

Maine's Forest Economy



Wood is the most environmentally sound material on earth. It is renewable, highly versatile, grown with relatively little effort, carbon friendly and it's produced and stored as forests that provide clean air, water, wildlife habitat, biodiversity, recreation and beautiful vistas.

\$1 out of every \$16
in Maine's gross state product
and 1 of every 20 jobs is
associated with Maine's forest
products sector.



Total economic impact
\$8 billion



**This report was produced by
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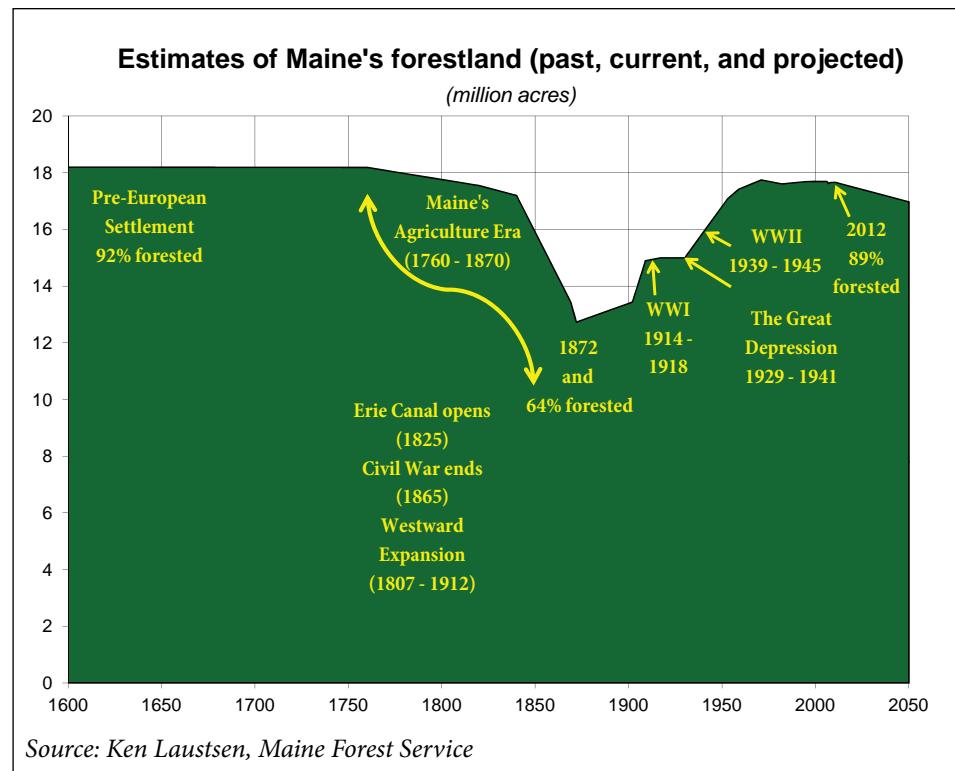
Maine forest industry at a glance

Subject	Amount	Year	Source	
Total economic impact	\$8 billion; \$1 out of every \$16 in Maine's gross state product is associated with the forest products sector	2011 <i>Economic Contribution of Maine's Forest Products Sector, Todd Gabe, professor of economics, University of Maine, 2013</i>	<i>Economic Contribution of Maine's Forest Products Sector, Todd Gabe, professor of economics, University of Maine, 2013</i>	
Direct employment, including paper manufacturing; forestry and logging; wood product manufacturing, and other	17,075			
Total direct and indirect employment	38,789 full and part-time jobs; one out of every 20 jobs in Maine is associated with the forest products sector			
Total payroll	\$1.9 billion			
Total state and local taxes paid	\$302 million			
Total exports <i>(See details below)</i>	\$885 million, Maine's top export, and 28.9% of all state exports	2012 <i>Measures of Growth 2013, Maine Economic Growth Council</i>	<i>Measures of Growth 2013, Maine Economic Growth Council</i>	
Paper and paperboard	\$393 million			
Pulpwood etc.	\$258 million			
Wood and articles of wood	\$234 million			
Total annual harvest	13.5 million green tons (5.4 million cords)	2011	<i>Maine Forest Service</i>	
Acres forested	17.6 million, 89% of Maine's total land acres	2012		
Forest land ownership				
Privately owned	16.3 million acres, 92.7% of forested land			
State and local government	1.1 million acres, 6.3%			
U.S. Forest Service	58,000 acres, 0.3%			
Other federal agencies	128,000 acres, 0.7%			
Acres certified as using sustainable forest practices by independent auditors of the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC) and American Tree Farm System (ATFS).	9.4 million acres – 53% of Maine's forestland. Maine has more certified forestland than any other state.	2013		



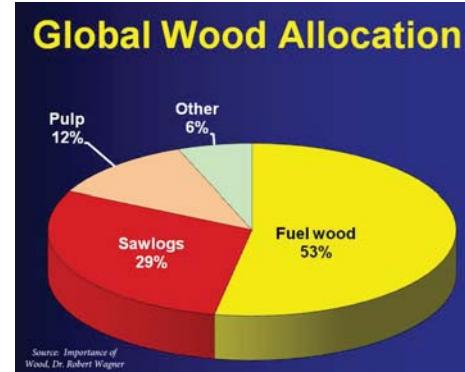
Why Maine is a great place for a forest industry

- Nearly as much forestland (89 percent by area) as when Europeans arrived in the 1600s.
- 92.7 percent of state's forestland is privately owned.
- Largest, contiguous, privately owned, working forest in the United States.
- Twice the standing wood volume today as in 1950.
- Can sustainably produce about 600 million cubic feet of wood each year.
- Recent studies of working forests and forest products show that both are important in helping reduce greenhouse gas pollution to the atmosphere.
- 97.9 percent of the forest area harvested is rapidly returned to forest using natural regeneration methods. Only 2.1 percent of the forest is regenerated by planting.
- One of the highest woody

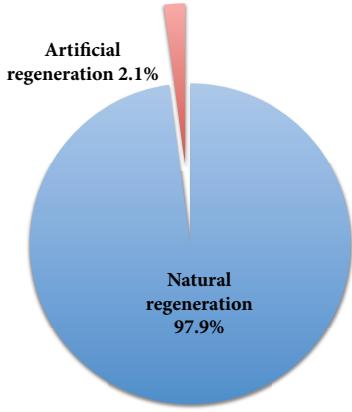


biomass producing states in the United States.

- Harvest and growth are in balance statewide.
- Family-owned forests make up about a third of the working forestland in Maine and provide about 25 percent of the wood used in making forest products.
- Market for everything! One of the most diverse and best integrated forest products processing and transportation systems in the U.S.
- Grows lots of wood within one-day drive of 70 million of the richest people on the planet.
- Independent auditors have certified that 9.4 million acres – 53 percent of Maine's working forests – are managed sustainably.
- National leader in forest conservation easements, with about 3.5 million acres protected from development (2.1 million acres are working forest easements). Very diverse tree species, with good balance of hardwoods and softwoods.
- Highest non-hydro renewable electrical generation in US because (wood provides ~20 percent of electrical generation).
- Maine forests are a recreation and tourism destination – \$1.15 billion in 2005 (Source: North East Foresters Association, 2007).



Maine's 'Magical Forest: Harvest quickly produces new trees



This is not your father's forest products industry

I've been talking a lot lately about an unlikely subject: popsicle sticks. That's because the future of the forest products industry and manufacturing in particular is on my mind and a 94-year-old Guilford company is a great illustration of where Maine's future lies.

We're on the cusp of a new kind of thinking in Maine and across the nation. People are realizing our economy can't be solely a service economy, nor can it be designed around financial institutions. There's a growing consensus that, as Bruce Katz of the Brookings Institute said at the 2012 GrowSmart Summit in Augusta, "Going forward, we will innovate less if we do not produce more. We must make things again."

Katz called it the Third Industrial Revolution and stressed the need to bring manufacturing back to the nation and Maine. While he didn't mention the forest economy specifically, I came away thinking Mainers need to become reacquainted with our industry. This report, which is drawn from many sources, is a major step in increasing understanding of the *new* forest economy.

As people talk about bringing back manufacturing jobs, for example, they should know that some of those jobs never left. While some may think forest products is a mature industry, we know it's not an industry that's seen its best days, but one that has a bright future. We are still the state's leading manufacturing industry and its largest exporter. As a 2013 University of Maine study shows, our industry has a total value-added impact of an estimated \$3.3 billion. That's equivalent to 6.38 percent of the state's gross domestic product in 2011. Put another way, \$1 out of every \$16 in Maine gross state product is associated with the forest products sector.

People need to understand that the forest economy isn't just about big paper mills crunching out paper anymore; it's about paper mills producing paper plus energy. It's about paper mills extracting chemicals out of wood, instead of just burning it as fuel. It's about high-tech sawmills and mechanized logging. This new age requires a lot more research and development, and more innovation. You can even throw green jobs into the mix, because that's what our business is all about.

Which brings me back to the 3.5 billion popsicle, ice



Patrick Strauch

*Executive Director
Maine Forest Products Council*

cream, corn dog and other sticks that 400 workers make annually at Hardwood Products in Guilford. The company has been going strong since 1919, and it's the only one of its kind left in the nation. One Canadian company still produces ice cream sticks alone, but five other companies in North America have gone under. Yet this Maine company is thriving. As James Cartwright, grandson of the founder and vice president of sales and woodware operations, told us, "We've been working 24 hours a day for the last 18 months just to keep up."

We don't want to oversell the opportunities we see coming, because there also are challenges to face as we gear up for this new economy. In the forests, paper mills and sawmills, folks are starting to get concerned about the retirement of the baby boomers. It's time to invest in the education of the workers we will need.

We're also in a race to make sure that manufacturing gets its first opportunity in Maine before materials are shipped away. Exports of processed materials are good. We don't mind being the lead exporter of paper, pulp or 2x4s. But we don't want to be the lead exporter of logs and paper mill chips to other parts of the world where they'll be processed further. We need to encourage more capital investments, so more processing can be done in Maine.

We must make sure our regulations are smart – still as rigorous as they need to be, but not cumbersome. They must allow innovation to take place, so we can approach problems and find solutions. We might discover even better environmental protections or ways to lower electricity costs. We also need to ensure our taxes are competitive and that we've got a trained work force.

Maine citizens want to maintain healthy forests, so we hope to help them understand that healthy forests depend upon competitive energy rates, economically and environmentally sound regulations, and the education of our youth. If we achieve those things, the entire Maine economy and all of our people will benefit.



Economic contributions of Maine's forest products sector

By Todd Gabe
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SUMMARY OF MAIN FINDINGS¹

- The forest products sector in Maine includes businesses, organizations and individuals involved in activities such as (but not limited to) logging and forestry, paper and related product manufacturing, sawmills and wood product manufacturing, wood furniture manufacturing, wood biomass power generation, maple syrup production, and activities of the Maine Forest Service.²
- The Maine forest products sector has a total annual (2011) statewide economic contribution, including multiplier effects, of an estimated \$8.0 billion in output, 38,789 full and part-time jobs, and \$1.9 billion in labor income.³ In the economic impact results shown in *Table 1*, the forest products sector is included in the direct contribution (e.g., \$5.1 billion in output) and the multiplier effects (e.g., \$643.7 million in output). This is because businesses such as paper mills, sawmills and wood furniture producers – counted in the direct contribution – purchase goods (e.g., timber) and services from businesses involved in logging and forest management (counted in the multiplier effects).
- Paper manufacturing is the largest segment of Maine's forest products sector. Of the forest products sector's direct contribution of \$5.1 billion (*shown in Table 1*), paper manufacturing accounts for about \$4.0 billion. Paper manufacturing also accounts for the largest number of jobs in Maine's forest products sector (*see Table 2*).
- The total employment impact of 38,789 jobs is equivalent to 4.85 percent of the jobs in Maine.⁴ Put another way, roughly 1 out of every 20 jobs in Maine is associated with the forest products sector.
- The total economic contribution of Maine's forest products sector is associated with an estimated (by the Maine IMPLAN model) fiscal impact of \$302.2 million in state and local taxes.⁵
- Maine's forest products sector has a total, including multiplier effects, value-added impact of an estimated

1 This analysis was requested by the Maine Forest Products Council.

2 Industrial categories (NAICS codes) counted in the forest products sector include forestry and logging (NAICS 113), support activities for forestry (NAICS 1153), other electric power generation (NAICS 221119), wood product manufacturing (NAICS 321), paper manufacturing (NAICS 322), sawmill and woodworking machinery manufacturing (NAICS 33321), and subsectors of furniture and related products manufacturing (NAICS 337). The economic impact analysis accounts for other activities (e.g., maple syrup production, Maine Forest Service) that are not included in these industrial categories.

3 The total output and employment impacts are estimated as 0.466 and 0.447 times the size of similar measures for Minnesota's forest products sector. For more information about the Minnesota study, see:

<http://files.dnr.state.mn.us/forestry/um/economiccontributionMNforestproductsindustry2011.pdf>.

4 The 2011 total employment figure for Maine is from the U.S. Bureau of Economic Analysis.

5 The state and local tax impact in Maine, as estimated by the IMPLAN model, is equivalent to 3.79 percent of the sector's total (output) economic contribution. The percentage of the tax impact relative to the sector's overall economic contribution is almost identical to the one (3.63 percent) calculated using figures from the Minnesota study, which also uses IMPLAN (see footnote 3).



\$3.3 billion.⁶ This is equivalent to 6.38 percent of the state's gross domestic product in 2011.⁷ Put another way, \$1 out of every \$16 in Maine gross state product is associated with the forest products sector.⁸

- The forest products sector in Maine impacts businesses of all types through the purchases made by forest products companies (organizations and individuals) and their employees. For example, the 26,786 jobs counted in the forest products sector's multiplier effects includes 2,006 jobs in wholesale trade, 1,688 positions in professional services, and 854 jobs in truck transportation (*see Table 2 and its notes for additional information*).
- The Maine forest products sector impacts businesses across the entire state through the activities of forest products companies (organizations and individuals) and the purchases that they (and their employees) make. The total employment impact varies from an estimated 271 jobs in Sagadahoc County to 6,749 jobs in Aroostook County (*see Table 3*). The total employment impact exceeds 20 percent of the jobs available in Piscataquis, Aroostook, Somerset, Franklin and Oxford counties.

Table 1. Estimated annual statewide economic contribution of Maine's forest products sector, 2011

	Direct Contribution	Multiplier Effects		Total Contribution
		Forest Products	Non-Forest Products	
Output	\$5,063,915,031	\$643,676,568	\$2,267,788,190	\$7,975,457,789
Employment	12,003	5,072	21,714	38,789
Labor Income	\$721,541,907	\$184,150,509	\$960,935,289	\$1,866,637,705

NOTES: Direct output, employment and labor income figures are estimated using information from the U.S. Census Bureau Annual Survey of Manufacturers, County Business Patterns of the U.S. Census Bureau, Nonemployer Statistics of the U.S. Census Bureau, various reports compiled by the Maine Forest Service, maple syrup statistics provided by the New England Field Office of the (USDA) National Agriculture Statistics Service, budget figures for the Maine Forest Service, a University of Maine survey of Maine's Clean Technology Sector, and the Maine IMPLAN model. Multiplier effects are estimated using an economic impact model (IMPLAN) of the Maine economy. The data used in the analysis are from the most recent year available, which is 2011 in most cases. The forest products sector is included in the direct contribution (e.g., \$5.1 billion in output) and the multiplier effects (e.g., \$643.7 million in output) because businesses such as paper mills, sawmills and wood furniture producers – counted in the direct contribution – purchase goods (e.g., timber) and services from businesses involved in logging and forest management (counted in the multiplier effects).

⁶ The ratio of value added to overall economic contribution in Maine (0.412) is almost identical to a similar ratio (0.404) calculated using figures from the Minnesota study (see footnote 3).

⁷ The figure for Maine's gross state product is from the U.S. Bureau of Economic Analysis.

⁸ The forest product sector's importance to gross state product (\$1 out of every \$16) is higher than its importance to employment (1 out of every 20 jobs) because forest products businesses (e.g., paper mills) tend to generate more output per worker (and provide higher wages) than other businesses operating in Maine..



Table 2. Industries impacted by Maine's forest products sector

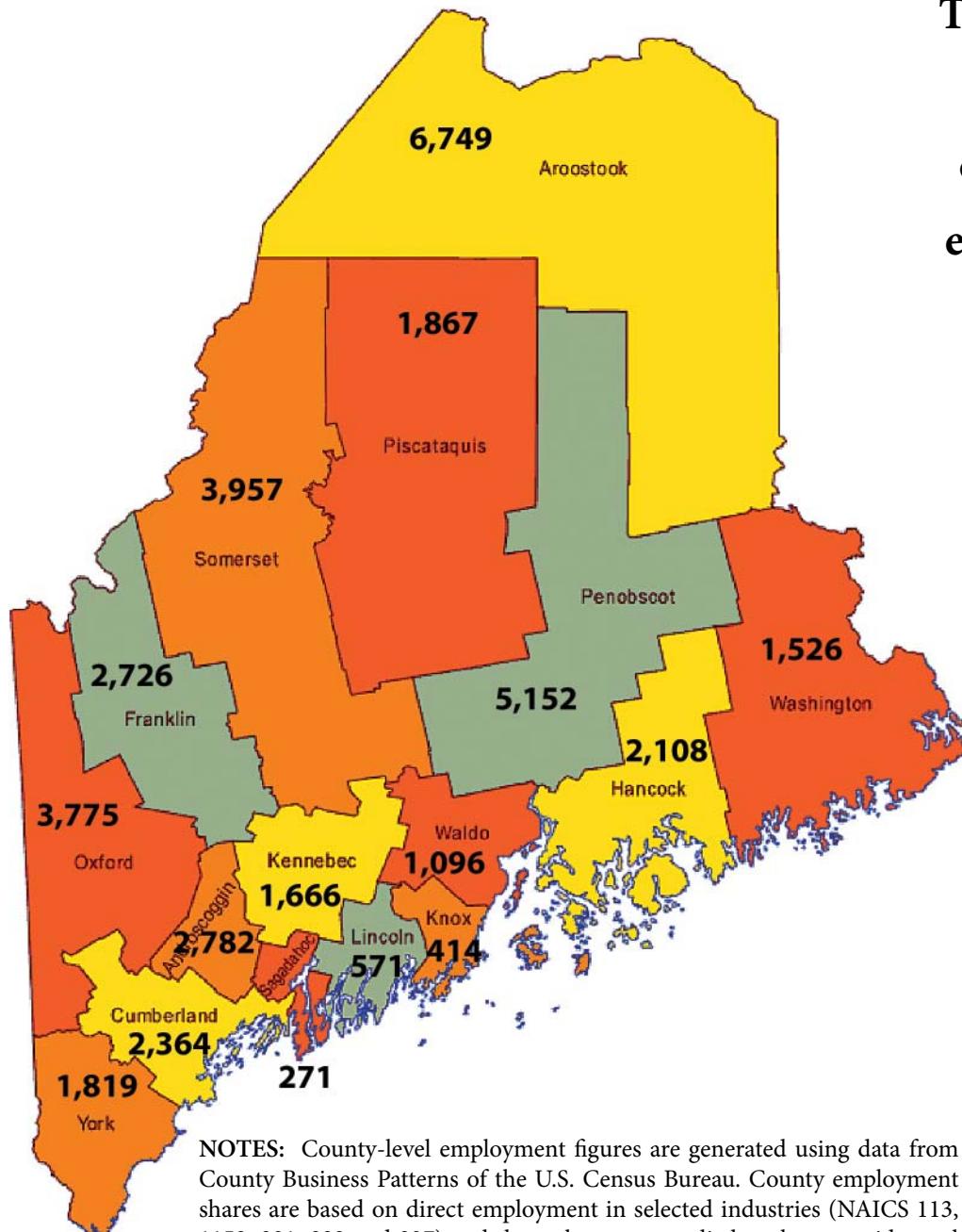
Forest products sector	Employment impact
Sector includes:	
Paper manufacturing	6,798
Forestry and logging	4,741
Wood product manufacturing	3,909
Other	1,627
Subtotal	17,075
Non-forest products sector	
Wholesale trade	2,006
Professional – scientific and tech services	1,688
Food services and drinking places	1,520
Administrative support services	1,344
Real estate	919
Ambulatory health care	916
Truck transportation	854
Management of companies	712
Repair and maintenance	614
Hospitals	583
Subtotal	11,156
Industries not listed above	10,558
Total	38,789

NOTES: The forest products sector employment impact of 17,075 jobs includes the direct employment of 12,003 (see *Table 1*) and 5,072 jobs counted in the multiplier effects; e.g., forestry and logging. The non-forest products sectors listed by title have the largest employment impacts (i.e., counted in the multiplier effects) as estimated by the Maine IMPLAN model. Employment figures count jobs that are “located” in Maine. In the non-forest products sectors, additional jobs located outside of Maine are supported by the Maine forest products sector. The sectors shown in *Table 2* are “industries,” which are defined on the basis of the primary good or service produced by a business. “Occupations,” on the other hand, are defined by a person’s job title. Information from the Maine Department of Labor shows that 2,770 truck drivers – an occupation – are employed in Maine’s forest products sector. These 2,770 jobs might be spread across several of the industries highlighted in *Table 2*.



Table 3. Maine forest products sector direct and indirect employment impact by county

Total: 38,789



NOTES: County-level employment figures are generated using data from County Business Patterns of the U.S. Census Bureau. County employment shares are based on direct employment in selected industries (NAICS 113, 1153, 321, 322 and 327) and these shares are applied to the statewide total employment impact.

Androscoggin	2,782	Oxford	3,775
Aroostook	6,749	Penobscot	5,152
Cumberland	2,364	Piscataquis	1,867
Franklin	2,726	Sagadahoc	271
Hancock	2,108	Somerset	3,957
Kennebec	1,666	Waldo	1,096
Knox	414	Washington	1,526
Lincoln	517	York	1,819



Jobs decline, but productivity and safety improve

For one brief moment last fall, it looked as if I might not survive my first exciting look at a modern logging site. I was so fascinated by a feller buncher – although I had no idea what to call it – that I just had to take photos. The other members of our tour group sensibly moved to the far side of the path, but I stood there mesmerized until someone pulled me aside.



In the past year, I've learned more than I could have imagined about Maine's forests and forest products industry. Their history is Maine's history, but somehow the most recent chapters have gone virtually unnoticed outside the industry. Despite all the time I've spent in the Maine woods, I certainly never connected the dots.

For example, I only vaguely recalled the last spruce budworm infestation in

the 1970s. Living in southern Maine, I didn't grasp what the state entomologist called "the grave and extensive holocaust posed to Maine forests by the budworm."

I remember the clear-cutting referendums that followed, but I never understood that much of the clearcutting was a frantic effort to salvage spruce and fir before it was lost to budworm. I didn't know that from 1976 to 1981 alone, 7 million cords of wood were directly lost to budworm and another 8 million cords disappeared because trees were so damaged they simply blew down. Nor did I trace the drop in the northern Maine deer herd to the loss of their winter cover to budworm. Then last fall Bill Brown described what he'd witnessed as a young forester for Seven Islands. Through his vivid words, he made me see the forests dying, the skies filled with bombers spraying trees, the crews scrambling to build roads to reach infested trees.

"In about June, you could fly and look out and everything you could see would be all red," Brown told me. "The



Roberta Scruggs
*Communications director
Maine Forest Products Council*

needles of the trees turned red once they'd been fed on – all red as far as you could see. Typically in one year or two of heavy feeding that would be it. The fir would be dead. You had one year or maybe two to salvage it and then it was gone."

How did I miss all that? Maybe because even though forest products is still one Maine's largest industries, we see it through the haze of history. I began my job at MFPC with a mental image based on historic photos and outdated assumptions. Today, that picture has been totally changed by what I've seen, heard and learned.

Like many Mainers, though, I knew that Maine's forest products industry has fewer jobs than in the past. But I didn't realize last fall that I was looking at the reason: the feller buncher and other machines have replaced many workers. Of course, that's a very familiar story, one many have experienced directly as technology has retooled our economy. I spent most of my working life in the newspaper business, which is now "the fastest shrinking industry in the U.S." Newsroom employment nationwide fell below 40,000 last year for the first time since 1978.

There also are fewer jobs in Maine's forest products industry, but, as you'll see in the following pages, productivity has increased dramatically thanks to new technology. There's also an upside to machines like the feller buncher. Their operators have far lower injury rates and longer working lives, because the physical toll of logging is much reduced if you're sitting in a cab.

Collecting the information in this report has certainly changed and sharpened my perspective on one of Maine's oldest industries. I'm still fascinated by its history, but I'm looking forward to watching its future unfold.

As Don White, former MFPC president told me, "We are going to be facing change constantly. The unions have changed. The mills have changed. The players who owned the mills have changed. So what? We're evolving. Change is constant and we're willing to change."



Private employment and wages for Maine and selected forest products industries, 2001, 2007 and 2011									
	Average Annual Employment			Total Payroll			Average Annual Wage		
Industry	2001	2007	2011	2001	2007	2011	2001	2007	2011
Total, all industries (Maine private sector)	496,308	503,051	482,451	\$14,095,793,470	\$17,340,532,174	\$18,039,007,841	\$28,401	\$34,471	\$37,390
Timber tract operations	99	91	81	\$4,473,341	\$4,760,514	\$3,884,116	\$45,185	\$52,313	\$47,952
Support activities for forestry	258	182	173	\$8,065,595	\$8,689,574	\$8,799,435	\$31,262	\$47,745	\$50,864
Construction equipment merchant wholesalers	531	600	481	\$23,809,007	\$31,953,986	\$27,910,174	\$44,838	\$53,257	\$58,025
Plywood and engineered wood product mfg.	1,166	1,010	495	\$39,188,058	\$38,368,249	\$20,353,548	\$33,609	\$37,988	\$41,118
Converted paper product manufacturing	2,048	1,808	1,576	\$71,766,308	\$76,407,884	\$76,707,724	\$35,042	\$42,261	\$48,672
Sawmills and wood preservation	2,365	2,229	1,776	\$70,596,996	\$81,579,957	\$68,232,258	\$29,851	\$36,599	\$38,419
Other wood product manufacturing	3,613	2,674	1,857	\$92,422,367	\$80,896,373	\$58,889,277	\$25,581	\$30,253	\$31,712
Logging	2,558	2,564	2,304	\$70,189,345	\$91,519,682	\$90,481,345	\$27,439	\$35,694	\$39,271
General freight trucking*	4,164	3,902	3,273	\$136,410,398	\$151,267,009	\$131,486,281	\$32,759	\$38,767	\$40,173
Pulp, paper, and paperboard mills	10,208	6,713	5,723	\$564,673,771	\$435,008,902	\$396,177,153	\$55,317	\$64,801	\$69,225
Total forest products	27,010	21,773	17,739	\$1,081,595,186	\$1,000,452,130	\$882,921,311	\$40,044	\$45,949	\$49,773
Percent of all industries	5%	4%	4%	8%	6%	5%	141%	133%	133%

Source: Maine Department of Labor Center for Workforce Research and Information. Compiled 3-13-2013 by request.

Note: Employment figures may differ from the sectors shown in Table 2 because those figures were based on "industries," which are defined on the basis of the primary good or services produced by a business. "Occupations," on the other hand, are defined by a person's job.

*In 2011, truck drivers estimated to work in the forest products cluster were concentrated in the general freight trucking industry – about 80 percent in general freight trucking and 17 percent in logging. Truck drivers working in firms counted in the general freight trucking industry may be transporting any type of material including, but not limited to forest products. This estimate, therefore, overestimates the number of wage and salary truckers moving forest products alone. On the other hand, the estimates do not include truck drivers who are self-employed operating as sole proprietors; we don't know how many truckers who might be moving forest products are not counted.

Rank (2011 emp)	Industry Sector (private ownership)	Average Annual Employment		
		2001	2007	2011
1	Health Care and Social Assistance	84,088	96,696	99,470
2	Retail Trade	86,199	87,921	81,150
3	Leisure and Hospitality	56,406	60,356	60,178
4	Professional and Business Services	51,801	53,810	57,477
5	Manufacturing*	74,538	59,311	50,722
6	Financial Activities	33,612	32,002	30,232
7	Construction	29,743	30,989	25,219
8	Wholesale Trade*	20,178	21,269	19,064
9	Forest Products Cluster	27,010	21,773	17,739
10	Transportation and Warehousing*	14,119	14,692	14,986
11	Educational Services	8,532	10,335	11,490
	Natural Resources*	5,941	5,954	6,119

* Contain industries that make up the Forest Products cluster; as a stand-alone industry, Forest Products would be #9



Fewer loggers can produce far more wood

Pre-1960s

- 9 cords per logger per week
- 270 cords per logger per year
- Length of season: 30 weeks
- 1950 harvest: 2.9 million cords



1960-1980

- 50 cords per logger per week
- 2,000 cords per logger per year
- Length of season: 40 weeks
- 1970 harvest: 5 million cords



1980 - present

- 75% tree length; 25% cut to length*
- 75.7 cords per logger per week
 - 3,558 cords per logger per year
 - Length of season: 47 weeks
 - 2011 harvest: 5.4 million cords

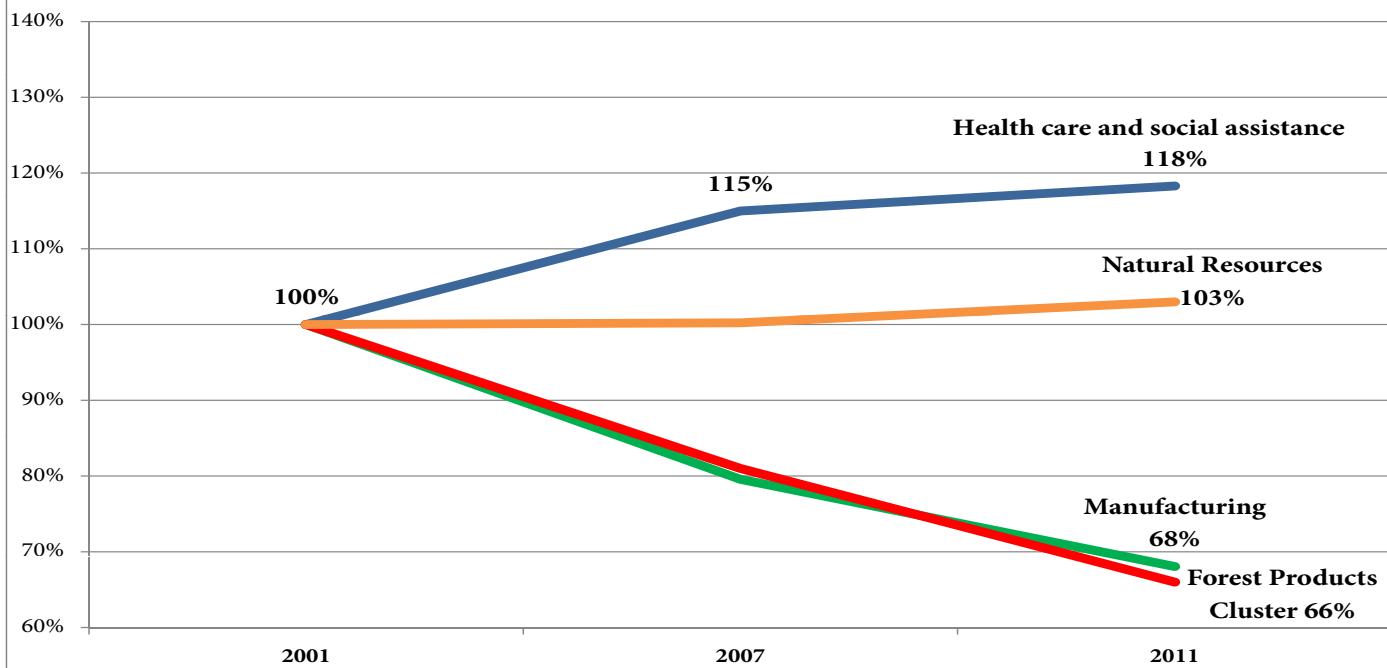


Sources for estimates and data: Certified Logging Professional, Maine Forest Service, Census of Maine Manufacturers



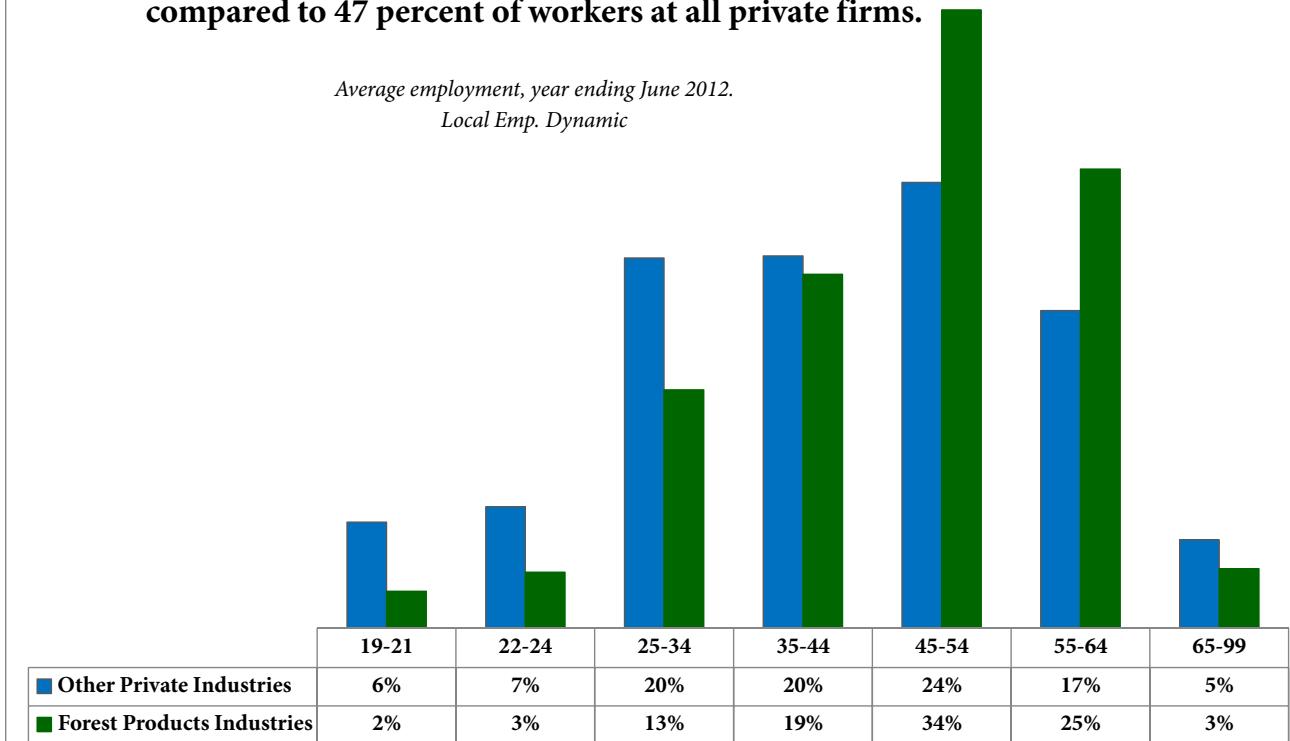
A substantial share of forest products industry cluster employment is derived from manufacturing industries. Job decline from 2001 to 2011 is similar that of the manufacturing sector as a whole.

Average annual employment by industry sector, indexed to 2001



Forest products industries have an older workforce than the private sector as a whole. Sixty-two percent of workers are ages 45 and older, compared to 47 percent of workers at all private firms.

*Average employment, year ending June 2012.
Local Emp. Dynamic*



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



Paper industry productivity rises sharply

1960

- Number of workers: 16,920
- Total tons/day: 4,658
- Tons per year: 1.7 million
- Tons per worker per year: 100



1980

- Number of workers: 18,076
- Tons/day: 8,767
- Tons per year: 3.2 million
- Tons per worker per year: 177



2011

- Number of workers: 6,798
- Total tons/day: 9,041
- Tons per year: 3.3 million
- Tons per worker per year: 485



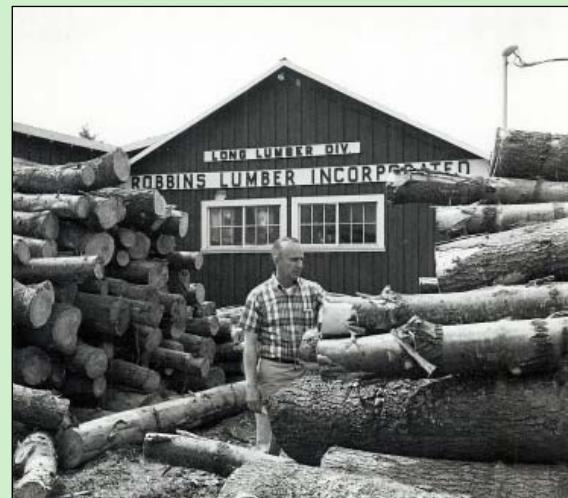
Sources: Economic Contribution of Maine's Forest Product Sector; Census of Maine Manufacturers; Maine Pulp and Paper Association



Output per worker increasing at sawmills

1950

- Number of mills reporting: 232
- Number of workers (*sawmills and planing mills*): 3,945
- Reported production (MBF): 497,486
- MBF per worker per year: 126



1981

- Number of mills reporting: 368
- Number of workers (*sawmills and planing mills*): 3,326
- Reported production (MBF): 742,652
- MBF per worker: 223



2011

- Number of mills reporting: 84
- Number of workers (*sawmills and wood preservation*): 1,776
- Reported production (MBF): 624,012
- MBF per worker: 351



Sources: Maine Forest Service, Census of Maine Manufacturers, Maine Department of Labor



Maine has a resilient and healthy forest

The State Forester is charged with protecting Maine's forests from fire and pests. This responsibility tends to make one a bit pessimistic about the future for good reason. We can't afford the luxury of being wrong; we can hope for the best, but must prepare as if the worst could happen. At this time, our forests are very healthy and this is evident from factual information and feedback from professional forest managers.

Fortunately, the state is blessed with thousands of forest landowners and residents who have a very strong stewardship ethic and are interested in keeping our forests safe from all manner of threats (more on this later).

We not only have a healthy forest, but one that is hard at work producing fiber for our manufacturing base. Maine is unique among northeastern states in that harvest and growth are nearly in balance, with a slight edge given to growth. This dynamic provides a good supply of young forest to replace mature forests before decline is well established. It is very likely that this unique balance contributes to Maine's significant net volumes of imported wood. Our manufacturing base has for years been taking advantage of surplus fiber growth in adjacent states and provinces.

Fire protection afforded our forests is of the highest order. While the incidence of fires continues at a consistent level, the size of fires has shrunk to about an acre per event. A number of factors have contributed to this trend including proficiency, response time, use of local fire departments, available federal equipment and harvest practices. A serious risk to maintaining this level of protection is the incidence of arson fires. While arson is a minor component of fire frequency, the average size of arson fires is huge in comparison to other causes.

There are a number of very serious introduced insect and disease pests either in Maine or at its borders. Names such as emerald ash borer, Asian longhorned beetle, winter moth, brown spruce longhorn beetle and hemlock adelgid are names that should be familiar to most.

Although the potential impact of these pests is huge, the actual losses we will experience vary between species and may be ameliorated by the management steps being taken (eradication, containment, and



Doug Denico

Director, Maine Forest Service

development/deployment of biological control methods that are still in their initial phase of investigation).

Some of the invasive pests that have been here for decades, such as gypsy moth, seem to be becoming naturalized and are causing less impact now than before. Others such as beech scale, white pine blister rust and balsam woolly adelgid continue to damage and/or kill trees, negatively impacting Maine's forests.

Then there are native pests that periodically cause serious problems. White pine has been plagued for several years with pathogens that cause needle blight. Similarly, we are seeing expansion and intensification of red pine shoot blight, which is killing trees in plantations across Maine.

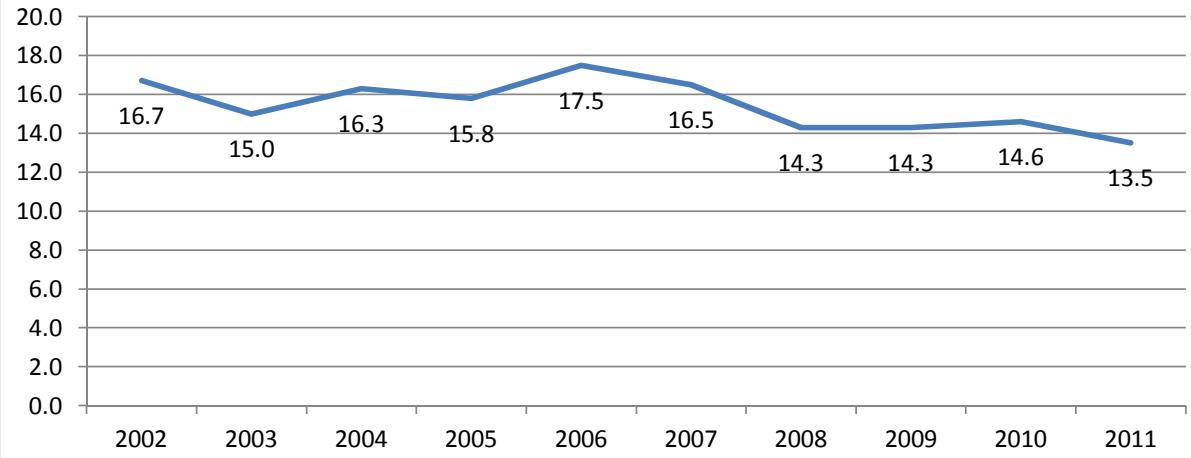
Our perennial visitor, the spruce budworm, is causing huge damage in Quebec and will appear in a few years. Tools used during the past epidemic must be reconfigured if Maine is to have an effective control program.

No list of threats would be complete without mentioning climate change, which is a factor in some of the pests mentioned above and threatens to have additional, as yet undetermined, impacts. While such change could have markedly different results on our various tree species, the best opportunity to minimize negative impacts is to keep forests healthy through the application of sound silvicultural techniques.

As stated before, a bit of pessimism is warranted from a public agency when all the potential risks to forest health are realized. Given the positive interest and active involvement of state agencies, and public and private entities, there is a sound basis for hope as well. Although funding for pest control is becoming more limited at the federal level, Maine and the rest of New England have been in the forefront of states joining together to share personnel and stretch dwindling financial resources. This initiative is garnering support and demonstrating significant initial success; a further indicator that Maine will weather coming challenges.

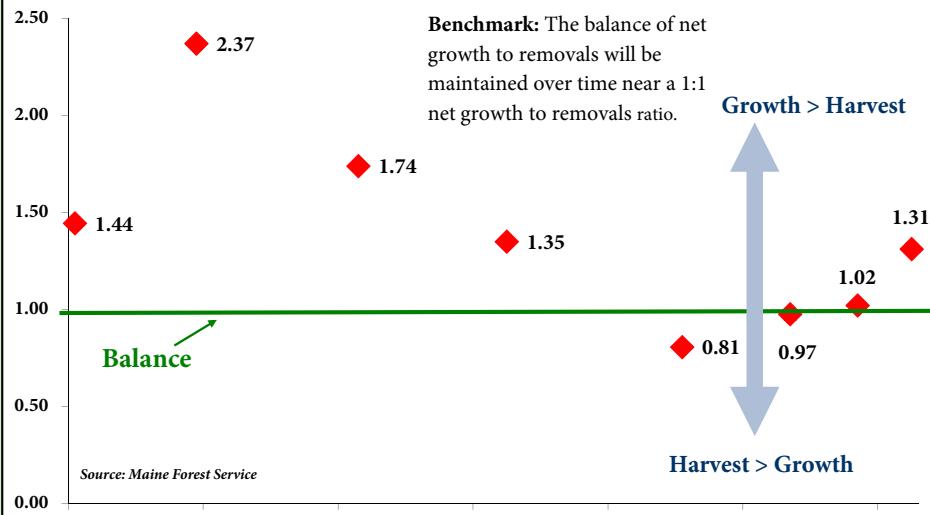


Maine wood harvest in millions of green tons



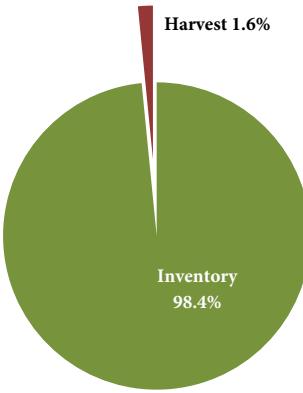
One of the measures of sustainable forest management is the relationship between how much timber is grown and how much is harvested. In the long run, the desirable net growth ratio is 1:1, meaning growth and harvest are balanced. A value greater than one indicates that growth is greater than harvest. Since 2008, growth has exceeded harvest in Maine and in 2012, the net growth ratio was 1.31:1; meaning growth exceeded harvest by 31 percent. It was the highest level of growth vs. harvest since 1982.

Historic Trends in the Net Growth to Removals Ratio



- Maine's forestland contains more than 24 billion live trees at least 1 inches in diameter, an increase of 6.3 percent since 2007. (*U.S. Forest Service, Maine's Forest Resources, 2012*). **That's 18,688 trees for each of the state's 1.3 million people.**
- Within the 20-state northern region, Maine is ranked #11 in land acreage, #3 in forestland acreage (behind New York and Michigan), and #1 in forestland percentage at 89 percent. New Hampshire, Vermont and West Virginia follow, being respectively at 85 percent, 78 percent and 78 percent forested. These are the only four states in the country more than 75 percent forested (*Forests of the Northern United States, Table 4*).

Average annual reported harvest as a share of merchantable inventory (1959 - 2012)



Tree Growth program preserves Maine's forests

To understand Maine's Tree Growth program, you need to think of trees as a crop, just like corn or apples. But unlike food crops, trees take decades to mature to harvest. The value of a mature woodlot just before harvest can be substantial, but its value after harvest is negligible and remains low for decades. So Tree Growth spreads property taxes evenly over the lifetime of the crop.

The state of Maine, like many other states, has long recognized the necessity and desirability of encouraging landowners to practice good, long-term forest management. In 1953, the Legislature established the policy that forestland should be taxed on its productivity – on its ability to grow trees – rather than its potential value if converted to house lots or other developments.

In 1970, citizens amended the Maine Constitution to allow current use taxation, meaning timberland is assessed on how the land is being used, rather than how it could potentially be used. A special study committee was appointed, which resulted in the Tree Growth Tax Law, declaring that “the public interest would be best served by encouraging forest landowners to retain and improve their holdings of forest lands . . . in order to protect this unique economic and recreational resource.”

Tree Growth summary for unorganized territory 2013						
County	# of parcels	Total acres	Total Value	Acres first classified	Acres withdrawn	Penalties assessed
Aroostook	352	2,296,068	\$281,609,692	0	86.17	\$64,105
Franklin	275	437,486	\$102,355,308	0	6.65	\$6,442
Hancock	106	241,646	\$29,743,137	0	90.8	\$13,699
Kennebec	9	4,874	\$1,218,398	0	0	\$0
Knox	0	0	\$0	0	0	\$0
Lincoln	5	193	\$38,985.00	0	0	\$0
Oxford	210	285,323	\$67,188,073	0	1.00	\$1,877
Penobscot	393	714,640	\$87,679,163	0	62.46	\$23,352
Piscataquis	372	1,527,884	\$187,007,519	0	7.00	\$28,615
Somerset	810	1,460,562	\$178,723,615	0	87.41	\$45,666
Washington	395	580,845	\$71,312,247	0	83.85	\$14,944
State totals	2,927	7,549,519	\$1,006,876,136	0	425.34	\$198,700

Tree Growth summary for municipalities 2012						
County	# of parcels	Total acres	Total Value	Acres first classified	Acres withdrawn	Penalties assessed
Androscoggin	648	34,541	\$10,728,987	77	81	\$7,583
Aroostook	1,734	714,632	\$81,872,653	4,825	1,421	\$41,896
Cumberland	1,551	84,672	\$28,180,441	402	355	\$108,471
Franklin	1,524	293,142	\$65,649,912	833	46	\$23,666
Hancock	1,718	227,845	\$25,128,429	871	419	\$151,713
Kennebec	1,374	70,949	\$17,145,532	691	486	\$34,367
Knox	415	20,412	\$5,226,533	78	165	\$4,507
Lincoln	764	35,156	\$8,569,089	320	72	\$760
Oxford	3,568	458,841	\$100,014,526	2,413	1,505	\$71,270
Penobscot	3,003	527,293	\$59,366,536	4,414	374	\$151,180
Piscataquis	1,404	300,450	\$35,552,422	318	301	\$7,817
Sagadahoc	395	17,998	\$5,632,147	205	102	\$15,140
Somerset	2,182	390,054	\$44,811,664	964	424	\$19,268
Waldo	853	55,879	\$13,465,660	379	409	\$14,951
Washington	1,476	366,906	\$41,439,608	1,804	139	\$29,962
York	1,513	92,864	\$30,609,940	2,567	556	\$92,911
State totals	24,122	3,691,633	\$573,394,078	21,159	6,856	\$775,465



"The Tree Growth Tax Law is very important to thousands of landowners and has done more to conserve land than any other program, including all the land acquisition bonds combined."

*- Tom Doak, executive director
Small Woodland Owners Association*

The Tree Growth program is one of four “current use” programs – along with **Farm-land, Open Space and Working Waterfront** – enacted because it is in the public’s interest to encourage the preservation of farmland, open space, working forests and waterfronts.

These programs are available to eligible property owners through municipalities. Any change in land use results in significant penalties paid to the municipality. Every year municipalities apply for reimbursement from the state for 90 percent of the difference in valuation from local ad valorem forestland rates and the Tree Growth rate.

Taxing land only on its ability to grow trees removes some of the economic pressures to convert forestland to other uses. So these lands grow timber, which provide jobs, income and taxes, and offer tremendous recreational opportunities. The program also provides municipalities with a more dependable and stable source of revenues.

Source: Maine Revenue Services



Despite changing landowners, working forest thrives

By Peter Triandafillou

Vice president, woodlands

Huber Resources

“Kingdoms for sale” read the Portland Press Herald’s front page headline on June 10, 2001. There was much concern that wealthy buyers who were “less interested in feeding the mills than nourishing their souls or their wallets” would change northern Maine.

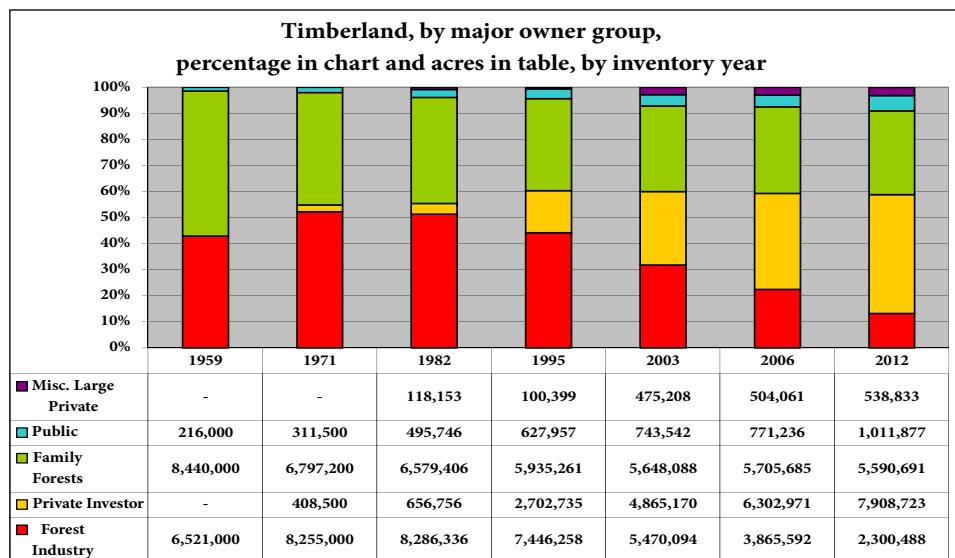
While much of the working timberland in central and southern Maine is composed of smaller woodlots owned by families, individuals and farmers, much of Maine’s northern timberlands are held in very large tracts by commercial owners.

From the 1980s through the 1990s, most timberland owned by paper companies was sold to private investors. These investors represent pension funds, other institutional investors and wealthy individuals. Many firms have fixed investment periods that require a sale in order to capture return on investment.

Although investment firms were initially hailed as an alternative to industrial owners, this fixed investment length created suspicion in some circles, with predictions of fragmenting ownerships, increased development and poor silviculture.

It’s been nearly two decades since this change in ownership took place and while some still claim things have changed for the worse, a look at the facts says otherwise.

When one looks at the heart of the industrial forest of the unorganized territories – a mile beyond an organized town or a paved public road



– the average rate of development as measured by LURC permits for new dwellings is one dwelling per township per decade. **That’s 10 new dwellings per 24,000 acres per century.** Deep woods development peaked in the late 1980s, well before all the paper company land was sold.

During this period, new and traditional landowners sold conservation easements on more than 3.5 million acres. Development is no longer allowed and the ability to subdivide is very limited. These are not the actions of entities seeking “higher and better” uses of forestland. The lands that were sold remain working forests that supply wood to consuming mills. Many were sold with supply agreements that run for decades and most are actively managed.

Other facts bear this out. The acres enrolled in Maine’s Tree Growth program, has remained essentially unchanged over the past two decades. The peak acreage occurred in 1990 at 7,586,723 acres and the low in 1997 at 7,525,312 acres.

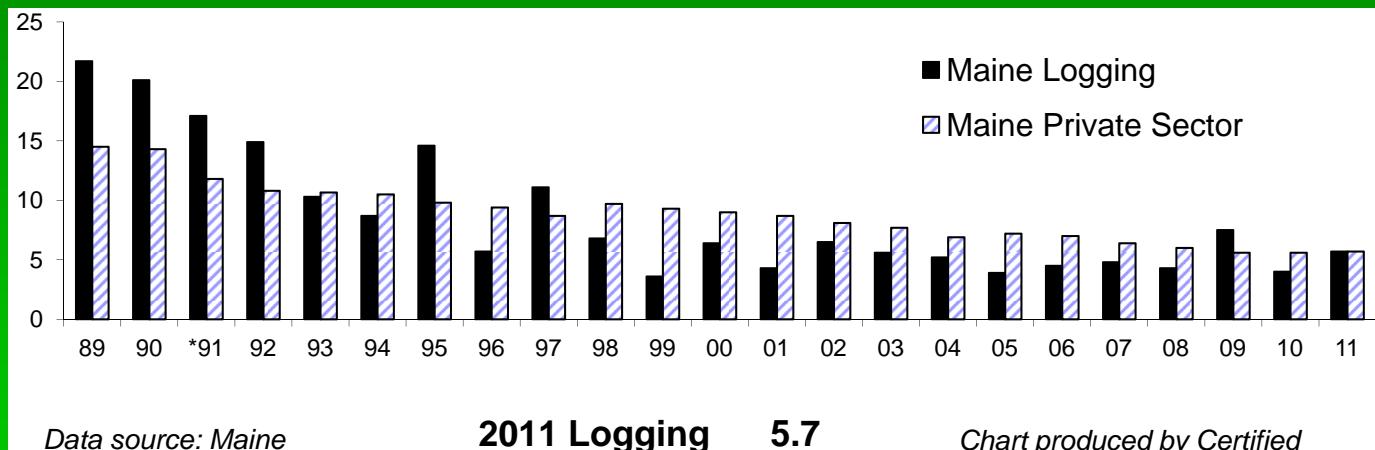
Landowners constantly made choices to drop out or join. Annual changes over the period range from a loss of 42,999 acres to a gain of 36,000 acres. The change in average parcel size in the unorganized territory – from 3,500 acres in 1988, to 2,570 acres in 2013 – reflects increases in the number of landowner.

Some raised the specter of reduced access, claiming that new owners would “lock the gates” for themselves or paying customers. However, there has been no significant change in access policy throughout the north woods. The public is still welcome to recreate on the vast landscape of the north woods.

There is no doubt that a lot of timberland in northern Maine was sold by paper companies to other owners in the 1980s and 1990s. However, many of the forest managers remain in place and the vast majority of properties remain working forests that are open to the public. Maine’s unique mix of job-creating working forests with public access remains alive and well.



Injuries/Illnesses per 100 full-time workers



Logging injuries and workers comp rates drop sharply

As Maine quietly marks the 20th anniversary of its reformed workers comp system, the logging industry has even more to celebrate.

"I think it's safe to say that the current mechanical logging certified CLP rate is probably the lowest there is in the country," says Mike St. Peter, executive director of Maine's Certified Professional Logging (CLP) program.

The battle over workers comp raged through the 1980s and 1990s, even triggering a state government shutdown in 1991, when reforms were linked to passage of the state budget. But thanks to recommendations from a blue

ribbon commission in 1992, the new system began in January 1993.

Since then average workers comp rates have declined about 50 percent, but in Maine's logging industry the savings and the improvements in safety are even more dramatic. Injuries have dropped sharply and workers comp rates have declined as much as 69 percent for some logging categories.

In 2011, workers comp cost \$5.9 million less than it would have in 1993 – \$1.2 million in savings for conventional logging and \$4.7 million for mechanical logging.

"The CLP program was initiated back in 1991 because of exorbitant workers' comp rates," St. Peter said. "The folks within the industry got together and said, 'Can we affect these high rates?' They got state government, the insurance industry, logging contractors and forest products groups to get together and come up with a solution. And that solution was promoting safety training and education."

Traditionally, logging injuries had been above the average of all private sector occupations, St. Peter said, but since 1997 – except for one spike in 2009 – Maine logging has had less injuries than the average of the occupations in the Maine private sector.



Source: Maine Department of Labor. This data begins in 2003, because injury/illness reporting rules, codes and categories of industries changed significantly then.

There are two major factors in safety improvement, St. Peter said. One is the strong emphasis on safety and education, not only through CLP, but by logging companies and contractors.

The other is big increase in the amount of mechanical logging, as opposed to conventional logging with chain saws and skidders.

"Certainly mechanization has been a big contributor to lowering the injury rates for the whole logging sector because there are less people under the (forest) canopy – they're all in enclosed cabs," St. Peter said. "So that's certainly had an effect on injuries. But training, education and improved technology have all contributed to lower injury rates."

When CLP started tracking workers comp rates in 1993, rates for both the certified and non-certified loggers were between 40 and 50 percent of payroll. As the certified rate developed, there was a marked difference between the certified and non certified rate in the conventional sector.

Since 2005, those rates have pretty much been the same, St. Peter said, "and the reason for that is there's virtually no longer any

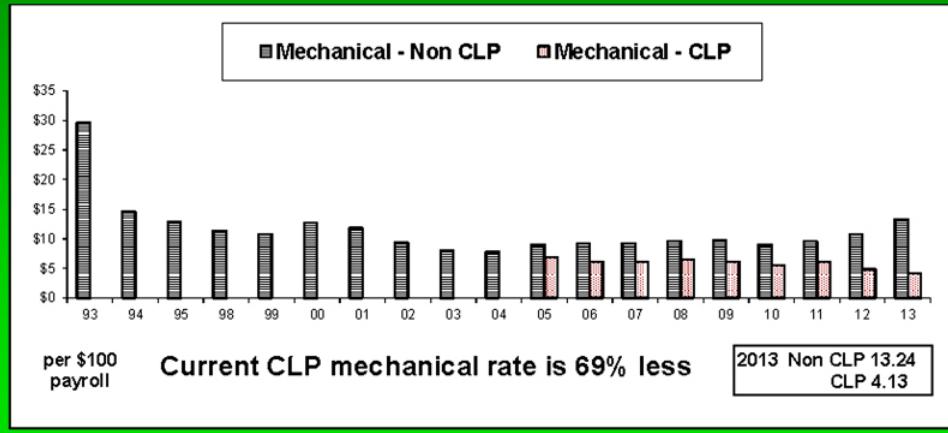
conventional loggers who are not certified and trained. There are a number of independent loggers that are certified and non certified out there, but they're not reflected in the workers comp rates because they are not on a payroll."

In 1993, workers comp costs for the mechanical sector were about \$30 per \$100 of payroll, now– for CLP certified loggers – it's \$4.13. For mechanical loggers without CLP certification, it's \$13.24.

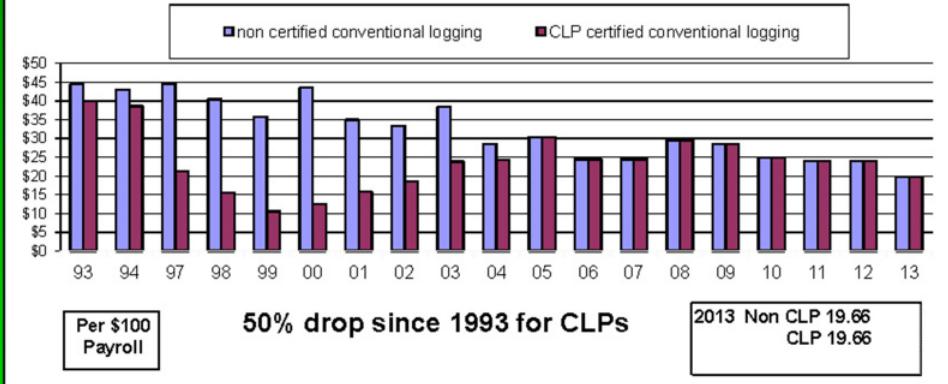
"Now we're seeing a little bit of an uptick in the non certified category," St. Peter said, "but since 2005, I think the graph illustrates there that the mechanical certified loggers have outperformed the certified conventional loggers – meaning their safety rates are better, which translates into lower costs."

CLP doesn't actively conduct training and education in the trucking sector, but it does try to promote safety for those logging companies that have their own trucking divisions.

History of mechanical logging class code



Conventional Workers Compensation Rates



Source: Maine Department of Labor; charts produced by Certified Logging Professional

In 2011, workers comp costs in Maine's logging industry were \$5.9 million less than in 1993 –\$1.2 million in savings for conventional logging and \$4.7 million for mechanical logging.



Don't forget trucking!

As every logger knows, forestry is as much about transportation as it is about trees. You've got wood growing in some hard-to-reach spot, but it's relatively worthless unless you can get it to the marketplace.

On any given business day of the year, about 2,300 truck loads of wood leave the Maine forest headed for a market. That figure is based on 6 million cords harvested annually, transporting an average of 10 cords loads on 260 annual business days.

According to the Maine Department of Labor, there were 2,770 truck drivers (heavy or tractor trailer) employed in the forest products industry cluster in 2011. For that year the statewide employment of



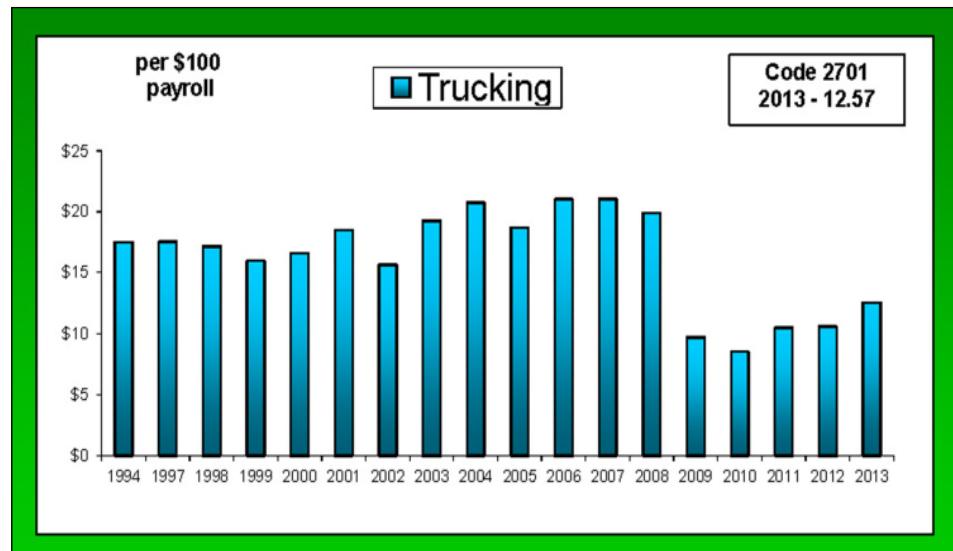
truck drivers (heavy/tractor trailer) in all industries was 8,830 (in 2012 the estimate was 8,670).

These estimates do not include truck drivers who are self-employed operating as sole proprietors.

Log and chip trucking was always included in the general trucking class code for workers comp rates, meaning all other companies that have trucking, St. Peter said. Then in 2008, with fuel costs increasing and profit margins getting slimmer, the Bureau of Insurance allowed log and chip truck operators the lowest rate available for general trucking.

"Since 2011, the log and chip trucking sector has been on its own, which means that based on their performance for their sector, they're generating their own workers comp rate based on log and chip truck experience," St. Peter said.

"And what we're seeing here is a little bit of a concern because there's been a steady increase from 2011, 2012 and 2013, in the trucking rate and I think that's something that the industry should take note of. Now that we're a smaller pool – because we've separated ourselves from the general trucking, rates are more subject to more volatility – either up or down – based on the number of injuries that are in that particular group."



Training Summary				
Participants	Active CLPs	Total completing CLP cert requirement in 2012	Total fulfilling recent requirements in 2012	Total trained since 1991
Contractors	251	3	103	705
Employees	919 – Mechanical 292 – conventional	67 – mechanical 17 – conventional	351 – mechanical 106 – conventional	1965 – mechanical 2767 - conventional
Others	111 – associates	1 – associates	25 – associates	508 - associates
TOTALS	1573	88	585	*5945

* The total number trained does not represent the number of people currently certified.

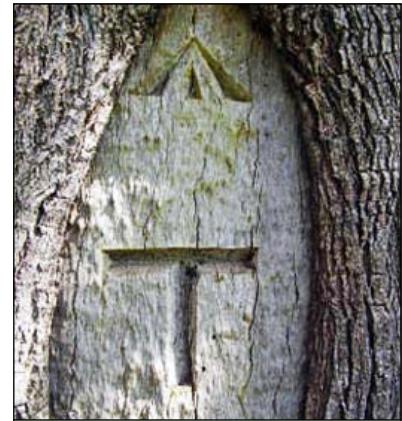


Game changers

Events, inventions and ideas have sometimes taken Maine's forests and forest economy in an entirely new direction.

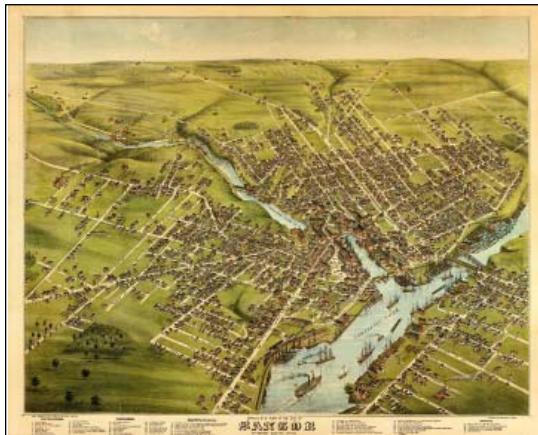
1. *The King's Broad Arrow*

Starting in 1605, the availability and high quality of white pine played an important part in the development and economy of Maine. After Captain George Weymouth of the British Royal Navy brought samples back to England, the British wanted to ensure that the best of the mast trees remained available for British ships. So in 1691, England declared the largest white pines to be the property of the King and they were marked, protected, and harvested for the government's use. Some historians believe colonists' anger over the prohibition on their use of these trees was as important as tea taxation in sparking the American Revolution. To learn more, visit: [Maine History Online](#).



King George's broad arrow, a vertical line topped with an upside-down "V" (see top of photo) was slashed on the surface of the straightest and tallest white pines.

Photo courtesy of King's Mark Resource Conservation & Development Project, Inc.

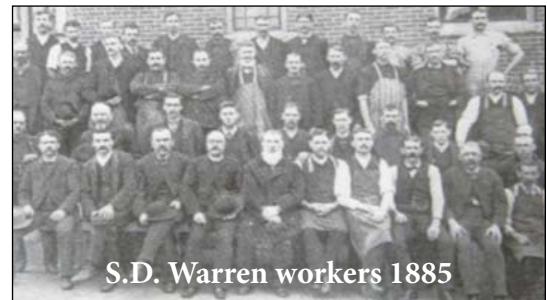


2. *Lumber capital of the world*

The first sawmill in Bangor was built in 1772. It marked the beginning of a century of dominance by Bangor in the world lumber industry. In the mid 1830s, Bangor was home to more than 300 sawmills, earning the city the undisputed title "Lumber Capital of the World." Bangor's prosperity in the lumber industry began to fade in the late 1800s, as Americans began to settle farther west. By the end of the century the city began to lose its mills. Today, Bangor has no mills.

3. *Using wood for pulp sparks Maine paper industry*

Papermaking in Maine began in the 1730s, when a small mill was built on the Presumpscot River in Westbrook. In 1854 Samuel Dennis Warren purchased the mill for \$28,000, starting the S.D. Warren Company. At that time discarded clothes were beaten to a pulp and poured into molds to make paper, but because of a rag shortage in the 1850s, methods were invented for making paper from wood. The first wood pulp in Maine was produced in the basement of a Topsham sawmill in 1868, marking the beginning of the paper industry's rapid growth in Maine. In 1880 the S.D. Warren mill in Westbrook first blended wood fibers with rag pulp and five years later the Westbrook mill was the largest paper mill in the world.



S.D. Warren workers 1885



4. End of log drives

Beginning in the 19th century, Maine's rivers were used to move vast amounts of timber from the North Woods to markets. Although impressive to see, the great log drives left huge amounts of silt, bark, and detritus that took a heavy toll on fish and other river life. The last log drive was held on the Kennebec River in 1976. Today timber is transported from the North Woods by truck.



July 1974: Spruce budworm defoliation as far as the eye can see around the West Branch of the Penobscot River/Chesuncook Lake.

5. Spruce budworm

After fire, the greatest enemy of Maine's forests is the spruce budworm. At least six separate and serious outbreaks have been recorded – 1770, 1806, 1878, 1910, 1949 and one from 1970-85 killed 21 percent of all fir trees in the state by 1982. From 1976-81, 7 million cords of spruce and fir were directly lost to the budworm and another 8 million cords were so damaged they simply blew down. “In all my career since 1929, I have never by far witnessed the grave and extensive holocaust posed to Maine forests by the budworm for 1975,” said former state entomologist Robley Nash.

6. Forest Practices Act and clearcutting referendums

A direct line can be drawn between the spruce budworm outbreak of 1970-85 and efforts to change Maine's timber harvesting laws. The scramble to salvage wood before it was killed or damaged set off alarms with environmental groups. The Legislature passed the Forest Practices Act in 1989 to regulate harvesting, but the limits didn't allay all the concerns and three referendums on clearcutting were fiercely debated in 1996, 1997 and 2000. All were defeated.

Carter declares war on paper companies

Forest Service report prompts promise of new forestry referendum by 2000

**By Gross Johnson
of the Herald Staff**
AP Wirephoto
Carter's "war on paper," vertical登記
Carter on Tuesday declared, "war" against the paper
industry, which he charged had harvested more
than the nation's worth of trees over the last 20 years. The
industry, he said, had cut down more than twice as many
trees as were harvested on the pine barrens, he said, and
had done it in a "senseless" way.
It's a prime understatement. Carter said "a lot for
the paper companies to live down." But the president
was referring specifically to how paper companies are
harvesting forests to live down. The paper companies
are harvesting forests to live down.
A lot of people are out in a call for violence, in spite
of the violence these companies are carrying out.

Environmental activists are calling for a moratorium on
clearcutting, and the violence these companies are carrying out.



7. Energy crisis sparks biomass boom

The energy crisis started in October 1973, when OPEC and other oil producers proclaimed an oil embargo in response to U.S. decision to supply weapons and supplies to Israel during the Yom Kippur war. Oil prices immediately jumped from \$3 per barrel to \$12, resulting in massive gas shortages and panic. But it also resulted in a surge in interest in biomass energy, including construction of biomass plants in Maine. In 2011, biomass harvesting volume was 2.4 million tons; 86 percent originated from Maine's forests; 14% was imported. In Maine, biomass comprises 35% of total energy consumption and 70% of renewable energy consumption, according to *The State of Maine's Environment 2010*.



8. Forest certification: 9.4 million acres

The concept of identifying products from well-managed forests emerged after discussions on sustainable development at the U.N. Conference on Environment and Development in Rio de Janeiro in 1992. Today, independent auditors, such as the Sustainable Forestry Initiative (SFI), the Forest Stewardship council (FSC), and the American Tree Farm System (ATFS), certify that sustainable forest practices are being used to manage forests in a particular location. Maine now has 9.4 million certified acres – 53 percent of the state's forestland – making our state the national leader in forest certification.



Maine conservation easements	
Easement holder	Acres
State of Maine	1,369,458
Private	1,564,255
Municipal	4,862
Federal	218,710
Other	358,430
Total	3,515,715

Source: Maine GIS Conservation Lands Data Layer, August 27, 2013

9. Conservation easements

In the 1980s, concern about preserving Maine's special places grew as real estate speculation increased and paper companies, which had owned much of the north woods, began to change hands. Conservation easements allow landowners to own and use their property, but permanently remove development rights. The Forest Society of Maine estimates that more than 2.1 million acres of Maine's working forest are covered by a conservation easement. Since 1987, the Land for Maine's Future program, for example, has conserved:

- 52 water access sites
- 37 farms of more than 8,900 acres;
- 20 commercial working waterfront properties
- More than 1,200 miles of shore lands, and 158 miles of former railroad corridors for recreational trails.
- More than 560,000 acres of conservation and recreation lands. This includes 315,000 acres of lands protected in partnership with land owners, reflecting LMF's efforts to conserve the working landscape.

10. Working forests provide habitat for Maine's wildlife

Maine's wildlife species, including deer, moose, bear, Canada lynx, marten and hundreds of species of birds, depend on the working forest, which creates a mosaic of habitats from early succession to mature forests. Maine's moose population, estimated by Maine Department of Inland Fisheries and Wildlife at approximately 76,000, is the largest in any of the lower 48 states. The young softwood forests of northern Maine support the only resident breeding population of the federally designated threatened Canada lynx in the Northeast. No longer considered rare, our bald eagle populations continue to expand. Maine has about 97 percent of all of the wild brook trout lakes and ponds in the eastern U.S., habitats best protected by healthy forests.



Good reasons for optimism about our forest economy

Looking at all the information about Maine's forest economy in the preceding pages, I can't help being proud and optimistic.

First, however, I must thank Dr. Todd Gabe, University of Maine School of Economics, for his research; Dr. Robert Wagner, director of the Center for Research on Sustainable Forests and the Cooperative Forestry Research Unit, for making forest facts understandable to those outside our industry, and the Maine Forest Service, especially Ken Laustsen, for helping compile and check the information in *Maine's Forest Economy*.

We hope it's useful to those who care about our forests and we'll update as new information becomes available.

As Maine gradually emerges from an extended and very difficult economic downturn, I believe the state's forest product industry is well positioned to benefit, as is the Maine economy. Here are some of the forest economy facts and figures that stand out most strongly for me:

- The amount of forestland today is an astounding 97 percent of the pre-settlement forestland in 1600 – and with a much higher population.
- The ownership of Maine's forest has changed, but by and large, the use as forestland has been constant.
- Maine leads the nation with 10.3 million acres of forestland that's certified as sustainably managed by the major sustainability certification bodies (SFI, ATFS, FSC), assuring the people of Maine that we can sustainably grow and harvest trees while protecting water quality, wildlife and so much more.
- Conservation easements covering 2.1 million acres of Maine's working forest are further assurance of well-managed forests continuing into the future.
- For the past 22 years, Maine has harvested on average 6.7 million cords each year, and since 2008 growth exceeds our harvest.
- Maine's merchantable inventory today is nearly twice as much as it was in 1953, and continues to increase.
- Though the industry has fewer jobs today, those jobs are safer, utilize more technology and pay an average wage 33 percent higher than the state average.



Mark Doty
President of the Board
Maine Forest Products Council

- Our aging workforce means good-paying, high-tech jobs are coming soon for you or your children.
- New uses of wood and wood bioproducts will expand our industry's economic contribution.
- Research shows that managed forests are carbon friendly, including a 2013 University of New Brunswick study (*A Comprehensive Greenhouse Gas Balance for a Forest Company Operating in Northeast North America*) on J. D. Irving's carbon dynamics.

So what do we need to insure Maine's forest economy continues to thrive? Here are a few ideas:

- Provide incentives for expanding the manufacturing base, because a strong manufacturing sector provides outlets for wood, which preserves forests.
- Expand value-added processing in Maine to enhance job growth and the overall economy.
- Increase primary and secondary processing mills.
- Protect the most effective conservation program in the state, the Tree Growth tax program.
- Enhance the image of forest sector jobs and increase training and educational opportunities.

Each forest sector has its own unique opportunities and challenges, but the potential exists to strengthen our industry as is being done in Canada and other states such as Wisconsin and Minnesota. All the elements are within reach to build a stronger forest economy.

The entrepreneurial spirit of those in our industry already is capitalizing on opportunities, but we need help. State, federal and local officials can help by creating an environment where companies are encouraged to invest capital and not discouraged by an unpredictable regulatory climate. The people of Maine can help by understanding that Maine's forests are healthy. Those of us who work in the forests products industry believe our future is bright. We hope this book helps everyone understand our optimism.



In 2011, 459 million cubic feet of wood was harvested from the forests of Maine. It was converted into:

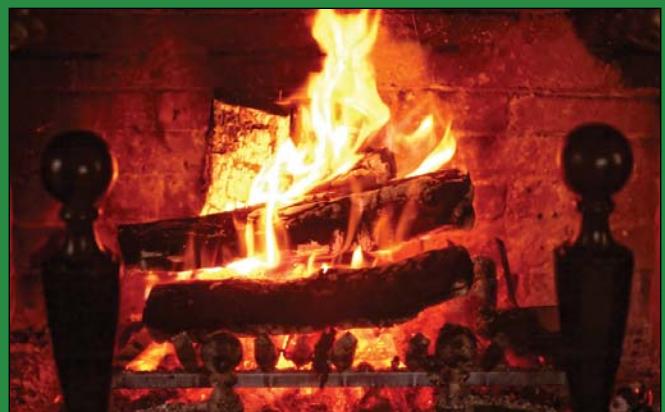
Pulpwood 56.5%
(for paper)



Sawlogs 23.5%
(for lumber)



Biomass 18%
(for electricity)



Firewood/pellets 2%
(to heat homes)