

# Grading Urban Hardwood Lumber

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UC Berkeley Center for Forestry  
Wood Resources Group

California Urban Forests Council  
Annual Meeting  
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# Wood Resources Group

**Public outreach and education** Workshops, fact-sheets and publications:

- ▶ Wood bioenergy public benefits.
- ▶ Wood properties and processing.
- ▶ Bioenergy conversion technologies.
- ▶ GHG balance from wood bioenergy.
- ▶ Harvesting and transportation cost and logistics.

**Technical assistance** Businesses and community organizations.

- ▶ Project development
- ▶ Technology due diligence

**Research** Forest bioenergy systems

- ▶ Evaluate potential for small scale distributed gasification + electricity generation
- ▶ Investigate maximum potential for carbon sequestration from CA forests

# Resource Library: Hardwood Properties

## Hardwood Handbook

- ▶ Drying
- ▶ Properties
- ▶ Milling
- ▶ Stacking and Loading
- ▶ Quality Control

## Sudden Oak Death

- ▶ Processing tanoak (*Notholithocarpus densiflorus*)
- ▶ Heat treatment

## California Hardwoods Video

University of California, Division of Agriculture and Natural Resources  
**Woody Biomass Utilization**

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### Hardwood Properties

**The California Hardwood Resource**

It surprises many to learn that California has a hardwood resource. California, one of the nation's most forested states, is well known for its majestic coastal redwood and giant sequoia softwood species. It is also one of the nation's leading producers of commercial lumber including Douglas-fir, white fir, ponderosa pine, and many other softwood species. In addition, the California forests are home to about 25 billion cubic feet of hardwoods, half a fourth of the total forest tree volume in the state. These hardwood trees – generally California black oak, Oregon white oak, tanoak, madrone, and the live oaks of the coastal regions, inland valleys and foothills – are found in the vast forests and rangelands of the state. Add to this a sizable stock of both indigenous and exotic trees in urban areas and it becomes difficult to ignore the California hardwood resource.

As California is also the nation's leading consumer of hardwood lumber and products it would logically follow that it is also a leading producer of hardwood lumber. But that is not the case. Of the 100 million board feet of hardwood lumber used in California each year only about 5% is produced locally from the California resource.

UC Forest Products Laboratory projects include evaluation and utilization of wood from trees killed by [Sudden Oak Death \(SOD\)](#) and the [Hardwood Handbook](#). Check out the [California Hardwoods Video](#) for an introduction to some of the issues regarding utilization of California grown hardwoods. Reports and presentations are available for download below. They summarize projects that dealt with examining the potential for more hardwood processing in California and providing recommendations on milling and drying to produce high quality hardwood products.

**Oak Woodland as a Forestal Resource** Summary: An examination of oak woodlands as a potential resource for higher value wood production. Dr. John R. Sively, 1/02

**Understanding California Hardwoods** Summary: Discussion of the important physical, mechanical and processing properties of some common California hardwood species. Includes information on wood drying principles and practice and a discussion of wood-boring insects sometimes encountered by the Dr. John R. Sively, October 17, 2001

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▶ WebGuide  
▶ Wood Properties  
▶ **Hardwood Properties**  
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Red gum monoliths  
High quality hardwood ash logs  
Sizing of logs using Logco mobile sawmill

# What are grades?

Lumber grades establish a **hierarchy of quality** for a general application based on a set of **standards**.



# Why grade lumber?

**Primary Function** Establish a **fungible** product. Transactions can be conducted without visual inspection of the product with confidence that the product meets established quality standards.

**Secondary (not necessarily) Marketing.** Proprietary grades can be used to differentiate products in a crowded market.

**Also...** Typically **required** in permitted structural applications

# Standards vs. grades

**Standards** Establish performance characteristics

- ▶ American Lumber Standards Committee (ALSC) ensures impartial/unbiased grading

**Grades** Establish a hierarchy of quality based on standards

- ▶ Many organizations develop grades, some more widely used than others. Typically grades reference ALSC standard
- ▶ Sets thresholds for:
  - ▶ Moisture content
  - ▶ Measurement and Tally
  - ▶ Lumber dimensions
  - ▶ Marking
  - ▶ Visual characteristics (knots, wane, warp)

# Grading Softwoods vs Hardwoods

## Softwoods Whole board

- ▶ Structural applications, strength properties
- ▶ **Necessary** but not required for sale into commodity lumber markets

## Hardwood Usable content

- ▶ Visual/aesthetic applications: knots, grain, wane, warp

# Hardwood Grades

National Hardwood Lumber Association (<http://www.nhla.com/>)

**Factory lumber** Intended for remanufacturing. Grades based on the number and quality of pieces that can be cut from the board of a minimum size. Milled to within dimension ranges specified by grade. *Examples: kiln-dried, unfinished lumber*

**Dimension and component parts** Intended for little or no remanufacturing. Machined to specific dimensions. *Examples: flat stock, rough squares*

**Finished market products** Machined for final use. *Examples: Flooring, architectural millwork*



# Factory grades

**FAS**(Firsts and Seconds), **F1F** (FAS one side)

- FAS**
- ▶ Minimum board size 6 in × 8 ft
  - ▶ >83% clearwood cutting not smaller than 3 in × 7 ft or 4 in × 5 ft
  - ▶ Both sides

**F1F** Same as FAS on 1 side, other side must meet #1 Common

**Selects** Same as F1F but minimum board size is 4 in × 6 ft

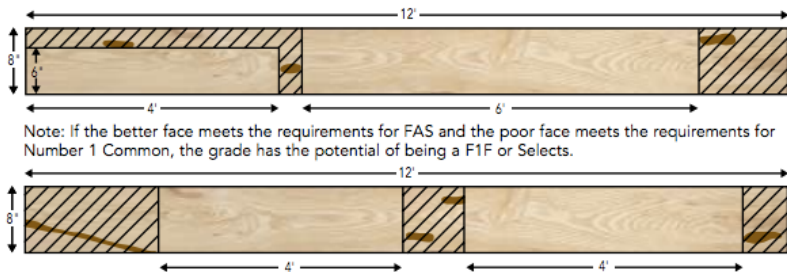


Note: Minimum yield 83% clear wood cuttings on the poor face of the board.



# Factory grades

- No. 1C “Cabinet”
- ▶ Minimum board size 3 in × 4 ft
  - ▶ >66% >83% clearwood cutting not smaller than 3 in × 3 ft or 4 in × 2 ft
  - ▶ Both sides same



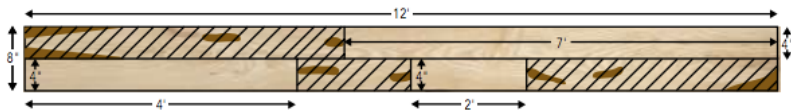
American Hardwood Export Council (aehc.org)

Source:

# Factory grades

No. 2C “Economy” Same as FAS on 1 side, other side must meet #1 Common

- ▶ Minimum board size 3 in × 4 ft
- ▶ >50% >66% clearwood cutting not smaller than 3 in × 3 ft or 3 in × 2 ft
- ▶ If best side is 2C, other side can be any.



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.

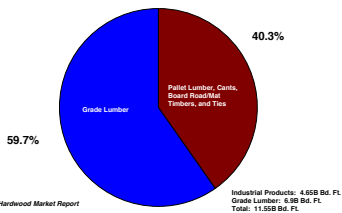
# Hardwood Consumption by Market Sector

Estimates of Consumption of US Hardwoods											
© 2013 Hardwood Market Report											
	2005	2006	2007	2008	2009	2010	2011	2012	2013	% Change 2012	% Change 2005
<b>Pallets</b>	3.8	3.7	3.6	3.5	3.0	3.2	3.26	3.27	3.572	9.2%	-6.0%
<b>Furniture</b>	1.2	1.1	1.0	0.7	0.3	0.35	0.29	0.30	0.372	24.0%	-69.0%
<b>Exports</b>	1.3	1.3	1.2	0.9	0.8	1.07	1.2	1.32	1.436	8.8%	10.5%
<b>Millwork</b>	1.3	1.2	1.0	0.7	0.4	0.43	0.24	0.26	0.314	20.8%	-75.9%
<b>Cabinets</b>	1.6	1.5	1.3	1.2	0.7	0.4	0.34	0.36	0.388	7.8%	-75.8%
<b>Flooring</b>	1.5	1.4	1.3	0.8	0.5	0.59	0.51	0.55	0.636	15.6%	-57.6%
<b>Railway Ties</b>	0.85	0.96	0.92	0.94	0.89	0.89	0.98	1.04	1.007	-3.2%	18.5%
<b>Board Road/Mat Timbers</b>	N/A	N/A	N/A	0.2	0.05	0.075	0.12	0.16	0.248	55.0%	NA
<b>Total Estimated Consumption</b>	<b>11.55</b>	<b>11.16</b>	<b>10.32</b>	<b>8.94</b>	<b>6.64</b>	<b>7.01</b>	<b>6.94</b>	<b>7.26</b>	<b>7.97</b>	<b>9.8%</b>	<b>-37.1%</b>

Billion Board feet

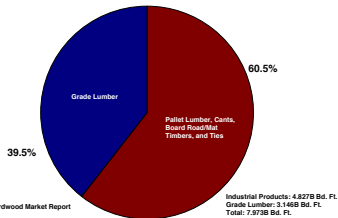
# Graded Hardwood Consumption Trends

Hardwood Consumption 2005



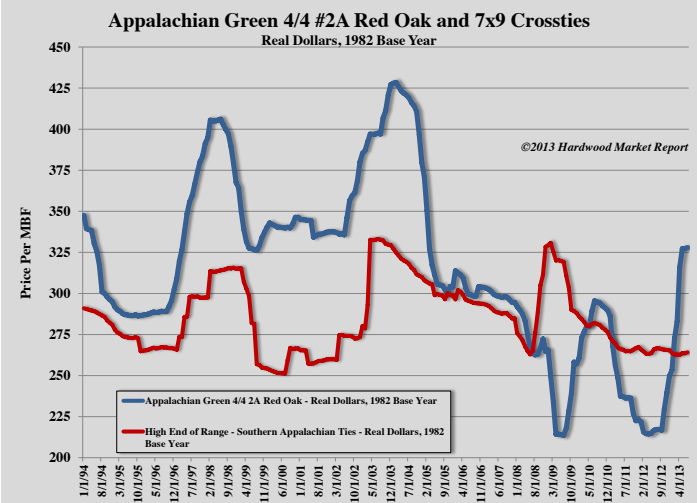
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2013 Hardwood Consumption



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# Hardwood Prices



# Urban Wood Cost

Expensive!



# Grading Urban Hardwoods



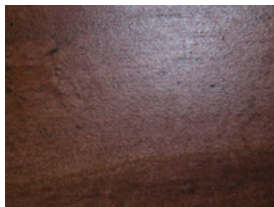


# Why grade urban hardwood lumber?

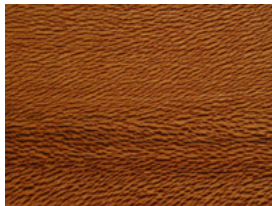
**Communicating** with buyers. Basis for conveying **familiar** quality standards.

**but...**

may be missing the point



Black walnut



Sycamore



Cherry

All the same grade...

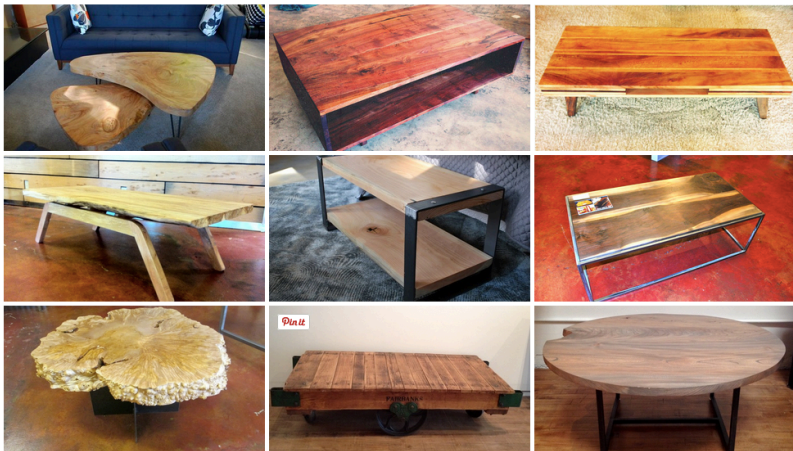
# Marketing vs Grading

For **unique** woods (origin, aesthetic, quality), **grade** should not be a substitute for **a story**

Stories can be built around:

- ▶ History
- ▶ Figure
- ▶ Color, grain
- ▶ Provenance (geographic origin)
- ▶ Cultural/personal meaning

# Urban wood application



Source: Urban Lumber Co. ([www.urbanlumber.co](http://www.urbanlumber.co))

## In summary

- ▶ Grading can be useful selling sight-unseen into commodity markets
- ▶ Useful to generally know grading rules
- ▶ Won't help differentiate the wood based on uniqueness/distinctiveness

# Questions?

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