MY CHARGE & BASIC QUESTIONS

- So, What’s in a Barrel?
- Why are there so many oak species in Missouri?
- How do oaks establish?
- Which oaks are found in Missouri?
- Describe the growth of Missouri oaks.
- Describe aspects of the Missouri Wood Products Industry.
FLAVORS DERIVED FROM THE OAK & FLAVORS FROM THE TOAST
From World cooperage Flavor Wheel

- Earthy
- Smoky
- Herbaceous
- Nutty
- Fruit
- Creamy
- Sweet
- Spicy
- Woody
- Roasted
- Astringent
# FLAVORS FROM THE OAK & TOAST

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| Tanic          | Walnut        | butter          |              |              |               |              |             |

| Bitter         | Hazelnut      | Lactic          |              |              |               |              |             |
Welcome to Missouri: A brief tour

- Location
- Geography
- Climate
- Familiar Places
This map is a plot of 1961-1990 annual average precipitation contours from NOAA Cooperative stations and (where appropriate) NRCS SNOTEL stations. Christopher Daly used the PRISM model to generate the gridded estimates from which this map was derived; the modeled grid was approximately 4x4 km latitude/longitude, and was resampled to 2x2 km using a Gaussian filter. Mapping was performed by Jenny Weisburg. Funding was provided by NRCS Water and Climate Center.
Forest Inventory-- plots with white oak
Historical Perspective – 56 Years
Millions of Acres of Timberland (2003 data set)
Ownership of Missouri’s Timberland

Ownership of Missouri Timber Land

- 11,813,688 (83%) Privately Owned
- 265,380 (2%) Other Federal Land
- 1,391,824 (10%) State & Local Government Land
- 717,094 (5%) Mark Twain National Forest

Legend:
- Blue: Mark Twain National Forest
- Red: Other Federal Land
- Light Grey: State & Local Government Land
- Dark Grey: Privately Owned
Area of Forest Types

Acreage of Missouri 2003 Forest Tree Groups

- Oak - Hickory: 11,466,300 acres
- Shortleaf Pine - Oak: 1,085,500 acres
- Shortleaf Pine: 66,000 acres
- Eastern Redcedar: 500 acres
- Elm - Ash - Cottonwood: 939,60 acres
- Maple - Basswood: 54,000 acres
- Oak - Gum - Cypress: 94,700 acres

Acres:
- 0
- 2,000,000
- 4,000,000
- 6,000,000
- 8,000,000
- 10,000,000
- 12,000,000
CURRENT RIVER OAK-PINE HILLS LTA
UPLAND ECOLOGICAL MANAGEMENT GROUPS & ELT-Ps

**Note: At Peck Ranch, some low slopes are in Lower Gasconade with Alfic ELTs**

- Mixed Oak-Pine/Desmodium, Vaccinium
  - Dry-mesic Alfic Forest

- Pine-Oak/Vaccinium
  - Dry Ulltic Woodland

- Pine-Oak/Vaccinium Complex

- Dolomite Glade/Woodland

- Roubidoux

- Upper Gasconade

- Upper Gasconade (Some Lower Gasconade at Peck R.)

- Cryptozoan Reefs

- Mixed Oak-Hickory/Dogwood
  - Dry-mesic Ulltic Forest

- Oak-Hardwood/Spicebush
  - Mesic Dolomite Forest

- Pine-Oak/Vaccinium
  - Dry Ulltic Woodland

- 2.1 (2.2)

- 3.1

- 3.2/5.2

- 2.4

- 4.1

- 2.1

- 1.1 & 1.2

- 7.1 to 7.3

- 2.3

- 8.1

- 4.2/6.2

- 2.3

- White (Red)Oak/Dogwood
  - Dry-mesic Alfic Forest
Timberland Area by Forest Type

Thousand Acres

- <1" TO 5" (OAK-HICKORY): 9.2%
- 5" TO 11" (OAK-HICKORY): 37.5%
- >11" (OAK-HICKORY): 53.3%

- <1" TO 5" (IDEAL): 30%
- 5" TO 11" (IDEAL): 30%
- >11" (IDEAL): 40%
Growing Stock Age Classes by Forest Type
Thousands of Cubic feet

- White Oak
- Black-Scarlet
- Post-Blackjack
- Pine-Oak
Oak Volume by log Grade
in Thousand Boardfeet

<table>
<thead>
<tr>
<th></th>
<th>White Oak</th>
<th>WO Group</th>
<th>Red Oaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>2.9%</td>
<td>40.4%</td>
<td>41.2%</td>
</tr>
<tr>
<td>#2</td>
<td>15.4%</td>
<td></td>
<td></td>
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<tr>
<td>#3</td>
<td>2698369</td>
<td>2745183</td>
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<tr>
<td>Tie &amp; Timber</td>
<td>1025055</td>
<td>194915</td>
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</tbody>
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- White Oak
- WO Group
- Red Oaks
Average Annual Growth on Growing Stock and Removals in Million Cubic Feet

- **White Oaks**: Growth on Growing Stock - 40.10, Removals - 74.60, Percent - 41.40
- **Red Oaks**: Growth on Growing Stock - 74.60, Removals - 41.40, Percent - 41.40
- **Other Spp.**: Growth on Growing Stock - 41.40, Removals - 41.40, Percent - 41.40

Legend:
- Green: Growth on Growing Stock
- Purple: Removals
- Orange: Percent
Sawlog Production 1990 to 1997
Thousand Board Feet

Veneer  Cooperage  Lumber  Total

2.3%, 3.8%, 4.3%
Missouri 2003 Harvest by Product Categories

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Cubic Feet</th>
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<tbody>
<tr>
<td>Sawlogs</td>
<td>111,716,000</td>
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<tr>
<td>Veneer Logs</td>
<td>1,318,000</td>
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<tr>
<td>Cooperage Logs</td>
<td>4,949,000</td>
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<tr>
<td>Handle logs</td>
<td>203,000</td>
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<tr>
<td>Cabin logs - sawn</td>
<td>45,000</td>
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<tr>
<td>Shavings</td>
<td>974,000</td>
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<tr>
<td>Mine Timbers</td>
<td>9,000</td>
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Product Category

Cubic Feet
Log Processing Mills 1946 to 1997
Missouri – Number of Mills

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<tr>
<th>Year</th>
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<th>Veneer</th>
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<tr>
<td>1946</td>
<td>85</td>
<td>6</td>
<td>19</td>
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<td>1969</td>
<td>36</td>
<td>4</td>
<td>7</td>
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<td>1997</td>
<td>8</td>
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Challenges

- Oak Decline – A Complex of vectors
- Gypsy Moth – A threat 15 to 20 years
- Many Forest Owners – 300,000
- Understanding Forests
Missouri’s forest has been subject to many changes: boreal forest, presence of glaciers, and now oak-hickory dominated, including 20 oak species, 8 are of the white oak group, 4 used in cooperage.

The oak-hickory forest type establishes through response to disturbance, natural or human induced.

Presently, approximately 14.61 million acres of commercial forest that is a part of the Central Hardwood Region and is a transition to the Great Plains and southern forest.

The aging Oak-Hickory forest type comprises 74% of the timberland, white oaks are estimated to account for 27% of the Oak-Hickory type and 25% of the timber volume.
Summary

- Approximately 83% of the forest is privately owned by over 300,000 owners.
- There is considerable competition for the upper grades of white oak logs. Cooperage captures 4% of the timber volume sold and 5% of the price paid for timber.
- Industry is adapting to technological change.
- Challenges: The oak decline complex, gypsy moth, number of forest owners, and the need to understand the forest is dynamic in response to change.
- Please remember: The forest is dynamic & continued orders for wood helps perpetuate a healthy, sustainable forest.
Length of Stave is tapered on jointer wheel to form bilge of barrel when assembled.

Edges of staves are tapered to fit snugly when barrel is assembled.
FINISHED BARRELS

- SHIPPED TO A DISTILLERY
- LOADED WITH BOURBON ONE TIME
- A WINE BARREL IS SHIPPED TO A WINERY AND LOADED WITH WINE MULTIPLE TIMES
- UPON RETIREMENT THE BARREL MAY BE RE-USED BY A SCOTCH DISTILLER UNTIL THE BARREL NO LONGER MEETS THE NEEDS OF THE BLENDER
FLAVORS DERIVED FROM THE OAK & FLAVORS FROM THE TOAST
From World cooperage Flavor Wheel

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SO, is it flavor or the power of suggestion?
IT IS A BENEFIT OF OUR DYNAMIC FORESTS