Harvested Wood Product (HWP) Carbon Storage from Oregon Forests

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&
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Forest Carbon Accounting Stakeholder Meeting Salem, OR
HWP C in the context of forest carbon

IPCC Approaches
1. Stock Change Approach
2. Production Approach
3. Atmospheric Flow Approach
Oregon Timber Harvest

Billion Board Feet, Scribner Thousands


Private  State  BLM  USFS  Total

0 1 2 3 4 5 6 7 8 9 10
Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 1998
Debra D. Warren

Estimates of carbon stored in harvested wood products from United States Forest Service Pacific Northwest Region, 1909-2012

Oregon’s Timber Harvests: 1849-2004
State Data – 1849 to 2004
County Data – 1925 to 2004
Compiled by Alicia Andrews and Kristin Kitara
Oregon Department of Forestry

Oregon’s Forest Products Industry and Timber Harvest 2013 With Trends Through 2014
Eric A. Simmons, Micah G. Scudder, Todd A. Morgan, Erik C. Berg,
and Glenn A. Christensen
The HWP framework

Timber Products vs. Primary Products

**Timber Products:**
Categories recorded at time of timber sale or harvest, may not closely correspond to primary products manufactured. Examples: sawtimber, pulpwood, fuelwood, non-saw, misc-convertible products.

**Primary Products:**
Categories of 1st products manufactured from the timber, includes mill residue uses. Examples: lumber, plywood, woodpulp, non-structural panels.
Timber Product Ratios

- The model has 40 timber product classes, 20 classes each for softwood and hardwood
- Annual time series; ratios sum to 1.00
- Examples of timber product classes include:
  - Hardwood sawtimber, softwood sawtimber, softwood poles, hardwood poles, hardwood pulpwood, softwood pulpwood, mine props, ties, float logs, miscellaneous convertible
Oregon Timber Harvest and Use

1,057 MMCF of **wood fiber**

- 60% to sawmills
- 14% to log exports
- 13% to pulp mills
- 12% to veneer mills

- 82% of mill residue used for pulp & particleboard
- 15% of mill residue used for energy

- 0.5 MMCF (0.1%) not used
Table I—Log consumption by mills, by species, resource area, and industry, California, 1982

<table>
<thead>
<tr>
<th>RESOURCE AREA AND MILL</th>
<th>CENTRAL COAST</th>
<th>NORTH COAST</th>
<th>SOUTH COAST</th>
<th>NORTHERN INTERIOR</th>
<th>CENTRAL VALLEY</th>
<th>OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUMBER</td>
<td>256,900</td>
<td>242,400</td>
<td>347,800</td>
<td>238,200</td>
<td>233,000</td>
<td>137,000</td>
<td>1,470,300</td>
</tr>
<tr>
<td>PLYWOOD</td>
<td>140,800</td>
<td>145,000</td>
<td>157,300</td>
<td>162,400</td>
<td>168,000</td>
<td>110,000</td>
<td>848,500</td>
</tr>
<tr>
<td>VENEER</td>
<td>154,000</td>
<td>158,700</td>
<td>149,000</td>
<td>152,800</td>
<td>156,000</td>
<td>107,000</td>
<td>937,600</td>
</tr>
<tr>
<td>PULP AND BOARD</td>
<td>228,000</td>
<td>231,000</td>
<td>240,000</td>
<td>242,400</td>
<td>245,000</td>
<td>154,000</td>
<td>1,122,800</td>
</tr>
<tr>
<td>SHAKE AND SHINGLE</td>
<td>191,000</td>
<td>195,000</td>
<td>199,000</td>
<td>202,000</td>
<td>206,000</td>
<td>134,000</td>
<td>1,090,000</td>
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<tr>
<td>EXPORT 2/</td>
<td></td>
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<tr>
<td>POST, POLE, AND PILING 2/</td>
<td></td>
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</tbody>
</table>

ALL AREAS: LUMBER, VENEER AND PLYWOOD, PULP AND BOARD, SHAKE AND SHINGLE, EXPORT 2/ POST, POLE, AND PILING 2/

TOTAL: 2,598,812
Primary Product Ratios

- Annual volumes of harvested timber products (e.g. softwood sawtimber) distributed to primary products
- The model has 64 primary product classes
- Examples of primary product classes include:
  - Softwood lumber, softwood poles, hardwood wood pulp, softwood wood pulp
- Example of a timber product distributed to primary products:

<table>
<thead>
<tr>
<th>Timber product</th>
<th>Sawmill products</th>
<th>Primary products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softwood sawtimber</td>
<td>Sawmill residue</td>
<td>Fuelwood and other</td>
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<tr>
<td></td>
<td></td>
<td>Lumber</td>
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<td></td>
<td>Non-structural panels</td>
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<td></td>
<td></td>
<td>Plywood</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other industrial products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wood pulp</td>
</tr>
</tbody>
</table>
About 4.8 million BDT of woody mill residue (excluding bark) generated annually. About 0.1% not used.

Most used for pulp/paper or particleboard (>82%)

Less used for bioenergy and landscaping/mulch

Result of wood products industry operating in OR
Table 27—Production and disposition of wood residue by sawmills, by type of residue, use, resource area, and mill-size class, California, 1982

(TONS, DRY WEIGHT)

<table>
<thead>
<tr>
<th>RESOURCE AREA AND MILL-SIZE CLASS</th>
<th>TOTAL</th>
<th>USED</th>
<th>PULP</th>
<th>BOARD</th>
<th>FUEL</th>
<th>MISCELLANEOUS</th>
<th>UNUSED</th>
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<tr>
<td>ALL TYPES OF RESIDUE</td>
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</table>

California’s Forest Products Industry: 1982

James O. Howard

This file was created by scanning the printed publication. Text errors identified by the authors have been corrected; however, some errors may remain.

See footnotes at the end of table.
HWP distribution examples

**Timber product:**
Softwood sawtimber

**Primary products:**
Softwood lumber, softwood plywood, mill residue pulp, mill residue fuel, mill residue non-structural panel, etc.

**End uses:**
New residential construction (single, multi family, mobile homes) residential upkeep and improvement, new non-residential construction, manufacturing (household furniture, other furniture, other products), shipping, other uses
End Use Ratios

- McKeever, David B. 2009. FPL-GTR-181

- 224 primary product end uses:
  - 47 each for HW and SW sawtimber
  - 47 each for HW and SW pulpwood
  - 36 for all other primary products
HWP Data Sources

- Annual Harvest data (several sources)
- Timber & Primary product ratios (from OR mill studies):
- Wood to carbon estimates (Smith et al. GTR-343)
- Half-life data (Skog 2008)
- End use ratios (McKeever 2009)
- Fuelwood and wood waste emitted with energy capture, discarded products to landfills, dumps, compost (Skog 2008)

*Bold font = user created data; plain font = examples of data and parameters hard wired in the current HWP model*
Run the model

Harvested Wood Products

Configure a simulation.

Download an Excel macro-enabled workbook that will help create the input data files here. Use the HWP Ribbon to export data in the correct format for this tool or to add a new year. Do NOT change the basic format of any of the worksheets.

Steps:

1. Upload yearly harvest data
   Choose File | No file chosen

2. Upload yearly timber product ratios
   Choose File | No file chosen

3. Upload yearly primary product ratios or choose region for default ratios
   See a map of the regions here.
   Choose Region or | Choose File | No file chosen

4. Upload distribution parameters (optional and rarely used)
   Choose File | No file chosen

5. Upload ratios for burned with energy capture (optional and rarely used)
   Choose File | No file chosen

6. Enter number of iterations
   Any number larger than 1 will result in Monte Carlo simulation and the only output will be a table of confidence intervals around carbon storage for each year.
   1 | Address to send email when done with Monte Carlo: ____________

7. Run the model
   Run

http://maps.gis.usu.edu/HWP/
Figure 1. Annual timber harvest in California, converted to MgC, 1952 to 2016.
Figure 2. All ownership HWP C disposition of products in use and in SWDS
Oregon HWP C Analysis
Schedule

1. Present methods & discuss with stakeholders & ODF (Oct 2018)
2. Gather historic data: harvest volumes, information to develop timber & primary product ratios (Oct 2018 – Jan 2019)
3. Investigate & update (where possible) OR-specific model parameters such as use & disposal rates, decay functions (Jan – May 2019)
4. Preliminary results & workshop with stakeholders (Jun/Jul 2019)
5. Draft final report to ODF (Sep/Oct 2019)
Thank you!

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