Forest Resources and Markets in the South

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Outline

- Forest resources in the U.S. South
- Timber use trends
- Industrial wood pellets
- Southern timber market outlook
Forest resources in the South

Total Forestland: 245.5 million acres-- 46% of the total land---32% of total U.S. forestland

Source: Forest Resources of the US 2017

Note: Nonvascular vegetation comprises less than 1 percent of U.S. land area and is omitted from the figure.
Timberland area steady but not static

Source: FIA
Forest ownership in the South

Public: 14%
Private corporate: 28%
Private non-corporate: 58%

A privately owned largely un-regulated landscape
Forest-type groups by ownership

More hardwood: 55%
Southwide forest inventory/carbon stock increasing
In the southern forest, where’s the carbon stock and where’s the sequestration?

Source: Abt, SOFAC
Fully-grown trees dominate

Figure 5-3. Volume of all-live trees on southern forest land by major species group and stand origin, 2017.
### Annual growth is higher than harvests

Growth to drain ratio:

<table>
<thead>
<tr>
<th></th>
<th>Softwoods</th>
<th>Hardwoods</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual net growth volume (billion cu ft)</td>
<td>9.71</td>
<td>4.71</td>
<td>14.43</td>
</tr>
<tr>
<td>Average annual removals (million cu ft)</td>
<td>6.14</td>
<td>2.52</td>
<td>8.66</td>
</tr>
<tr>
<td>Growth to Drain Ratio</td>
<td>1.58</td>
<td>1.87</td>
<td>1.67</td>
</tr>
</tbody>
</table>

Annual harvest is less than annual growth

Source: USDA FS FIA
The economic importance of forestry in the South

Forestry and the forest products industry generated $230.6 BILLION, or over 2% of U.S. South regional economic output. Forest-related economic activity generated 1,075,764 JOBS and $47.9 BILLION in income in 2011, about 2% OF ALL JOBS in the South.

Source: SGSF, 2013
Timber Markets in the U.S. South

South-Wide Regional Timber Price Trends, 2005-2019 (Timber-Mart South 2019)

Pine sawtimber prices have dropped almost 40%
75% of structural wood products go to housing

- A primary driver of the wood product industry.
- Housing market continues to improve, albeit slowly. Research shows not much of room to increase.
Oversupply—Inventory is accumulating

Pine non-Sawtimber Inventory on Plantations

2011-2015 avg increase = 11%

Pine Sawtimber Inventory on Plantations

2011-2015 increase = 28%
Why? Tree Planting Cycles in the South

We planted a lot of trees 30 yrs ago—Supported by federal programs
Pine sawtimber prices decline

Relative to Everything

Forest2Market Pine Southwide Annual Average

Forest2Market Hardwood Southwide Annual Average

PPW price becomes more important
Harvest details: timber product output (demand)

w/2015 TPO
Pine pulpwood and Other
(includes pellets and energy)
Hardwood pulpwod and other
(includes pellets and energy)
Small proportion but increasing trend

In 2015: pellet consumption (18% of total pine pulpwood), 19% of total hardwood pulpwood
2015 TPO wood consumption pellet/energy % of pulpwood by state

Large enough share to affect market
But, how much of total timber goes to pellet industry?

About 2% of all southern timber products and 27% of all industrial fuelwood output.

Annual biomass capacity

**Table 5-3.** National and regional densified biomass annual capacity, inclusive of plants in operation, temporarily not in operation, planned or under construction, and unknown status.

<table>
<thead>
<tr>
<th>Region</th>
<th>Annual capacity (tons per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North region</td>
<td>2,438,580</td>
</tr>
<tr>
<td>South region</td>
<td>10,193,455</td>
</tr>
<tr>
<td>Rocky Mountain and Pacific Coast regions</td>
<td>1,117,848</td>
</tr>
<tr>
<td>United States total</td>
<td>13,749,883</td>
</tr>
</tbody>
</table>

Source: DOE EIA (2017)
Wood₂Energy Mills

Source: wood2energy.org
Wood pellet capacity in the U.S. South

Southern capacity increased more than fivefold since 2009

Data source: Forisk Consulting
We Have Not Reached Peak Pellets: Recently Added or Announced Capacity
Pulpmill consumption trends: How does sawmill production affect pellets?

Pulpmills switch to roundwood when mill residues disappear. Pulpmills and pellet mills compete for sawmill residue.
Pellet demand and pulpwood prices

Pellet mills have caused a structural change in the pulpwood prices

Kanieski et al. 2019
Enviva’s feedstock sources

What is the source of Enviva's wood?

- Mixed pine and hardwood forests: 40%
- Southern yellow pine forests: 38%
- Arboricultural sources: <1%
- Bottomland hardwood forests: 2%
- Upland hardwood forests: 3%
- Sawdust, shavings or residuals from wood manufacturing: 17%

These forest tracts were an average of 35 years old at the time of harvest.

And of that wood:
- 53% was hardwood
- 47% was softwood
Enviva’s feedstock sources

The Chesapeake region includes the Ahoskie, Northampton, and Southampton mills.

<table>
<thead>
<tr>
<th>Feedstock</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Pine and Hardwood</td>
<td>55%</td>
</tr>
<tr>
<td>Southern Yellow Pine</td>
<td>25%</td>
</tr>
<tr>
<td>Mill &amp; Industry Residues</td>
<td>14%</td>
</tr>
<tr>
<td>Upland Hardwood</td>
<td>3%</td>
</tr>
<tr>
<td>Bottomland Hardwood</td>
<td>3%</td>
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The Wilmington region includes the Sampson and Greenwood mills.

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<th>Feedstock</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Pine and Hardwood</td>
<td>42%</td>
</tr>
<tr>
<td>Southern Yellow Pine</td>
<td>54%</td>
</tr>
<tr>
<td>Mill &amp; Industry Residues</td>
<td>1%</td>
</tr>
<tr>
<td>Upland Hardwood</td>
<td>3%</td>
</tr>
<tr>
<td>Bottomland Hardwood</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Feedstock varies by the region

Source: Enviva
NE NC hardwood Mill consumption and inventory

Franklin Mill Closure

Enviva

Hwd Sawtimber
Pellets in NC
Pellets demand: Promising

37% of energy from bio-energy

UK electricity generation from all renewable resources at a record high in 2018: 110 TWh

SOURCE: Digest of United Kingdom Energy Statistics (DUKES), U.K. Department for Business, Energy and Industrial Strategy
Pellets demand: Promising

The two largest pellet producers in North America—Enviva and Pinnacle—have off-take contracts to Asia that will total more than 3.3 million metric tons per year by 2023.

Source: FORISK
Southern timber markets projections

- **Subregional Timber Supply (SRTS) model** developed by SOFAC NCSU
- Based on FIA and TPO data
- Annually updated bio-economic model
PINE PULPWOOD MARKETS in the South
SRTS projections: south-wide

Pine CNS

PINE Chip-N-Saw MARKETS in the South
SRTS projections: south-wide

PINE Sawtimber MARKETS in the South
SRTS projections: south-wide

Hardwood Pulpwood

Hardwood Sawtimber

Hardwood MARKETS in the South
Summary

• Forest inventory in the South is rising
• Different timber market dynamics in the mix of wood energy and traditional timber products
• Increased demand has not depleted forests
• Woody biomass in the south seems a promising feedstock source
Thank you

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- SOFAC NCSU (Bob Abt and Fred Cubbage)