

# Professional Logging Contractors of Maine Maine Logger and Log Trucker Employment Availability and Wage Analysis Report Data Appendix

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# Overview and data methods

Recent expansions announced at several mill facilities in Maine, in addition to the potential development of mass timber production facilities located in the state over the next several years, will continue to increase the demand for harvested wood fiber. The logging industry, which contracted following a slew of mill shutdowns in the state over the past decade and impacted by the severe economic recession in 2008-2009, has been challenged in ramping up production and harvests because of workforce constraints despite rising demand for wood. Likewise, the logging workforce is rapidly aging and large numbers of workers will be retiring in the near future needing replacement. Stagnant or negative population growth and aging population across Maine's regions, particularly rural areas, only limit the potential pool of workers. Competition for workers across the state is intensifying and reaching crisis levels in many industries, including the logging industry and other manufacturing and production oriented sectors.

Competition in attracting and retaining workers is highly dependent upon the compensation workers can receive for a set of skills in one job compared to another, or for the same job in a different industry. Maine's logging industry has been challenged in offering competitive wages to attract and retain workers to the industry and compete against other industries vying for the same dwindling pool of workers. Although capital costs in the logging industry have risen across the board, prices paid for harvesting and trucking services have not. This scenario has left little room for businesses to offer higher, more competitive wages to workers or to entice new businesses to enter the industry. If the industry is to meet continued and projected demand for harvested wood fiber, a significant boost to the logging workforce pipeline will be required, which will largely be dependent on the ability of the industry to attract and retain workers with higher wages in an intensely competitive labor market.

This analysis considers the competitiveness of occupational wages of key logging industry occupations in comparison to other key industries competing for similarly skilled labor. We also estimate the relationship between harvested production and labor requirements with respect to announced and planned expansions at mill facilities in Maine and the projected workforce replacement requirements over the next 10 years as older workers age out of the workforce. Lastly, we provide a summary update of estimates of the economic impact of the logging industry in Maine on the state economy in terms of jobs and earnings.

Our analysis relies upon several sources of labor market and occupational wage and employment data to compare wages in key logging occupations to wages of occupations with comparable skill sets and related industries. We report wages by median hourly and wage distributions for the 10th, 25th, 75th, and 90th percentiles. While secondary data reported through government and proprietary sources are limited in the level of occupational detail and do not provide a window into every scenario, they do provide a robust representation of the competitiveness of wages across similar occupations and industries.

# Labor Force Trends and Logging Industry Employment and Wage Overview

## Labor Force Overview

The labor market is tight, at technical full employment across the state (Figure 1). Overall employment has not grown above levels 10 years ago (pre-recession). The labor force has grown slightly as unemployment rates have dropped (Figure 2). However, this has largely been the result of existing populations reengaging in the labor force, which is about tapped out.

Figure 2: Employment and labor force overview, 2008-18

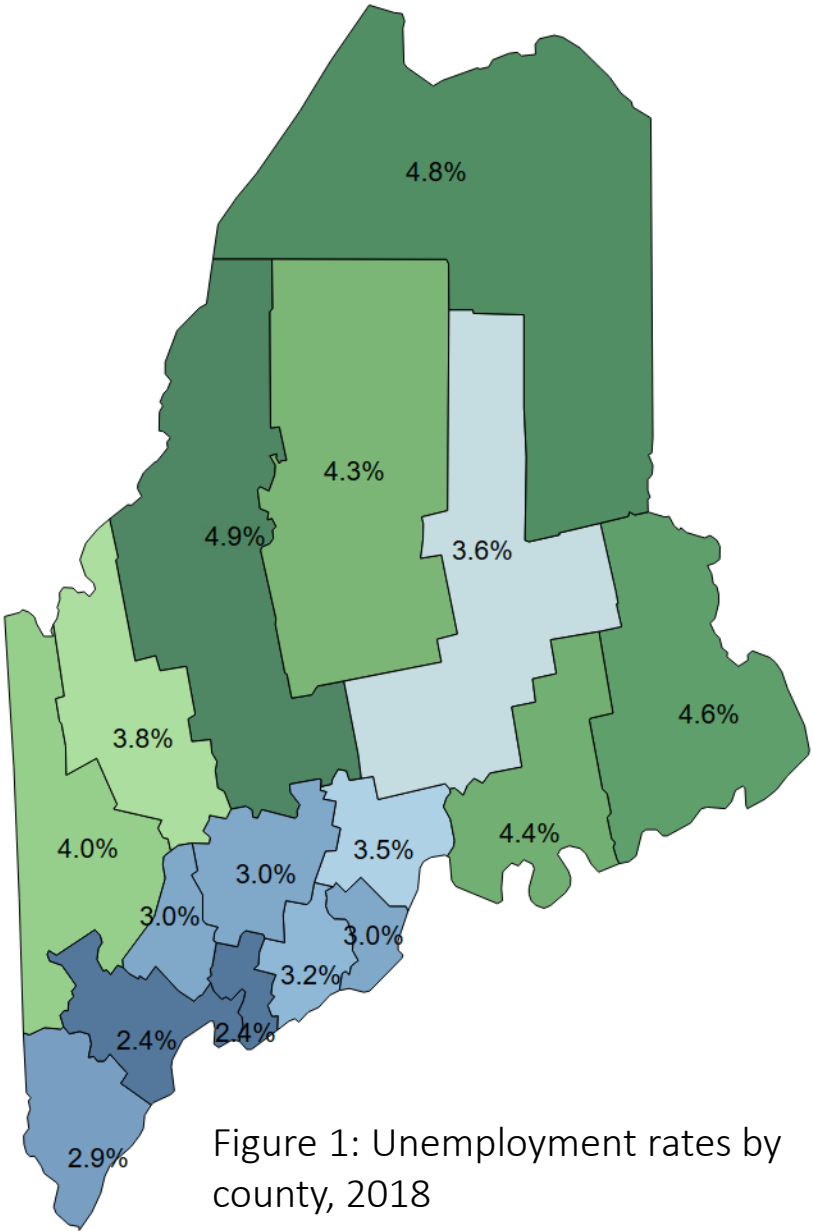
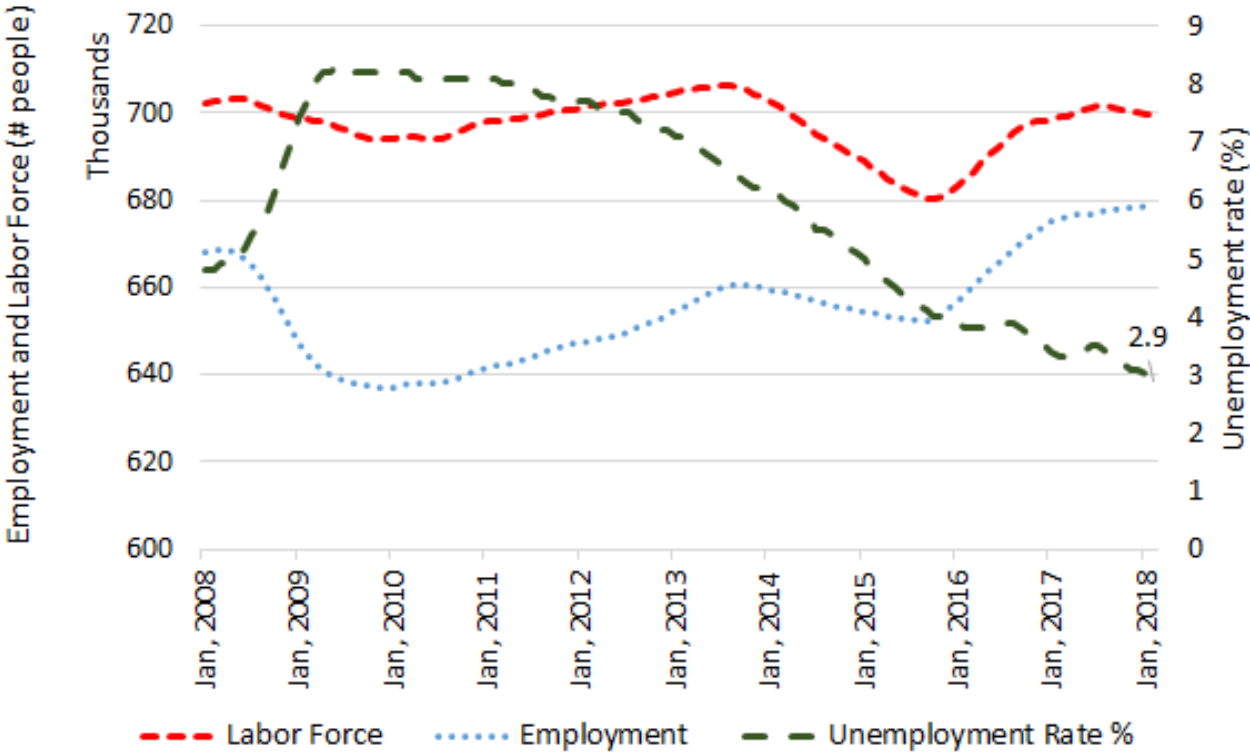


Figure 1: Unemployment rates by county, 2018

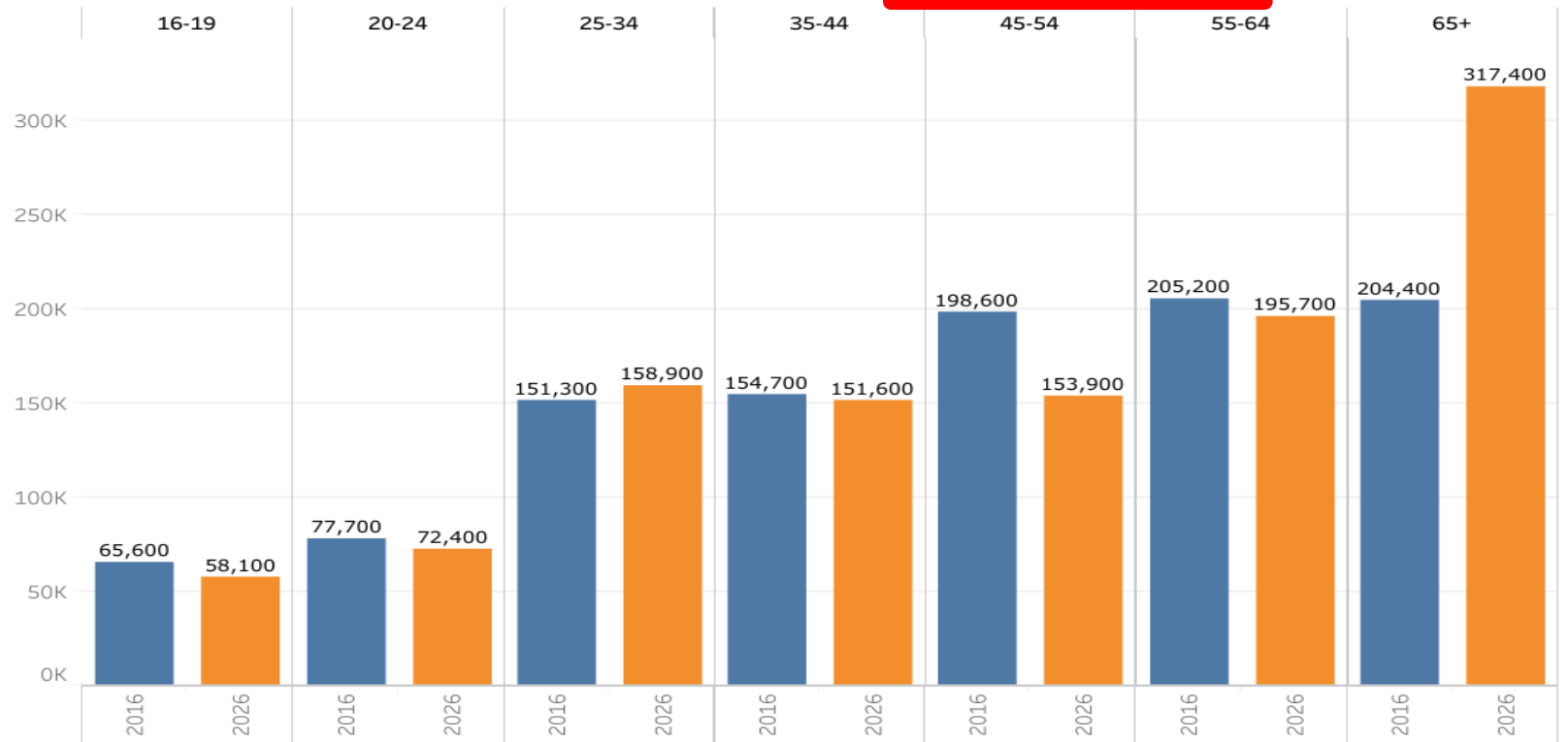
Source: Maine Department of Labor, Center for Workforce Research and Information; Economic Modeling Specialists Inc (EMSI), 2019.1 dataserries

Figure 3: Population demographic forecast in Maine, 2016-2026

Tight labor market conditions are expected to continue, driven by structural labor force constraints mitigated only slightly by short-term macroeconomic business cycle downturns. The demographic trends in Maine suggest a deficit of an estimated 62,000 working age people (16-64) in the state by 2026 (Figure 3).

Civilian Noninstitutionalized Population by Age in Maine, 2016 and Projected 2026

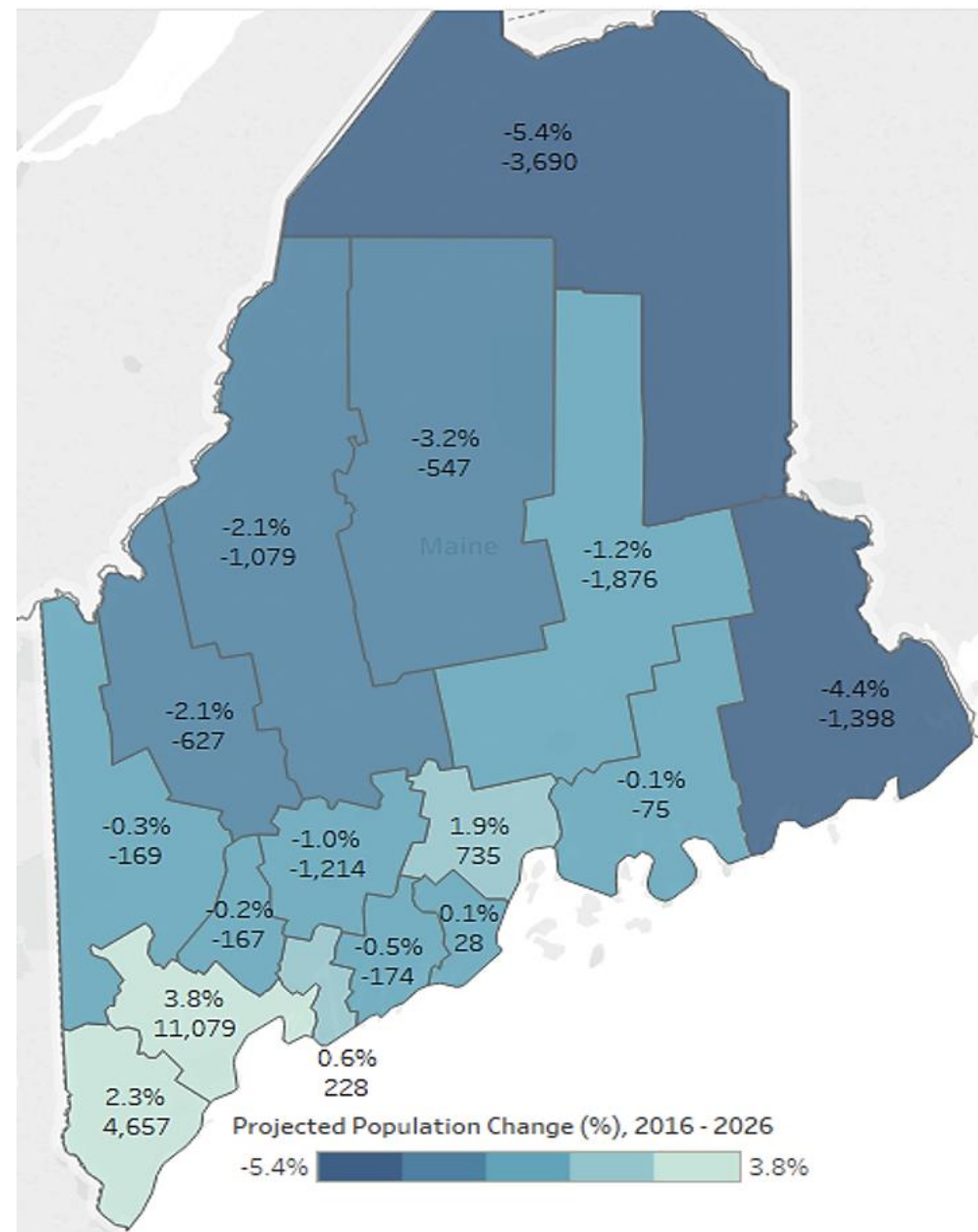
Age Group	2016	2026	Net Change	Percent change
16+	1,057,500	1,108,000	50,500	4.8%
16-19	65,600	58,100	-7,500	-11.4%
20-24	77,700	72,400	-5,300	-6.8%
25-34	151,300	158,900	7,600	5.0%
35-44	154,700	151,600	-3,100	-2.0%
45-54	198,600	153,900	-44,700	-22.5%
55-64	205,200	195,700	-9,500	-4.6%
65+	204,400	317,400	113,000	55.3%



Source: Maine Department of Labor, Center for Workforce Research and Information

Figure 4: Population growth projections by county, 2016-2026

Population and workforce challenges will differ regionally (Figure 4). Central and rim counties will be most strained by an aging population and regional and statewide out-migration. More regionally specialized industries, like logging and the broader forest products sector, will be most challenged to attract and retain skilled workers.



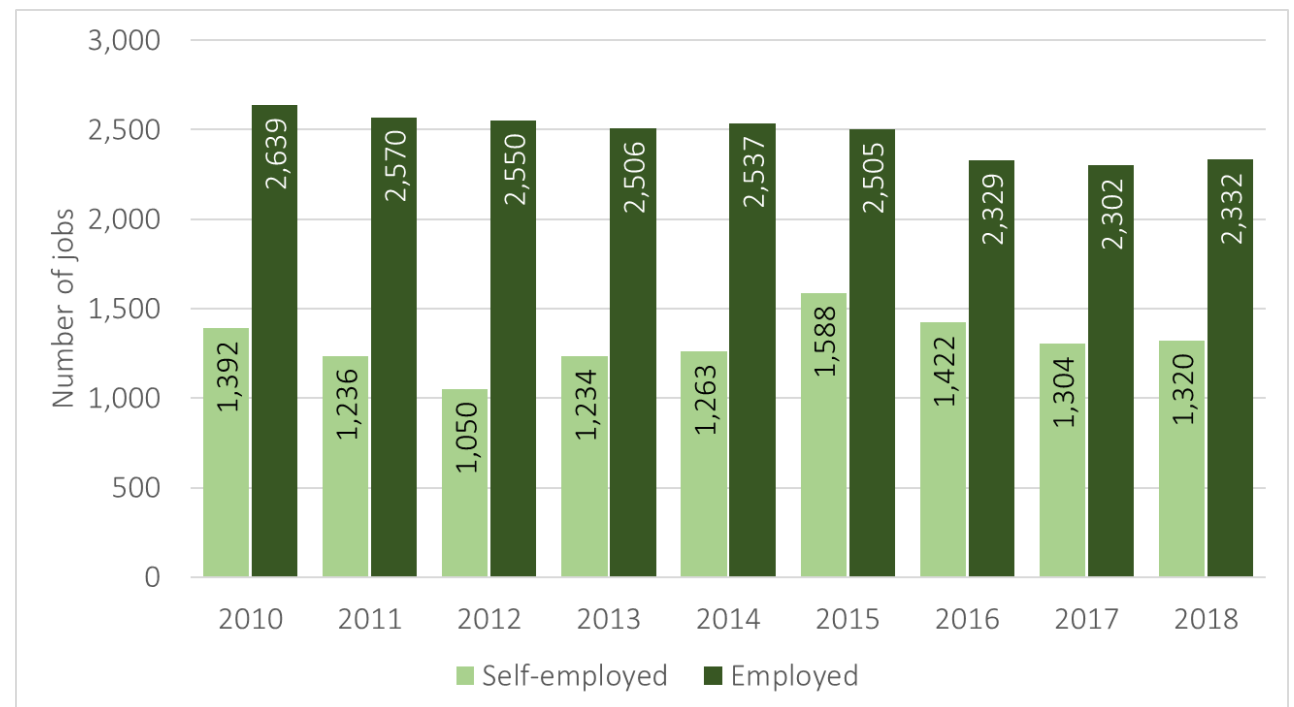
## Employment Summary and Trends in the Logging Industry

Employment in the logging industry totaled an estimated 3,652 workers in 2018; a decline of 9.4 percent since 2010 (Table 1). Employment in the industry is comprised of self-employed (non-employers) which comprised a little over 1/3 of all workers. Traditional employment (paid employees) continues to make up the bulk of jobs in the industry. Self-employed workers declined by 70 jobs between 2010 and 2018 (-5.2%) while traditional employment declined by about 300 jobs or -11.6% over the same period (Figure 5). While traditional employment has been on a slow decline, self-employment has been a bit more cyclical reaching a peak of 1,588 jobs in 2015 before falling back to current levels.

Table 1: Employment for logging contractors by class of worker, 2010 to 2018

Class of Worker	Employment	
	Number 2018	Pct. Change, 2010-18
Self-employed	1,320	-5.2%
Employed (covered)	2,332	-11.6%
All Employed	3,652	-9.4%

Figure 5: Employment growth for logging contractors by class of worker



Source: EMSI dataserries 2019.1. Note: Self-employed includes workers with no paid employees (non-employer); Employed includes all employment “covered” under the state and federal unemployment insurance program and reported in Quarterly Census of Employment and Wages (QCEW) employment statistics reported by US Bureau of Labor Statistics and Maine Department of Labor.

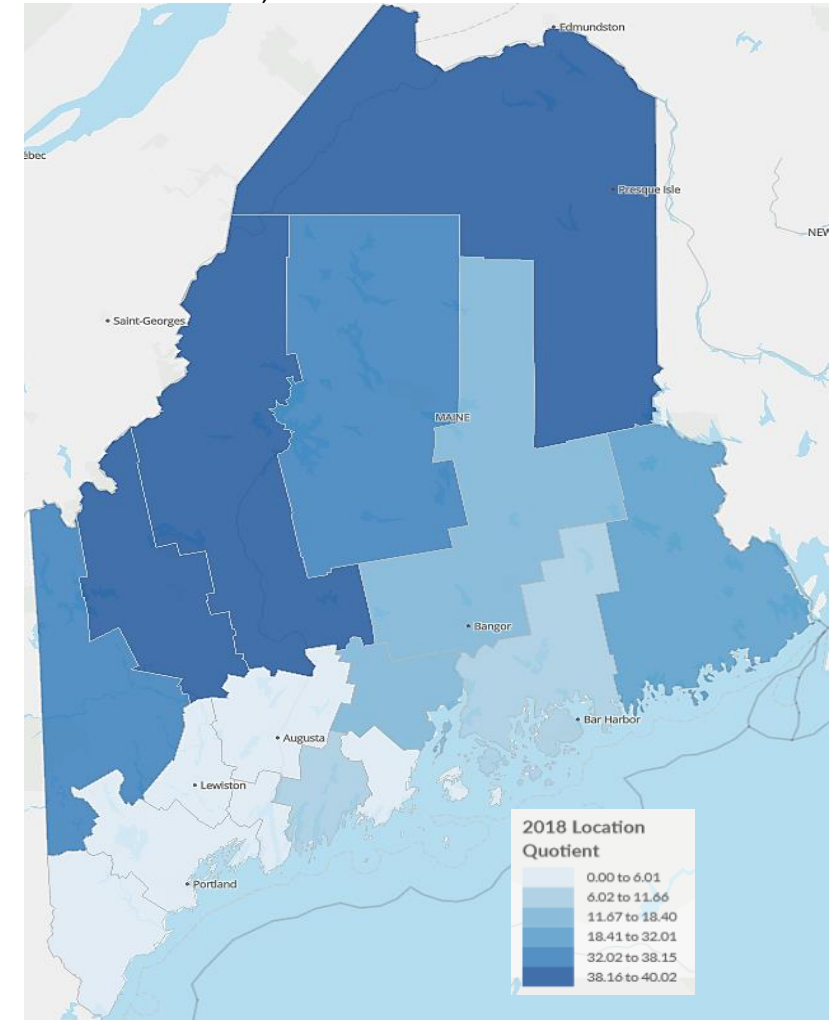
Regional employment continues to be concentrated in the northern rim and Penobscot counties, where industry-wide wages are typically also highest. Table 2 provides employment, employment change, hourly median wage, number of establishments, and regional concentration (measured by location quotients in which the higher above 1 a value is, the greater the concentration of the industry as a share of the overall employment base). Regional concentration by county is shown in Figure 6.

Table 2: Regional employment trends in Maine, 2018

County Name	Number Jobs	PCT Change 2010-18	Hourly		
			Median Wage	Establishments	Location Quotient
Aroostook	702	-146	\$25.91	141	38.5
Penobscot	683	-161	\$27.35	68	14.7
Somerset	453	-135	\$25.37	51	40
Oxford	381	53	\$24.40	42	32
Franklin	280	-134	\$23.60	26	38.2
Kennebec	160	32	\$19.09	23	4
York	149	35	\$22.12	22	2.9
Washington	145	-99	\$20.77	18	18.4
Piscataquis	129	-67	\$21.98	15	32.7
Hancock	104	-40	\$18.09	10	6
Waldo	103	7	\$15.35	7	11.7
Cumberland	92	-17	\$18.46	17	0.7
Androscoggin	80	7	\$19.33	11	2.5
Lincoln	59	-1	\$15.27	3	6.9
Knox	57	12	\$17.10	6	4.3
Sagadahoc	25	-23	\$17.28	1	2.3
[Maine, county not reported]	50	-26	\$18.44	4	7.3
<b>Total</b>	<b>3602</b>	<b>-703</b>		<b>465</b>	

## Regional Employment Trends in the Logging Industry

Figure 6: Regional industry employment concentration, 2018

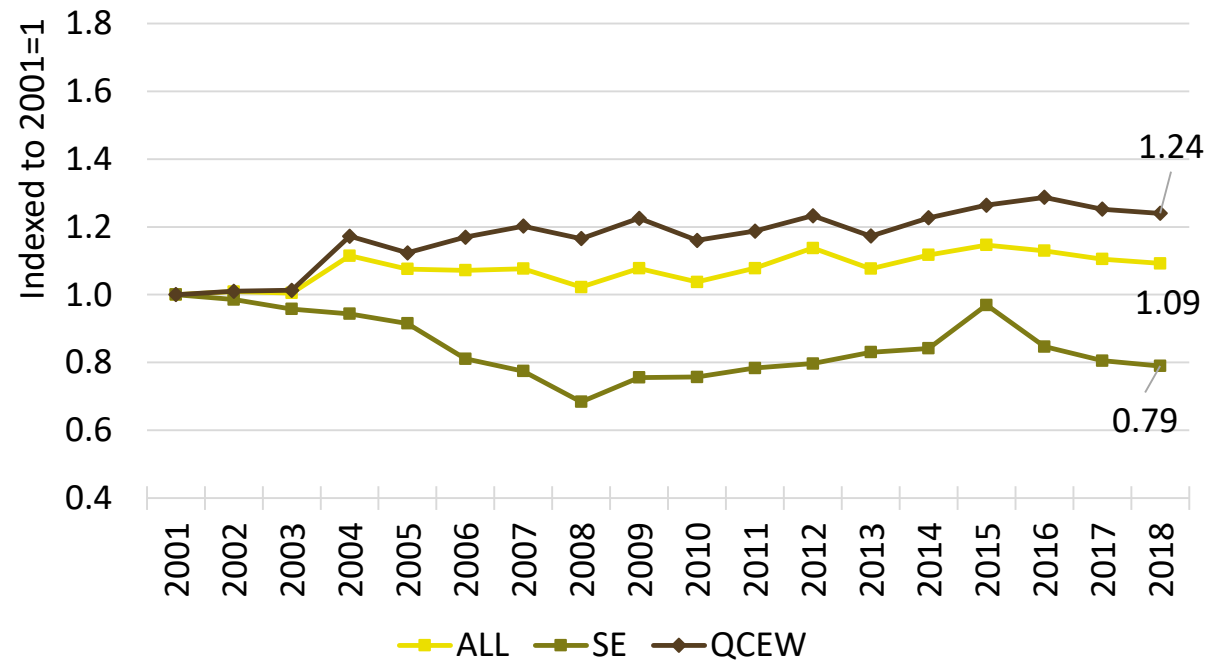




## Wage Trends in the Logging Industry

The average wage for all worker classes in Maine’s logging industry increased by 9% since 2001 (Figure 7), however wages for self-employed workers dropped by 21% over the period. Wages for traditional employees have increased by 24% since 2001, though wages have been relatively level compared to 2012.

Figure 7: Indexed trend in annual average wages in the logging industry by total employment, self-employed, and traditional employee (QCEW), in 2018 \$



## Key Occupations in the Logging Industry

The 15 occupations in Table 3 employed 92% of the logging industry in 2018. Wages vary by class of worker for several key occupations. Relative to QCEW employees, heavy truck drivers and laborers earned more when self-employed whereas as logging equipment operators and first-line supervisors earned a lower hourly wage (Table 4). One out of every 2 jobs in the logging industry is some type of logging equipment operator.

Table 4: Wages by class of worker for several key occupations, 2018

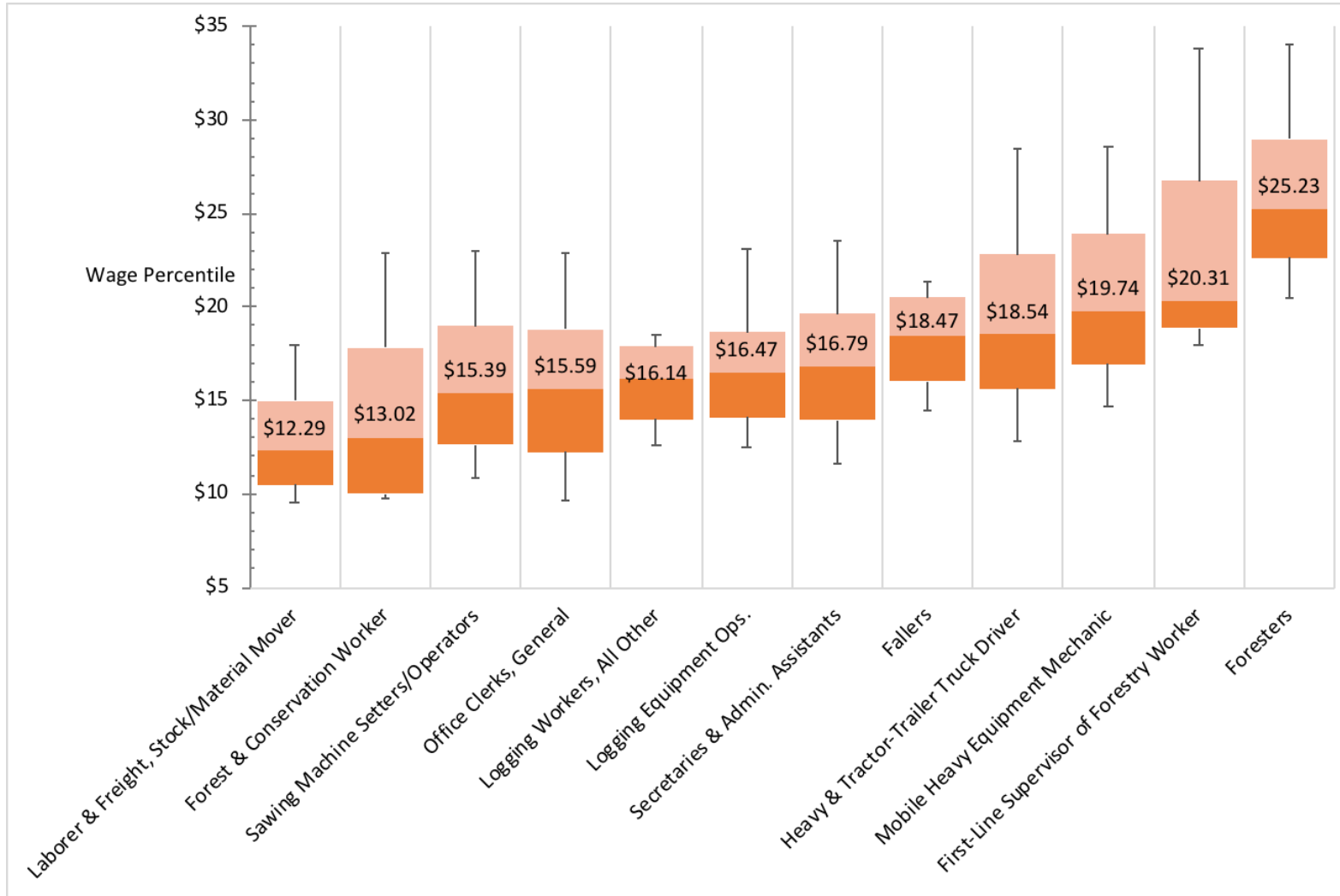
Occupation	All	QCEW Employees, Non-QCEW Employees	Self- Employed
Logging Equipment Operators	\$16.47	\$17.20	\$15.67
Laborers and Freight, Stock, and Material Movers, Hand	\$12.29	\$12.03	\$15.15
Heavy and Tractor-Trailer Truck Drivers	\$18.54	\$18.30	\$19.40
First-Line Supervisors of Farming, Fishing, and Forestry Workers	\$20.31	\$24.86	\$19.31

Table 3: Key logging industry occupations summary, 2018

SOC	Occupation	Employed in Industry (2018)	% Change 01 - 18	% of Total Jobs in Industry	% Jobs in Total Occupation	Median Hourly Earnings	Typical Entry Level Education
45-4022	Logging Equipment Operators	1,732	19%	50.5%	95.5%	\$16.47	H.S. diploma
53-3032	Heavy and Tractor-Trailer Truck Drivers	485	9%	14.1%	5.0%	\$18.54	Postsecondary nondegree
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	270	(6%)	7.9%	56.6%	\$20.31	H.S. diploma
45-4021	Fallers	130	(57%)	3.8%	88.8%	\$18.47	H.S. diploma
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	86	16%	2.5%	7.3%	\$19.74	H.S. diploma
45-4029	Logging Workers, All Other	70	(53%)	2.1%	91.8%	\$16.14	H.S. diploma
45-4011	Forest and Conservation Workers	67	(46%)	1.9%	85.2%	\$13.02	H.S. diploma
43-6014	Secretaries and Administrative Assistants, Except Legal, Med.	65	(2%)	1.9%	0.5%	\$16.79	H.S. diploma
43-9061	Office Clerks, General	63	15%	1.8%	0.5%	\$15.59	H.S. diploma
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	62	(6%)	1.8%	1.0%	\$12.29	No formal edu. cred
19-1032	Foresters	40	3%	1.2%	28.2%	\$25.23	Bachelor's degree
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	38	(81%)	1.1%	4.4%	\$15.39	H.S. diploma

## Wage Structure of Key Occupations in Logging

Figure 8: Percentile hourly earnings for key logging industry occupations summary, 2018



Available secondary data is somewhat limited in the variety and specificity of occupations in the industry. Public secondary occupational data is collected through surveys and reported under the Standard Occupational Classification (SOC) System, although a much larger sample of job titles are reported by survey respondents. A sample of job titles reported by survey respondents are provided for several key industry occupations that follow in this report. For instance, embedded within the occupational title Logging Equipment Operators are Loader, Yarder, Delimmar, and Skidder operators among others. Consequently, many of those occupations vary in the wages received which are not able to be directly captured in the reported statistics. However, the range in hourly wages reported provides a means of comparison across reported occupational titles.

Throughout this wage analysis, hourly wages are reported as a median wage, as well as for the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentiles of wages reported in the occupational secondary data. The result is that for every SOC reported occupation, wages for 80 percent of employed persons in a respective occupation earn an hourly wage between the 10<sup>th</sup> and 90<sup>th</sup> percentile wage. The boxed area represents the interquartile range (between the 25<sup>th</sup> and 75<sup>th</sup> percentile) in which 50 percent of employed persons earn wages for a respective occupation. The extending “whisker” lines from each box plot represent the 10<sup>th</sup> and 90<sup>th</sup> percentiles, with the 90<sup>th</sup> percentile being greater than the median wage, and the 10<sup>th</sup> percentile being below the median wage. The median wage is denoted by the middle line of each box plot, or in the case of Figure 8 the change in color scheme in each box.

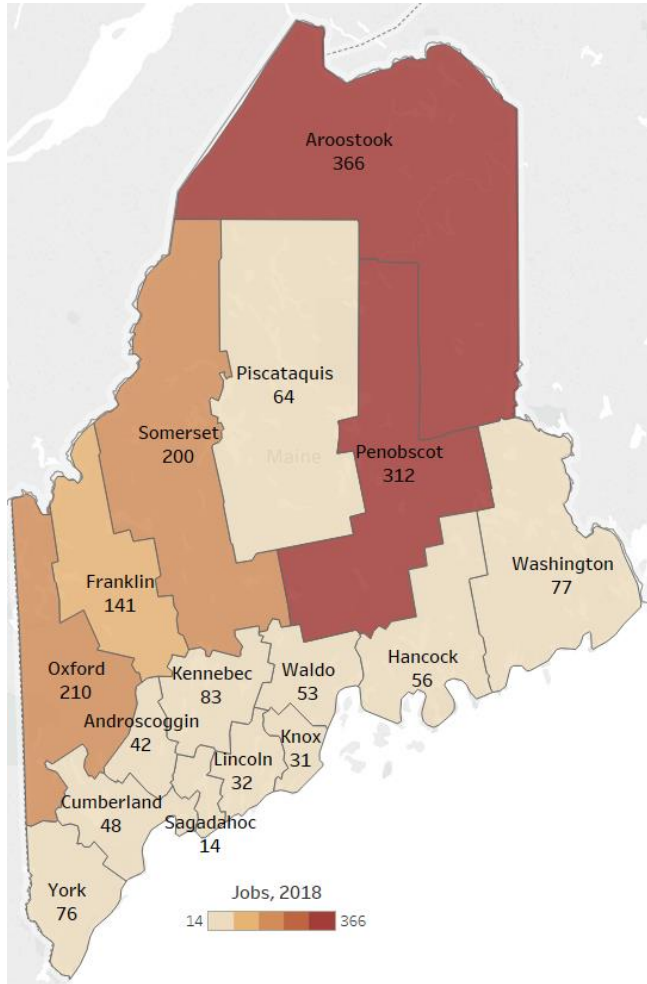
# Occupational Wage Profile

- Logging Equipment Operators
- Competitive Occupation Wage Analysis
  - Compatible and Competitor Occupations
  - Operators and General Technologists in Pulp and Paper Manufacturing
  - Operators and General Technologists in Wood Product Manufacturing
- Heavy Truck Drivers

## Logging Equipment Operators – Occupation Overview

### Occupational Wage Analysis

Figure 9: Regional employment, 2018



Logging Equipment Operators (SOC 45-4022):

Drive logging tractor or wheeled vehicle equipped with one or more accessories, such as bulldozer blade, frontal shear, grapple, logging arch, cable winches, hoisting rack, or crane boom, to fell tree; to skid, load, unload, or stack logs; or to pull stumps or clear brush. Logging truck drivers are included in 'Heavy and Tractor Trailer Truck Drivers' (53-3032).

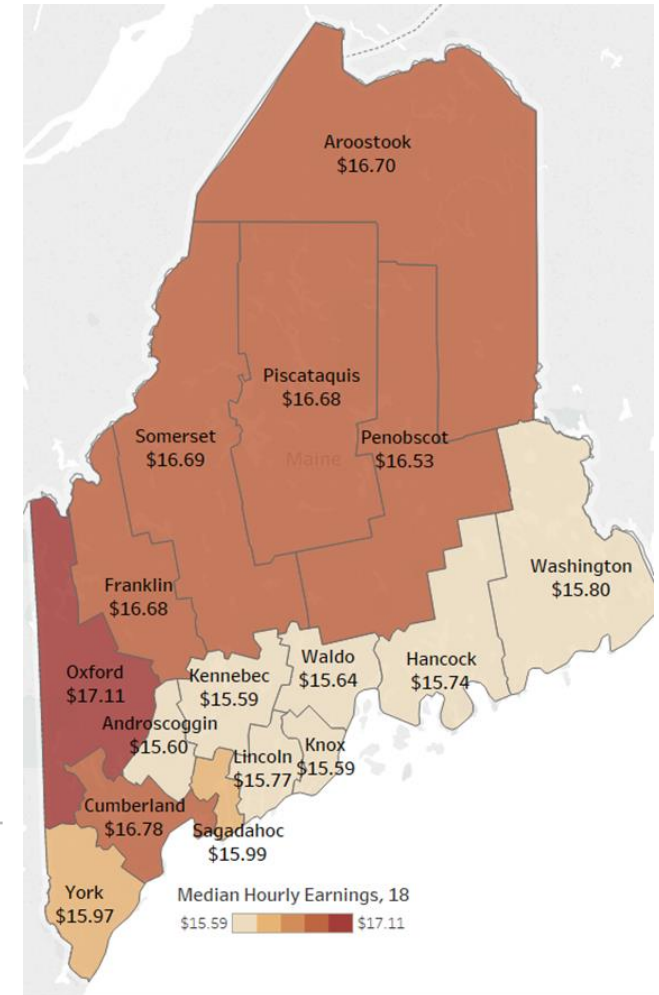
Sample of Reported Job Titles:

- Loader Operator
- Grapple Skidder Operator
- Feller Buncher Operator
- Tree-Shear Operator
- Processor Operator
- Logging Shovel Operator
- Log Processor Operator
- Delimber Operator
- Yarder Operator
- Skidder Operator

#### Growth for Logging Equipment Operators (45-4022)

1,594	1,813	219	13.7%
2001 Jobs	2018 Jobs	Change (2001-2018)	% Change (2001-2018)

Figure 10: Regional hourly wage, 2018



## Logging Equipment Operators – Regional Percentile Earnings

In counties with a higher median wage, traditionally employed workers (QCEW) earn a wage higher than self-employed workers – the difference is typically less in areas where employment levels are lower.

Table 5: Hourly percentile earnings by region, 2018

County Name	2018 Jobs	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
Aroostook	366	\$14.23	\$16.70	\$19.82
Penobscot	312	\$14.10	\$16.53	\$19.23
Oxford	210	\$14.65	\$17.11	\$19.71
Somerset	200	\$14.27	\$16.69	\$19.12
Franklin	141	\$14.27	\$16.68	\$18.95
Kennebec	83	\$13.42	\$15.59	\$17.55
Washington	77	\$13.58	\$15.80	\$17.75
York	76	\$13.69	\$15.97	\$18.02
Piscataquis	64	\$14.31	\$16.68	\$18.62
Hancock	56	\$13.58	\$15.74	\$17.56
Waldo	53	\$13.54	\$15.64	\$17.49
Cumberland	48	\$14.37	\$16.78	\$18.58
Androscoggin	42	\$13.45	\$15.60	\$17.54
Lincoln	32	\$13.69	\$15.77	\$17.44
Knox	31	\$13.43	\$15.59	\$17.51
Sagadahoc	14	\$13.83	\$15.99	\$17.58
<b>Maine</b>	<b>1,804</b>	<b>\$14.10</b>	<b>\$16.47</b>	<b>\$18.66</b>

Table 6: Hourly median earnings for by class of worker and region, 2018

County Name	Median Hourly Earnings, 2018		
	All Employed	QCEW Workers	Self-Employed
Androscoggin	\$15.60	\$15.48	\$15.65
Aroostook	\$16.70	\$17.09	\$15.67
Cumberland	\$16.78	\$19.11	\$15.62
Franklin	\$16.68	\$17.61	\$15.69
Hancock	\$15.74	\$15.94	\$15.66
Kennebec	\$15.59	\$15.48	\$15.64
Knox	\$15.59	\$15.48	\$15.63
Lincoln	\$15.77	Insf. Data	\$15.65
Oxford	\$17.11	\$19.03	\$15.67
Penobscot	\$16.53	\$16.97	\$15.69
Piscataquis	\$16.68	\$18.17	\$15.69
Sagadahoc	\$15.99	Insf. Data	\$15.69
Somerset	\$16.69	\$17.50	\$15.69
Waldo	\$15.64	\$15.48	\$15.68
Washington	\$15.80	\$15.96	\$15.68
York	\$15.97	\$16.30	\$15.60

## Logging Equipment Operators – Compatible Occupations

The occupations in Table 7 are identified as having compatible skill sets and occupational requirements as logging equipment operators based on a compatibility index ranking, where 100 is a full match. These jobs are closely related to logging equipment operators in which their skill sets could be applied with some short to moderate term training. Employers of these jobs compete for workers from a pool of labor with skill sets that translate well across occupations. While these do not represent the full spectrum of compatible occupations, this summary represents occupations which employed greater than 100 workers and paid a median hourly wage higher than that reported for logging equipment operators. These jobs are found across a number of production oriented industries in the forest products sector and manufacturing more broadly.

Wage competitiveness is shown in Figure 11 on the following page.

Table 7: Compatible occupations to logging equipment operators, 2018

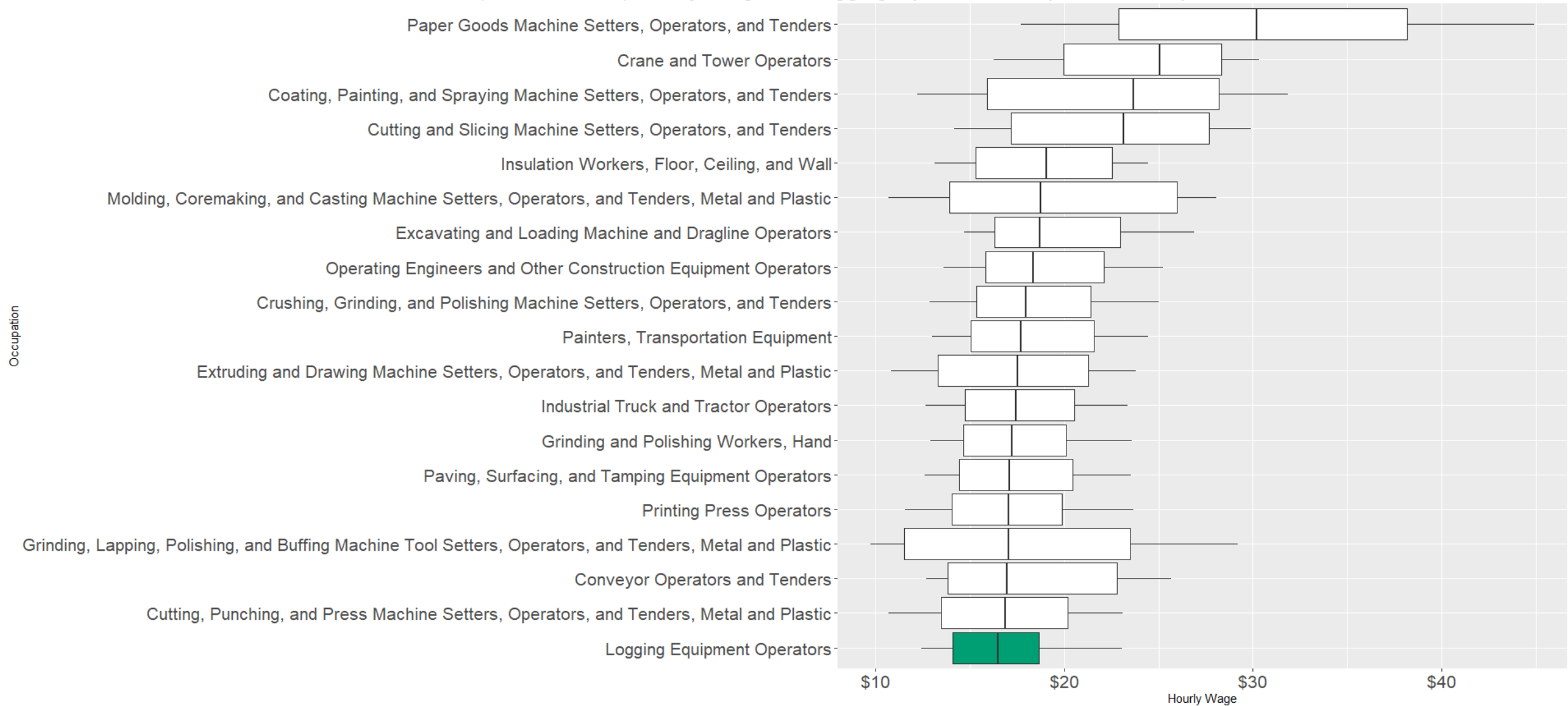
SOC	Occupation	Jobs 2018	PCT Change 2010-18	2018 Hourly Wages by Percentiles					Comptability Index
				10th	25th	Median	75th	90th	
45-4022	Logging Equipment Operators	1,813	-1.60%	\$12.45	\$14.10	\$16.47	\$18.66	\$23.08	100
47-2071	Paving, Surfacing, & Tamping Equipment Operators	446	-3.90%	\$12.59	\$14.42	\$17.08	\$20.44	\$23.52	93
47-2073	Operating Engineers & Other Construction Equipment Operators	1,801	1.00%	\$13.59	\$15.83	\$18.34	\$22.09	\$25.22	93
47-2131	Insulation Workers, Floor, Ceiling, & Wall	385	36.50%	\$13.15	\$15.30	\$19.04	\$22.53	\$24.45	93
51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	217	-17.80%	\$10.80	\$13.29	\$17.52	\$21.27	\$23.79	94
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	244	-21.80%	\$10.67	\$13.47	\$16.89	\$20.20	\$23.12	95
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	246	6.00%	\$9.75	\$11.51	\$17.05	\$23.51	\$29.19	94
51-4072	Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	224	23.10%	\$10.71	\$13.90	\$18.77	\$25.99	\$28.07	93
51-5112	Printing Press Operators	471	-10.60%	\$11.58	\$14.04	\$17.06	\$19.88	\$23.66	92
51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	149	-29.40%	\$12.89	\$15.36	\$17.96	\$21.39	\$25.04	94
51-9022	Grinding & Polishing Workers, Hand	120	18.80%	\$12.92	\$14.65	\$17.21	\$20.08	\$23.58	93
51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	357	-29.20%	\$14.16	\$17.19	\$23.17	\$27.66	\$29.91	94
51-9121	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	394	-4.40%	\$12.21	\$15.93	\$23.66	\$28.22	\$31.87	95
51-9122	Painters, Transportation Equipment	488	25.80%	\$13.02	\$15.04	\$17.70	\$21.58	\$24.44	92
51-9196	Paper Goods Machine Setters, Operators, & Tenders	142	-68.00%	\$17.69	\$22.88	\$30.22	\$38.16	\$44.92	93
53-7011	Conveyor Operators & Tenders	154	-44.40%	\$12.71	\$13.81	\$16.97	\$22.80	\$25.67	95
53-7021	Crane & Tower Operators	314	3.30%	\$16.27	\$19.96	\$25.07	\$28.33	\$30.35	95
53-7032	Excavating & Loading Machine & Dragline Operators	770	-11.90%	\$14.68	\$16.32	\$18.70	\$22.97	\$26.88	94
53-7051	Industrial Truck & Tractor Operators	2,689	-3.50%	\$12.67	\$14.73	\$17.44	\$20.55	\$23.37	94



# Logging Equipment Operators – Compatible Occupations

Figure 11: Wages of compatible production occupations for logging equipment operator skill sets, 2018

## Median and Percentile (10, 25, 75, 90) Hourly Wages of Logging Operators Compatible Occupations, 2018





## Competitive Wage Analysis – Key Occupations in Pulp & Paper Manufacturing

The pulp and paper manufacturing industry employs a number of production jobs and general technologists, virtually all of which earned median wages above logging equipment operators. Many of these jobs have similar or adaptable skill sets to logging equipment operators, a few of which are identified in Table 7 as having a high compatibility score. Logging equipment operators are included for comparison purposes only.

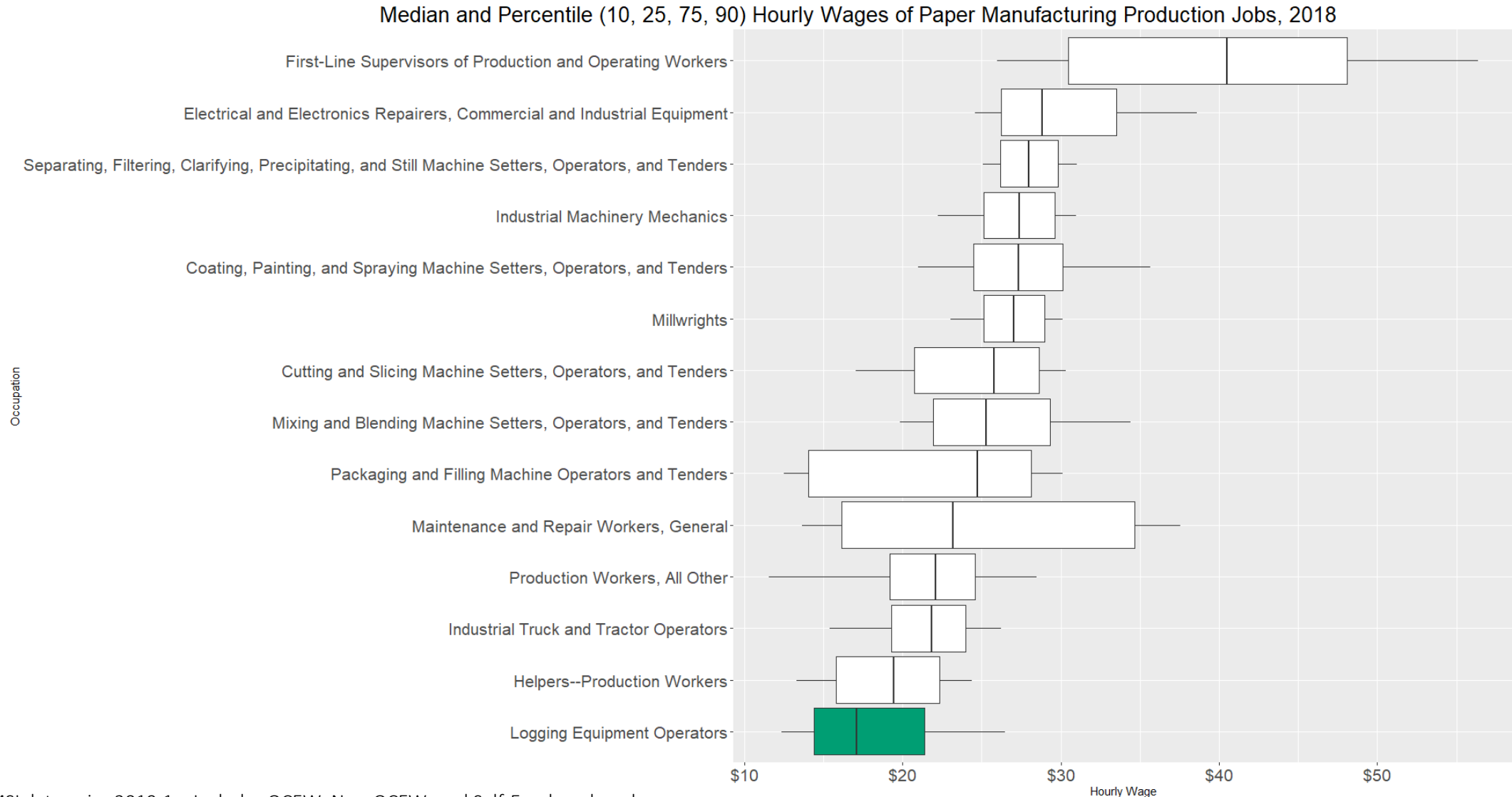
Wages of pulp and paper manufacturing production occupations are illustrated in Figure 12 on the following page.

Table 8: Wage comparison of logging equipment operators to production occupations in pulp and paper manufacturing, 2018

SOC	Occupation	Jobs 2018	PCT Industry Jobs	2018 Hourly Wages by Percentiles				
				10th	25th	Median	75th	90th
51-9198	Helpers--Production Workers	430	9.5%	\$13.29	\$15.78	\$19.43	\$22.35	\$24.37
53-7051	Industrial Truck and Tractor Operators	140	3.2%	\$15.41	\$19.28	\$21.82	\$23.98	\$26.20
51-9199	Production Workers, All Other	460	10.3%	\$11.55	\$19.17	\$22.06	\$24.59	\$28.49
49-9071	Maintenance and Repair Workers, General	240	5.2%	\$13.63	\$16.14	\$23.20	\$34.67	\$37.57
51-9111	Packaging and Filling Machine Operators and Tenders	130	2.8%	\$12.48	\$14.05	\$24.73	\$28.10	\$30.12
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	170	3.8%	\$19.86	\$21.95	\$25.27	\$29.30	\$34.39
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	200	4.4%	\$17.02	\$20.71	\$25.79	\$28.61	\$30.33
49-9044	Millwrights	130	2.8%	\$23.01	\$25.14	\$27.04	\$28.96	\$30.11
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	180	4.1%	\$21.00	\$24.47	\$27.33	\$30.13	\$35.67
49-9041	Industrial Machinery Mechanics	270	6.1%	\$22.21	\$25.13	\$27.36	\$29.62	\$30.99
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters,	140	3.1%	\$25.06	\$26.15	\$27.98	\$29.80	\$31.00
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	130	3.0%	\$24.58	\$26.24	\$28.82	\$33.52	\$38.59
51-1011	First-Line Supervisors of Production and Operating Workers	190	4.2%	\$25.96	\$30.49	\$40.50	\$48.09	\$56.38
45-4022	Logging Equipment Operators	990	NA	\$12.35	\$14.41	\$17.09	\$21.36	\$26.46

## Key Occupations in Pulp & Paper Manufacturing

Figure 12: Wage comparison of logging equipment operators to production occupations in pulp and paper manufacturing, 2018



Source: EMSI dataserries 2019.1 – Includes QCEW, Non-QCEW, and Self-Employed workers.

## Competitive Wage Analysis – Key Occupations in Wood Product Manufacturing

Table 9 provides wage and employment data for key production oriented occupations reported in the wood product manufacturing industry; a key employment industry in Maine’s forest products sector. Sawmill (machine) operators are the largest number of employed workers (750), followed by other machine operators (540). Logging equipment operators are included for comparison purposes only.

Wages of wood product manufacturing production occupations are illustrated in Figure 13 on the following page.

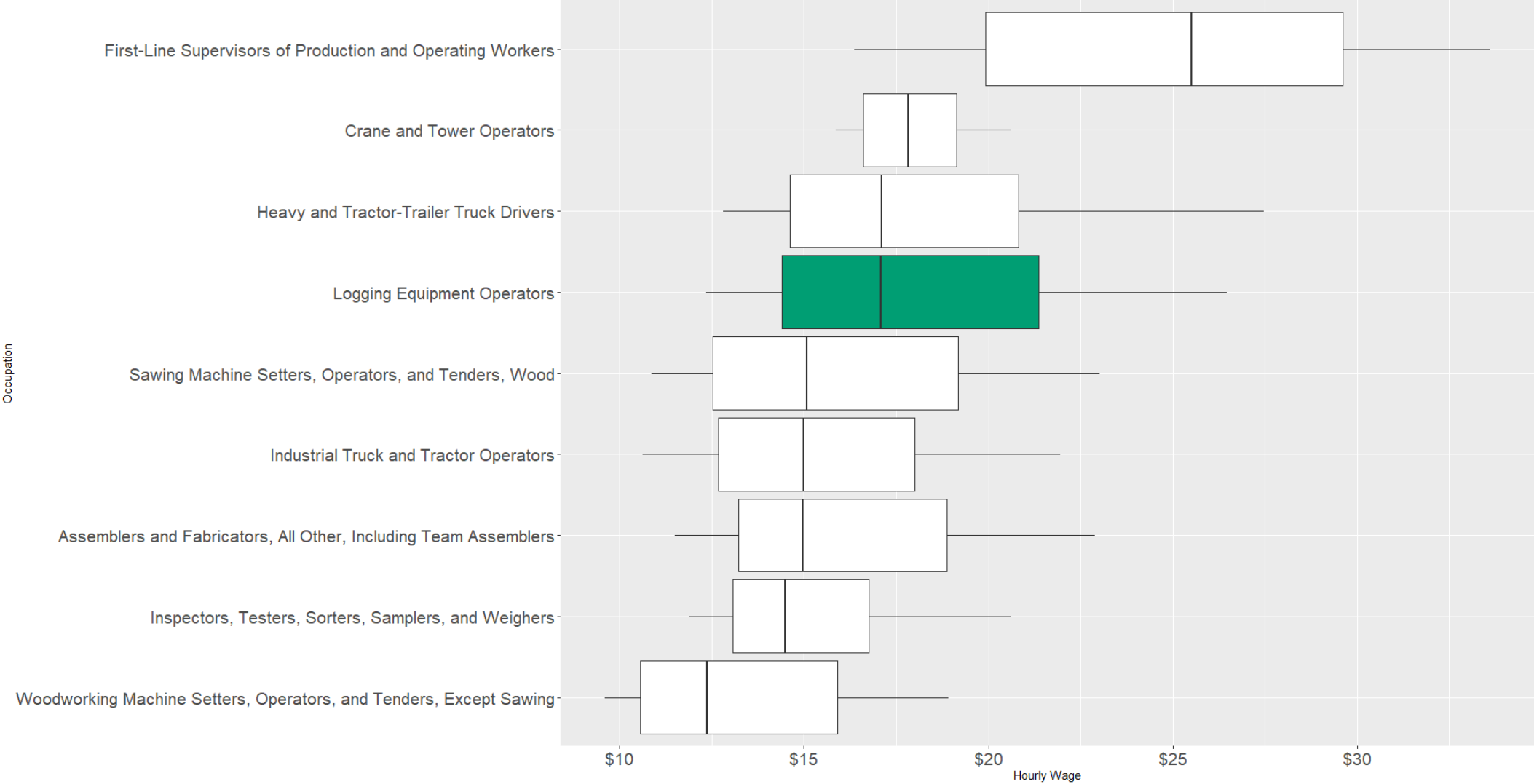
Table 9: Wage comparison of logging equipment operators to production occupations in wood product manufacturing, 2018

SOC	Occupation	Jobs 2018	PCT Industry Jobs	2018 Hourly Wages by Percentiles				
				10th	25th	Median	75th	90th
51-1011	First-Line Supervisors of Production and Operating Workers	180	4.0%	\$16.37	\$19.93	\$25.51	\$29.61	\$33.61
51-2098	Assemblers and Fabricators, All Other, Including Team Assemblers	110	2.6%	\$11.50	\$13.23	\$14.97	\$18.87	\$22.89
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	750	17.1%	\$10.86	\$12.52	\$15.08	\$19.18	\$23.02
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	540	12.3%	\$9.60	\$10.56	\$12.36	\$15.90	\$18.92
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	170	3.9%	\$11.89	\$13.07	\$14.49	\$16.75	\$20.62
53-3032	Heavy and Tractor-Trailer Truck Drivers	100	2.2%	\$12.81	\$14.62	\$17.11	\$20.82	\$27.48
53-7021	Crane and Tower Operators	30	0.7%	\$15.86	\$16.61	\$17.82	\$19.14	\$20.61
53-7051	Industrial Truck and Tractor Operators	240	5.6%	\$10.62	\$12.67	\$14.99	\$18.01	\$21.95
45-4022	Logging Equipment Operators	990	NA	\$12.35	\$14.41	\$17.09	\$21.36	\$26.46

# Competitive Wage Analysis – Key Occupations in Wood Product Manufacturing

Figure 13: Wage comparison of logging equipment operators to production occupations in wood product manufacturing, 2018

Median and Percentile (10, 25, 75, 90) Hourly Wages of Wood Product Manufacturing Production Jobs, 2018

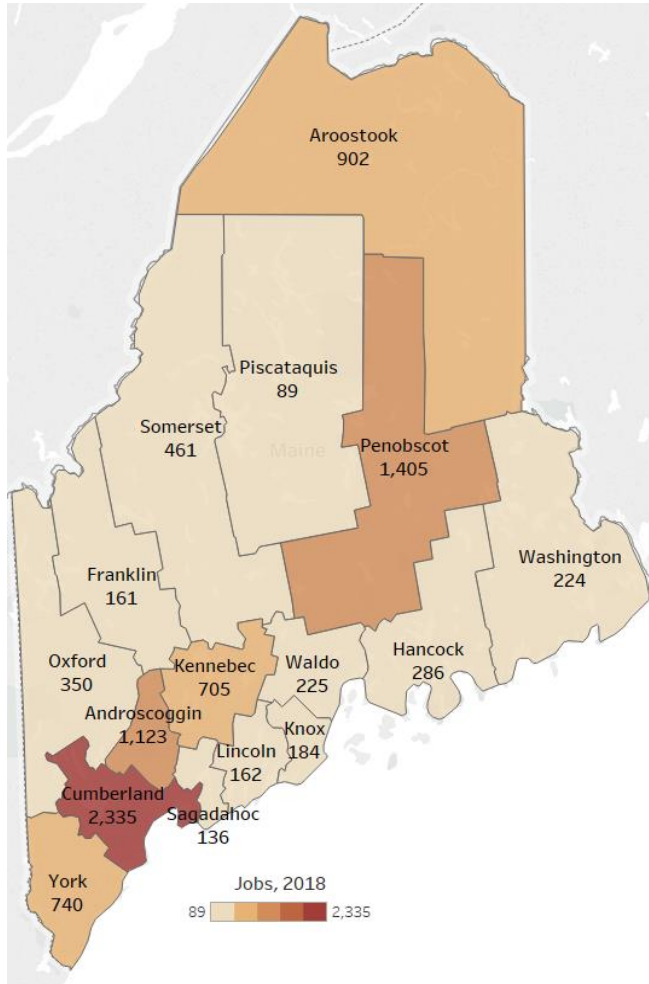


Source: EMSI dataserries 2019.1 – Includes QCEW, Non-QCEW, and Self-Employed workers.

## Heavy Truck Drivers – Occupation Overview

### Occupational Wage Analysis

Figure 14: Regional employment, 2018



Heavy and tractor-trailer truck drivers are a key occupation in the logging sector. The occupation is defined as:

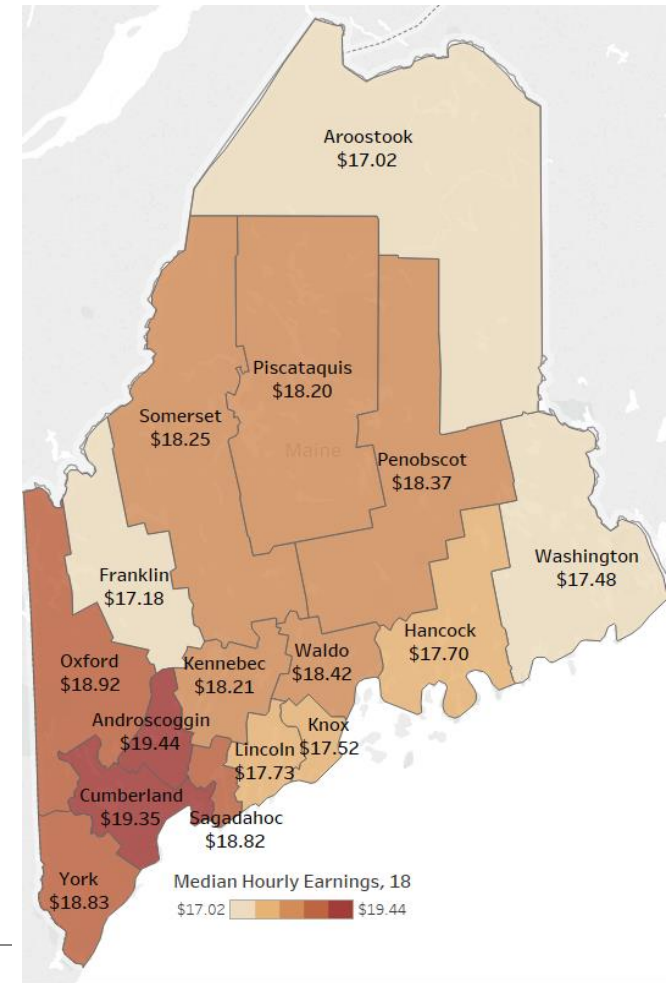
“Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license.”

Sample of Reported Job Titles:

- Over the Road Driver (OTR Driver)
- License Truck Driver (CDL Truck Driver)
- Commercial Driver's License Driver (CDL Driver)
- Tractor Trailer Operator
- Semi Driver
- Truck Driver
- Mixer Driver
- Log Truck Driver
- Line Haul Driver
- Commercial Driver's

Truck drivers are employed across a wide variety of industries and regions in the state. Total county employment in heavy truck drivers is shown in Figure 14 and median wages shown in Figure 15.

Figure 15: Regional hourly wage, 2018



#### Occupation Summary for Heavy and Tractor-Trailer Truck Drivers

9,310	4.3%	\$18.54/hr
Jobs (2010)	% Change (2010-2018)	Median Hourly Earnings
18% above National average	Nation: 19.4%	Nation: \$19.88/hr

## Regional Wages for Heavy Truck Drivers

Table 10 shows hourly percentile earnings and employment trends for heavy tractor trailer truck drivers by region for 2018, as well as employment and employment change in the logging industry only. Wages are only available aggregated across all industries. In total, wages for truck drivers are relatively consistent across all counties in Maine Industry specific wages are reported in Table 11 and Figure 16 that follow.

Table 10: Hourly percentile earnings for heavy tractor trailer truck drivers by region,

County Name	Total Jobs	2001 - 2018 % Change	Jobs in Logging only	2001 - 2018 % Change (Logging only)	2001 - 2018 Change (Logging only)	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
Androscoggin	1,124	54%	<10	100%	4	\$16.48	<b><u>\$19.44</u></b>	\$24.29
Cumberland	2,335	1%	<10	17%	1	\$16.40	<b><u>\$19.35</u></b>	\$24.20
Oxford	351	14%	51	76%	22	\$16.14	<b><u>\$18.92</u></b>	\$23.07
York	741	5%	20	122	11	\$15.92	<b><u>\$18.83</u></b>	\$23.01
Sagadahoc	136	(43%)	<10	-67%	-4	\$16.02	<b><u>\$18.82</u></b>	\$23.30
Waldo	225	41%	<10	75%	3	\$15.45	\$18.42	\$21.82
Penobscot	1,406	(13%)	99	5.0%	5	\$15.49	\$18.37	\$22.74
Somerset	461	(19%)	54	-17%	-11	\$15.38	\$18.25	\$22.21
Kennebec	705	5%	19	138%	11	\$15.32	\$18.21	\$22.35
Piscataquis	89	(44%)	15	-12%	-2	\$15.33	\$18.20	\$21.60
Lincoln	163	19%	<10	0%	0	\$14.81	\$17.73	\$21.36
Hancock	286	10%	11	10%	1	\$14.83	\$17.70	\$21.56
Knox	185	(14%)	<10	250%	5	\$14.62	\$17.52	\$21.15
Washington	225	(30%)	19	-24%	-6	\$14.49	\$17.48	\$20.86
Franklin	162	(26%)	37	-20%	-9	\$14.35	\$17.18	\$20.77
Aroostook	903	(7%)	122	4%	5	\$14.26	\$17.02	\$20.88
<b>Maine</b>	<b>9,712</b>	<b>(1%)</b>	<b>485</b>	<b>9</b>	<b>38</b>	<b>\$15.65</b>	<b>\$18.54</b>	<b>\$22.82</b>

## Competitive Wage Analysis – Heavy Truck Drivers

The labor shortage of truck drivers has been a long and persistent challenge and is well documented in Maine and nationally. Like logging equipment operators, heavy truck drives are a key occupation in the logging industry. Unlike logging equipment operators, heavy truck drivers are not unique to the logging industry and are found across a wide variety of industries. The ability of logging companies to attract and recruit truck drivers under an already scarce supply of workers is further challenged by wage competitiveness.

Table 11 shows the hourly median wage percentiles for heavy truck drivers employed in respective industries, in addition to estimated employment in 2017 and the share of industry total jobs employment comprises. For example, the 300 jobs in forestry and logging industry comprises 16.7 percent of all employment in the industry.

Wage competitiveness is displayed graphically in Figure 16 on the following page.

Table 11: Hourly wage and employment for heavy truck drivers by industry, 2017

NAICS (3)	Industry	PCT Industry		2017 Hourly Wages by Percentiles				
		Jobs 2017	Jobs	10th	25th	Median	75th	90th
113	Forestry and Logging	300	16.7%	\$9.31	\$10.11	\$15.23	\$17.61	\$19.00
237	Heavy and Civil Engineering Construction	170	5.6%	\$11.77	\$14.18	\$16.69	\$19.28	\$23.29
238	Specialty Trade Contractors	1,090	5.9%	\$13.20	\$14.94	\$16.77	\$18.61	\$21.37
321	Wood Product Manufacturing	100	2.2%	\$12.81	\$14.62	\$17.11	\$20.82	\$27.48
327	Nonmetallic Mineral Product Mnfg	280	17.8%	\$13.00	\$14.77	\$16.56	\$18.50	\$21.36
423	Merchant Wholesalers, Durable Goods	260	3.0%	\$13.32	\$15.38	\$18.49	\$22.34	\$25.27
424	Merchant Wholesalers, Nondurable Goods	580	7.3%	\$14.71	\$17.93	\$21.60	\$24.23	\$27.91
444	Bldg Material & Garden Equip. & Supplies Dealers	260	3.3%	\$12.93	\$14.73	\$16.96	\$19.81	\$23.51
454	Nonstore Retailers	840	16.8%	\$14.64	\$16.04	\$17.82	\$19.87	\$23.62
484	Truck Transportation	3,390	58.7%	\$10.06	\$15.94	\$20.72	\$27.15	\$31.21
488	Support Activities for Transport	130	8.9%	\$11.69	\$13.28	\$15.60	\$20.41	\$29.35
493	Warehousing and Storage	190	5.0%	\$9.68	\$10.33	\$11.41	\$18.12	\$22.63
532	Rental and Leasing Services	170	8.9%	\$17.04	\$19.30	\$21.92	\$25.59	\$29.43
562	Waste Management and Remediation Svcs	390	18.8%	\$13.23	\$15.21	\$17.13	\$19.25	\$22.70

Source: US Bureau of Labor Statistics, Occupational Employment and Wages (OES) by Industry Research Estimates, 2017. Note: OES Industry Research Estimates provide a relative comparison of wages for truck drivers across industries. However, wages for heavy truck drivers may vary from previous section due to difference in data source, vintage, and industry aggregation. Other data sources (EMSI) provide more recent and regional (county) reporting, but provide aggregated data for truck drivers across all industries.



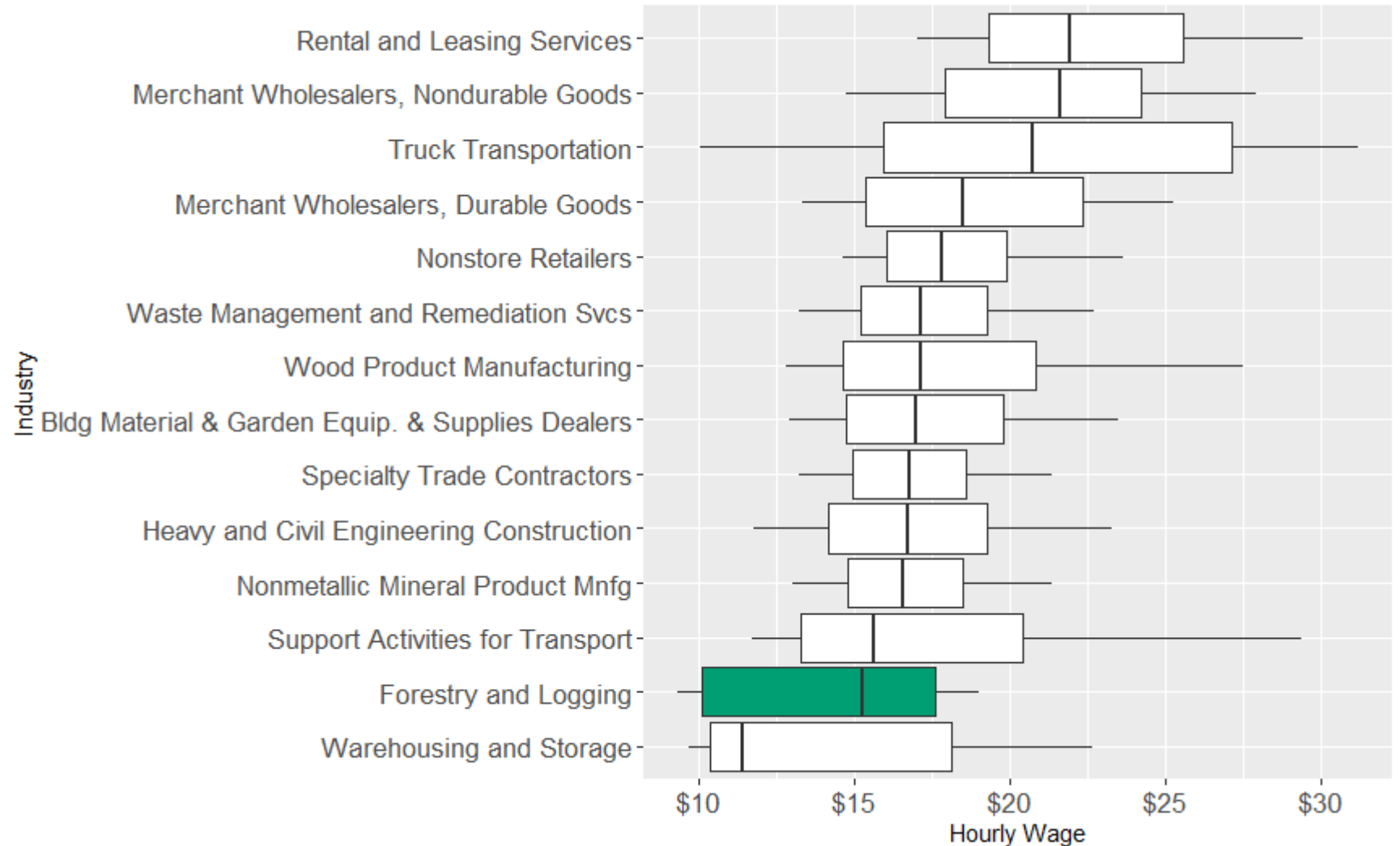
## Competitive Wage Analysis – Heavy Truck Drivers Wage by Industry

Across industries that employ heavy truck drivers, workers in the forestry and logging industry earned an hourly median wage ranked second lowest compared to other industries (Figure 16). This presents serious challenges in trying to recruit and attract truck drivers in the industry under current wage rates.

Occupational industry wage data is only provided at the state level and is not reported by sub-state region or county.

Figure 16: Hourly wages of heavy truck drivers by industry, 2017

Median and Percentile (10, 25, 75, 90) Hourly Wages of Heavy Truck Drivers Across Industries, 2017





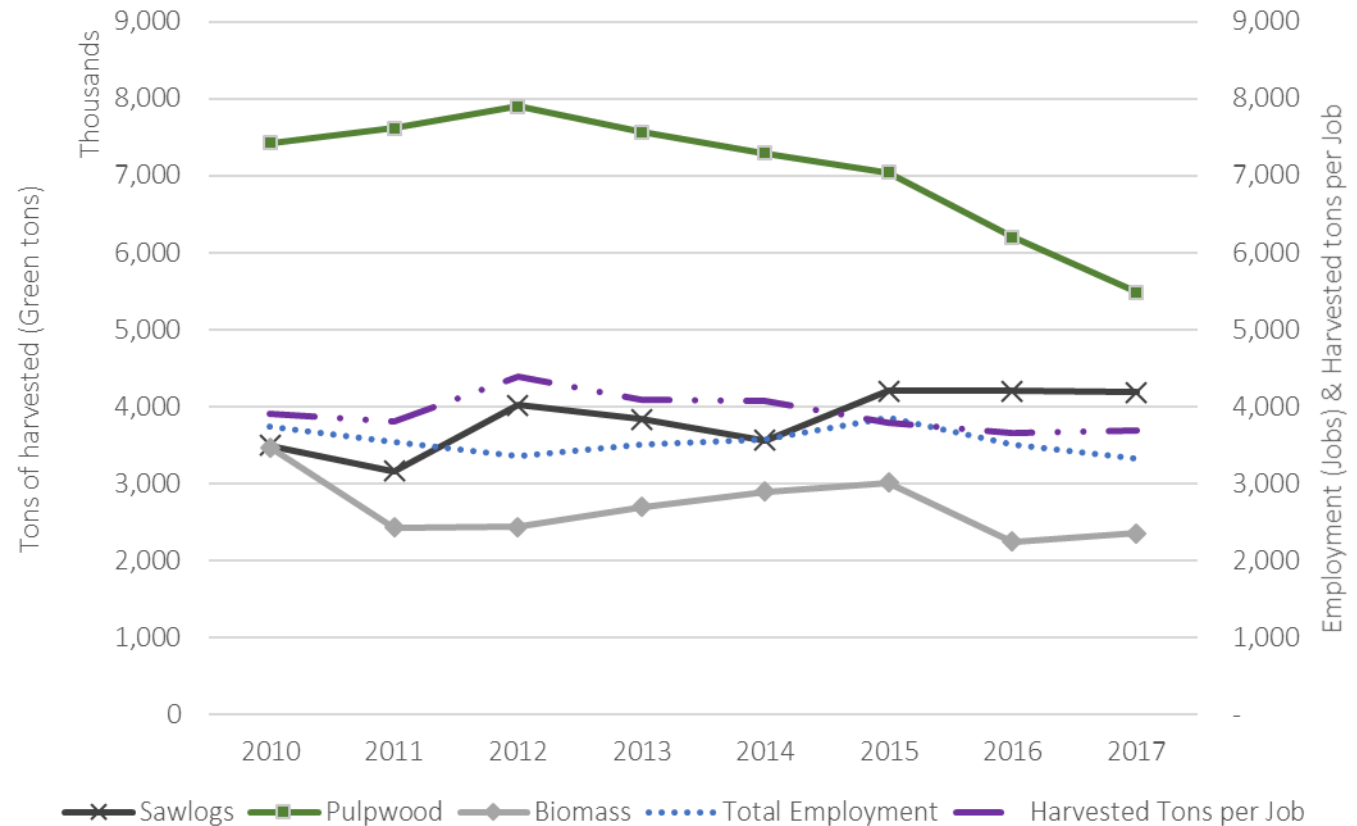
# Projected Labor Demands

# Wood harvesting and employment demands

Harvested green tons of wood dropped by -16% between 2010 and 2017, and has dropped by -26% since 2007. Logging employment has followed a similar trend, dropping by -11% since 2010, and -18% since 2007.

An average of 1 job in the logging industry supported the harvesting of 3,925 tons of wood, inclusive of sawlogs, pulpwood, and biomass, between 2010 and 2017 (Harvested Tons per Job).

Figure 17: Wood harvest volumes and logging employment in Maine, 2010-2017

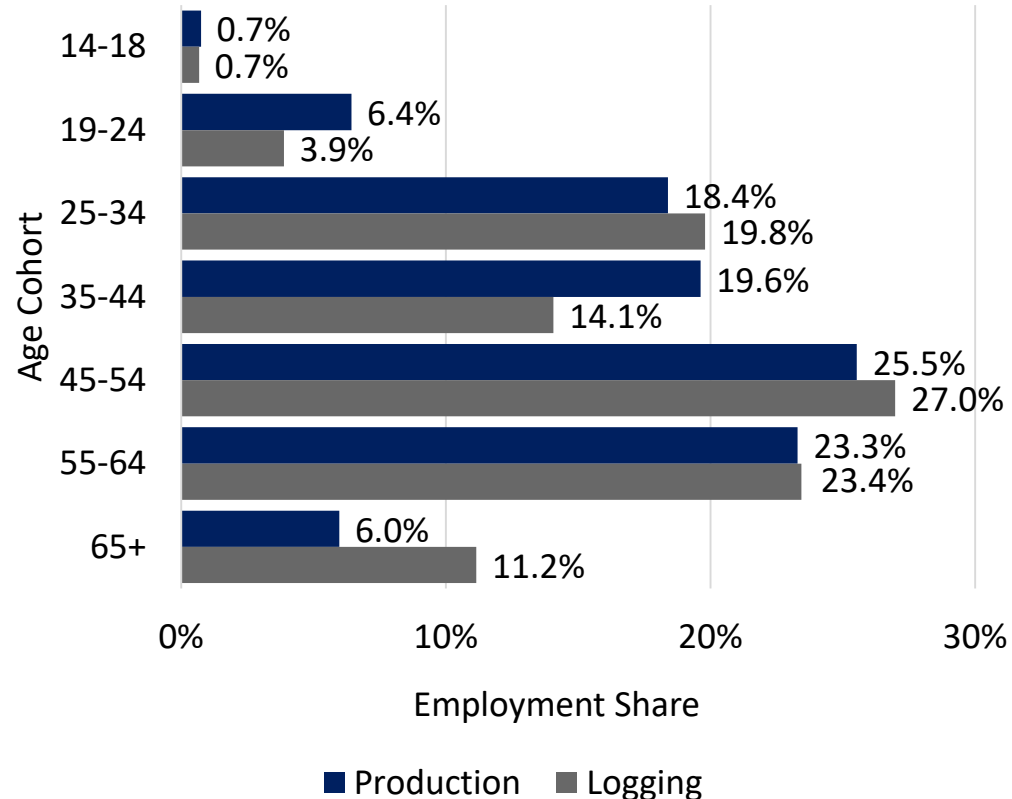


# Labor Demands

- For every 2 jobs in a saw mill or pulp mill, 1 job in the logging industry is supported.
- For every 4 jobs in paper manufacturing, 1 job in the logging industry is supported.
- Several expansions have been announced beginning in 2018 at the Verso mill in Jay, Nine Dragons mills in Rumford and Old Town, and Please River which collectively will add about 340 jobs. Sources included in Appendix.
- These expansions will in turn require just over 100 jobs in the logging industry; 52 of which will be logging equipment operators and about 25 heavy truck drivers, among a number of other jobs in the industry.
- Under the assumption that a new cross laminated timber manufacturing facility producing 50 MBF at full capacity will be cited in Maine, an estimated 29 jobs in logging will be needed.
- Associated employment estimates are sourced from media news reports and announcements.
- Calculations are based off of industry spending pattern multipliers produced under the US Bureau of Economic Analysis RIMS II industry spending patterns and Economic Modeling Specialists Inc (EMSI) dataserie 2019.1.

## Age Trends and Project Replacements in the Logging Industry

Figure 18: Age distribution for employment in the logging industry, 2018



The age structure of the logging industry is older than other production oriented industries, including manufacturing (Figure 18). Sixty-two percent of logging industry workers are 45 or older, compared to 55% for all production employment and 50 percent for all industries. Over 400 workers in the industry are in retirement age (65+), while 850 workers will be reaching retirement age within the next 10 years. Attracting younger generations of workers will be critical in replacing the retiring workforce. Likewise, there is a disproportionately smaller share of younger age workers (25-44) able to offset the aging older cohorts.

# Economic Impact Summary 2014 Comparison and Update

## Economic Impact of the Logging Industry

- The 2014 Economic Impact Report by Dr. Mindy Crandall at the University of Maine estimated the total direct employment in the logging industry (harvesting) to be 4,632 jobs which supported another 2,711 jobs indirectly and induced.
- These estimates include proprietor income and supported employment, which are not easily reflected in public secondary data. As a result it is difficult to compare current employment estimates reported in our analysis directly to the impact estimates from the 2014 report.
- However, we use our economic input-output model developed by Economic Modeling Specialists Inc (EMSI) that relies on industry spending patterns provided by the US Bureau of Economic Analysis (BEA) Regional Industry Multipliers (RIMS II) dataset, which is the basis of the IMPLAN model used to estimate the 2014 economic impact estimates for the logging industry.
- Based on 2018 data, an estimated 4,927 jobs were directly supported by covered, self-employed, and proprietor income employment which supported another 3,266 jobs indirectly and induced spending.
- In addition, a total of \$320,824,489 in earnings (compensation) were supported by direct, indirect, and induced employment from the logging industry.
- The direct employment estimates here differ from employment figures reported elsewhere because these data include proprietor income which covers jobs that represent miscellaneous labor income for persons who do not consider it a primary job. Includes minor or underreported self-employment, investments trusts and partnerships, certain farms and tax-exempt nonprofit cooperatives. This employment is typically only considered for economic impact modeling purposes and not reported in standard employment (QCEW covered or non-employer self-employed) statistics.

Source: EMSI dataserie 2019.1 – Includes QCEW, Non-QCEW, and Self-Employed workers, as well as proprietor income. EMSI data includes EMSI proprietary data and data from the US Bureau of Economic Analysis Regional Input-Output Modeling System II (RIMS II)

# Appendix

Table A1: Hourly wage and employment for all occupations reported in Logging, 2018

SOC	Description	Jobs, 2018	% Change 01 - 18	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
45-4022	Logging Equipment Operators	1,732	19%	\$14.10	\$16.47	\$18.66
53-3032	Heavy and Tractor-Trailer Truck Drivers	485	9%	\$15.65	\$18.54	\$22.82
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	270	(6%)	\$18.86	\$20.31	\$26.74
45-4021	Fallers	130	(57%)	\$16.01	\$18.47	\$20.52
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	86	16%	\$16.92	\$19.74	\$23.91
45-4029	Logging Workers, All Other	70	(53%)	\$13.98	\$16.14	\$17.85
45-4011	Forest and Conservation Workers	67	(46%)	\$9.99	\$13.02	\$17.79
43-6014	Secretaries and Administrative Assistants, Except Legal, Med.	65	(2%)	\$13.96	\$16.79	\$19.64
43-9061	Office Clerks, General	63	15%	\$12.25	\$15.59	\$18.81
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	62	(6%)	\$10.52	\$12.29	\$14.99
11-9013	Farmers, Ranchers, and Other Agricultural Managers	44	22%	\$9.53	\$10.62	\$12.31
19-1032	Foresters	40	3%	\$22.65	\$25.23	\$28.95
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	38	(81%)	\$12.62	\$15.39	\$18.98
43-3031	Bookkeeping, Accounting, and Auditing Clerks	37	(47%)	\$15.33	\$18.01	\$21.57
51-9199	Production Workers, All Other	30	50%	\$11.60	\$15.45	\$22.27
11-1021	General and Operations Managers	27	(56%)	\$25.68	\$37.81	\$58.11
47-2073	Operating Engineers and Other Construction Equipment Operators	22	10%	\$15.83	\$18.34	\$22.09
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	20	(41%)	\$10.74	\$13.77	\$16.72
11-9199	Managers, All Other	19	12%	\$16.30	\$20.05	\$37.67
53-7051	Industrial Truck and Tractor Operators	18	(56%)	\$14.73	\$17.44	\$20.55
37-3011	Landscaping and Groundskeeping Workers	17	0%	\$9.30	\$12.27	\$16.00
37-3013	Tree Trimmers and Pruners	16	(30%)	\$12.01	\$14.65	\$17.30
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	14	(39%)	\$16.69	\$20.12	\$23.40
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	13	(52%)	\$10.77	\$13.01	\$16.26
53-7041	Hoist and Winch Operators	13	(32%)	\$18.37	\$23.12	\$32.70
45-4023	Log Graders and Scalers	13	(68%)	\$15.41	\$17.27	\$18.77
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Tech	11	(31%)	\$19.40	\$25.86	\$35.99
13-1028	Buyers and Purchasing Agents	11	(21%)	\$21.45	\$27.65	\$35.01



## Labor Demands: Announced Expansions Sources

- <https://observer-me.com/2018/04/19/pleasant-river-lumber-awarded-4-2m-grant-for-12m-project-in-d-f-company-conducting-20m-expansion-between-two-mills/>
- <http://www.mainebiz.biz/article/20180720/NEWS01/180729998/verso-to-upgrade-jay-mill-for-specialty-papermaking>
- <https://www.prnewswire.com/news-releases/verso-announces-strategic-investments-in-its-androscoggin-mill-in-jay-maine-300682841.html>
- <https://www.pressherald.com/2018/02/15/verso-to-restart-no-3-paper-machine-bringing-back-120-jobs/>
- <https://www.pressherald.com/2018/10/10/nd-paper-adds-to-its-maine-holdings-purchasing-the-old-town-mill-for-an-undisclosed-sum/>
- <http://www.mainebiz.biz/article/20181011/NEWS01/181019991/nd-paper-to-buy-and-reopen-old-town-mill-restoring-100-jobs>
- <http://www.mainebiz.biz/article/20180702/NEWS01/180709996/new-owner-of-rumford-paper-mill-will-retain-workers-eyes-investment>