



The Economic Importance and Wood Flows from Maine's Forests, 2007*

North East *State* Foresters Association



Maine is the most forested state in the nation. Approximately 17.6 million acres, or 89% of the state's total land area, is covered with trees. The forest helps define the Maine "Way of Life." It plays a huge role in shaping our state's economy and provides the backdrop for forest-related recreation and tourism. However, the forest provides more than just wood products and recreational opportunities. It provides habitat for wildlife, quiet areas for spiritual renewal, a source of clean water, biological diversity beyond our own understanding, and a source of pride for many landowners.

I hope this report adds to your understanding of the wonderful resources of the Maine forest.

ALEC GIFFEN, Director
Maine Forest Service

This booklet is part of a series on the economic importance and value of forest-based manufacturing and forest-related recreation and tourism of the four states in the NEFA region – New York, Vermont, New Hampshire and Maine. A regional report, and the individual state reports, are also available online at www.nefainfo.org. The reports include an overview of the land base in each state and a summary of federal and state data from 2005 or newer that provide a picture of the forest-based manufacturing and forest-related recreation and tourism sectors of the economy.

The reports do not include indirect or induced multipliers, so all data provided represent direct contributions to the economy. The reports update a similar series produced by NEFA in 1995, 2001 and 2004. Different data sources and methods to calculate values were used for the 1995 and 2001 reports, so values from the current reports can only legitimately be compared to the 2004 reports. The economic benefits associated with forest values such as clean water, soil stabilization and regional green space, among others, are not included in this report, so the final values are very conservative.

* Published August, 2007 using 2005 or better data.



Highlights

- Maine is the major timber producer of the NEFA region, accounting for more than half of timber harvest and wood products manufacturing output.
- The annual contribution of forest-based manufacturing and forest-related recreation and tourism to the Maine economy is over **\$6.47 billion**.
- Forest-based manufacturing is the largest manufacturing industry in Maine, contributing **\$5.31 billion in value of shipments** to the economy in 2005 or 36% of Maine's total manufacturing sales.
- The forest-based manufacturing industry provides employment for 19,614 people and generates a payroll of over **\$0.75 billion**, the largest payroll in Maine's manufacturing sector.
- Forest-based recreation and tourism provides employment for over 12,000 and generates payrolls of **\$0.14 billion**.
- In 2005, forest-based manufacturing contributed **\$2.47 billion** in Gross State Product (GSP) to the state economy, or 31% of the manufacturing GSP for Maine.
- Revenues from forest-related recreation and tourism activities totaled **\$1.15 billion** in 2005.
- Maine landowners received estimated stumpage revenue in 2005 of **\$0.18 billion**.
- The sale of Christmas trees, wreaths and maple syrup contributed approximately **\$0.01 billion** in 2005.
- Wood provides the energy for approximately **20%** of electrical use in Maine.
- Revenues from the sales of biomass chips in 2005 totaled approximately **\$0.06 billion**.
- Each 1,000 acres of forest land in Maine supports 1.2 forest-based manufacturing, forestry and logging jobs and .7 forest-related tourism and recreation jobs.

Table 1. ANNUAL REVENUES FROM MAINE'S FORESTS

	Total values and per forested acre basis	
	Billions of \$	\$ per forested acre
Forest-based manufacturing value of shipments	\$5.31	\$301
Forest-related recreation and tourism	1.15	65
Christmas trees/maple products	0.01	.63
Totals	\$6.47 billion	\$366.63



The Forest Resource in Maine

Maine’s land area is 19.9 million acres, 17.6 million acres (89%) is forested. The USDA Forest Service classifies 17.1 million acres as timberland or land that is fertile enough to produce wood as a crop and is not withdrawn from timber harvesting by statute or regulation (table 2).

The majority of timberland in Maine is privately-owned (16.4 million acres or 95.6%). The Maine Forest Service estimates that business owners (corporate and investors) own 59.4% and 36.2% is owned by family forest owners and other private owners such as non-profit organizations and Native American tribes. Local, State and Federal governments owns just 4.4% of Maine’s forest (see figure 1).

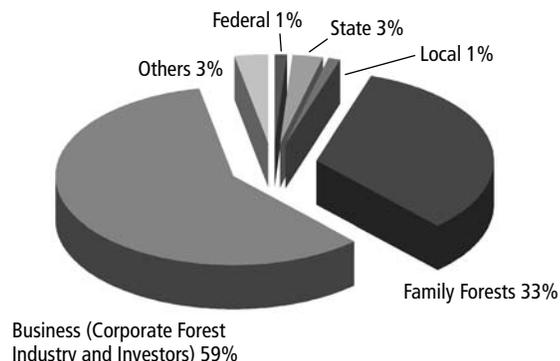
Table 2. TOTAL LAND AREA, FOREST LAND ACRES, AND TIMBERLAND ACRES, MAINE, 2006

Total land area	Forest land	Timberland
19,951,394	17,671,177	17,160,607

Source: Maine Forest Service Estimate (FIA Data 2001 - 2005)

Figure 1. TIMBERLAND OWNERSHIP, MAINE, 2006

Source: Maine Forest Service Estimate (FIA Data 2001 - 2005)



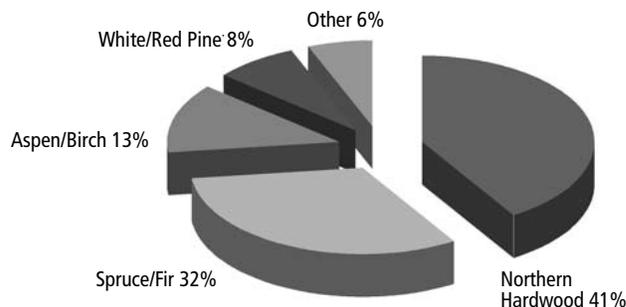
Forest types are areas of forest where certain tree species grow in association with one another due to similar growing requirements. The northern hardwood forest type is the most common in Maine (figure 2) and covers 7.0 million acres (41%), followed by the spruce/fir, aspen/birch and white/red pine.

MAINE’S FOREST INDUSTRY

Maine’s forest products industry is the largest and most diverse of the states in the Northern Forest region. Challenges being experienced by all sectors result from global competition, high energy costs, and high insurance costs, among other factors.

Figure 2. FOREST TYPES, MAINE, 2005

Source: Maine Forest Service Estimate (FIA Data 2001 - 2005) Area of Timberland by Forest Type Group



Despite this, the forest products industry continues to produce at near record high levels as compared with historic production highs in the 20th century. Investment in the latest technology in existing forest products manufacturing sectors as well as exploring new products such as biofuels, are key avenues to a successful future for this industry.

Forest-based Manufacturing

Maine’s forest-based manufacturing system consists of:

- timber harvesting and associated trucking,
- primary manufacturing and
- secondary manufacturing.

Large and small operations in the timber harvesting sector cut the trees down and market the logs and other products to many markets in Maine and elsewhere. Sawlogs will be trucked to sawmills and the highest value logs may be shipped to veneer mills that take thin layers from the log in sheets (or peel them like an apple peeler) to produce veneers that go into many uses. Pulpwood is used by a few large pulp mills to manufacture pulp used in paper manufacturing. The wood energy industry takes slash (limbs and tops), whole tree wood chips or residues such as chips and sawdust from sawmills and burns the wood material in a boiler to produce steam and then electricity. Sometimes the steam is used for other manufacturing processes such as drying lumber. Some products are shipped out-of-state for further processing.

This report includes several economic indicators and metrics on forest-based manufacturing that are provided by the federal government. Employment and payroll data are taken from the US Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, 2005. Value-added contributions and the value of shipments are provided by the US Bureau of Census, Annual Survey of Manufacturers, 2006 (2005 data).

PRIMARY MANUFACTURING

The conversion of trees (roundwood) or parts of trees into lumber, veneer, pulp and paper or energy starts with the primary manufacturing sectors. In Maine a large paper industry of nine pulp and paper mills that draws fiber over long distances dominates the primary manufacturing sector. The state also has over a hundred substantial sized sawmills and specialty wood products mills. The wood energy sector has seen a renewed resurgence as idled wood energy plants built in the 1980s have started up after shut-downs a few years ago due to the increased cost of alternative energy fuels such as natural gas as well as the domestic concern about over-reliance on foreign energy sources. Wood-fired energy production is, once again, economically feasible and popular given its renewable source. Together, these various mill sectors make up the primary wood manufacturing sector – the sector where raw trees are initially processed.

Forest Certification

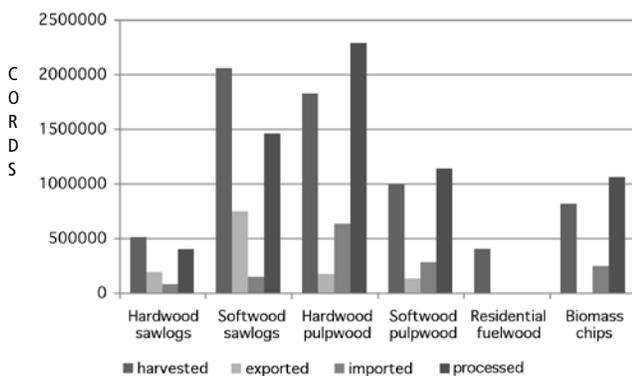
Maine has been the leading state in forest certification¹ since the early 1990s when the Pingree Heirs land became the first million acre ownership to get certified under the Forest Stewardship Council standard. Since then, acreage of certified land has increased dramatically. Today, nearly 7 million acres of forestland is certified to one of the major certification systems: Sustainable Forestry Initiative, Forest Stewardship Council or American Tree Farm System.

Timber Harvesting & Wood Flows

In 2005, 255 million board feet² of hardwood sawlogs and 1.03 billion board feet of softwood sawlogs were harvested from the forests of Maine. In that same year, 1.82 million cords³ of hardwood pulpwood and 990,855 cords of softwood pulpwood were harvested in the State. Over 2.035 million green tons⁴ of whole tree chips were harvested in 2005 as well. The estimated value of these harvested volumes to landowners in stumpage⁵ equals \$240 million.

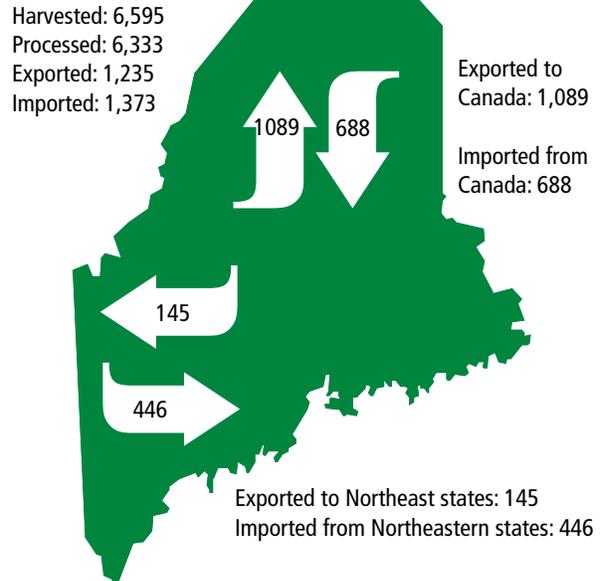
The map that is part of Figure 3 shows the flows graphically.

Figure 3. WOOD FLOWS IN MAINE, 2005



Maine 2005

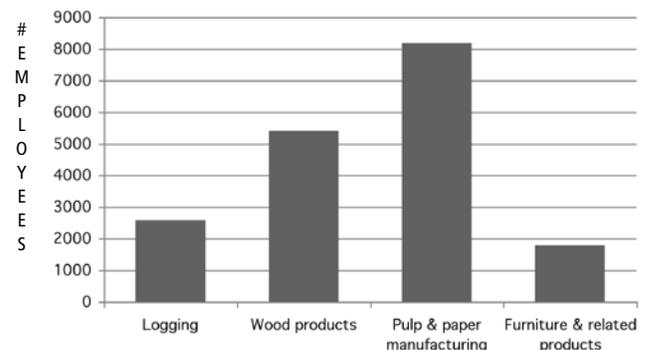
All units are in 1000 cords



The US Department Labor, reported 2,583 individuals employed in the forestry and logging sector in Maine in 2005 (figure 4), with a payroll of \$83 million (figure 5).

Figure 4. EMPLOYMENT IN FOREST-BASED MANUFACTURING, MAINE, 2005

Source: US Dept. of Commerce, Bureau of Economic Analysis, 2005 & US Dept of Labor, 2005



Logger training took hold earlier in Maine than anywhere in the United States. Born of the desire to reduce workers compensation insurance premium through reduction in accidents, the Maine Certified Logging Professional program has, since the late 1980s, trained over 2,500 loggers in safe, efficient and environmentally sound harvesting practices.

- 1 Forest certification refers to the private-sector independent auditing of forestland according to a sustainable forestry standard
- 2 Board foot equals a solid piece of wood 1" thick by 12" wide by 12" long
- 3 Cord – equals a stack of round wood 4 feet by 4 feet by 8 feet, including air spaces
- 4 Green ton – weight in tons (1 ton=2000 pounds) of wood chips harvested from live trees – contains substantial amounts of water weight hence “green”
- 5 Stumpage – value landowners receive for their trees when they are sold in a timber sale.

Additional training in sustainable forestry practices through the Sustainable Forestry Initiative Program has supplemented the CLP training.

The Master Logger Program was also founded in Maine. An additional program of certification, loggers voluntarily apply for and are certified if they meet the program's criteria.

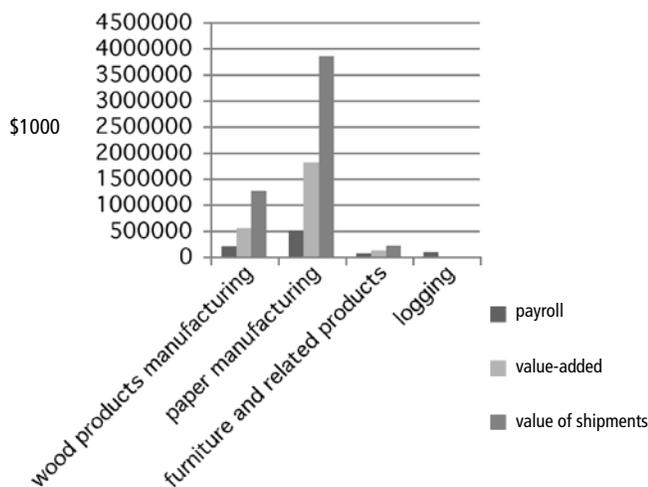
Production of Lumber and Related Solid Wood Products

Maine's sawmill industry is led by a large softwood sawmill industry sawing spruce & fir for dimension lumber and a white pine sector supplying finish pine for the home building sector. The hardwood sawmill component of the industry is much smaller than the softwood sector (largely due to the availability and quality of the hardwood resource). In 2005, sawmills in Maine processed 199 million board feet of hardwood sawlogs and 728 million board feet of softwood sawlogs into lumber.

The US Dept. of Commerce Annual Survey of Manufactures reports that there were 5,395 individuals employed in Wood Product Manufacturing in 2005 (figure 4), with wages and salaries totaling \$191 million. The value added for this sector in Maine was \$547 million and value of shipments was \$1.258 billion (figure 5).

Figure 5. PAYROLL, VALUE-ADDED, AND VALUE OF SHIPMENTS FOR FOREST-BASED MANUFACTURING INDUSTRIES, MAINE, 2005

Sources: US Dept of Commerce, Bureau of Economic Analysis, 2006



Pulp and Paper Manufacturing

Total pulpwood processed in Maine in 2005 was 3.4 million cords. Maine's manufacturing sector is dominated by pulp and paper manufacturing, which straddles the primary and secondary manufacturing base. There are nine pulp and paper manufacturing companies operating in the state, which produce a wide variety of pulp and paper grades for

specialty and fine papers, books, magazines, catalogues, tissue products, and microwave popcorn bags. The Bureau of Economic Analysis reports that there were 8,186 individuals employed in Paper Manufacturing in 2005 (figure 4), with wages and salaries totaling \$498 million. In 2005 the total value added for this sector in Maine was \$1.8 billion and value of shipments was \$3.8 billion (figure 5).

Wood Energy

Wood provides over 20% of electrical needs and 25% of the energy needs in Maine. Wood fiber and bark burned for energy are referred to as biomass and come from three sources: sawmill residue and land-clearing waste, slash (limbs and tops), and the entirety of low quality trees (whole tree chips). Biomass facilities include stand-alone electric generating plants or co-generating facilities that use the electricity to serve their own load and export surplus to the electrical grid. There are 11 stand-alone biomass plants operating in Maine that burned over 2.6 million green tons of whole tree chips in 2005. Additionally, ten other major industrial plants, utilized over 2 million green tons of wood waste and sawmill residues to generate electricity for their facilities. The biomass market generated revenues of over \$1,500,000 to landowners from stumpage while the sales of those chips was over \$60 million.

Although not updated since 1999, residential firewood sales are estimated at over 400,000 cords annually. This is worth over \$50 million in sales.

SECONDARY MANUFACTURING

Secondary manufacturing generally refers to the drying, planing, cutting and assembly of lumber into parts or finished products. Maine has a small secondary industry.

Furniture and Related Product Manufacturing

The federal reports show that there were 1,784 individuals employed in Furniture and Related Products in 2005 (figure 4), with annual wages and salaries totaling over \$61 million. In 2005 the total value added for this sector in Maine was \$112 million and value of shipments was \$213 million (figure 5).

Table 3. GROSS STATE PRODUCT, FOREST-BASED MANUFACTURING, MAINE, 2005

	millions of \$
Wood products manufacturing	\$548
Furniture and related product manufacturing	\$ 113
Paper manufacturing	\$1,807
	Total \$2,468
GSP, Manufacturing, Maine	\$4,900
GSP, Total for Maine	\$44,971

ASSOCIATED FOREST PRODUCTS AND GROSS STATE PRODUCT

In 2005 sales of maple products in Maine totaled \$5.7 million. Sales of Maine Christmas trees and greens are estimated to total over \$5 million for 2005.

Gross State Product (GSP) is a broad measure of economic activity corresponding to GNP at the national level. GSP is synonymous with value added, which is sales minus raw materials and services inputs. Forest-based manufacturing contributed \$2.5 billion to Maine's manufacturing GSP in 2005, which was 50% of the total manufacturing GSP (table 3) and 5% of the total GSP.

THE POSITION OF FOREST-BASED MANUFACTURING IN THE MAINE ECONOMY

Table 4 provides a comparison of the forest-based manufacturing sector (excluding logging) with the total manufacturing sector in Maine. Forest-based manufacturing provides 32% of the manufacturing payroll and employs 35% of manufacturing employees. This sector provides 31% of value added receipts in manufacturing and 36% of value of shipments receipts.

Forest-Related Recreation and Tourism

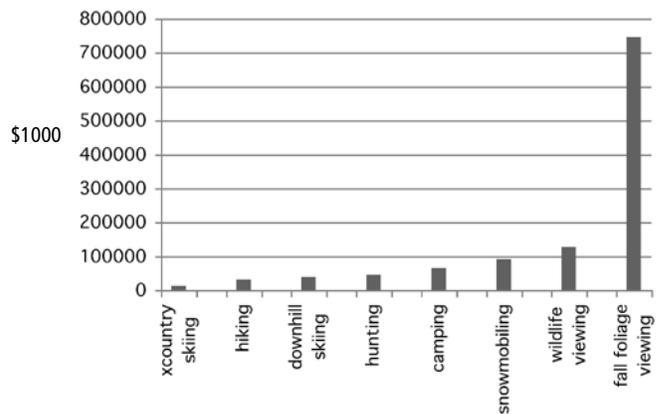
In Maine, as the most heavily forested state in the nation, most recreation and tourism activities are linked to the forest, but it is difficult to estimate the specific contribution made by the forest environment towards recreation and tourism expenditures. The recreation activities selected for this report use the same methodology as those used in our similar report in 2004. The activities that take place primarily in a forest environment include camping, hiking, hunting, downhill skiing, cross-country skiing, snowmobiling, fall foliage viewing and wildlife viewing. Attributing 100% of the economic contribution of these activities to forests is an overstatement, but 50% is an understatement. In his analysis for this report, Dr. Hugh Canham assumed three-quarters (75%) of each activity would not take place if there were

no forests. That percentage was raised to 100% for fall foliage viewing.

The recreation activities included in this report contribute \$1.32 billion dollars in sales to the Maine economy. The portion attributed to the forest resource is \$1.15 billion dollars. These are distributed among purchases at food and beverage stores, automobile gasoline service stations, accommodations (lodging places), eating and drinking establishments and a host of other retail trade or service sectors. Fall foliage viewing is the largest contributor with over half of the total sales, and wildlife viewing is second (figure 6). About 12,000 people are directly employed with payrolls of \$145 million due to forest-related recreation in Maine.

Figure 6. FOREST-RELATED RECREATION AND TOURISM EXPENDITURES, MAINE, 2006

Source: NEFA, 2006



Further notes about methodology for determining recreation and tourism data: Estimates of number of visitor, or participant, days engaged in for each selected recreation activity were drawn from the latest National Survey on Recreation and the Environment (NSRE, 2004) and by updating data from the 2004 NEFA reports. For camping and hiking, the average number of visitor days per visit for the North region in the NSRE were used. These were updated to 2005 by the percent increase in population as determined from U.S. Census projections (US

Table 4. FOREST-BASED MANUFACTURING AND OTHER MANUFACTURING INDUSTRIES, MAINE, 2005

	# employees	% of manufacturing employees	Payroll (\$1000)	% of manufacturing payroll	Value added (\$1000)	% value added all manufacturing	Value of shipments (\$1000)	% of value of shipments all manufacturers
Forest-based manufacturing	19,614	35%	749,462	32%	2,468,280	31%	5,311,992	36%
All manufacturing	56,260		2,343,283		7,856,947		14,918,483	

Source: US Department of Commerce, Bureau of Economic Analysis, 2005 & Annual Survey of Manufactures, November 2006 US Department of Commerce (2005 data)

Bureau of the Census). For downhill skiing, cross country skiing, sightseeing (fall foliage viewing) and snowmobiling, the numbers used in the 2000 study (which were 1997 data) were updated using trend increases contained in the NSRE for 2000 and extrapolated to 2005 assuming the trends between 1994 and 2001 would hold through 2005. Statewide Comprehensive Outdoor Recreation Plans (SCORP) for each state were used for the 2001 NEFA reports, but these are no longer available. Expenditure data per participant-day were updated using the Consumer Price Index (US Bureau of Labor Statistics). (The factor for converting 1997 prices to 2005 prices is 1.24.) There were no direct number of visitor-days developed for hunting and wildlife viewing. Instead, direct estimates of expenditures were taken from the National Survey of Fishing, Hunting, and Wildlife-Related Activities (US Dept of Interior 2004).

Estimates of impacts on employment and payroll were developed from ratios of employment or payroll to sales based on data for these in the 1997 Economic Census of the U.S. Bureau of the Census following procedures used in the 2000 report. Employment impacts were calculated by first taking estimated 2005 sales and deflating them back to the 1997 datum then applying the calculated ratio of sales to employment. For payroll, the estimate of sales to payroll was applied directly to the 2005 sales results. The rationale for this is that employment does not increase due to nominal dollar increases but rather will increase due to real (deflated) dollar output increases.

SOURCES OF DATA

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National Association of Manufacturers manufacturing economic data

Northeast Midwest Institute economic data



NORTH EAST STATE FORESTERS ASSOCIATION (NEFA) NEFA'S MISSION

Encourage sound decisions about the management and use of rural and urban forest resources in the NEFA region by: developing quality data and information about the forests of the region, identifying significant regional trends, assist the states in broadening awareness of forest health and sustainability issues, providing a regional context for state and local decisions about forest resources and analyzing the environmental, social and economic impacts of forest land use.

This series of reports, as well as other NEFA publications, and additional information about NEFA can be found at www.nefainfo.org. NEFA is the State Foresters of New York, Vermont, New Hampshire and Maine cooperating with the US Forest Service, State and Private Forestry.



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