FUTURE WOOD SUPPLY
UPDATED ASSESSMENT AFTER THE 2014 ICE STORM

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Forest Resource Analyst
SC Forestry Commission
OUTLINE

• Review of the 2014 Ice Storm
  • Storm Impact
  • Damage Assessment

• Resource Review: Standing Inventory at time of ice storm event and current market conditions

• SRTS Modeling
  • Review of 2012 Study
  • Assessment of Ice Storm Damage on Future Timber Supply
Ice storm wallops Southeast, stranding drivers, cutting power

By Chelsea J. Carter, CNN

Updated 2:31 AM ET, Thu February 13, 2014

GET OFF THE ROADS, AND STAY OFF.

That was the message in Georgia and the Carolinas as a snow and ice storm swept through Wednesday, bringing some of the Southeast's most populous cities to a standstill.
Ice Storm Impacts

- 40 counties experienced significant icing
- 350,000 homes without power
- 1 million yards of debris created
2014 ICE STORM | Storm Impact

Leaning damage, recoverable
Leaning damage, potentially stand-replacing
2014 ICE STORM | Storm Impact

Tops broken, stems down
Impact on Forest Resources

- 1.5 million acres of forest impacted
- $360 million dollars worth of damage
- 24 counties required unscheduled harvesting
Damage Assessment

South Carolina Forestry Commission developed quick response survey techniques

- Utilized existing FIA plot allocations
  - Modified plot design/location to increase response time
- Assessed 20 trees per plot
- Plot damage condition classes
  - *None* or *Light* damage – no salvage needed
  - *Moderate* damage – may warrant a salvage harvest to remove damaged trees
  - *Heavy* damage – salvage harvest or clearcut and replanting will most likely be needed
Damage Classifications

Heavy damage, recently thinned loblolly

Light damage

Moderate damage, Young longleaf

Moderate damage, loblolly
Damage Assessment

• 248 sample plots

• Aerial survey to adjust plot data

• 22.2 millions tons total damage, divided between Coastal Plain FIA units
  - SCP - 11.13 million tons
  - NCP – 11.06 million tons
### 2014 ICE STORM | Damage Assessment

Damage estimates, per county, based on aerial and field observations.

<table>
<thead>
<tr>
<th>County</th>
<th>Pulpwood Volume</th>
<th>Sawtimber Volume</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cords</td>
<td>MBF (Int. Rule)</td>
<td>Dollars</td>
</tr>
<tr>
<td>Aiken</td>
<td>331,470</td>
<td>132,441</td>
<td>$30,136,573</td>
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<tr>
<td>Allendale</td>
<td>171,953</td>
<td>107,065</td>
<td>$21,525,756</td>
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<tr>
<td>Bamberg</td>
<td>243,847</td>
<td>108,320</td>
<td>$24,085,755</td>
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<tr>
<td>Barnwell</td>
<td>244,248</td>
<td>146,063</td>
<td>$29,994,166</td>
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<tr>
<td>Berkeley</td>
<td>666,839</td>
<td>273,340</td>
<td>$61,890,271</td>
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<tr>
<td>Calhoun</td>
<td>23,137</td>
<td>12,730</td>
<td>$2,638,283</td>
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<tr>
<td>Clarendon</td>
<td>172,592</td>
<td>60,453</td>
<td>$14,349,297</td>
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<tr>
<td>Colleton</td>
<td>392,658</td>
<td>174,078</td>
<td>$38,419,853</td>
</tr>
<tr>
<td>Dillon</td>
<td>32,521</td>
<td>17,232</td>
<td>$3,593,298</td>
</tr>
<tr>
<td>Dorchester</td>
<td>86,295</td>
<td>35,623</td>
<td>$8,009,218</td>
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<tr>
<td>Florence</td>
<td>138,614</td>
<td>64,366</td>
<td>$14,056,829</td>
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<tr>
<td>Georgetown</td>
<td>168,749</td>
<td>99,768</td>
<td>$20,568,895</td>
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<tr>
<td>Hampton</td>
<td>51,401</td>
<td>23,874</td>
<td>$5,204,545</td>
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<tr>
<td>Horry</td>
<td>118,509</td>
<td>53,329</td>
<td>$11,607,161</td>
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<tr>
<td>Marion</td>
<td>318,519</td>
<td>128,511</td>
<td>$28,729,983</td>
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<tr>
<td>Orangeburg</td>
<td>238,353</td>
<td>109,937</td>
<td>$23,901,489</td>
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<tr>
<td>Sumter</td>
<td>84,788</td>
<td>38,076</td>
<td>$8,320,827</td>
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<tr>
<td>Williamsburg</td>
<td>156,604</td>
<td>77,777</td>
<td>$16,656,788</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,641,097</strong></td>
<td><strong>1,662,983</strong></td>
<td><strong>$363,688,989</strong></td>
</tr>
</tbody>
</table>
Mill survey results
- 57 mills surveyed (5 out of state)
- Pulpwood highest use (57%)

### 2014 ICE STORM | Damage Assessment

#### Salvaged Softwood, Tons

<table>
<thead>
<tr>
<th></th>
<th>Sawtimber</th>
<th>Chip-n-saw</th>
<th>Pulpwood</th>
<th>In-Woods Chips</th>
<th>Fuelwood</th>
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</thead>
<tbody>
<tr>
<td>March</td>
<td>8,450</td>
<td>24,606</td>
<td>164,444</td>
<td>35,671</td>
<td>48,168</td>
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<tr>
<td>April</td>
<td>3,846</td>
<td>9,208</td>
<td>104,315</td>
<td>24,154</td>
<td>27,553</td>
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<tr>
<td>May</td>
<td>4,900</td>
<td>2,880</td>
<td>58,148</td>
<td>18,182</td>
<td>17,510</td>
</tr>
<tr>
<td>June</td>
<td>3,200</td>
<td>2,107</td>
<td>22,690</td>
<td>5,500</td>
<td>4,399</td>
</tr>
<tr>
<td>July</td>
<td>225</td>
<td>789</td>
<td>1,126</td>
<td>7,904</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>20,621</td>
<td>39,590</td>
<td>350,723</td>
<td>91,411</td>
<td>97,630</td>
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</table>

**Total Softwood Salvage**: 599,975 (96.6% of all Salvage)

#### Salvaged Hardwood, Tons

<table>
<thead>
<tr>
<th></th>
<th>Sawtimber</th>
<th>Chip-n-Saw</th>
<th>Pulpwood</th>
<th>In-Woods Chips</th>
<th>Fuelwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>0</td>
<td>0</td>
<td>5,320</td>
<td>1,406</td>
<td>2,992</td>
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<tr>
<td>April</td>
<td>0</td>
<td>0</td>
<td>2,150</td>
<td>450</td>
<td>1,906</td>
</tr>
<tr>
<td>May</td>
<td>0</td>
<td>0</td>
<td>1,800</td>
<td>500</td>
<td>1,892</td>
</tr>
<tr>
<td>June</td>
<td>0</td>
<td>0</td>
<td>1,000</td>
<td>500</td>
<td>659</td>
</tr>
<tr>
<td>July</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
<td>10,270</td>
<td>2,856</td>
<td>7,449</td>
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</table>

**Total Hardwood Salvage**: 20,575 (3.4% of all Salvage)

**Grand Total**: 620,550 tons
Storm return interval and intensity is highly variable, however ice storm occurrences are a regular part of the disturbance regime for the Southeast.
• Largest damage experienced in the smaller diameter classes
  • Recently thinned stands

Low utilization rates of damaged compared to other disturbance events
  • ~3% overall
  • Higher for SYP

• Unharvested damaged wood unsuitable for most purposes by August, 2014

• Total losses equal to one year of harvest removals (2.6% total inventory)

• 25,000 to 30,000 acres required to be replanted
Timberland Acreage of Southern Yellow Pine, SC - 1986
Timberland Acreage of Southern Yellow Pine, SC - 1993

STATE OF FORESTRY IN SOUTH CAROLINA
Timberland Acreage of Southern Yellow Pine, SC - 2001
Timberland Acreage of Southern Yellow Pine, SC - 2006
Timberland Acreage of Southern Yellow Pine, SC - 2014

5-yr Age Class

Acres

0 200,000 400,000 600,000 800,000 1,000,000 1,200,000

STATE OF FORESTRY IN SOUTH CAROLINA
NORTHERN COASTAL PLAIN SYP VOLUMES BY DIAMETER CLASS, 2001-2014

- **6-8"**
- **10-12"**
- **14+"**

- **↑ 80%**
- **↑ 71%**
- **↑ 14%**
PIEDMONT SYP VOLUMES BY DIAMETER CLASS, 2001-2014

- 6-8" ↑45%
- 10-12" ↑39%
- 14+" ↑17%
## Table 1—Output of industrial products by product and species group, South Carolina, 2011 and 2013*

<table>
<thead>
<tr>
<th>Product and species group</th>
<th>Year</th>
<th>2011</th>
<th>2013</th>
<th>Change</th>
<th>Change</th>
<th>Year</th>
<th>2011</th>
<th>2013</th>
<th>Change</th>
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<tbody>
<tr>
<td><strong>Saw logs</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Softwood</td>
<td></td>
<td>157,296</td>
<td>182,933</td>
<td>25,637</td>
<td>16.3</td>
<td>Softwood</td>
<td>60,877</td>
<td>83,051</td>
<td>22,174</td>
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<tr>
<td>Hardwood</td>
<td></td>
<td>14,375</td>
<td>17,267</td>
<td>2,892</td>
<td>20.1</td>
<td>Hardwood</td>
<td>1,385</td>
<td>3,456</td>
<td>2,071</td>
<td>149.5</td>
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<tr>
<td>Total</td>
<td></td>
<td>171,671</td>
<td>200,200</td>
<td>28,529</td>
<td>16.6</td>
<td>Total</td>
<td>62,262</td>
<td>86,506</td>
<td>24,244</td>
<td>38.9</td>
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<tr>
<td><strong>Veneer logs</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softwood</td>
<td></td>
<td>26,267</td>
<td>30,592</td>
<td>4,325</td>
<td>16.5</td>
<td>Softwood</td>
<td>549,516</td>
<td>581,736</td>
<td>32,220</td>
<td>5.9</td>
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<td>Hardwood</td>
<td></td>
<td>3,895</td>
<td>2,803</td>
<td>-1,092</td>
<td>-28.0</td>
<td>Hardwood</td>
<td>96,590</td>
<td>93,334</td>
<td>-3,256</td>
<td>-3.4</td>
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<tr>
<td>Total</td>
<td></td>
<td>30,162</td>
<td>33,396</td>
<td>3,234</td>
<td>10.7</td>
<td>Total</td>
<td>646,106</td>
<td>675,070</td>
<td>28,964</td>
<td>4.5</td>
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<tr>
<td><strong>Pulpwood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softwood</td>
<td></td>
<td>305,076</td>
<td>285,160</td>
<td>-19,916</td>
<td>-6.5</td>
<td>Softwood</td>
<td>581,736</td>
<td>627,125</td>
<td>45,389</td>
<td>7.3</td>
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<tr>
<td>Hardwood</td>
<td></td>
<td>76,935</td>
<td>69,807</td>
<td>-7,128</td>
<td>-9.3</td>
<td>Hardwood</td>
<td>93,334</td>
<td>96,590</td>
<td>3,256</td>
<td>3.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>382,011</td>
<td>354,968</td>
<td>-27,043</td>
<td>-7.1</td>
<td>Total</td>
<td>627,125</td>
<td>627,125</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Export volumes estimated from 2011 values

** Includes composite panels, poles, posts, mulch, log homes, industrial fuelwood, and all other industrial products.
Housing Recovery

- Recovery slow, but improving
- More multi-unit demand
- Short supply (5.1 months)
- Strict lending rules

http://www.calculatedriskblog.com/
• Wall of Wood maturing, 21-25, 26-30 year age classes
  • CNS and Sawtimber size classes

• Pressure on smaller diameter size classes (SYP)
  • Southern Coastal Plain (Northern Coastal Plain showing limited growth)

• Increasing volume statewide (dominated by larger diameter classes)

• Market recovering, but slowly
Sub-Regional Timber Supply Model
Developed by Abt, Cubbage, NC State University
Integrates currently available spatially explicit forest resource data from the USDA Forest Service, Forest Inventory and Analysis (FIA) program and economic theory to model timber supply and demand in the South.
2012 Study – a 20/15 Program Project
(Abt, Adams, Houston and Lupold)

• Model ran under varying demand scenarios products
  • Low - Housing Recovery
  • High – Housing Recovery plus additional removals

• Design utilized 7 different forest products
  • 4 Pine (Pulp, CNS, Sawtimber, Large Sawtimber)
  • 3 Hardwood (Pulp, Small Sawtimber, Sawtimber)
  • Results were grouped into Small and Large Diameter classes

• Based on 2012 FIA Data
2012 Study Results

- Total pine inventory will be higher in 20 years
  - Large variation across size classes
  - Highest increase in large diameter size classes

- Scarcity emerging in smaller diameter classes
  - May be more pronounced at FIA Unit level (SCP)

- Overall positive results across all demand scenarios
  - 20-22 millions tons harvest annually
  - 4-8 million tons of surplus
2012 Study Results, All Pine Products
Results for All Pine Products, with Removals from Ice Storm Loss
Pine Small Roundwood Low Demand Scenario

Baseline

With Ice Storm Removals
Pine Small Roundwood High Demand Scenario

Baseline

With Ice Storm Removals
SRTS | Results

Pine Large Roundwood High Demand Scenario

Baseline

With Ice Storm Removals

STATE OF FORESTRY IN SOUTH CAROLINA
SRTS | Results

Pine Pulpwood Low Demand Scenario

Baseline

With Ice Storm Removals
SRTS | Results

Pine Pulpwood High Demand Scenario

Baseline

With Ice Storm Removals

Inventory
Removals

%
• Short-term decrease in inventory for All Pine Products
  • Still above baseline

• Long-term reduction in All Pine Products inventory compared to 2012 Study, however still increasing overall

• Current demand levels will continue to reduce small-diameter Pine inventory
  • Under High Demand Scenario, reductions are more pronounced
  • Impacts vary widely by FIA Unit

• Large diameter Pine inventory increases subsequent to ice storm event
  • Driven by increasing demand?
Acknowledgements

Special thanks to Bob Abt, Jesse Henderson and the SOFAC group for their assistance, advice and feedback.