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**Economic Contribution of Maine's Forest Products Industry,
2014 and 2016 (estimated)**

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SUMMARY OF MAIN FINDINGS: 2014

- The Maine forest products industry had a total estimated 2014 statewide economic impact contribution, including multiplier effect, of \$9.8B in sales output, 38,956 supported full- or part-time positions, and \$2.1B in labor income (Table 1).
- The total direct employment in the forest product industry of 16,551 jobs supported an additional 22,405 jobs in Maine, for a total of 38,956 jobs associated with the forest products industry. This was 4.81% of the employment in Maine. That is, just over 1 out of 21 jobs in Maine were associated with the forest product industry (Table 2).
- The total economic impact contributions of Maine's forest product industry provided an estimated \$318.5M in state and local taxes.
- Maine's forest product industry contributed an estimated \$3.1B in value added impact (see explanatory information). This made up 5.56% of Maine's gross regional product for 2014.

SUMMARY OF MAIN FINDINGS: 2016 Estimate (see explanatory information)

- The Maine forest products industry has a total estimated 2016 statewide economic impact contribution, including multiplier effect, of \$8.5B in sales output, 33,538 supported full- or part-time positions, and \$1.8B in labor income (Table 3).
- The total direct employment in the forest product industry of 14,562.5 jobs supports an additional 18,975 jobs in Maine, for a total of 33,538 jobs associated with the forest products industry. This is 4.13% of the employment in Maine. That is, just under 1 out of 24 jobs in Maine are associated with the forest product industry (Table 4).
- The total economic impact contributions of Maine's forest product industry provides an estimated \$278.4M in state and local taxes. The industry's tax base is about 3.3% of its output. This is comparable to the previous study in Maine and a study in Minnesota, from 2013 and 2011, respectively. The tax base for these studies was 3.8% and 3.6%, respectively.
- Maine's forest product industry contributes an estimated \$2.7B in value added impact. This makes up 4.96% of Maine's gross regional product for 2016; just under \$1 out of every \$20 of Maine's gross regional product is associated with the forest products industry.
- The forest products industry impacts business of every type in Maine. The forest products industry makes specific purchases based on their operational needs. However, forest industry employees have a much wider range of purchases and bring forest product industry dollars to all aspects of Maine's economy (Table 5).
- The impact of the forest products industry on every county in the state can be seen in the statewide distribution of employment (Table 6).

Table 1. Estimated annual economic impact of the forest products industry (FPI) in Maine, 2014.

2014 (in 2014 \$USD)	Direct Contribution	Total Multiplier Effects (Indirect + Induced)			Total Impact
	FPI	FPI	FPI Support	non-FPI	Total
Output	\$5,642,301,353	\$676,974,725	\$467,789,920	\$2,987,544,490	\$9,774,610,488
Employment	14,370	2,181	1,223	21,182	38,956
Compensation	\$763,642,873	\$99,596,923	\$57,577,968	\$852,493,180	\$1,773,310,944
Proprietor Income	\$94,749,775	\$56,326,942	\$36,989,988	\$108,411,044	\$296,477,749

Table 2. Comparison of 2014 and 2011 estimates of economic impact, in 2014 \$USD.

	2011 (in 2014 \$USD)	2014 Estimate (in 2014 \$USD) (change)
Maine GDP	\$55.1B	\$55.8B (+1.3%)
FPI Value Added	\$3.5B	\$3.1B (-11.4%)
Percent of GDP	6.38% (1 out of 15.7)	5.56% (1 out of 18.0) (-12.9%)
Total Economic Impact	\$8.5B	\$9.8B (+15.3%)
All Maine Jobs	794,279	810,672 (+2.1%)
FPI Jobs	38,789	38,956 (+0.4%)
Percent of Employment	4.88% (1 out of 20.5)	4.81% (1 out of 20.8) (-1.5%)
Total Payroll	\$1978.9M	\$2069.8M (+4.6%)
Total State and Local Taxes	\$320.1	\$318.5M (-0.5%)

Table 3. Estimated annual economic impact of the forest products industry (FPI) in Maine, 2016.

2016 (in 2016 \$USD)	Direct Contribution	Total Multiplier Effects (Indirect + Induced)			Total Impact
	FPI	FPI	FPI Support	non-FPI	Total
Output	\$4,889,266,934	\$617,574,623	\$414,408,861	\$2,620,051,284	\$8,541,301,702
Employment	12,572.4	1,990.1	1,040.1	17,935.4	33,538.0
Compensation	\$664,056,504	\$93,717,637	\$50,976,529	\$748,919,925	\$1,557,670,595
Proprietor Income	\$93,099,947	\$54,106,618	\$32,933,481	\$95,226,720	\$275,366,766

Table 4. Comparison of 2016 and 2011 estimates of economic impact, in 2016 \$USD.

	2011 Estimate (in 2016 \$USD)	2016 Estimate (in 2016 \$USD) (change)
Maine GDP	\$55.7 Billion	\$55.4B (-0.5%)
FPI Value Added	\$3.5B	\$2.7B (-21.7%)
Percent of GDP	6.38% (1 out of 15.7)	4.96% (1 out of 20.2) (-22.2%)
Total Economic Impact	\$8.6B	\$8.5B (-1.2%)
All Maine Jobs	794,279	811,321 (+2.1%)
FPI Jobs	38,789	33,538 (-13.5%)
Percent of Employment	4.88% (1 out of 20.5)	4.13% (1 out of 24.2) (-15.3%)
Total Payroll	\$1,999.0M	\$1,833.0M (-8.3%)
Total State and Local Taxes	\$323.4M	\$278.4M (-13.9%)

Table 5. Top 25 Employment Impacts on other sectors of Maine’s Forest Product Industry, 2016.

<i>Sector Description</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
<i>Wholesale trade</i>	1,569.5	220.7	1,790.2
<i>Management of companies and enterprises</i>	848.7	64.2	912.9
<i>Full-service restaurants</i>	266.7	521.0	787.7
<i>Transportation</i>	681.3	49.6	730.9
<i>Hospitals</i>	0.0	603.5	603.5
<i>Limited-service restaurants</i>	203.5	384.1	587.6
<i>Services to buildings</i>	423.6	126.2	549.8
<i>Maintenance and repair construction of nonresidential structures</i>	451.4	69.9	521.3
<i>Retail - Food and beverage stores</i>	21.9	314.3	336.2
<i>Architectural, engineering, and related services</i>	299.2	32.2	331.3
<i>Automotive repair and maintenance, except car washes</i>	145.2	184.1	329.3
<i>Retail - General merchandise stores</i>	73.7	253.8	327.5
<i>Business support services</i>	271.4	52.4	323.8
<i>Accounting, tax preparation, bookkeeping, and payroll services</i>	261.4	61.6	323.0
<i>Independent artists, writers, and performers</i>	221.9	77.3	299.1
<i>Nursing and community care facilities</i>	0.0	293.1	293.1
<i>Landscape and horticultural services</i>	211.8	76.3	288.1
<i>All other food and drinking places</i>	46.2	240.9	287.1
<i>Employment services</i>	199.3	86.9	286.1
<i>Monetary authorities and depository credit intermediation</i>	143.4	141.2	284.6
<i>Offices of physicians</i>	0.0	280.2	280.2
<i>Warehousing and storage</i>	228.6	43.8	272.4
<i>Individual and family services</i>	0.0	239.0	239.0
<i>Marketing research and all other miscellaneous professional, scientific, and technical services</i>	187.0	30.0	217.0
<i>Retail - Motor vehicle and parts dealers</i>	70.4	135.2	205.6

Table 6. Employment Impacts of the Forest Products Industry, by county.

County	Direct County Employment in FPI	Multiplier State Employment due to FPI in County	Multiplier County Employment due to FPI in State
2014			
Androscoggin	1,131.6	2,170.5	1,837.9
Aroostook	1,910.5	3,256.3	1,277.8
Cumberland	905.7	1,532.2	6,639.6
Franklin	1,324.3	2,830.8	566.5
Hancock	531.6	1,123.8	1,102.2
Kennebec	695.2	1,409.1	2,217.1
Knox	306.9	209.1	846.9
Lincoln	73.9	96.2	565.1
Oxford	1,662.1	3,152.0	849.2
Penobscot	1,777.8	2,563.8	2,850.4
Piscataquis	312.1	328.7	277.4
Sagadahoc	78.3	64.2	605.1
Somerset	1,868.2	3,153.5	955.3
Waldo	206.4	246.1	535.3
Washington	861.6	1,538.1	588.7
York	724.2	911.3	2,871.2
2014 Total	14,370.4	24,585.5	24,585.5
2016			
Androscoggin	941.2	1,773.2	1,558.6
Aroostook	1,722.0	2,878.3	1,104.9
Cumberland	802.2	1,328.1	5,628.8
Franklin	1,061.5	2,289.7	486.3
Hancock	417.2	898.3	936.2
Kennebec	559.6	1,141.7	1,881.0
Knox	306.9	209.1	724.3
Lincoln	73.9	96.2	480.4
Oxford	1,446.9	2,727.7	735.4
Penobscot	1,598.4	2,188.3	2,438.7
Piscataquis	311.0	324.5	240.3
Sagadahoc	78.3	64.2	512.7
Somerset	1,633.8	2,691.3	834.7
Waldo	206.4	246.1	455.5
Washington	715.8	1,250.6	508.6
York	697.3	858.3	2,439.4
2016 Total	12,572.4	20,965.7	20,965.6

Table 7. Forestry, Logging, Hauling, and Bioelectric Impacts, 2014 (in 2014\$)

2014 (in 2014 \$USD)	Direct Contribution	Multiplier Effects			Total Impact
		F/L/H/B FI	FPI	FPI Support	
Output	\$345,070,608	\$75,535,725	\$50,902,398	\$273,048,888	\$744,567,619
Employment	3,611.5	351.7	127.9	2,157.5	6,248.6
Compensation	\$161,237,254	\$15,236,889	\$6,768,542	\$78,271,049	\$261,513,734
Prop Income	\$49,633,616	\$13,707,439	\$5,312,626	\$10,568,922	\$79,222,603

Table 8. Lumber, Plywood, Veneer, Engineered Products, Furniture, & other solid Wood Products Impacts, 2014 (in 2014\$)

2014 (in 2014 \$USD)	Direct Contribution	Multiplier Effects			Total Impact
		Solid Wood	FPI	FPI Support	
Output	\$1,146,523,300	\$282,908,419	\$106,129,887	\$724,534,977	\$2,260,096,583
Employment	4,837.2	1,060.5	265.2	5,322.4	11,485.3
Compensation	\$181,735,234	\$45,866,586	\$12,329,385	\$211,707,791	\$451,638,996
Prop Income	\$21,114,056	\$27,776,047	\$8,540,486	\$27,169,624	\$84,600,213

Table 9. Pulp and Paper Manufacturing Impacts, 2014 (in 2014\$)

2014 (in 2014 \$USD)	Direct Contribution	Multiplier Effects			Total Impact
		Pulp and Paper	FPI	FPI Support	
Output	\$4,150,697,445	\$318,530,586	\$310,757,639	\$1,989,960,616	\$6,769,946,286
Employment	5,921.7	768.1	829.4	13,702.7	21,221.9
Compensation	\$420,670,385	\$38,493,441	\$38,480,039	\$562,514,350	\$1,060,158,215
Prop Income	\$24,002,103	\$14,843,447	\$23,136,879	\$70,672,503	\$132,654,932

Table 10. Impacts attributable to each FPI sector, 2014 (in 2014 \$USD)

FPI Sector	Employment Impact	Output Impact (Total Impact)	Value Added Impact
F/L/H/B FI	6,248.6	\$744,567,619	\$482,003,719
Solid Wood	11,485.3	\$2,260,096,583	\$788,963,456
Pulp and Paper	21,221.9	\$6,769,946,286	\$1,854,139,878
Maine	38,955.9	\$9,774,610,488	\$3,125,107,053

Explanatory information

1. This study was requested by the Maine Forest Products Council to update information last generated in 2013 from 2011 data.
2. The forest products industry in Maine consist of business, organizations, and individuals involved in one of eight primary industries. These are harvesting (including forestry); biomass electricity generation; sawmills; plywood and veneer (and engineered wood product manufacturing); pulp and paper manufacturing; wood furniture; wood products (other non-glued products); wood products manufacturing; and the Maine Forest Service (Table A1).
3. *Direct impacts* arise from the sector's employment of workers, wages, production value (direct sales), and the value they add to the inputs in the production process. *Indirect impacts* result from the sector's purchases of goods and services from supporting sectors as a part of doing business – for example, the purchase of a piece of harvest equipment from an equipment dealer that sells to other industries as well. As these supporting sectors produce the goods and services needed by the sector of interest, they generate indirect employment, wages, production, and value-added. Value added is made up of employee compensation, proprietor income or profit, other incomes, and taxes on imports and production. *Induced impacts* are those generated by the household purchases of goods and services of employees in both the primary and support sectors. The direct effect of production activity in a sector thus has additional effects that are larger and are collectively called *multiplier effects* (multiplier = indirect + induced effects).
4. The Forest Products Industry has both direct and multiplier effects because the sectors within the FPI purchase from other FPI sectors. For example, some of the multiplier impact of sawmills occurs in the pulp and paper sector as sawmills purchase paper in order to conduct business. Harvesting and forest management support all other sectors of the industry.
5. Total economic impact, including multiplier effects, were estimated using an economic impact model (IMPLAN), based on known information on total employment, total labor income, and total output of the sectors of interest.
6. Total output, employment, and labor income numbers are derived from the most recent available data (in general, 2014) from the U.S. Bureau of Labor Statistics, U.S. Census Bureau Nonemployer Statistics, U.S. Census Bureau Survey of Manufacturers, Maine Forest Service, and IMPLAN.
7. Direct output, employment, and labor income in pulp and paper and biomass electricity sectors were adjusted to account for known mill closures in 2014, 2015 and January through May of 2016 to arrive at a “current” estimate. The 2016 estimate numbers therefore assume no changes in output, employment, and labor income between 2014 and May 2016 in the other six primary sectors (except for reductions in multiplier effect due to the adjusted output). Actual 2016 data, when released, will differ from that used here, as will final calculations of 2016 economic impact.
8. The adjustments made accounted for 5 closures and 2 downsizings of pulp and/or paper mills and 2 biomass electricity generating plant closures (Table A2). Decreases in employment numbers were taken from published media reports or industry knowledge. To estimate decreased output, estimates of aggregate input for the closed mills were calculated by MFPC

and the ratio of employment to input for closed mills was used to adjust estimated reductions in output. The 2014 output amount was adjusted downward by 35%.

9. All prices were adjusted to 2014 or 2016 \$USD directly in IMPLAN or using published price indices. The IMPLAN adjustment adjusts each sector individually while the CPI method uses a single conversion factor for everything. For this reason, using the IMPLAN adjustment is preferred to the CPI adjustment when available since it is based on much more detail information. The 2014 and 2016 results could be directly adjusted in IMPLAN, while the 2011 results were adjusted using published CPI.
10. County level employment impact estimates for 2014 and 2016 were calculated based on the share of direct employment in the county in the primary forest products sectors.
11. County level multiplier employment impacts can be expressed in two ways (Table 6). The direct employment counts that occurring in the county that is in the FPI sectors. Multiplier state employment (column 2) refers to the state-level employment impact of the FPI activities occurring within the county. Multiplier county employment (column 3) refers to the impact employment that occurs within the county due to the FPI in the state. These two factors can be very different depending on the county. For example, in 2014, Aroostook County had the highest direct county-level employment in the industry (1,910.5). In addition, the FPI business activity occurring in Aroostook County supported an additional 3,256.3 jobs across the state, for a total impact of 5,166.8 jobs resulting from the forest products industry in Aroostook County. In contrast, Cumberland County has lower direct FPI employment (905.7) and therefore FPI activity within the county supports fewer multiplier jobs across the state (1,532.2). However, the presence of the FPI in the state results in a large amount of multiplier impact employment that occurs in Cumberland County – 6,639.6. This is due to the preponderance of support industries such as financial services, hospitals, restaurants, etc. that are located in the county. The combination of columns 1 and 2 in Table 6 are most equivalent to the county-level numbers reported in Table 3 of the 2013 report, “Economic Contribution of Maine’s Forest Products Sector”.

Table A1. Forest Product Sectors and associated subsectors and NAICS Codes.

FPI Primary Sector	Subsector	NAICS Codes
Harvesting	Forestry, forest products, and timber tract production	1131
	Commercial logging	1133
Biomass Electricity	Biomass electricity	221117
Sawmills	Sawmills	321113
	Wood preservation	321114
	Cut stock, resawing lumber, and planing	321912
Plywood and Veneer	Veneer and plywood manufacturing	321211
	Engineered wood member and truss manufacturing	321213
	Engineered wood member and truss manufacturing	321214
	Reconstituted wood product manufacturing	321219
Wood Products	Wood container and pallet manufacturing	321920
	Manufactured home (mobile home) manufacturing	321991
	Prefabricated wood building manufacturing	321992
	All other miscellaneous wood product manufacturing	321999
Pulp and Paper	Pulp, paper, and paperboard mills	3221
	Converted paper product manufacturing	3222
Wood Furniture	Wood kitchen cabinet and countertop manufacturing	337110
	Nonupholstered wood household furniture manufacturing	337122
	Wood office furniture manufacturing	337211
	Custom architectural woodwork and millwork	337212
<i>Maine Forest Service*</i>		<i>N/A</i>
FPI Support Sector	Subsector	Codes
Regeneration and Management	Greenhouse, nursery, and floriculture production	1114
	Support activities for agriculture and forestry	115
	Management consulting services	54161
Machinery Lease and Repair	Farm machinery and equipment manufacturing	333111
	Sawmill, woodworking, and paper machinery	333243
	Sawmill, woodworking, and paper machinery	333292
	Sawmill, woodworking, and paper machinery	333210
	Commercial and industrial machinery and equipment rental and leasing	5324
	Commercial and industrial machinery and equipment repair and maintenance	8113
Transportation	Rail transportation	482
	Truck transportation	484
Land Lease	Land Lease	531190
Research	Environmental and other technical consulting services	541620
	Environmental and other technical consulting services	541690
	Scientific research and development services	5417

Table A2. Mill/plant closures and downsizing accounted for in 2016 estimates.

Mill	Location	Estimated employment loss	Date
Lincoln Tissue & Paper ¹	Lincoln	180 (downsize)	November 2013
Katahdin Fuel & Fiber	East Millinocket	200	February 2014
Verso ²	Bucksport	500	December 2014
Lincoln Tissue & Paper ³	Lincoln	210	September 2015
Verso Androscoggin ⁴	Jay	300 (downsize)	October 2015
Expera ⁵	Old Town	200	November 2015
Covanta Energy (2) ⁶	West Enfield & Jonesboro	44	March 2016
Madison Paper ⁷	Madison	200	May 2016

¹ <http://bangordailynews.com/2015/09/28/news/penobscot/lincoln-paper-company-files-for-bankruptcy/>

² <http://bangordailynews.com/slideshow/bucksport-residents-workers-mark-final-shift-at-closing-paper-mill/>

³ <http://bangordailynews.com/2015/09/28/news/penobscot/lincoln-paper-company-files-for-bankruptcy/>

⁴ <http://www.centralmaine.com/2015/10/26/jay-workers-get-layoff-notice-paper-machine-shuts-down/>

⁵ <http://bangordailynews.com/2015/09/29/news/bangor/owners-announce-closure-of-old-town-pulp-mill/>

⁶ <http://bangordailynews.com/2016/01/07/business/biomass-plants-in-west-enfield-jonesboro-to-close/>

⁷ <http://bangordailynews.com/2016/05/25/news/mid-maine/madison-paper-mill-shuts-down/>