Eastern Oregon Forests & Mills

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National & state forests

The Oregon Forest Resources Institute
Who owns Oregon’s forests?

Ownership

- 60% Federal
- 19% Large private
- 15% Small private
- 4% State
- 2% Tribal
- 1% State
- 8% Small private
- 1% Tribal

Harvest

- 67% Large private
- 15% Federal
- 9% State
- 1% Tribal
- 2% Small private
- 2% Tribal

75% of annual harvest comes from private forestland
Harvest by owner

Oregon timber harvest by owner, 25 years
Federal forests

FIA data (2001-05) shows mortality exceeded harvest in Federal forests.
## Eastern Oregon forestland

<table>
<thead>
<tr>
<th>Landowner</th>
<th>Acreage</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>9,727,000</td>
<td>70.1</td>
</tr>
<tr>
<td>State &amp; Other</td>
<td>201,000</td>
<td>1.4</td>
</tr>
<tr>
<td>Large Private</td>
<td>1,709,000</td>
<td>12.3</td>
</tr>
<tr>
<td>Small Private</td>
<td>1,835,000</td>
<td>13.2</td>
</tr>
<tr>
<td>Tribal</td>
<td>396,000</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>13,868,000</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: ODF Resources Planning 2013
## Eastern Oregon harvest

(2011 harvest as a percentage of 1991 harvest)

<table>
<thead>
<tr>
<th>Landowner</th>
<th>1991</th>
<th>2011</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>1,123.1</td>
<td>133.2</td>
<td>12</td>
</tr>
<tr>
<td>State &amp; Other</td>
<td>5.1</td>
<td>20.3</td>
<td>398</td>
</tr>
<tr>
<td>Large Private</td>
<td>547.2</td>
<td>196.2</td>
<td>36</td>
</tr>
<tr>
<td>Small Private</td>
<td>115.5</td>
<td>21.5</td>
<td>54</td>
</tr>
<tr>
<td>Tribal</td>
<td>66.1</td>
<td>35.4</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,856.9</td>
<td>406.6</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: ODF Resources Planning
# Ownership vs. harvest

(Percentage of harvest by owner, 1991 vs. 2011)

<table>
<thead>
<tr>
<th>Landowner</th>
<th>Land</th>
<th>1991</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>70.1</td>
<td>60.5</td>
<td>32.8</td>
</tr>
<tr>
<td>State &amp; Other</td>
<td>1.4</td>
<td>0.3</td>
<td>5.0</td>
</tr>
<tr>
<td>Large Private</td>
<td>12.3</td>
<td>29.5</td>
<td>48.3</td>
</tr>
<tr>
<td>Small Private</td>
<td>13.2</td>
<td>6.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Tribal</td>
<td>2.9</td>
<td>3.5</td>
<td>8.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: ODF Resources Planning
Crisis in dry forests

Growing recognition of the need to manage federal forests to restore healthy conditions
Forests “out of whack”

The Nature Conservancy estimates that about 9.5 million acres of Oregon’s east-side forests are moderately or severely departed from healthy ecological condition, due largely to fire suppression and proliferation of small-diameter trees.
“If Oregon were to double the average number of acres treated annually to benefit and restore ecosystem health on Oregon’s dry-side national forestlands, then what would that cost and what would be the economic benefit?”
Large landscape needs big effort

Much of the USFS forestlands in the study area are in danger of fire.

Restoration can reestablish healthy forests and employ people.

Crown fire potential on Oregon’s dry-side national forests
Families are hurting

In dry-side communities nearly 1 in 5 people live in poverty.

As of September 2012, the average unemployment rate in the study area was 10.8%. Doubling restoration would create or protect some 2,300 jobs.
Cost of treating 129,000 acres
Average (2007-2011)

Costs of Restoration Treatments
Averaged Annual, 2007 - 2011

Total Cost $40,784,000

- Non-Commercial Service Contracts, $23,570,000
- Commercial Timber Sales, $13,991,000
- Commercial Stewardship Contracts, $3,223,000

Average Annual cost of USFS dry-side forest restoration. 2007-2011.
Total economic impact

Average Annual

- 2,310 jobs created or retained throughout the economy
- $90.5 million in total income
- $231.5 million in industrial output
- $3.6 million in state tax revenue
The study question

What would happen if we scaled up the amount of restoration in proportion to the problem?
What doubling looks like

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Current Level (2007-11)</th>
<th>Doubling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jobs</td>
<td>2,310</td>
<td>4,620</td>
</tr>
<tr>
<td>Sawlogs</td>
<td>141 mmbf</td>
<td>282 mmbf</td>
</tr>
<tr>
<td>Biomass</td>
<td>225,000 bdt</td>
<td>450,000 bdt</td>
</tr>
<tr>
<td>Income</td>
<td>$90,517,000</td>
<td>$181,034,000</td>
</tr>
<tr>
<td>Economic Output</td>
<td>$231,512,000</td>
<td>$463,024,000</td>
</tr>
<tr>
<td>Tax Revenue</td>
<td>$3,612,000</td>
<td>$7,224,000</td>
</tr>
<tr>
<td>Acres Treated</td>
<td>129,000</td>
<td>258,000</td>
</tr>
</tbody>
</table>
Collaboratives

The Oregon Forest Resources Institute
Decline in infrastructure

Oregon is losing valuable forestry infrastructure such as mills, logging equipment and know-how.

Since 1980, 55 east side mills have closed and only 11 remain.
Eastside mills at risk
## Eastside mills at risk

<table>
<thead>
<tr>
<th>Company / Mill</th>
<th>Location</th>
<th>Current Employees</th>
<th>Timber Vol. (mmbf)</th>
<th>Estimated % of Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malheur Lumber Co.</td>
<td>John Day</td>
<td>76</td>
<td>27</td>
<td>54</td>
</tr>
<tr>
<td>Warm Springs Forest Products</td>
<td>Warm Springs</td>
<td>129</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Interfor Pacific</td>
<td>Gilchrist</td>
<td>135</td>
<td>75</td>
<td>30</td>
</tr>
<tr>
<td>Jeld-Wen/Thomas Lumber Co.</td>
<td>Klamath Falls</td>
<td>56</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Columbia Plywood</td>
<td>Klamath Falls</td>
<td>215</td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td>Collins Fremont Sawmill</td>
<td>Lakeview</td>
<td>75</td>
<td>40</td>
<td>76</td>
</tr>
<tr>
<td>Blue Mountain Lumber Products</td>
<td>Pendleton</td>
<td>90</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Boise Cascade</td>
<td>Pilot Rock</td>
<td>84</td>
<td>44</td>
<td>73</td>
</tr>
<tr>
<td>Boise Cascade - sawmill</td>
<td>Elgin</td>
<td>114</td>
<td>36</td>
<td>69</td>
</tr>
<tr>
<td>Boise Cascade – plywood mill</td>
<td>Elgin</td>
<td>200</td>
<td>71</td>
<td>100</td>
</tr>
<tr>
<td>Boise Cascade</td>
<td>La Grande</td>
<td>32</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1,206</strong></td>
<td><strong>415</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National Forest</th>
<th>Total Acres</th>
<th>Volume Growth/Year (mmbf)</th>
<th>Volume Sold/Year (mmbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deschutes</td>
<td>1,854,000</td>
<td>252</td>
<td>51</td>
</tr>
<tr>
<td>Fremont-Winema</td>
<td>2,811,000</td>
<td>322</td>
<td>54</td>
</tr>
<tr>
<td>Malheur</td>
<td>1,542,000</td>
<td>238</td>
<td>25</td>
</tr>
<tr>
<td>Ochoco</td>
<td>979,000</td>
<td>115</td>
<td>15</td>
</tr>
<tr>
<td>Umatilla</td>
<td>1,194,000</td>
<td>196</td>
<td>32</td>
</tr>
<tr>
<td>Wallowa-Whitman</td>
<td>2,388,000</td>
<td>334</td>
<td>24</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>10,768,000</strong></td>
<td><strong>1,457</strong></td>
<td><strong>201</strong></td>
</tr>
</tbody>
</table>

Relative values of products - 2011

Relative values of products - 2013

2013 First Quarter Prices

- Biomass
- Sawdust
- Lumber Shavings
- Wood Chips
- Lumber

Mill adaptations

**Malheur Lumber**
- John Day, Oregon
- Pine sawmill – traditional
- Pellet mill – new
- Support biomass thermal cluster
- Brick mill - new
- Shavings mill – new
- Stewardship Contracting
- Collaborative partner

**Integrated Biomass Campus**
- Enterprise, Oregon
- Sort yard
- Sawlogs to Boise Cascade
- Post and Pole plant
- Packaged firewood
- Densified Fire Logs
- Hog fuel – to Enterprise HS
- Gasification
- Combined Heat & Power
Forest Product Opportunities for Eastern Oregon

Scott Leavengood
Oregon State University
Oriented Strand Board (OSB)

- Structural building product that can use lower strength raw material (e.g., poplar, lodgepole pine, etc.)
- Louisiana Pacific has explored Central Oregon a time or two – supply is always an issue.
Cross Laminated Timber

THE BUILDING BLOCKS
The panels, made of three or five layers, are up to 6 inches thick and 30 feet long. But thicker log segments can be made.

IN CASE OF FIRE
When moisture in the wood panels burns, their surfaces expand and contract, which can slow the fire and protect the inner core from heating, keeping it structurally sound. Panels with fewer layers of wood last longer in a fire. Plywood walls and ceilings have double walls with an insulating layer between.

STRUCTURE OF WOOD
Long tubular cells of the tree trunk make wood strong and resistant to splitting and warping. Unlike expansion and shrinkage due to moisture in the cross-grain direction.

MAKING THE PANELS
Layers of spruce boards are glued together to provide maximum strength and stability. Each layer's grain is laid perpendicular to the previous one's.

studio630.tumblr.com

e-architect.co.uk
“Plywood on steroids”

- a massive structural composite panel
- 3 to 9 lamina of dimension lumber arranged perpendicular to each other

Width: up to 3.2 m
Length: up to 16 m
Thickness: up to 40 cm
Pre-cutting: cuts for windows, doors, ducts
Wood species: Spruce, Pine or Larch

http://www.binderholz-bausysteme.com/Home.9.0.html
NARA bio-refinery project

NARA PATHWAY TO BIOJET AND CO-PRODUCTS

Northwest Advanced Renewables Alliance
Changing the Biomass Value Proposition

David Smith
Oregon State University
Hog fuel value is low
Maximize Volume:

- Incentives needed to get it out of the woods

Minimize Costs:

- Energy markets are not competitive due to low cost alternatives
  - Natural gas
  - Hydroelectric

Few Customers:

- Weak industrial markets
- Doesn’t work for schools
Take a “Manufacturing Approach” to converting forest biomass into higher value products

- Bring coarse material to processing facility
- Equip to make a range of products
- Merchandise material to highest end use
- Operate like a mill
- Make quality products that conform to performance-driven specifications
Example: biomass processing plant

Field ground biomass (50%)
- Screen
  - Reload
    - Hogfuel, 35%
  - Pyrolysis, 25%
    - Fines, 25%
  - P- Gas
- Biochar, 8%

Chunk wood (50%)
- Chipper
  - Screen
    - Overs, 8%
  - Fines, 20%
    - Fuel chip
    - Dryer
      - Fuel chips, 32%
    - Overs, 20%
      - Pulp chips, 10%
### Biomass Processing: Cost & Revenue

<table>
<thead>
<tr>
<th>Product</th>
<th>Hog fuel</th>
<th>Biochar</th>
<th>Fuel chips</th>
<th>Pulp chips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value, $/BDT</td>
<td>$45</td>
<td>$250</td>
<td>$140</td>
<td>$100</td>
</tr>
<tr>
<td>Volume, BDT/year</td>
<td>17,500</td>
<td>4,000</td>
<td>16,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Annual revenue</td>
<td>$787,500</td>
<td>$1,000,000</td>
<td>$2,240,000</td>
<td>$500,000</td>
</tr>
</tbody>
</table>

**Total annual revenue** (new value proposition): $4,577,500

**Old value proposition:** 50,000 BDT hog fuel x $45/BDT = $2,250,000
Eastern Oregon forests & mills

- Federal forestland at risk of uncharacteristic fire due to overstocking of trees
- Need active management to restore health
- Restoration yields mostly low-value, small diameter timber
- Mills at risk of closure - lack of timber supply
- Existing mills need sawlogs to stay open
- New markets needed for small diameter timber and biomass
- Successful mills must utilize available timber
THANK YOU!

Oregon Forest Resources Institute

Oregon Wood Innovation Center

Connecting People, Ideas, and Resources