Economics of Wood Products
Speaker Background

- Pat Layton
  - Current position:
    - Director, Clemson Wood Utilization & Design Institute
    - Professor, Department of Forestry and Environmental Conservation, Clemson University
  - Credentials:
    - MS and PhD Forest Genetics
    - BS Forest Resource Management
    - Fellow, Society of American Foresters
  - Key experiences
    - 20 years at Clemson University as Professor, Chair and Director
    - 13 years in the pulp and paper industry
    - 4 years in biomass energy and 10 in learning wood products
Forest Change in the US South
Cheesman Lake 1900

Natural fire-dominated landscape

South Platte 2002

Prescribed fire/stocking issues

Office of the Colorado State Forester, 2003-4
Who Owns the Nation’s Forest

- Private entities own and manage 445 million acres
- Private corporate ownership - 147.4 million acres
- Private non-corporate ownership - 297.6 million acres
- More than 10 million private owners
- Highest % is family and individual – ave. 22 acres or less
- Private owners have differing goals for forest management
Area of Forest and Woodlands for Selected Regions, Types, Ownership and Origins – Who Plants Trees

<table>
<thead>
<tr>
<th>Forest-type group</th>
<th>All owners</th>
<th>National forest</th>
<th>Other public</th>
<th>Private corporate</th>
<th>Private non-corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Planted</td>
<td>Natural origin</td>
<td>Total</td>
<td>Planted</td>
</tr>
<tr>
<td>Thousand acres</td>
<td></td>
<td></td>
<td></td>
<td>Thousand</td>
<td></td>
</tr>
<tr>
<td>Longleaf-slash pine</td>
<td>12,999</td>
<td>7,250</td>
<td>5,799</td>
<td>1,192</td>
<td>258</td>
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<tr>
<td>Loblolly-shortleaf</td>
<td>83,904</td>
<td>34,202</td>
<td>29,702</td>
<td>3,309</td>
<td>514</td>
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<tr>
<td>South total</td>
<td>245,513</td>
<td>48,836</td>
<td>197,277</td>
<td>13,130</td>
<td>878</td>
</tr>
<tr>
<td>Pacific Coast:</td>
<td></td>
<td></td>
<td></td>
<td>Thousand</td>
<td></td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>21,087</td>
<td>8,130</td>
<td>12,957</td>
<td>7,344</td>
<td>1,304</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>9,498</td>
<td>1,199</td>
<td>8,304</td>
<td>5,121</td>
<td>664</td>
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<tr>
<td>Fir-spruce</td>
<td>52,251</td>
<td>380</td>
<td>51,861</td>
<td>6,027</td>
<td>191</td>
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<tr>
<td>Pacific Coast total</td>
<td>213,549</td>
<td>12,977</td>
<td>200,572</td>
<td>48,502</td>
<td>3,070</td>
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<td>United States:</td>
<td></td>
<td></td>
<td></td>
<td>Thousand</td>
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<td></td>
<td>765,493</td>
<td>66,005</td>
<td>697,488</td>
<td>144,868</td>
<td>5,126</td>
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<td></td>
<td>287,733</td>
<td>23,015</td>
<td>264,718</td>
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</tbody>
</table>

95% of planted pines in South are on private land
66% of planted Douglas-firs are on private land

US Forests are data-rich. The USFS, States and others provide these data to all.
Internet searches can provide many analyses, but look closely as not all data are equal, i.e. time frame or measured the same. Changes through decades may be significant, e.g., the change in corporate landownership from the 1990 to 2010.
SC Landowners - Managed Forests

Private Corporate

Private Non-Corporate

Photos by Pat Layton
Prescribed Fire Use for Forestry Objectives by State in 2017
Economics of the system

- Transportation of water and air is expensive.
- Logs when harvested are half water
- Logs are often merchandized on site
- Products are transported to mills
- Merchandizing on site may vary by the type of mills that are close
- Reducing embodied carbon begins by reducing hauling distance

Photos by Pat Layton
“Wood Baskets” for Mills

- A wood basket is the area around the mill from which logs are received
  - In the SE most logs with 50 miles
  - More than 75 miles is rare for pine
- Wood baskets can overlap
  - Different types of mills
  - Competition
- Distance from the mill impacts
  - Price paid to landowner
  - Carbon emitted in transportation
Washington State Wood Processing Facilities by Timbershed

[Map of Washington State showing wood processing facilities with color-coded regions for North Coast, South Coast, Northwest, and Eastern Cascades, and symbols indicating types of mills.

Washington’s Forests, Timber Supply, and Forest-Related Industries


Wood Carbon Seminars, Pat Layton
Modern Softwood Sawmills – What Logs Are Harvested

- ≈ 10% or fewer mills in the SE take logs with butt diameters ≥ 28”
- Only 8 mills take these sizes in the PNW (≈ 9%) (source Forest2Market)
- Size matters to the efficiency of sawmills
- Markets drying up for big logs
  - Export Markets
  - Pole/Pilings

Courtesy of Collum’s Lumber Products, LLC
Grading and Sorting

- Every log is processed into multiple products depending on log quality and size
- All boards from each log are sorted by size and then dried
- Dried stacks are then planned, graded to standards, trimmed to enhance grading, restacked by size, packaged and shipped
- Shipping dried, well-stacked lumber to distribution centers reduces costs and fossil-based carbon

Courtesy of Collum’s Lumber Products, LLC
Grade Marking Southern Pine

Grade Mark Key

1. Registered Trademark
2. Grade of Lumber
3. Moisture Content
4. Mill Identification Number
5. Heat Treated for Pest Pasteurization
Grade Marking Western Wood Products

- WWPA certification mark
- 12 – Mill ID
- Stand – Grade Identification
- Species
- Seasoning
  - Includes type of drying and moisture content
Distribution Centers and Softwood Dimension Lumber Mills
Distribution Centers, Plywood (squares) and OSB (diamonds) Mills
Distribution Centers to Building Suppliers to Job Sites

Photos by Pat Layton
Mass Timber – Sawmill to Secondary Manufacturer

Structurlam Mass Timber Products

Photos by Pat Layton
Manufacturer to Mass Timber Buildings

UMASS: Total SQ FT: 76,030
76 Truckloads delivered to jobsite
1,025,808 bd ft of Mass Timber: 245,136 Glulam Beams + 780,672 CLT.
Interestingly, for this project, which used HBV connectors to create composite floor slabs, the steel accounted for 20% of the material structural cost (not accounting for labor)

Platte 15: Total SQ FT: 128,410
70 Truckloads delivered to jobsite
1,013,940 bd ft of Mass Timber: 559,680 Glulam Beams + 454,260 CLT

Quattlebaum: Total SQ FT 16,500
354,000 bd ft of Mass Timber: 72,000 bd ft Glulam Beams + 282,000 bd ft of CLT (885 -- 20” dbh trees)
Quattlebaum Building - Wood Sources

**LEGEND**

SmartLam (SL) - CLT
- C = Canfor (60%)
- R = Rex Lumber (20%)
- I = Interfor (15%)
- H = Harrigan Lumber (5%)

% = percentages of lumber used in CLT

Structural Wood Systems (SWS)
- All glulam lumber provided by Canfor in Fulton, AL
Influencing Carbon in Wood Products

- Use certified wood sources, C of C for mills, distributors, secondary manufacturers
  - Carbon being incorporated into the standards
- USFS wood is not certified but does need markets
- Private landowners and wood production
  - Landowner objectives differ significantly
  - All ecosystem services are critical – water, air, habitat, diversity
- Not all lumber is equal, even from a single tree
- Wood selection
  - Local or not?
- Off-site/premanufacturing
- Design for reuse/deconstruction
Understanding Trees and Embodied Carbon

- Live trees sequester carbon up to a certain age
- Not all US forests produce wood for buildings
- Ecosystem services from managed forests are important
- Deforestation is not “sustainably managed forestry”
- Using wood in building, consider the whole life of the building
- Fossil fuel prices dominate the economics of wood/lumber