A Deeper Dive into Wood Product LCA Forest Resource Accounting

CLF Wood Seminar Series
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by
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Director of Science and Sustainability, CORRIM

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Regional Data Development

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ISO standards

- Regional Data Development for Forest Resources and Wood Manufacturing processes
  - LCI
  - LCIA
  - Impact Assessment based on TRACI Criteria for all impacts required under the PCR and EPD (US EPA)

ISO 14040
ISO 14044
ISO 21930

Summarization and Integration of LCI and LCIA consistent with ISO, PCR and EPD requirements

PCR

- North American Wood PCR (ULE 2019)
  - Synthesis and aggregation of national product data e.g. North American Softwood Lumber EPD (2013, 2020)

LCA

EPD

North American Wood PCR (ULE 2019)
Synthesis and aggregation of national product data e.g. North American Softwood Lumber EPD (2013, 2020)
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**Stand Level Carbon Sequestration**

**PNW Commercial Softwoods**

- **Y-axis:** Carbon in t/ha
- **X-axis:** Years since forest establishment

Legend:
- **PNW Commercial Softwood Management**
Graphic representation of the spatial and temporal dynamics of C storage for a typical PNW forest managed on 45-year rotations presented as: the growth and harvest cycles of one forest stand (in turquoise), an average per ha for 10 forest stands harvested in sequential intervals (in teal), and an average for 100 stands harvested sustainably as part of a “normal” forest (in brown). Adapted from McKinley et al. 2011 and Janowiak et al. 2017.
Major wood producing regions

bark beetles and fire – mostly National Forests driving the trend

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• 60 year old PNW Douglas-fir ready for harvest

• This is the result of intensive forest management that happens to be SFI certified, under a spotted owl management plan, and still part of the company’s active harvesting program.

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Forest Growth with Management

Forest Growth without Management

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Stand Level Carbon Sequestration
Natural Regeneration vs Managed Forests

Carbon in t/ha

Years since forest establishment

PNW Commercial Softwood Management
PNW No Management/Natural Regen

Management Matters
SE region productivity increase

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Silvicultural developments over 8 decades that have led to increased pine plantation productivity, heightened C uptake and storage, and shortened time to harvest in the US SE. Adapted from Fox et al. 2004.
SE Region Forest Carbon Stocks and Cumulative Harvest

Image courtesy of Reid Miner, NCASI, 2014

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Rocky Mountain region productivity decrease
Management Matters

Annual Net Growth, Mortality, and Harvest on National Forest Timberlands - 1952-2016

## EPD “Nutritional” Label
### WOOD PRODUCT

#### AMOUNT PER UNIT

<table>
<thead>
<tr>
<th>LCA IMPACT ASSESSMENT</th>
<th>TOTAL</th>
<th>FORESTRY OPERATIONS</th>
<th>WOOD PRODUCT PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Warming Potential</td>
<td>143</td>
<td>11</td>
<td>132</td>
</tr>
<tr>
<td>Acidification Potential</td>
<td>1.60</td>
<td>0.15</td>
<td>1.45</td>
</tr>
<tr>
<td>Eutrophication</td>
<td>0.06</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Smog</td>
<td>25</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Total Energy</td>
<td>7,425</td>
<td>165</td>
<td>7,260</td>
</tr>
<tr>
<td>Non-Renewable Resources</td>
<td>6</td>
<td>0.01</td>
<td>6</td>
</tr>
<tr>
<td>Renewable Resources</td>
<td>640</td>
<td>0.00</td>
<td>640</td>
</tr>
<tr>
<td>Water Use</td>
<td>1,061</td>
<td>11</td>
<td>1,050</td>
</tr>
</tbody>
</table>

Ingredients: Carbon

Pueettmann et al 2018

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Forest Management Cycle
## Carbon Footprint per m³

<table>
<thead>
<tr>
<th></th>
<th>Reference Unit</th>
<th>Herbicide Treatment only</th>
<th>Herbicide plus Pile and Burn Treatment</th>
<th>*Broadcast Burn Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard TRACI methodology for the treatment of biogenic carbon</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Emissions</td>
<td>kg CO₂ eq/m³</td>
<td>10.74</td>
<td>18.14</td>
<td>23.16</td>
</tr>
<tr>
<td>co2 sequestered per m³</td>
<td>kg CO₂ eq/m³</td>
<td>960.37</td>
<td>960.37</td>
<td>960.37</td>
</tr>
<tr>
<td>Net sequestration</td>
<td>kg CO₂ eq/m³</td>
<td>-949.63</td>
<td>-942.23</td>
<td>-937.21</td>
</tr>
<tr>
<td><strong>Modified TRACI methodology that includes biogenic carbon emissions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Emissions</td>
<td>kg CO₂ eq/m³</td>
<td>10.74</td>
<td>141.31</td>
<td>315.83</td>
</tr>
<tr>
<td>co2 sequestered per m³</td>
<td>kg CO₂ eq/m³</td>
<td>1615</td>
<td>1615</td>
<td>1615</td>
</tr>
<tr>
<td>Net sequestration</td>
<td>kg CO₂ eq/m³</td>
<td>-1604.25</td>
<td>-1473.69</td>
<td>-1299.17</td>
</tr>
</tbody>
</table>


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Thank You

For More Information

www.corrim.org

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