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The Economic Contribution of Logging and Trucking in Maine

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THE ECONOMIC CONTRIBUTION OF LOGGING AND TRUCKING IN MAINE[1]

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EXECUTIVE SUMMARY

Maine's forest products industry has long been hailed as a backbone of the state's economy. Multiple reports have been commissioned detailing the economic role of the sector (e.g. Bailey, 2019; Anderson III and Crandall, 2016; Gabe, 2013). It was recently was estimated that the forest products industry contributed $7.7 billion in output to the state's economy in 2016 (Bailey, 2019).

An essential component of the industry is logging – which directly effects the availability and cost of delivered wood. In 2014, researchers set out to specifically highlight the logging industry's economic role in Maine (Crandall, McCullock, Bick, Kizha, 2016). The work presented here aims to update and build upon that report.

HIGHLIGHTS OF MAIN FINDINGS

- *Economic Impact Analysis (2017)*

  - The estimated overall annual (2017) economic contribution of Maine's logging and trucking industries[5], including multiplier effects, was an estimated $619 million in output, 9 thousand jobs and $342 million in labor income (Table 7).

  - The total economic contribution of Maine's logging industry in 2017 was associated with an estimated fiscal impact of $25 million in state and local taxes. This tax impact is equivalent to 4% of the logging sector's total (output) economic contribution.

  - Maine's logging industry impacts businesses across the entire state through the activities of logging companies (organizations and individuals) and the purchases that they (and their employees) make. The total employment impact varies from an estimated 2,465 jobs in Penobscot County to 42 jobs in Lincoln County (Table 8).

- *Survey of Industry (2018)*

  - Forty-four percent of the Professional Logging Contractor's member companies responded to the survey - accounting for 833 full-time equivalent positions in the industry in 2018. The responding firms reported an average of 13 full-time equivalent employees (Table 1).

  - On average, survey respondents had 42 operational weeks in 2018 and harvested a combined 91,000 acres (averaging 1,621 acres per firm).

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[5] Only trucking contributions associated with the logging industry, as estimated by the Maine IMPLAN model, are included in these results

o The harvesting methods among survey respondents were largely mechanized, with whole-tree operations dominating. Fifty-six percent of firm crews reported were whole-tree, 35% were cut-to-length, and 8% were manual/hand-crews (Table 2 and Figure 5).

o Most respondents (26%) trucked either all or the majority (37%) of the material harvested by their firm. Thirteen percent rarely (less than 50% of the time) trucked their own material and 24% contracted with an outside source for *all* of their trucking needs (Table 3).

o Respondents reported a total volume of 1.9 million tons of sawtimber, 1.5 million tons of pulpwood and 429 thousand tons of biomass in 2018. That is, survey respondents harvested 44%, 27%, and 19% of the state's total harvest of sawtimber, pulpwood and biomass, respectively (Figure 6 and Table 4).

o Respondents reported $21.1 million in new capital investment – 76% of which was spent on new equipment. The interest dollars generated in 2018 are cautiously estimated to be $760 thousand (Tables 5 and 6).

1. SURVEY

A one-page survey was distributed to all member companies (150) of the Professional Logging Contractors of Maine (PLC) throughout the summer of 2019. Companies had the option to fill the survey out on-line or via hard copy. The final response rate was 44% (n=66). This is slightly lower than the 60% response rate obtained during the 2014 survey implementation but more in line with typical survey response rates, even within the industry (e.g. Koirala et al. (2017) had a response rate of 31%).

The survey asked for information on average weeks of operation, harvested acres, harvested totals (sawtimber, pulpwood, and biomass), number (and type) of crews, full-time equivalent employees, and for details on new capital investments for 2018. The instrument was similar to that used in 2014, enabling comparison across years where appropriate.

a. Employment and Number of Firms

The PLC divides member companies into four classes[6] based on the size of their annual operation (by tons harvested or number of employees). As in the original study, a majority of survey respondents (63%) were firms located in Class sizes III and IV (Figure 1).
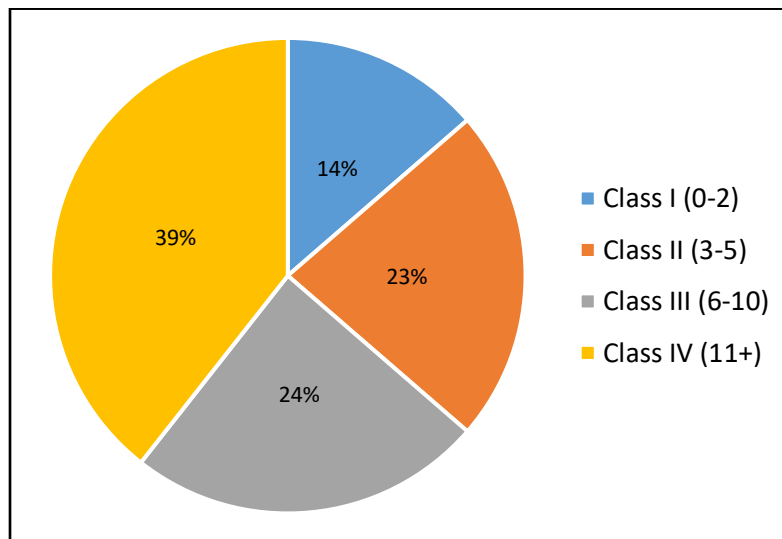

Figure 1. Size Category of Survey Respondent Logging Firms Based On Number of Employees, 2018

When binning the survey respondents into the firm class categories used by state and federal agencies[7], it becomes clear that the survey sample disproportionally represents larger firms (Figure 2). According to the Bureau of Labor Statistics Quarterly Census of Employment and Wages, Maine's logging sector is

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[6] Class I - 25,000 tons and under or 0-2 employees, Class II – 25,0001 tons to 50,000 tons or 3-5 employees, Class III – 50,001 tons to 100,000 tons or 6-10 employees, Class IV – 100,001 tons and above or 11 or more employees.

[7] Class I: 0-4 employees, Class II: 5-9 employees, Class III: 10-19 employees, Class IV: 20-49 employees, Class V: 50-99 employees, Class VI: 100-249 employees. Please note, more size categories exists but are not included here as none of Maine's logging firms reported having more than 249 employees in 2018.

heavily dominated by small businesses, with an average (between 2006 and 2016) of 67% of employing establishments in the industry employing fewer than 5 people. Additionally, 1,719 non-employer entities in the logging and harvest sector were reported in Maine during 2017. These entities are overwhelmingly (94%) sole proprietorships. As compared with the overall industry, survey respondents overrepresented the larger companies operating in the state. Only 32% of survey respondents reported fewer than 5 employees compared with 67% (on average) in the industry statewide.
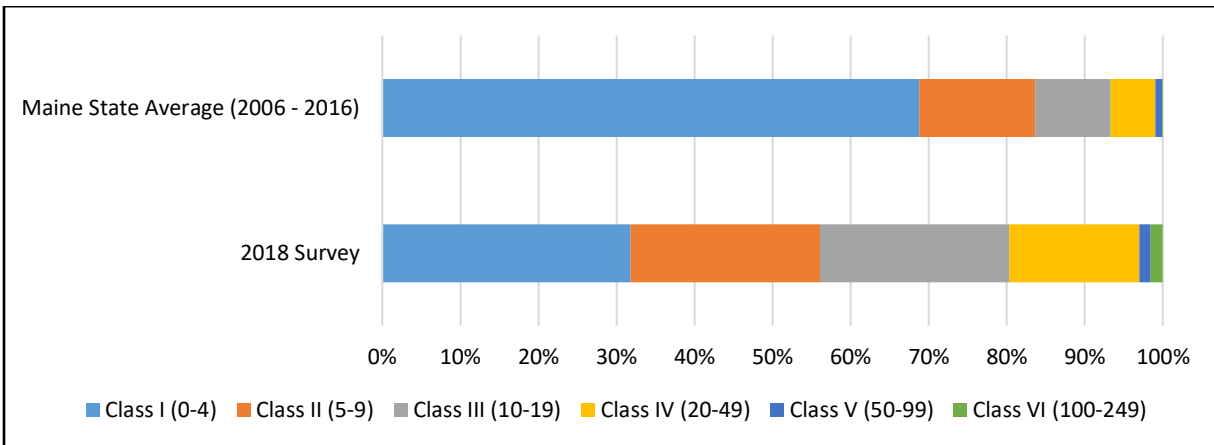

Figure 2. Size Categories of Survey Respondent Logging Firms by Number of Employees Compared to the Size Categories of All Maine Logging Firms (Average 2006-2016). Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

As in 2014, the majority of respondent employees work in the woods, on average 7 per firm; an additional average of 2 per firm provide office support, 3 trucking and 1 mechanical support (Table 1). It is notable that the average number of wood-based employees per firm, as calculated from survey responses, is a little more than half of what it was in 2014.

Table 1. Full-Time Equivalent Employees Within Each Survey Respondent Firm by Duties: 2014 and 2018

	2014				2018			
	Average	Total	Percent	Maximum	Average	Total	Percent	Maximum
In-Woods	12	578	54%	46	7	450	54%	45
Support	2	126	12%	8	2	124	15%	10
Trucking	6	269	25%	25	3	194	23%	20
Mechanics	2	93	9%	9	1	65	8%	10
Total	22	1,066			13	833		

Using information from the U.S. Bureau of Labor Statistics on forestry and logging businesses (those with employees, not sole proprietors), both the number of employees and establishments in the industry have declined since 2006 by 14% and 7%, respectively (Figures 3 and 4). Average annual earnings adjusted for inflation have increased approximately 9% since 2001, peaking in 2015.
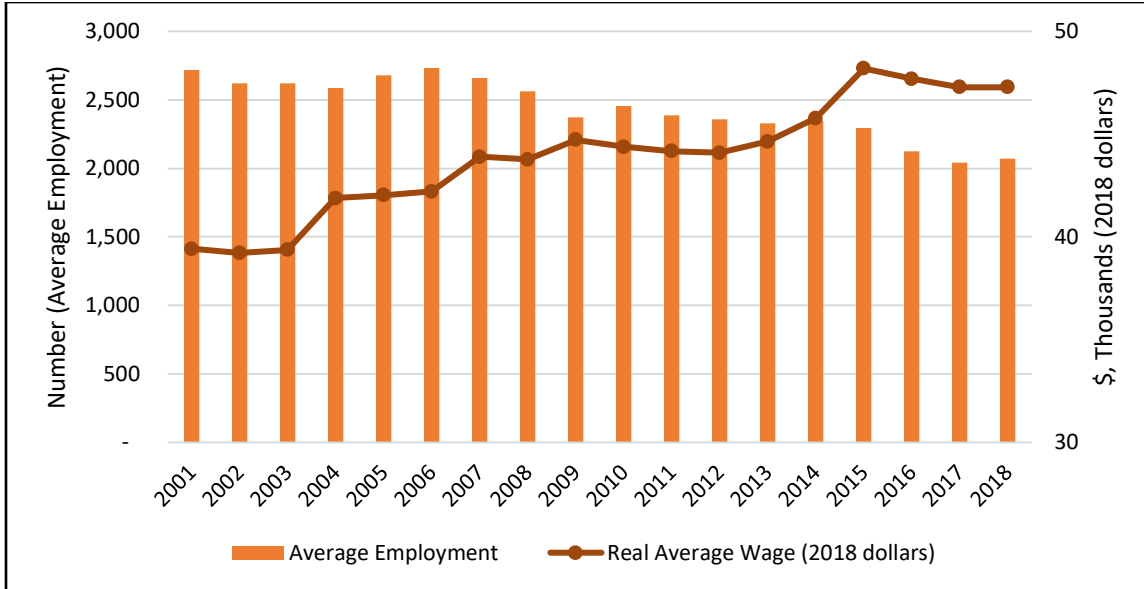
Figure 3. Trends in Forestry and Logging Employment and Average Annual Wages for Covered Employers, 2001 - 2018. Source: U.S. Bureau of Labor Statistics, Quarterly Census of Labor and Wages
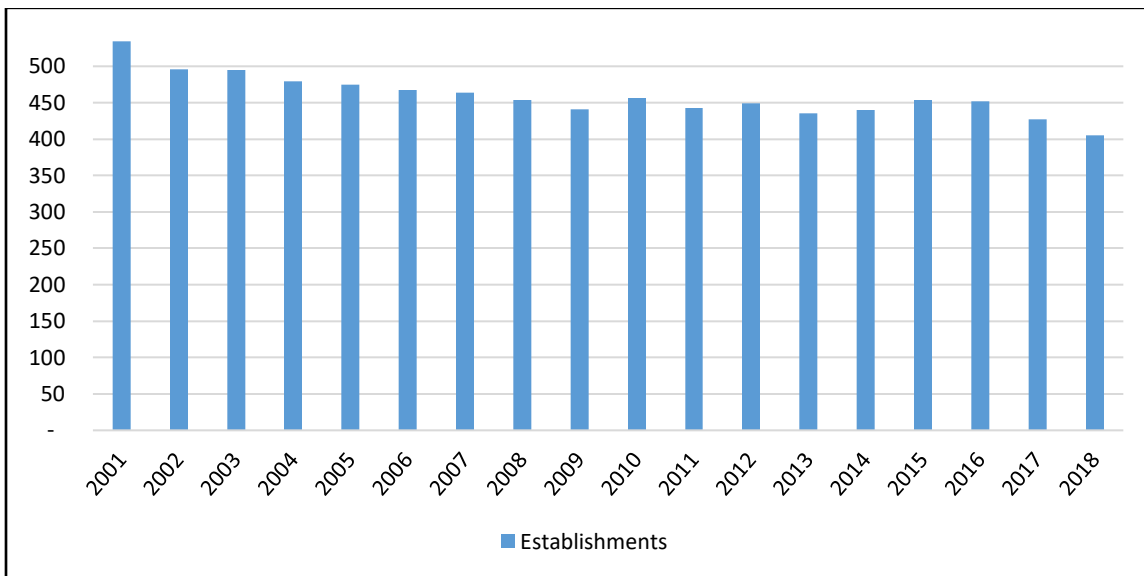

Figure 4. Trends in the Number of Forestry and Logging Establishments for Covered Employers, 2001 - 2018. Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

b. Crew Types and Trucking

Harvesting in Maine remains mechanized, requiring skilled workers (Table 2). Survey respondents employed a total of 144 crews in 2018, 56% of which were whole-tree operations.[8] A lesser proportion (35%) of crews used a cut-to-length system (harvesters and forwarders delivering log-lengths to the landing) while even fewer, 8%, relied on chainsaws and cable skidders (hand crews).

Table 2. Summary Statistics on Survey Respondent Logging Firms Crew Types

	Whole-Tree		Cut-to-Length		Hand Crew	
	2014	2018	2014	2018	2014	2018
Total	108	81	44	51	19	12
Percent	63%	56%	26%	35%	11%	8%
Average	2	1	1	<1	<1	<1

Respondent companies employed slightly fewer crews on average in 2018 than in 2014. Interestingly, the proportion of cut-to-length crews (while still a minority) increased in 2018 (Figure 5).
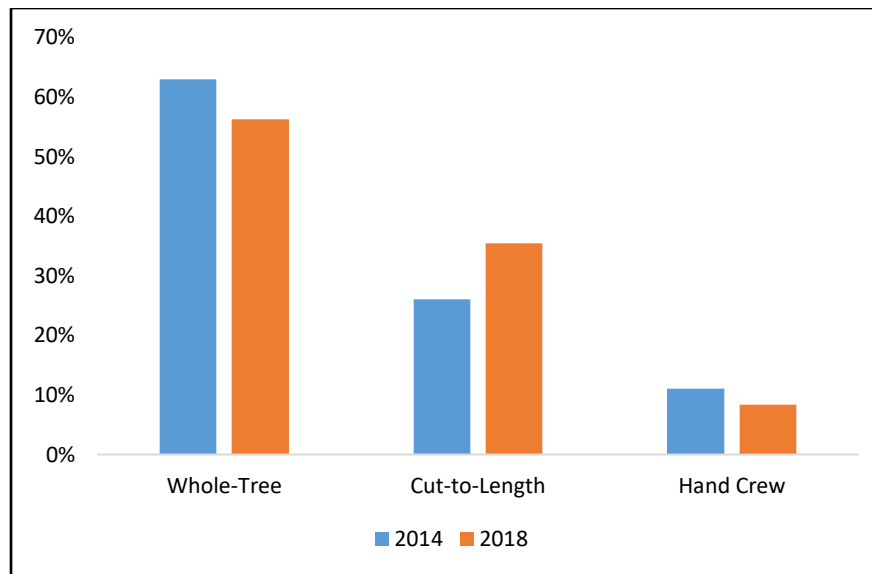

Figure 5. Survey Respondent Firm Crews by Type

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[8] Feller-buncher fells, grapple skidder delivers the whole tree to the landing, and stroke delimbers processing at the landing.

Trucking is an essential component of the forest products industry that is often difficult to account for. Many truckers (an occupation) work for multiple industries while others are employed exclusively in or for the logging or other forest product sector.

Table 3. Proportion of Trucking Done Within Survey Respondent Companies

	Contracted Outside Source for Hauling	Rarely Hauled (<50%)	Hauled often (>50%)	Hauled All Harvested Material
2018 Survey	38%	3%	22%	37%
2014 Survey	24%	13%	37%	26%

Results presented here show how frequently respondent companies hauled their harvested material themselves (versus contracting with an outside source). Across both years most responding firms hauled all (or a majority) of their material without contracting to outside companies (Table 3). The 2014 and 2018 results indicate that 20-25% of the employees in the logging industry may be truckers by occupation (Table 1).

c. Harvest Production

Survey respondents represented 44% of the harvested sawtimber, 27% of the harvested pulpwood, and 19% of the harvested biomass volume in Maine in 2018, based on a comparison of results published by the Maine Forest Service (2018 Wood Processor Report).
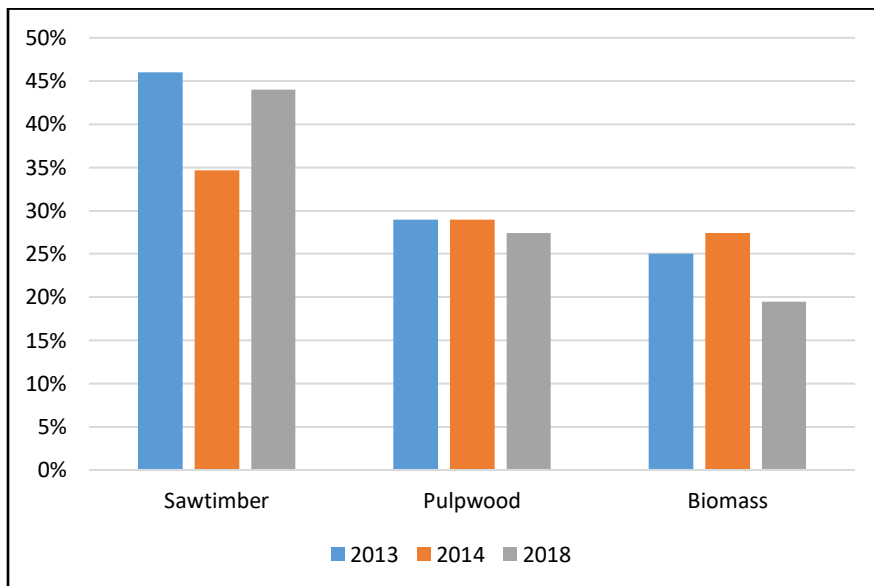

Figure 6: Percent of State Harvest by Survey Respondents

The proportion of the state harvest by survey respondents has remained relatively consistent from 2013 to 2018 (the 2014 survey asked for both 2013 and 2014 harvest information). There is a notable fluctuation in the proportion of harvested sawtimber (46% in 2013, 35% in 2014 and back up to 44% in 2018). In 2018, there was a drop in the proportion of harvested biomass, going from 27% in 2014 down to 19%.

Table 4. Harvest Amounts Reported from the Survey Compared to the Total Maine State Harvest. Source: Maine State Forest Service Wood Processor Reports

	2013		
	Survey	State	Percent
Sawtimber, tons	1,760,678	3,833,158	46%
Pulpwood, tons	2,229,397	7,565,832	29%
Biomass, tons	673,285	2,693,201	25%
	2014		
	Survey	State	Percent
Sawtimber, tons	1,387,521	4,004,051	35%
Pulpwood, tons	2,112,707	7,289,270	29%
Biomass, tons	794,487	2,894,764	27%
	2018		
	Survey	State	Percent
Sawtimber, tons	1,858,994	4,222,170	44%
Pulpwood, tons	1,478,428	5,391,052	27%
Biomass, tons	428,968	2,204,145	19%

d. Capital Expenditures and Investment

The 2014 survey asked respondents to:

- Estimate the amount of new capital purchased over the last two years (2013, 2014)
- List total current capital investments (e.g., capital inventory) and estimate replacement rates

Due to low response for these questions and varying reported replacement rates (across both survey respondents and type of equipment) from those who did respond, the decision was made not to ask about current capital inventory in the 2018 instrument.

Respondents were strictly asked to list the amount of new capital investment over the last year – differentiating between investment in new and used equipment (Table 5).

Table 5. Survey Respondent New Capital Investment, 2018

	Total	Average	Maximum	Median
New Equipment	$16,047,438	$373,196	$1,445,000	$331,000
Used Equipment	$5,066,170	$117,818	$1,000,000	$40,000
Total 2018 Investment	$21,113,608	$491,014		

Following the assumptions outlined in Crandall et al., the Federal Funds Prime Rate (5%) was used to estimate the financing interest rates that will be close to prime plus 1% (or 6%) and approximate dollars generated throughout financing. It is estimated that the proportion of equipment financed was 75%, on a five-year term, with financing approximately 80% loan to value. Table 6, below, outlines the estimates of annual interest dollars.

Table 6. Survey Respondent Capital Investment, 2018

	Total Capital Investment Reported	Financing Term	Annual Interest Dollars
New Equipment	$16,047,438	5 year	$577,708
Used Equipment	$5,066,170	5 year	$182,382
		Total	$760,090

Notes: Calculations above assume a Federal Funds Prime Rate of 5% and estimate that financing interest rates will be close to prime plus 1% (6%); it is assumed that the proportion of equipment financed was approximately 75% and that the equipment was financed on a five-year term, with financing approximately 80% loan to value.

2. ECONOMIC CONTRIBUTION ANALYSIS

The logging and trucking industries contribute directly to the Maine economy through both day-to-day operations (e.g. direct sales, wages, employment of workers) and indirect effects. In addition to day-to-day operations (direct impacts), every dollar that is spent on local purchases by any business, organization or individual involved in the logging and trucking industries circulates throughout Maine's economy and is used by other businesses and organizations to pay their employees, taxes, and purchase more goods and services. This "multiplier effect" is a crucial component to consider when studying the total economic contribution of the logging and trucking industries to the state of Maine. These effects are estimated using an input-output (IMPLAN) model of the Maine economy.

When considering these multiplier effects, Maine's logging and trucking industries contributed an estimated $619 million in total output and over 9 thousand full-and-part-time jobs to the state economy in 2017 (Table 7).

Table 7. Total Annual Statewide Economic Contribution of Maine's Logging and Trucking Industries, 2017

	Direct Impact	Multiplier Effects	Total Impact
Output	$222,231,548	$396,928,834	$619,160,382
Employment	3,954	5,412	9,366
Labor Income	$179,943,802	$162,136,158	$342,079,960

Notes: Direct output, employment and labor income figures were estimated using information from the County Business Patterns and Nonemployer Statistics of the U.S. Census Bureau, and the Maine IMPLAN model; multiplier effects are estimating using an economic impact (IMPLAN) model of the Maine economy; only trucking contributions associated with the logging industry, as estimated by the Maine IMPLAN model, are included here; values are in 2020 dollars

This economic contribution was associated with an estimated fiscal impact of $25 million in state and local taxes in 2017. This tax impact is equivalent to 4% of the logging sector's total (output) economic contribution.

Maine's logging and trucking industries impact businesses across the *entire* state through the activities of logging companies (organizations and individuals) and the purchases that they (and their employees) make. The total employment impact varies from an estimated 2,465 jobs in Penobscot County to 42 jobs in Lincoln County (Table 8). This includes direct employment in the logging and trucking industry (3,954) and indirect employment across a variety of sectors, including forestry and logging support activities (3,287), hospitals (105), real estate (71), and limited-service restaurants (69).

Table 8. Estimated Maine Logging and Trucking Employment Impact by County, 2017

County	Total (Direct + Indirect) Employment Impact
Androscoggin	157
Aroostook	2,258
Cumberland	106
Franklin	657
Hancock	127
Kennebec	271
Knox	68
Lincoln	42
Oxford	657
Penobscot	2,465
Piscataquis	258
Somerset	1,224
Waldo	72
Washington	542
York	462
TOTAL	9,366

Notes: County-level employment figures are generated using data from the County Business Patterns of the U.S. Census Bureau. County employment shares are based on direct employment in the logging industry (NAICS 113) and these shares are applied to the statewide total employment impact.

3. CONCLUSION

Harvesting employed 9,366 people across the state and had a total economic contribution of $619 million in 2017. Survey responses indicate, as they did in 2014, that logging companies are processing a significant amount of the statewide harvest on highly mechanized equipment requiring skilled workers and significant financial investments.

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