: 1993 to 2002

(Millions of dollars. Components may not add to totals due to rounding)

	1993	1995	1997	1999	2001	2002
Total expenditures	$79,800	$83,911	$93,962	$99,281	$109,642	$121,507
Additions	14,909	9,784	12,057	10,773	11,638	17,778
Decks and porches	1,890	2,466	2,911	2,407	1,305	3,239
Attached garages	2,332	2,227	472	544	1,189	1,499
Rooms	10,688	5,092	8,674	7,822	9,144	13,040
Alterations	20,209	20,022	26,566	33,678	37,016	39,355
Plumbing	892	919	1,587	1,297	1,140	892
HVAC	972	1,229	1,952	2,127	1,602	1,681
Electrical	537	495	556	628	482	678
Flooring	1,823	1,970	2,573	2,999	5,209	5,052
Kitchen remodeling	2,769	2,781	5,064	4,823	2,714	6,608
Bathroom remodeling	1,593	1,532	3,281	2,498	2,425	4,492
Kitchen and bathroom remodeling	641	600	171	180	2,745	2,124
Finishing space	1,122	1,172	1,216	1,284	1,696	2,956
Interior restructuring	1,456	2,363	3,639	3,151	8,451	3,588
Siding	994	369	1,164	1,328	384	566
Windows and doors	863	320	620	756	100	223
Other alterations	6,547	6,271	4,741	12,606	10,069	10,493
Outside Additions and Alterations	7,402	8,824	9,805	11,351	13,307	15,383
Detached buildings	587	1,492	3,235	1,464	1,912	1,402
Patios and terraces	529	495	1,357	794	1,495	1,090
Driveways and walkways	885	866	1,240	1,292	1,058	2,631
Fences	1,475	1,441	1,564	2,079	1,817	2,186
Other outside additions and alterations	3,925	4,530	2,409	5,723	7,025	8,075
Major Replacements	14,749	18,086	18,206	19,229	23,063	25,339
Plumbing	1,684	2,029	1,555	1,334	1,202	1,557
HVAC	3,684	5,307	4,603	3,120	4,892	4,314
Siding	1,190	1,110	1,105	1,972	1,764	1,684
Roofing	3,060	3,732	5,450	5,375	5,221	5,974
Driveways and walkways	774	435	551	990	1,033	890
Windows	1,871	2,436	2,959	3,291	3,892	3,861
Doors	975	846	1,008	1,188	1,364	1,354
Other major replacements	1,510	2,189	975	1,958	3,695	5,705

D. Western Wood Products Association
Fall Forecast

WWPA Fall Forecast 2004-2006

Western Wood Products Association 522 SW Fifth Avenue, Suite 500, Portland, OR 97204-2122 503-224-3930

October 26, 2004

A stronger than expected U.S. economy in 2004 will push lumber consumption to historic highs. While economic activity will slow into 2005, housing and lumber demand will decline only moderately and pick up again in 2006. Offshore lumber imports should continue to climb, but Western mills should be able to hold their own in 2005 and 2006.

U.S. Economic & Housing Outlook

U.S. ECONOMY IN PIVOTAL POSITION

The U.S. represents 30 percent of the world's GDP and is the largest importing country in the world. Thus, if the U.S. economy coughs, the rest of the world catches a cold. To avoid a return to global economic weakness, energy prices must moderate and the U.S. economy has to fire on all cylinders.

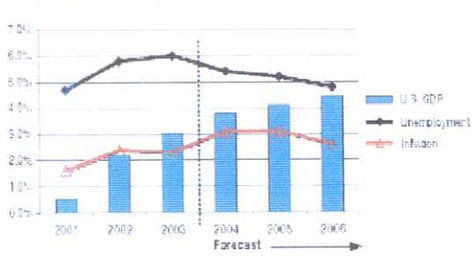
Many forecasts are calling for slower growth in 2005 and 2006. By contrast, WWPA forecast calls for moderate growth in the U.S. this year and next, with further expansion in 2006.

FALSE SPRING

Aided by federal tax cuts and low interest rates, quarterly consumer spending (two-thirds of U.S. GDP) rose 3.3 percent on average from 2001 through 2003, helping the U.S. economy climb out of a mild recession. Aided by consumers' spendthrift ways, gross domestic product rose to 3 percent in 2003.

By the second quarter of 2004, however, consumer spending moderated as people began paying off high consumer debt in anticipation of higher rates. Savings rates are still near all-time lows and should inch higher. Expect uneven consumer spending until mid-year 2005.

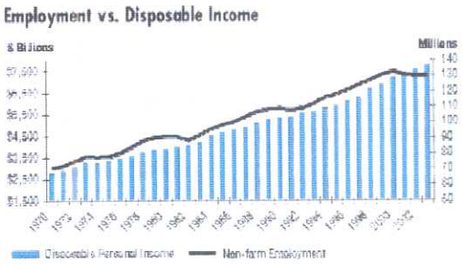
Forecast Fundamentals



IT'S ALL ABOUT JOBS

Consumer spending won't heat up again until real gains are seen in personal income. Since 1970, growth in personal income has averaged 1.7 percent during periods of no job growth. During times of expanding employment, real growth in personal income averaged 3.8 percent.

Employment vs. Disposable Income



New jobs in September 2004 totaled an estimated 96,000, which did not keep pace with the number of new entrants into the civilian workforce due to immigration and demographics. The upbeat forecast for 2006 hinges on an estimated 200,000 jobs created per month during the second half of 2005.

HIGHER PROFITS, INCREASED INVESTMENTS

On average, increased business investment added more than a percentage point to U.S. economic growth from 1993 to 2000.

In the face of the 2001 recession and the weak growth that followed, businesses trimmed spending and jobs.

Although profits have steadily grown since the last quarter of 2002, business investment has lagged. Purchases of equipment and software have trended higher since the beginning of 2003. However, with office and industrial building vacancy rates failing to drop significantly, investment in new nonresidential buildings has remained weak. Expect a modest increase in

spending on structures, gaining momentum as the economy gathers steam in mid-2005.

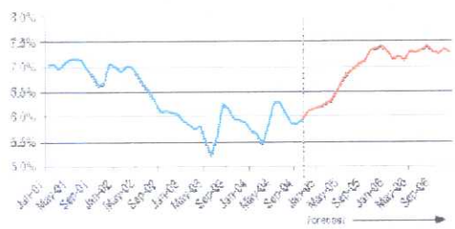
Business Profits vs. Business Investment

Increased business investment, combined with job growth and steadier consumer spending, should provide a good boost to the U.S. economy, particularly in 2006. Because higher prices seen early in the year were predominantly energy driven, lower energy prices coupled with modest interest rate increases should keep inflation at bay through 2006.

U.S. HOUSING MARKETS

Conventional housing construction and existing home sales boomed through the recession of 2001, gathering strength into 2004. Although low interest rates were key in keeping home buying affordable during this period, personal income growth and general economic health are longer term indicators of the housing sector's health.

30-year Fixed Mortgage Rate



Interest rates are expected to rise slowly in 2005, with 30-year fixed mortgage rates easing past 7 percent by midyear.

2004-2006 U.S. Housing

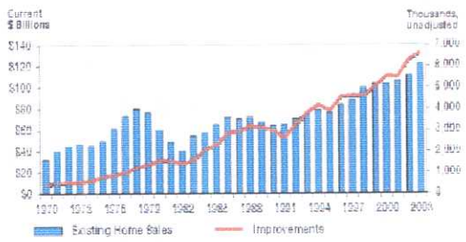
thousands	2004	2005	2006
Single family	1,574	1,465	1,515
Multi-family	343	338	345
Total	1,917	1,803	1,860
Manufactured housing	135	140	140

Higher rates are expected to dampen home buying and remodeling more than home building, with existing home sales off 8 percent and 2 percent in 2005 and 2006, respectively. Meanwhile, new home construction should fade in the second half of 2005, rekindling by the spring of 2006 due to improved economic conditions.

REPAIR AND REMODELING

Repair and remodeling of existing homes is the second leading lumber market in the U.S. Ninety percent of lumber used in the R&R market is used in improvements. Expenditures for improvements track with existing home sales. Since home sales are expected to decline in 2005 and 2006, record R&R lumber consumption of nearly 19 billion board feet in 2004 should be followed by an 8 percent decline in 2005 and a smaller decline of 4 percent in 2006.

Home Sales vs. Home Improvement Expenditures



INDUSTRIAL, OTHER MARKETS

Industrial/Other lumber use (not related to construction end-use markets) is expected to top 9 billion feet in 2004 and climb modestly over the next two years due to an increase in manufacturing and trade. Lumber use in nonresidential construction is forecast to increase over the forecast period as investment in new commercial buildings gains momentum, particularly in 2006.

U.S. Lumber Demand

Million Board Feet	2003	2004	2005	2006
New Construction	24,366	25,568	23,861	24,624
Repair and Remodeling	17,988	18,930	17,395	16,724
Non-Residential	5,956	6,184	6,544	6,849
Industrial and Other	8,683	9,056	9,437	9,691
Total Demand	56,993	59,738	57,237	57,888

Lumber Supply by Region

B.C. – A TALE OF TWO REGIONS

The lumber industry in British Columbia is increasingly split between the Coast and Inland regions of the province, with each area seeing unique challenges and opportunities.

Increased sawmill productivity combined with an expanding supply of beetle-killed timber has lumber production in Interior B.C. headed for a record 13 billion board feet in 2004. An expected 4 percent decline in U.S. lumber consumption in 2005 should have only a modest impact on Interior B.C. mills. Interior production is forecast to drop 0.8 percent in 2005 and rise slightly more than 1 percent in 2006.

B.C. Production

Million Board Feet	2003	2004	2005	2006
Interior	12,552	13,150	13,050	13,200
Coast	2,458	2,400	2,250	2,285
Total B.C.	15,010	15,550	15,300	15,485

Meanwhile, the Coast B.C. industry is in the midst of rationalization – closing inefficient mills while at the same time reducing production of Hemlock. Coast B.C. production is expected to decline 2 percent to 2.4 billion board feet in 2004 and move lower yet over the next two years.

EASTERN ADVANTAGE FADES

Between 1995 (the last year before the quota) and 2002 (the first full year after its demise), Canadian production east of the Rockies rose 54 percent. U.S. imports from that region peaked at 9.8 billion board feet in 2000, a 31 percent increase compared to 1995.

Production East of the Rockies

Million Board Feet	2003	2004	2005	2006
Quebec	7,487	7,614	7,217	7,290
Ontario	3,563	3,438	3,208	3,224
Prairies	3,872	4,243	4,094	4,151
Maritimes	2,255	2,311	2,207	2,229
Total	17,177	17,607	16,727	16,894

After expanding its capacity during the late 1990s, Quebec saw production reach 8.1 billion board feet in 2002. Maritimes production climbed to 2.4 billion board feet. Despite the then-record U.S. consumption, production in the Eastern provinces (Ontario, Quebec, New Brunswick, Nova Scotia) faltered in 2003, dropping 7 percent. U.S. duties on Canadian imports had some impact, but growing evidence suggests timber availability is getting stretched in the Eastern provinces.

With U.S. lumber markets red hot through three quarters of 2004, Canadian imports shot up 8 percent but production in the Eastern provinces was muted, up less than 1 percent year-to-date through July. By contrast, production in the Prairie provinces (Alberta, Saskatchewan and Manitoba) posted year-to-date increases of 10 percent. Production in the Eastern provinces has likely topped out and is expected to decline in 2005 and 2006.

CANADIAN IMPORTS, TIMBER SUPPLY

Timber supply constraints in the Eastern provinces will likely restrict market share and force exports to the U.S. down over the forecast period. By contrast, Interior B.C. is expected to gain share in the U.S. market while Coast B.C. will see its share decline. Imports from Prairie provinces are expected to track with U.S. consumption.

Canadian Imports

Million Board Feet	2003	2004	2005	2006
B.C.	10,258	10,733	10,562	10,673
Prairies & East	9,108	9,691	9,206	9,372
Total Canada	19,366	20,424	19,768	20,045

SOUTH PACES U.S. PRODUCTION

The South has been called the new "timber basket of North America" and the region's response to favorable lumber markets in 2004 support that claim. But record Southern production, combined with healthy lumber price increases, hasn't translated into record timber prices in the region.

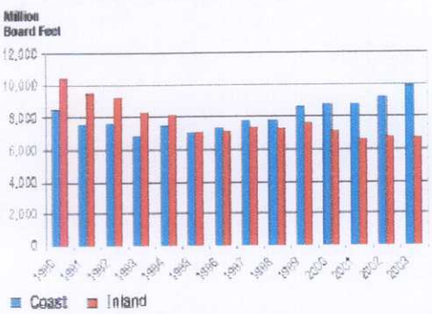
Timber Mart-South reports second quarter 2004 Southern Yellow Pine sawtimber prices (the latest report available) nearly flat since the second quarter of 2002. State forestry departments report modestly higher prices (up approximately $2 per ton or $8-10/MBF, Scribner) in July-August 2004 compared to May-June.

Southern production is expected to exceed 17.5 billion board feet for 2004, drop 3 percent next year and then climb back over 17 billion board feet in 2006.

INLAND WEST: WORST IS OVER

Over the past decade, lumber production in the Inland region has been cut nearly in half due to drastic reductions in federal timber sales. By 2003, national forests supplied less than 12 percent of the logs used by Inland sawmills compared to 53 percent in 1990.

Inland Production vs. Coast Production



In the past two years, the dramatic reduction of Inland sawmill capacity has slowed. Although additional Inland mill closures are expected, other mills are retooling and becoming more competitive. Meanwhile, Inland mills report a better log supply. The outlook for Inland sawmills is for modest declines in market share through 2006.

COAST CONTINUES TO RISE

In contrast to the Inland region, Coast mills have enjoyed increased log availability since the mid-1990s. There have been steep declines in log exports and increasing log imports. Private timberlands – long the primary source of logs for Coast sawmills – continue to increase productivity. State timberlands have been more resilient and haven't experienced the same timber sale reductions as federal lands. The state of Washington in particular is working to increase timberland revenues of DNR lands.

U.S. Production

Million Board Feet	2003	2004	2005	2006
Inland	6,717	6,775	6,500	6,523
Coast	9,904	10,500	10,298	10,381
California Redwood	976	995	864	865
South	16,858	17,512	16,985	17,084
Other U.S.	2,153	2,200	1,924	1,950
Total	36,608	37,982	36,571	36,803

Better log supply coupled with capacity increases should allow the Coast region to gain market share over the forecast period.

OFFSHORE IMPORTS CLIMB

Lumber imports from countries other than Canada are expected to top 2 billion board feet in 2004, up 17 percent. Leading the way is European imports, expected to increase shipments to U.S. markets by 28 percent to 1.2 billion board feet this year. Latin American imports will be up by at least 17 percent and top 800 million board feet.

U.S. Lumber Imports

Million Board Feet	2003	2004	2005	2006
Canada	19,366	20,424	19,768	20,045
Europe	904	1,160	968	1,044
Latin America	712	835	754	821
New Zealand/Other	227	170	185	190
Total	21,209	22,589	21,675	22,100

Both Europe and Latin America consider the U.S. an important market today. Look for offshore imports to gain market share in 2005 and 2006 even as U.S. lumber consumption softens cyclically.

EXPORTS IN THE DOLDRUMS

After the brief rebound in 2003, U.S. lumber exports continued their decline in 2004 and are expected finish 13 percent lower for the year. Due to a modestly weaker dollar and lower domestic prices, exports should see mild increases in 2005 and 2006.

U.S. Lumber Exports

Million Board Feet	2003	2004	2005	2006
Japan	113	102	115	112
Canada	217	225	230	225
Mexico	294	189	197	205
Other	323	310	319	330
Total	947	826	861	872

E. Western Wood Products Association Statistics

ESTIMATED U.S. SOFTWOOD LUMBER CONSUMPTION

By Markets and Principal Sources 1994 — 2002

Million Board Feet

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Markets (Demand):									
Residential Construction	18,997	17,864	19,095	19,158	20,642	22,122	20,596	21,248	22,652
Repair & Remodeling	14,254	14,296	14,890	15,148	14,675	15,113	16,420	16,188	17,937
Non-Residential Construction	6,238	6,696	6,883	7,541	7,790	7,634	7,713	7,608	6,851
Materials Handling	4,110	4,309	4,436	4,695	4,771	4,943	5,085	4,879	4,844
All Other	4,054	4,133	4,174	4,328	4,331	4,451	4,126	4,006	3,780
Total	**47,653**	**47,298**	**49,478**	**50,870**	**52,209**	**54,263**	**53,940**	**53,929**	**56,064**
Sources (Supply):									
Coast Region	6,610	6,399	6,650	7,039	7,527	8,071	8,310	8,503	8,994
Inland Region	7,656	6,314	6,631	6,762	7,027	7,260	6,732	6,380	6,579
California Redwood Region	1,424	1,179	1,281	1,441	1,367	1,323	1,216	1,123	1,052
Southern Pine Region	14,618	14,384	14,991	15,887	15,673	16,427	16,253	15,880	16,411
Other U.S.	965	1,627	1,711	1,737	1,928	2,004	1,980	1,968	2,048
Total	**31,273**	**29,903**	**31,264**	**32,866**	**33,522**	**35,085**	**34,491**	**33,854**	**35,084**
Imports	16,380	17,395	18,214	18,004	18,687	19,178	19,449	20,075	20,980
Total	**47,653**	**47,298**	**49,478**	**50,870**	**52,209**	**54,263**	**53,940**	**53,929**	**56,064**

Residential Construction: Single-family; low rise and high-rise multi-family; and mobile homes.

Non-residential Construction: Commercial, industrial, public and other buildings; public utilities; sewer and water systems; highway construction; conservation and development projects; and non-residential farm construction.

Repair & Remodeling: Residential and non-residential.

Materials Handling: Boxes, crates and packaging; wooden pallets; and dunnage.

All Other: Railroads and mining, products made for sale, including furniture; and miscellaneous uses not included elsewhere.

Imports: Softwood lumber, softwood siding and flooring.

Columns may not add to total due to rounding.

PRIVATE HOUSING STARTS
and
MANUFACTURED HOME SHIPMENTS
By Region and Type of Structure 1994 — 2002
Thousands of Units

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Single-Family Starts									
Northeast	123	102	112	111	122	126	118	111	118
Midwest	268	234	254	238	273	289	260	269	277
South	522	485	524	507	574	579	556	590	628
West	286	256	271	278	303	308	297	303	336
	1,198	**1,076**	**1,161**	**1,134**	**1,271**	**1,302**	**1,231**	**1,273**	**1,359**
Multi-Family Starts									
Northeast	15	16	20	26	27	30	37	38	40
Midwest	61	56	68	66	57	58	57	62	73
South	117	130	138	163	169	167	158	142	154
West	65	75	90	85	92	84	86	88	80
	259	**278**	**316**	**340**	**346**	**339**	**338**	**330**	**346**
Total Housing Starts									
Northeast	138	118	132	137	149	156	155	149	158
Midwest	329	290	322	304	330	347	317	331	350
South	639	615	662	670	743	746	714	732	782
West	351	331	361	363	395	392	383	391	416
	1,457	**1,354**	**1,477**	**1,474**	**1,617**	**1,641**	**1,569**	**1,603**	**1,705**
Manufactured Home Shipments	**304**	**340**	**363**	**354**	**373**	**348**	**251**	**193**	**169**
Total New Housing	**1,761**	**1,694**	**1,840**	**1,828**	**1,990**	**1,989**	**1,820**	**1,796**	**1,874**

MANUFACTURED HOME PLACEMENTS
By Region 1994 — 2002
Thousands of Units

	1994	1995	1996	1997	1998	1999	2000	2001*	2002
Mobile Home Placements									
Northeast	16	15	16	14	15	14	15	12	12
Midwest	53	57	59	55	58	52	50	38	33
South	178	203	218	220	250	229	178	116	100
West	44	44	45	47	51	43	38	30	27
Total	**291**	**319**	**338**	**336**	**374**	**338**	**281**	**196**	**172**

* Census Bureau Revisions.
Housing data: U.S. Census Bureau
Columns may not add to total due to rounding.

F. U.S. Population Distribution

Population Distribution

State	Jul-03 pop.	Percent	Pop. rank, 2003
Alabama	4,500,752		23
Alaska	648,818		47
Arizona	5,580,811		18
Arkansas	2,725,714		32
California	35,484,453		1
Colorado	4,550,688		22
Connecticut	3,483,372		29
Delaware	817,491		45
DC	563,384		50
Florida	17,019,068		4
Georgia	8,684,715		9
Hawaii	1,257,608	0.43%	42
Idaho	1,366,332		39
Illinois	12,653,544		5
Indiana	6,195,643		14
Iowa	2,944,062		30
Kansas	2,723,507		33
Kentucky	4,117,827		26
Louisiana	4,496,334		24
Maine	1,305,728		40
Maryland	5,508,909		19
Massachusetts	6,433,422		13
Michigan	10,079,985		8
Minnesota	5,059,375		21
Mississippi	2,881,281		31
Missouri	5,704,484		17
Montana	917,621		44
Nebraska	1,739,291		38
Nevada	2,241,154		35
New Hampshire	1,287,687		41
New Jersey	8,638,396		10
New Mexico	1,874,614		36
New York	19,190,115		3
North Carolina	8,407,248		11
North Dakota	633,837		48
Ohio	11,435,798		7
Oklahoma	3,511,532		28
Oregon	3,559,596		27
Pennsylvania	12,365,455		6
Rhode Island	1,076,164		43
South Carolina	4,147,152		25
South Dakota	764,309		46
Tennessee	5,841,748		16
Texas	22,118,509		2
Utah	2,351,467		34
Vermont	619,107		49
Virginia	7,386,330		12
Washington	6,131,445		15
West Virginia	1,810,354		37
Wisconsin	5,472,299		20
Wyoming	501,242		51
Total U.S.	**290,809,777**		—