

NEFA'S MISSION

To encourage sound decisions about the management and use of forest resources in the NEFA region by identifying significant regional trends, 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 <http://nefa.conknet.com>.

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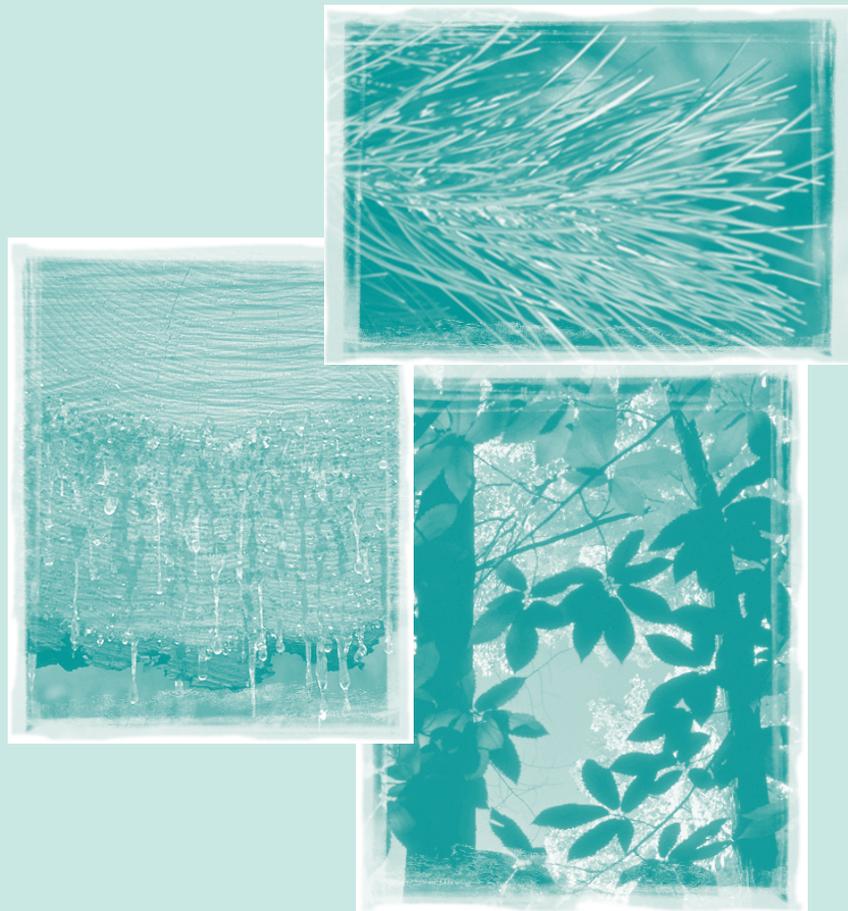
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The Economic Importance of Maine's Forests



**North East *State* Foresters Association
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Maine is the most forested state in the nation. Approximately 17.7 million acres, or nearly 90% 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.

TOM DOAK

Director, Maine Forest Service

The economic importance of Maine's forests

This booklet is part of a series on the importance of forest-based manufacturing and forest-related recreation and tourism on the economy of the four states in the NEFA region — New York, Vermont, New Hampshire, and Maine. A regional report is also available. Each report includes an overview of the land base in each state and a summary of federal and state data 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. Different data sources and methods to calculate values were used at that time, so values from the current reports cannot be compared to the previous ones. The economic benefits associated with forest values such as clean water, soil stabilization, and regional green space are not included in this report, so the final values are conservative.



HIGHLIGHTS

- Maine is the major wood producer of the NEFA region, accounting for roughly half of the production.
- The contribution of forest-based manufacturing and forest-related tourism and recreation to the Maine economy is over **\$6.5 billion** (table 1).
- Forest-based manufacturing is the largest manufacturing industry in Maine, contributing **\$5.6 billion in value of shipments** to the economy in 1998, or 40.5% of Maine's total manufacturing sales.
- The forest-based manufacturing industry provides employment for 30,000 people and generates wages and salaries of **\$1 billion**, the largest payroll in Maine's manufacturing sector. Forest-based recreation and tourism provides employment for over 7,000 and generates payrolls of **\$51 million**.
- In 1998, forest-based manufacturing contributed **\$2.2 billion in Gross State Product (GSP)** to the state economy, or **7% of the GSP**.
- Forest-related recreation and tourism expenditures contribute **\$900 million** annually to Maine's economy.
- Maine landowners received estimated stumpage revenue in 1999 of **\$236 million**. Total delivered value of these roundwood products is estimated at **\$528 million**.
- The sale of Christmas trees, wreaths, and maple syrup contributed **\$12.8 million** in 1998.
- Wood provides the energy for approximately 24% of electrical use in Maine. Revenues from the sales of biomass chips in 1999 totaled **\$13 million**. In 1998, 470,000 cords of firewood were harvested and processed in Maine, contributing **\$44 million** to the economy.
- Each 1,000 acres of forest land in Maine supports 1.7 forest-based manufacturing jobs and 0.4 forest-related tourism and recreation jobs.

TABLE 1. REVENUES FROM MAINE'S FORESTS

	<i>millions of \$</i>	<i>\$ per acre</i>
Forest-based manufacturing value of shipments	5,600	316
Forest-related tourism and recreation expenditures	900	51
Christmas trees/wreaths/maple products	13	1
Totals	6,513	368

The Forest Resource in Maine

Maine is the most heavily forested state in the country, with 90% of its landbase covered with trees. Maine depends on its forests to supply clean water, wildlife habitat, and scenic areas for recreation, as well as the raw materials that support a large forest products industry, the largest manufacturing industry in the state.

Land area

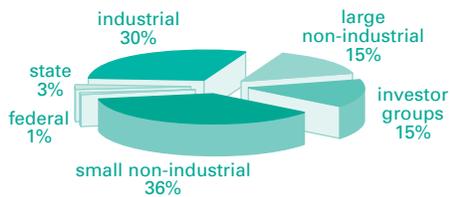
Maine covers 19.7 million acres. Ninety percent, or 17.6 million acres, is forested. Of these forested acres, 17 million acres are classified as timberland by the USDA Forest Service, or land that is fertile and accessible enough to produce wood as a crop and is not withdrawn from timber harvesting by statute or regulation (table 2).

Table 2. TOTAL LAND AREA, FOREST LAND ACRES, AND TIMBERLAND ACRES, MAINE, 1995

total land area	forest land	timberland
19,753,320	17,689,100	16,937,690

Source: USDA Forest Service

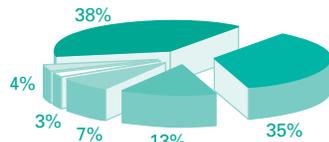
Figure 1. TIMBERLAND OWNERSHIP, MAINE, 2000



Source: Maine Forest Service

The majority of timberland in Maine is privately owned (16.2 million acres or 96%). The Maine Forest Service estimates that 30% is owned by the forest industry, 15% is owned by investor groups, 15% is owned by large non-industrial owners (defined as those who own 100,000 acres or greater, but do not own manufacturing facilities in Maine), and 36% is owned by small non-industrial owners. State and federal government own 652,000 acres, or 4% of timberland (figure 1).

Figure 2. FOREST TYPES, MAINE, 1995

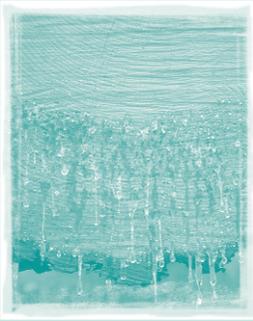


Source: USDA Forest Service

Certain tree species in the forest grow in association with one another due to similar growing requirements and are referred to as forest types. The northern hardwood forest type is the most common in Maine (figure 2) and covers 6.4 million acres (38%), followed by the spruce/fir, aspen/birch, white/red pine and oak/hickory types.

Forest-based Manufacturing

The forest-based manufacturing system consists of timber harvesting, primary manufacturing, and secondary manufacturing. The chain of relationships among different parts of the system varies. Timber harvesters cut the trees down and market the logs, which are processed at sawmills in Maine, or exported for further processing. Primary manufacturers convert raw material into lumber, veneer, pulp, and paper. Some of the lumber is shipped out-of-state for further processing. Secondary wood-based manufacturing firms convert the raw material



The average Maine forest products sector worker earns 80% above the Maine average. One forest products sector job equals 1.8 average Maine jobs in terms of wages and salary income earned. The average wage in the paper industry is over \$47,000.

into finished products, but may purchase lumber from a broker, who supplies wood from outside Maine.

A recent study in Maine concludes that, aside from typical business cycle fluctuations, forest-based industries have maintained stable employment levels since 1970. The average Maine forest products sector worker earns 80% above the Maine average. One forest products sector job equals 1.8 average Maine jobs in terms of wages and salary income earned. The average wage in the paper industry is over \$47,000.

Primary manufacturing

The conversion of roundwood, or parts of trees, into lumber, veneer, pulp, and paper starts with the primary manufacturing sectors. In Maine a large paper industry that draws fiber over long distances dominates the primary manufacturing sector. The state also has numerous sawmills and specialty wood products mills. The wood energy sector has been reduced from the early 1990's.

Timber harvesting and production of lumber and related solid wood products

"Stumpage" is the money earned by landowners for the sale of their standing timber. In 1999, the total sales of stumpage earned by Maine landowners was \$236 million. Sales of these products to sawmills, referred to as delivered roundwood, is estimated at \$528 million⁽¹⁾. In Maine, large quantities of wood are sold on a contract basis directly to mills, rather than as stumpage, and these values are not included in this study.

Figure 3. WOOD FLOW, MAINE, 1999

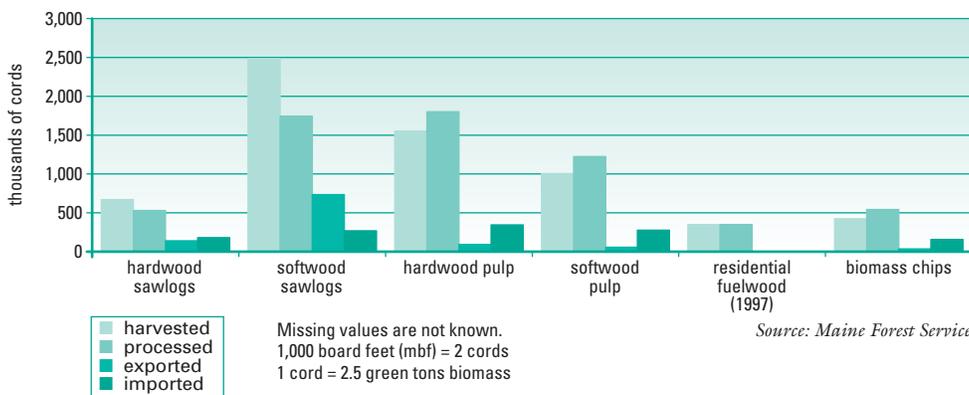


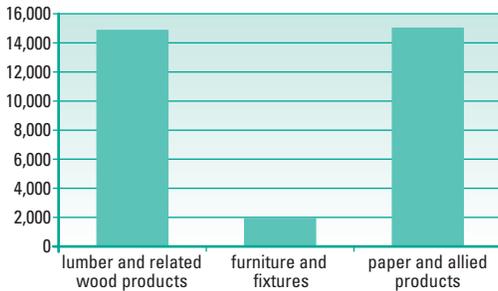
Figure 3 provides data on the harvesting, processing, importing, and exporting of wood products in Maine for the year 1999. During that year, 334 million board feet of hardwood sawlogs and 1.2 billion board feet of softwood sawlogs were harvested from

Maine's forests, totaling over 1.5 billion board feet. Maine's pulpwood harvest was 2.5 million cords. Over one million green tons of whole tree chips were harvested. These chips are used primarily as fuel in wood-to-energy facilities.

The logging and log trucking industry is a significant portion of the employment base in northern Maine. The Maine Certified Loggers program trains and certifies loggers in safe, efficient, and environmentally sound harvesting practices. There were 3,876 participants enrolled in this program in 2000.

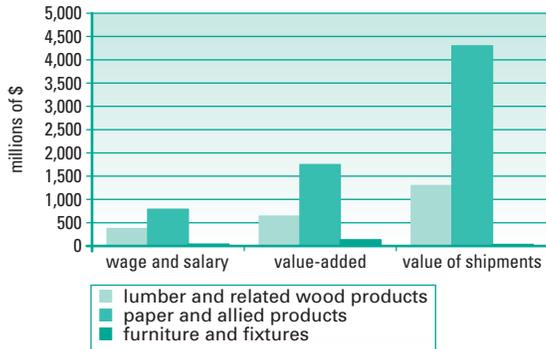
Maine has a large softwood sawmill industry and a smaller hardwood one, due to the small tree sizes and modest quality of the hardwood resource. There are numerous sawmills and specialty wood products mills, as well as a small, but high-quality wooden furniture industry. In 1999, sawmills in Maine processed 265 million board feet of hardwood sawlogs and 872 million board feet of softwood sawlogs into lumber. Total pulpwood processed was 3 million cords (figure 3).

Figure 4. EMPLOYMENT IN FOREST-BASED MANUFACTURING INDUSTRIES, MAINE, 1998



Source: US Bureau of Economic Analysis

Figure 5. PAYROLL, VALUE-ADDED, AND VALUE OF SHIPMENTS FOR FOREST-BASED MANUFACTURING INDUSTRIES, MAINE, 1997



Source: US Bureau of Economic Analysis

This sector of Maine's forest products industry is referred to as the Lumber and Wood products group (SIC code 2400, which includes logging). In 1998, there were 14,854 individuals employed in this sector (figure 4), with wages and salaries totaling \$375 million. The total value added for this sector was \$643 million and value of shipments was \$1.3 billion (figure 5).

Pulp and paper manufacturing

Maine's forest-based manufacturing industry is dominated by this sector, which straddles the primary and secondary manufacturing base. Maine has 15 pulp mills, 16 paper mills, and 56 paper machines with a combined paper-making capacity that is second only to the state of Wisconsin. The paper industry relies on wood harvested from Maine forests for 75% of its supply. Imports of pulpwood and wood pulp supplement the instate cut.

This sector of Maine's forest products industry is defined as the Paper and Allied Products Group (SIC code 2600). In 1998 there were 15,000 individuals employed in this sector (figure 4), with wages and salaries totaling \$790 million. The total value added for this sector was \$1.5 billion and the value of shipments was \$4.3 billion (figure 5).

Wood energy

Wood provides approximately 24% of electrical needs in Maine. Wood fiber and bark burned for energy are referred to as biomass and come from two sources: sawmill residue and land-clearing waste (hogfuel), and from tops and low quality stems of harvested trees (whole tree chips).

Wood biomass fuel provides electrical power through ten biomass plants in Maine. These plants consumed 1.4 million tons of chips in 1999; over one million tons were harvested in Maine. Thirty-seven sawmills and ten pulp and paper mills utilize wood waste to heat their manufacturing plants and dry kilns. The biomass market provides an important outlet for low-grade wood, a material neither suitable nor economical to process for lumber or paper. Revenues from sales of biomass chips in 1999 totaled \$13 million.



According to the National Association of Home Builders, the average American home of 2,200 square feet uses 17,000 board feet in lumber. Using this figure, Maine's sawlog harvest of 1.5 billion board feet in 1999 could build 88,235 homes.

The firewood market has declined significantly since a peak in the early 1980's, but recent increases in home heating fuel prices is contributing to renewed interest in wood as residential fuel, with accompanying increases in demand and price. In 1998, 470,000 cords of firewood were harvested and processed in Maine, contributing \$44 million to the economy.

Secondary manufacturing

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

Furniture and fixtures

In 1998, there were 1,916 individuals employed in this sector (figure 4), with a payroll of \$40 million. The total value added for Furniture & related products was \$134 million and value of shipments was \$34.5 million (figure 5).

The position of forest-based manufacturing in the Maine economy

Forest-based manufacturing is the largest manufacturing sector in Maine, with the largest number of manufacturing facilities and employees, the largest payroll, and the highest value of shipments. Paper manufacturing alone has the highest values for all categories, except for number of manufacturing facilities. Forest-based manufacturing is followed by Transportation equipment manufacturing and Leather and allied products manufacturing (table 3). These data are taken from the US Bureau of Census, and they differ from previous ones provided in this publication by the Bureau of Economic Analysis.

Table 3. FOREST-BASED MANUFACTURING AND OTHER MANUFACTURING INDUSTRIES, MAINE, 1997

	# of businesses	% of manufacturing businesses	value of shipments (\$1,000)	% of value of shipments, all manufacturing	payroll (\$1,000)	% of manufacturing payroll	# of employees	% of manufacturing employees
Forest-based manufacturing	873	48	6,391,067	45	982,918	38	26,633	32
Transportation equipment manufacturing	100	5	1,755,193	12	392,372	15	11,125	13
Leather and allied products manufacturing	45	2	1,081,429	7	166,815	6	7,466	9

Source: US Bureau of Census

Manufacturing is the largest sector in Maine's economy, with a value of shipments of \$14 billion. It is followed by Retail Trade, with a value of shipments of \$12 billion, then wholesale trade, with a value of shipments of \$7.3 billion. All



The payroll of Maine forest-based manufacturing industries grew consistently between 1992 and 1997, with all sectors showing an increased payroll of 14%. Payroll in Paper and Allied Products grew by 7%, significant given an 11% reduction in number of employees during this same time period.

other sectors follow Construction (value of shipments of \$2.8 billion), with value of shipments at \$2 billion or lower.

Gross State Product

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 \$2.2 billion to Maine's GSP in 1998, which was 7% of the total GSP (table 4).

Table 4. GROSS STATE PRODUCT, FOREST-BASED MANUFACTURING, MAINE, 1998

Lumber and wood products	\$643 million
Furniture and fixtures	\$134 million
Paper products	\$1,452 million
Total	\$2.2 billion (7% of total)
Total for state	\$ 32 billion

Source: US Bureau of Economic Analysis

Associated forest products

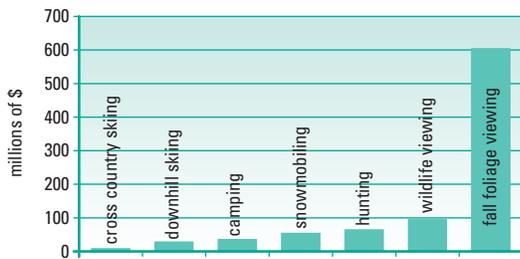
Maine's forests provide other commodities besides timber and pulp. In 1998 sales of maple products totaled \$3.2 million. Sales of Christmas trees totaled \$3.6 million. A formal mechanism for gathering data on sales of Christmas wreaths does not exist, but annual sales are estimated at \$6 million.

Forest-related Recreation and Tourism

It is difficult to quantify the contribution made by the forest environment towards recreation and tourism expenditures. The recreation activities selected for this report take place primarily in a forest environment and 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. The author 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.

Participation data in these recreational activities were obtained from various state and federal sources. State total estimates of employment and sales in retail trade and service sectors of the economy were taken from the 1997 Economic Census of the U.S. Bureau of the Census. These were divided into Food and Beverage Stores, Gas Stations, Accommodations, Eating and Drinking Establishments, and Other Retail. Number of activity days were applied to expenditure per activity day per participant by category (food and beverage, gas, etc.) to get the final values for expenditures, payroll, and employment.

Figure 6. FOREST-RELATED RECREATION AND TOURISM EXPENDITURES, MAINE, 1999



Source: NEFA, 2000

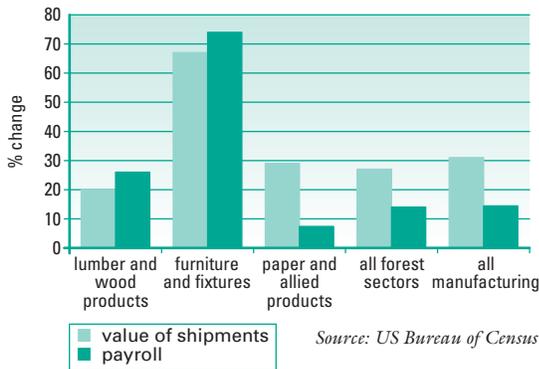
The outdoor recreation activities included in this report directly contribute over \$1 billion dollars in sales to Maine’s economy. The contribution of forests to the recreation expenditures is estimated at \$900 million. Accommodations and the Other category accounted for the largest share of expenditures. Fall foliage viewing makes the largest contribution followed by wildlife viewing, hunting, and snowmobiling (figure 6).

Forest-related recreation and tourism provides employment for 7,095 individuals and a payroll of \$51 million. Statewide, the direct impact is 7% of all sales or employment in the selected sectors. However, recreation spending accounts for over half (57%) of sales and employment in accommodations. These jobs are important to many rural areas, where there are few alternative employment opportunities.

Information regarding participation rates and revenues generated for rafting were solicited from the Maine Department of Inland Fisheries and Wildlife, but were not included in the formal study on forest-related recreation in Maine. According to a Great Northern Paper FERC (Federal Energy Relicensing Commission) report, 93,000 people participated in whitewater rafting and paid \$350.00/trip in 1999, generating revenues of \$32.5 million. Applying 75% of this figure to the total forest-related recreation and tourism expenditures for Maine increases the total to \$932.5 million.

Industry Trends

Figure 7. PERCENT CHANGE IN VALUE OF SHIPMENTS AND PAYROLL, FOREST-BASED INDUSTRIES, MAINE, 1992-1997

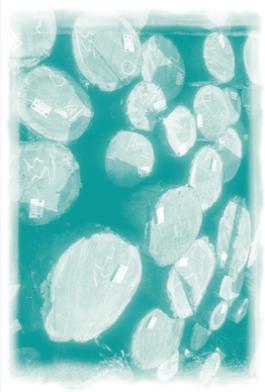


Source: US Bureau of Census

Between 1992 and 1997, all sectors of Maine’s forest-based manufacturing industries saw significant increases in the value of shipments (figure 7). For businesses classified under the SIC codes as Lumber and wood products, primarily sawmills, shipments increased by 20% during this time period. The value of shipments by businesses engaged in manufacturing Furniture and fixtures, which includes some businesses that do not use wood, increased by two-thirds during this time period. Paper and allied products, primarily pulp and paper mills, increased the value of their shipments by 29%.

The value of shipments by all Maine forest-based industries, a combination of Lumber, Furniture, and Paper, increased by 27% from 1992–1997.

The payroll of Maine forest-based manufacturing industries grew consistently between 1992 and 1997, with all sectors showing an increased payroll of 14% (figure 7). Lumber and wood products payroll grew by 26% over this time period, equal to the growth in this sector nationally. Payroll for Furniture and fixture



The value of shipments by all Maine forest-based industries, a combination of Lumber, Furniture, and Paper, increased by 27% from 1992–1997.

manufacturers grew by almost three-quarters, roughly three times the national average. Payroll in Paper and allied products grew by 7%, significant given an 11% reduction in number of employees during this same time period.

Conclusion

The economic importance of Maine's forests is significant. The forest products sector is a consistent provider of income and employment for thousands of rural residents and forest landowners. The sale of forest products adds over \$5.6 billion in direct payments to the state's economy. Additionally, the forest attracts millions of visitors to the state for recreation and tourism activities, contributing \$900 million. Altogether, the contribution of forest-based manufacturing and forest-related tourism and recreation to the Maine economy is over \$6.5 billion.

(1) Calculations for delivered roundwood were arrived at by adding the stumpage value of the product (sawlog, pulpwood, or biomass) to estimated operating costs associated with the product. The operating costs were derived from the New Hampshire Forest Products Report, 1999.

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