Maine’s Perspective on the Future of Forestry

2017 Annual General Meeting & Industry Forum

March 1, 2017

Patrick Strauch, Executive Director,

Maine Forest Products Council
Since 1961, the Maine Forest Products Council has been the voice of Maine’s forest economy. The Council has more than 300 members companies, including landowners, loggers, truckers, paper mills, tree farmers, foresters and lumber processors, but our members also include bankers, lawyers and insurance executives.

We feel we represent anyone who has an interest in seeing the Maine woods remain a viable, sustainable resource.
<table>
<thead>
<tr>
<th>Owner Group</th>
<th>Private %</th>
<th>Public %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Investors</td>
<td>49.8%</td>
<td></td>
</tr>
<tr>
<td>Family Forests</td>
<td>30.4%</td>
<td></td>
</tr>
<tr>
<td>Forest Industry</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>Misc. Large Private</td>
<td>3.5%</td>
<td></td>
</tr>
<tr>
<td>State Gov't</td>
<td>6.9%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Federal Gov't</td>
<td>1.3%</td>
<td></td>
</tr>
<tr>
<td>Local Gov't</td>
<td>1.2%</td>
<td></td>
</tr>
</tbody>
</table>
4 million acres are now conserved statewide
SUSTAINABLE FOREST CERTIFICATION IN MAINE

- 9 million certified acres
- Nearly half of state’s forestland
- National leader in forest certification
- First-in-the-nation Master Logger Certification program has certified >100 loggers
Acres Defoliated by Spruce Budworm in the Province of Quebec 2003-2016
Défoliation causée par la tordeuse des bourgeons de l’épinette
Québec méridional
Historic Trend in Net Growth to Removals Ratio

Source: Department of Conservation. Maine Forest Service
MAINE’S WOOD HARVEST IS SUSTAINABLE

Maine wood harvest
(sawlogs, pulpwood, firewood/pellet feedstock, and biomass)
in millions of green tons (2000 - 2014)
Maine’s Forest Economy

Est. 2016 Economic impact: $8.5 billion

Wood is the most environmentally sound building material on earth

Millions of acres of working forest open for recreation
Est. 2016 total economic impact
$8.5 billion

Source: Economic contribution of Maine’s forest products industry 2014 and 2016 (estimated)

Total jobs 33,538
Economic Impact of the Forest Products Industry in Maine

Summary information from:
Economic Contribution of Maine’s Forest Product Industry, 2014 and 2016 (estimated)

A report prepared for the Maine Forest Products Council, June 2016
By James L. Anderson III, Ph.D. Student
and Mindy S. Crandall, Ph.D.
Assistant Professor, Forest Economics and Management
School of Forest Resources
University of Maine
mindy.crandall@maine.edu
IMPLAN and Economic Impact

Direct Effects
New Jobs and Expenditures

Leakage
Nonlocal Spending
Commuters Saving

Local Spending

Income Spending

Industry Purchases

Induced Effects
Goods and Services

Indirect Effects

Direct Effects + Indirect Effects + Induced Effects (I&I)
Total Impact

Leakage

Labor Income

Leakage

Leakage
## 2014 and 2011 Results

<table>
<thead>
<tr>
<th>2014 (in 2016 $USD)</th>
<th>Direct Contribution</th>
<th>Multiplier Effects</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FPI</td>
<td>FPI Support</td>
<td>non-FPI</td>
</tr>
<tr>
<td>Output</td>
<td>$5,642,301,353</td>
<td>$676,974,725</td>
<td>$467,789,920</td>
</tr>
<tr>
<td>Employment</td>
<td>14,370.4</td>
<td>2,180.5</td>
<td>1,222.6</td>
</tr>
<tr>
<td>Compensation</td>
<td>$763,642,873</td>
<td>$99,596,923</td>
<td>$57,577,968</td>
</tr>
<tr>
<td>Prop Income</td>
<td>$94,749,775</td>
<td>$56,326,942</td>
<td>$36,989,988</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2011 (in 2011 $USD)</th>
<th>Direct Contribution</th>
<th>Multiplier Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forest Products</td>
<td>Non-Forest Products</td>
</tr>
<tr>
<td>Output</td>
<td>$5,063,915,031</td>
<td>$2,267,788,190</td>
</tr>
<tr>
<td>Employment</td>
<td>12,003</td>
<td>21,714</td>
</tr>
<tr>
<td>Labor Income*</td>
<td>$721,541,907</td>
<td>$960,935,289</td>
</tr>
</tbody>
</table>

* Labor Income = Employee Compensation + Proprietor Income
2014 Results: FPI’s Contribution to Maine

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Maine GDP</td>
<td>$55.1B</td>
<td>$55.8B (1.3%)</td>
</tr>
<tr>
<td>FPI Value Added</td>
<td>$3.5B</td>
<td>$3.1B (-11.4%)</td>
</tr>
<tr>
<td>Percent of GDP</td>
<td>6.38% (1 out of 15.7)</td>
<td>5.56% (1 out of 18.0) (-12.9%)</td>
</tr>
<tr>
<td>Total Economic Impact</td>
<td>$8.5B</td>
<td>$9.8B (+15.3%)</td>
</tr>
<tr>
<td>All Maine Jobs</td>
<td>794,279</td>
<td>810,672 (+2.1%)</td>
</tr>
<tr>
<td>FPI Jobs</td>
<td>38,789</td>
<td>38,956 (+0.4%)</td>
</tr>
<tr>
<td>Percent of Employment</td>
<td>4.88% (1 out of 20.5)</td>
<td>4.81% (1 out of 20.8) (-1.5%)</td>
</tr>
<tr>
<td>Total Payroll</td>
<td>$1,978.9M</td>
<td>$2,069.8M (+4.6%)</td>
</tr>
<tr>
<td>Total State &amp; Local Taxes</td>
<td>$320.1</td>
<td>$318.5M (-0.5%)</td>
</tr>
</tbody>
</table>
Final output by sector 2014:

- Pulp and paper products: 44%
- Wood products: 3%
- Plywood and veneer: 2%
- Sawmills: 7%
- Biomass electricity: 1%
- Housing construction: 0%
- Harvesting: 5%
- Machinery lease and repair: 1%
- Transportation: 2%
- Land lease and research: 0%
- Regeneration and management (incl. MFS): 1%
- Wood furniture: 1%
- All other sectors: 31%

Source: University of Maine
Percent of Output Impact Supported by Each FPI sector

- Pulp and Paper Products: 69%
- Wood Products: 6%
- Plywood and Veneer: 4%
- Sawmills: 11%
- Harvesting: 6%
- Biomass Electricity: 2%
- MFS: 0%
- Wood Furniture: 2%

Total: $9.8B
A major shift in wood markets has occurred!
## Accounting for closures

<table>
<thead>
<tr>
<th>Mill</th>
<th>Location</th>
<th>Estimated employment loss</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln Tissue &amp; Paper</td>
<td>Lincoln</td>
<td>180 (downsize)</td>
<td>November 2013</td>
</tr>
<tr>
<td>Katahdin Fuel &amp; Fiber</td>
<td>East Millinocket</td>
<td>200</td>
<td>February 2014</td>
</tr>
<tr>
<td>Verso</td>
<td>Bucksport</td>
<td>500</td>
<td>December 2014</td>
</tr>
<tr>
<td>Lincoln Tissue &amp; Paper</td>
<td>Lincoln</td>
<td>210</td>
<td>September 2015</td>
</tr>
<tr>
<td>Verso Androscoggin</td>
<td>Jay</td>
<td>300 (downsize)</td>
<td>October 2015</td>
</tr>
<tr>
<td>Expera</td>
<td>Old Town</td>
<td>200</td>
<td>November 2015</td>
</tr>
<tr>
<td>Covanta Energy (2)</td>
<td>West Enfield &amp; Jonesboro</td>
<td>44</td>
<td>March 2016</td>
</tr>
<tr>
<td>Madison Paper</td>
<td>Madison</td>
<td>200</td>
<td>May 2016</td>
</tr>
</tbody>
</table>
Accounting for closures

☐ Five pulp and paper mills and two biomass plants have closed since late 2013

☐ The results presented are based on the loss of 1,805 direct pulp and paper positions and then regaining 51 positions at Rumford
  ☐ We assume, on average, output per employee from the closed mills is only 65% of those which are still operating

☐ For the BioElectric closures, the 44 lost position are assumed to have equal per employee output to those that remain
## Results with recent closures

<table>
<thead>
<tr>
<th>2016 (in 2016 $USD)</th>
<th>Direct Contribution</th>
<th>Multiplier Effects</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pulp and Paper</td>
<td>FPI</td>
<td>FPI Support</td>
</tr>
<tr>
<td>Output</td>
<td>($918,679,755)</td>
<td>($70,039,682)</td>
<td>($71,305,941)</td>
</tr>
<tr>
<td>Employment</td>
<td>-1,754.0</td>
<td>-163.9</td>
<td>-178.3</td>
</tr>
<tr>
<td>Compensation</td>
<td>($126,122,301)</td>
<td>($8,522,660)</td>
<td>($8,596,209)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2016 (in 2016 $USD)</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>Bioelectric</td>
<td>FPI</td>
<td>FPI Support</td>
</tr>
<tr>
<td>Employment</td>
<td>-44</td>
<td>-26</td>
<td>-4</td>
</tr>
<tr>
<td>Compensation</td>
<td>($2,834,684)</td>
<td>($1,157,728)</td>
<td>($219,684)</td>
</tr>
<tr>
<td>Prop Income</td>
<td>$0</td>
<td>($1,069,575)</td>
<td>($186,216)</td>
</tr>
</tbody>
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<td></td>
<td>FPI</td>
<td>FPI</td>
<td>FPI Support</td>
</tr>
<tr>
<td>Output</td>
<td>$4,889,266,934</td>
<td>$617,574,623</td>
<td>$414,408,861</td>
</tr>
<tr>
<td>Employment</td>
<td>12,572.4</td>
<td>1,990.1</td>
<td>1,040.1</td>
</tr>
<tr>
<td>Compensation</td>
<td>$664,056,504</td>
<td>$93,717,637</td>
<td>$50,976,529</td>
</tr>
<tr>
<td>Prop Income</td>
<td>$93,099,947</td>
<td>$54,106,618</td>
<td>$32,933,481</td>
</tr>
</tbody>
</table>
Comparing 2014 and 2016

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<td>$55.4B (-1.8%)</td>
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<tr>
<td>FPI Value Added</td>
<td>$3.2 B</td>
<td>$2.7B (-15.6%)</td>
</tr>
<tr>
<td>Percent of GDP</td>
<td>5.67% (1 out of 17.6)</td>
<td>4.96% (1 out of 20.2) (-13.6%)</td>
</tr>
<tr>
<td>Total Economic Impact</td>
<td>$10.1 B</td>
<td>$8.5B (-15.8%)</td>
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<tr>
<td>All Maine Jobs</td>
<td>810,672</td>
<td>811,321 (+0.1%)</td>
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<td>38,956</td>
<td>33,538 (-13.9%)</td>
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<td>Percent of Employment</td>
<td>4.81% (1 out of 20.8)</td>
<td>4.13% (1 out of 24.2) (-14.1%)</td>
</tr>
<tr>
<td>Total Payroll</td>
<td>$2,149.4 M</td>
<td>$1,833.0M (-14.7%)</td>
</tr>
<tr>
<td>Total State &amp; Local Taxes</td>
<td>$330.5 M</td>
<td>$278.4M (-15.8%)</td>
</tr>
<tr>
<td>Economic impact</td>
<td>2011*</td>
<td>2014</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Total impact</td>
<td>$8.5 billion</td>
<td>$9.8 billion</td>
</tr>
<tr>
<td>Total payroll</td>
<td>$2.0 billion</td>
<td>$2.1 billion</td>
</tr>
<tr>
<td>Direct jobs</td>
<td>17,075</td>
<td>16,551</td>
</tr>
<tr>
<td>Total jobs</td>
<td>38,789</td>
<td>38,956</td>
</tr>
</tbody>
</table>

*2014 dollars. **2016 dollars.

*Source: Economic Contribution of Maine's forest products industry 2014 and 2016 (estimated)*
Conclusions

- FPI is still an important and integrated part of Maine’s economy
- $8.5B in total output impact
- The share of FPI as part of the total state GDP has slightly declined
  - $1 out of every $20 of state GDP is associated with the FPI
- 1 out of every 24 jobs in Maine is associated with the FPI
  - Employment in sawmills, plywood/veneer, and other wood products increased by 363 (from 4376.6 to 4739.6)
Maine’s Logging Economy

A study of the economic impact of professional logging in Maine
Logging: Economic Impact 2014

- Logging companies employed 4,632 workers
- Average capital expenditures per company were $626,000
- Worker wages and proprietor income exceeded $296 million

- Logging created an additional 2,710 indirect jobs
- Logging timber production value was $493 million
- Workers earned an average of $42,795/year

Maine logging contributed **$882 million** to the state’s economy in 2014
OUR CHALLENGES

Increased Operational Costs – Minimal Rate Increase

Reduced Markets

Low Profitability = Tight margins = Running on Equity

Longer hauls

High Workforce Demand = Low Workforce Supply

Contractors are going out of business and increased fiber costs are not a result of contractor wealth.
Maine in-state processing by product

Expected Market Loss 2016 - MFPC

Biomass est. loss 12%
Biomass 8%
Pellets 3%
Softwood sawlogs 16%
Hardwood sawlogs 8%
Softwood pulpwood 8%
Softwood pulpwood 10%
Hardwood pulpwood 32%
Hardwood pulpwood est. loss 3%

Expected Market Loss 2016 - MFPC
Estimated Pulpwood Consumption by Maine Pulp Mills
Estimates Based Upon INRS Data
MISSED OPPORTUNITIES

• Canadian industry asks for $200 million investment to develop game-changing products

LP locating in Minnesota

Louisiana-Pacific has purchased a shuttered board-making plant near Cook and is eyeing the site for a possible siding plant there, instead of in Hoyt Lakes.

LP officials Friday confirmed reports that they had purchased the former Ainsworth waferboard plant along U.S. Highway 53 near Cook. The company has been renting the site as a "laydown" site to store wood for its Two Harbors and Hayward plants.

Company spokesman Mark Morrison said LP is now considering the Cook site for a new siding plant instead of the proposed Hoyt Lakes site.

The News Tribune first reported in June that LP was ready to use state and Iron Range Resources and Rehabilitation Board incentives to build an all-new siding facility at a Hoyt Lakes industrial park. The new facility would produce LP's hot-selling SmartSide composite wood exterior home siding product.

While Minnesota officials have known they are competing against other possible sites in the U.S. and Canada, LP confirmed that Friday by saying it had swapped board plants in Canada with another company. LP is swapping ownership of its Chambord, Quebec, mill for Norbord's Val-d'Or, Quebec, mill, which now is in the running for the new siding plant.

As part of the deal, Norbord, which held a covenant over the deed of the Cook plant, has agreed to drop a noncompete clause that previously prevented any buyer of the property from opening any kind of wood products plant there.

"Once that covenant was dropped, it opened the door for Cook, which they had been looking at before Hoyt Lakes," said Mark Phillips, IRRRB commissioner.

Phillips said LP now is focusing on Cook for the new siding plant and its potential 250 jobs.

Ensyn breaks ground on new 10 million gallon advanced biofuels project in Quebec
Maine needs its own roadmap for forest products
Coming Spruce Budworm Outbreak: Initial Risk Assessment and Preparation & Response Recommendations for Maine’s Forestry Community

Jointly presented by:
Cooperative Forestry Research Unit (CFRU), University of Maine
Maine Forest Products Council
Maine Forest Service
Forest Industry Implementation Team
Maine Forest Economy Growth Initiative

 Recommendations to Strengthen and Diversify Maine’s Forest Industry and Rural Economies

December 2016

- Patrick Strauch, Maine Forest Products Council
- Donna Cassese, SAPPI North America
- Steve Schley, Pingree Associates
- Charlotte Mace, Biobased Maine
- Tom Doak, Maine Woodland Owners
- Dana Doran, Professional Logging Contractors (PLC) of Maine
- Stephen Shaler, University of Maine
- Jake Ward, University of Maine
- Peggy Daigle, former Town Manager/Consultant
- Andy Hamilton, Eaton Peabody Attorneys at Law
- Charlie Spies, CEI Capital Management
- Yellow Light Breen, Maine Development Foundation
We envision a thriving and diverse forest products industry that provides good jobs in vibrant rural Maine communities.

Goal 1. Sustain Maine’s existing forest products businesses

Goal 2. Attract capital investments and develop greater economic prosperity in the forest products sector across the State for both existing and new businesses

Goal 3. Support the revitalization of Maine’s rural communities as places where people want to live, work and visit.
9 Priorities

A. Conduct a global market assessment to assess future demand for Maine wood products.

B. Conduct a statewide wood supply analysis to attract new markets.

C. Conduct a transportation analysis to determine where infrastructure improvements are necessary to increase profitability for the forest products value chain.

D. Support and grow markets for low-value, underutilized wood and biomass utilizing state-of-the-art Combined Heat and Power (CHP) biomass plants, micro-grids, and modern thermal systems.

E. Invest in the research, development, and commercialization of emerging wood technologies such as forest bioproducts as an opportunity for the utilization of low value fiber.

F. Support small landowners who want to grow and harvest more wood.

G. Invest in logger and forest products workforce development with high-tech and automation.

H. Redevelop and reutilize or repurpose Maine’s closed mill industrial sites.

I. Diversify and strengthen Maine’s rural economy.
Maine Forest Economy Growth Initiative

Global market assessment | Benchmark states and countries | SWOT analysis (strengths, weaknesses, opportunities and threats) | Forest modeling: Phase I & II: Availability of fiber | Transportation study | Combined heat and power | Emerging technologies

INTEGRATED PLAN: Synthesizing results from the previous stages into a comprehensive and achievable vision for Maine’s forest sector.

MARKETING PLAN: Informs potential investors about the business resources and manufacturing site options that might fit their objectives is to be included.
Executive Committee

10-12 people, including Industry co-chairs, MFPC, Biobased Maine, MWO, PLC, University of Maine, Maine Forest Service, and Task Team Chairs

Roadmap Advisory Group

30 people, including at least 2 each from landowners, pulp and paper, sawmills, logging and trucking, biomass/wood energy, also University of Maine, Governor’s office, legislators, MTI, MITC

Global Market and Benchmarking Subcommittee
Donna Cassese, SAPPI
Charlotte Mace, Biobased Maine
Steve Schley, Pingree Assoc.

Wood Fiber Availability Subcommittee
MFS
Aaron Weiskettle, U Maine
Peter Triandafillou, Huber Resources
Jim Contino, VERSO
Tom Doak, MWO

Subsector Analysis Subcommittee
Aaron Weiskettle, U Maine
Patrick Strauch, MFPC

Transportation Subcommittee
Dana Doran, PLC
Tony Lyons, Catalyst

CHP Subcommittee
Bob Linkletter
Jim Robbins Sr.
Dana Doran, PLC
Sarah Boggess, ReEnergy

Emerging Technologies Subcommittee
Jake Ward, U Maine
Steve Shaler, U Maine
Charlotte Mace, Biobased Maine
Jim Robbins Sr.

Subsector Analysis Subcommittee

Integration Subcommittee

Marketing Plan Subcommittee
Biomass energy

• Stored Solar

• PUC contract

• Movement toward

Combined Heat and Power (CHP)
Low-grade wood

- Panel manufacturing
- Medium density fiberboard (MDF)
Dimension lumber

- Housing starts increase
- Capacity to expand sawmills
- New products, such as cross-laminated timber

When complete, 475 West 18th, a 10-story residential building, will be the first structural timber building in New York City. The design by SHoP Architects was one of two winners of the U.S. Tall Wood Building Prize, sponsored by the Department of Agriculture.

JD Irving announces $30 million investment in Aroostook County mill, to create 60 jobs
Paper mills

Grade switches:

• Tissue
• Labels
• Box board
• Fluff pulp

The Woodland Mill in Baileyville spent $150 million to purchase and bring online on two new tissue machines — work that lasted for more than two years. *Photo by Bangor Daily News*
Sappi to pump $165 million into Skowhegan mill
Potential biobased opportunities

- Nanocelluose (papermaking, cosmetics, foam insulation, thickening foods)
- Bioplastics (food containers, packaging, 3D printing)
- Advanced biofuels (for planes and ships)

This Shelby Cobra was 3D printed at the Department of Energy’s Manufacturing Demonstration Facility at the Oak Ridge National Laboratory.
Sappi North America launches paper inspired by shark skin

Magnified shark skin. Sappi North America has launched a “first of its kind” casting and release paper inspired by the texture of shark skin which will be made at Sappi’s Westbrook mill. The product creates surfaces that inhibit bacterial growth without the use of toxic additives or chemicals.
Thank you.