

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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The Economic Importance of Vermont's Forests



**North East *State* Foresters Association
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Vermont's forests are a valuable resource. Our forested ecosystem provides the basis for biological diversity, natural communities, wildlife habitats, scenic landscapes, and recreational opportunities. As a natural resource, forests provide an important economic base for employment, tourism, and recreation, and support a diverse forest products industry. Livable communities and our quality of life depend on healthy, sustainable forests.

I hope this report adds to your understanding of the wonderful resources of Vermont's forests.

DAVE STEVENS, Director of Forests
Vermont Department of Forests, Parks, and Recreation

The economic importance of Vermont's forests

This booklet is part of a series on the importance of forest-based manufacturing and forest-related recreation and tourism to 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

- The contribution of forest-based manufacturing and forest-related tourism and recreation to the Vermont economy is over **\$1.2 billion**.
- Forest-based manufacturing totaled **\$964.3 million in value of shipments** to Vermont's economy in 1997. This is 12% of the statewide value for manufacturing.
- Forest-related recreation and tourism expenditures contribute **\$257 million** annually to Vermont's economy.
- The forest-based manufacturing economy provides employment for almost 7,500 people and generates payrolls of almost **\$200 million**. Forest-related recreation and tourism provides employment for 2,393 and generates payrolls of **\$33 million**.
- Vermont landowners received estimated stumpage revenue in 1997 of **\$30 million**. Total delivered value of these roundwood products was **\$85 million**.
- The sale of Christmas trees, wreaths, and maple syrup contributes **\$20.2 million**
- Wood provides 6% of total energy use in Vermont. Revenues from sales of biomass chips totaled **\$2.4 million** in 1997. Sales of cordwood generated **\$25 million** annually between 1996 and 1997.
- Each 1,000 acres of forestland in Vermont supports 1.6 forest-related manufacturing jobs and 0.5 forest-related tourism and recreation jobs.

Table 1. REVENUES FROM VERMONT'S FORESTS

	<i>millions of \$</i>	<i>\$ per acre</i>
Forest-based manufacturing value of shipments	964	210
Forest-related tourism and recreation expenditures	257	56
Christmas trees/maple products	20	4
Totals	1,241	270

The Forest Resource in Vermont

Vermont’s forested ecosystem provides the basis for biological diversity, natural communities, wildlife habitats, and scenic landscapes. The forests of Vermont also provide an important economic base for employment, tourism, and recreation, and support a diverse forest products industry.

Land area

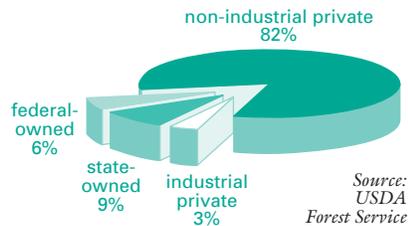
Vermont covers 5.9 million acres. Seventy-eight percent, or 4.6 million acres, is forested. Of these forested acres, 4.5 million acres (75%) are classified as timberland by the USDA Forest Service, or land that is fertile and accessible enough to produce wood as a crop and is not withdrawn from timber harvesting by statute or regulation (table 2).

Table 2. TOTAL LAND AREA, FOREST LAND ACRES, AND TIMBERLAND ACRES, VERMONT, 1997

total land area	forest land	timberland
5,900,000	4,600,000	4,500,000

Source: USDA Forest Service

Figure 1. TIMBERLAND OWNERSHIP, VERMONT, 1997

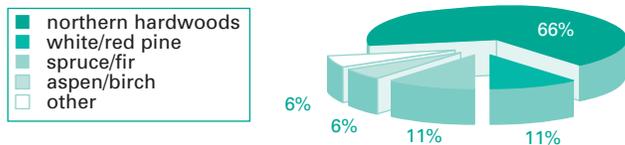


The majority of timberland in Vermont (3.8 million acres or 85%) is privately owned by non-industrial private owners. Industrial ownership is 3%, or 160,000 acres. State and federal government own 658,000 acres, or 15% of timberland (figure 1).

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 Vermont (figure 2) and covers 3 million acres (66%), followed by the white/red pine, spruce/fir, and aspen/birch types.

Figure 2. FOREST TYPES, VERMONT, 1997



Forest-based Manufacturing

The forest-based manufacturing system consists of timber harvesting, primary manufacturing, and secondary manufacturing. Vermont has an active and diversified primary and secondary wood processing industry that provides good markets for Vermont’s wood and, because of the state’s small size, results in extensive wood movements with nearby states. Forest-based manufacturing is

widely dispersed throughout the state and provides important employment opportunities to many rural areas.

Most of the data used for this series of publications is from the Bureau of Census, Census of Manufacturing, NAICS Series (North American Industrial Classification). Prior to September 2000, these data were available under SIC codes (Standard Industrial Classification). Comparison of SIC and NAICS is difficult because of several changes. Logging is now under a separate sector. Also, the SIC category for Furniture and Fixtures previously included non-wood materials. The NAICS system separates wood from metal and other materials, so the data are more reliable, but the totals are inevitably lower.

The Census of Manufacturing typically undercounts the activity in each sector, especially in regards to smaller firms, which are abundant in forest-based industries. The Census data given should be treated as minimums, with the understanding that actual values are likely to be higher.

Primary manufacturing

The conversion of roundwood, or parts of trees, into lumber, veneer, pulp, and paper starts with the primary manufacturing sectors. In Vermont, lumber and related solid wood products made in sawmills are the major primary processing activities. There is also a stable wood energy sector.

Timber harvesting

Most forest land in Vermont is privately owned by individual landowners who sell their standing trees as “stumpage”. In 1998, the total sales of stumpage earned by Vermont landowners was \$30 million. Sales of these products to sawmills (referred to as delivered roundwood) totaled \$85 million.

Figure 3. WOOD FLOW, VERMONT, 1997

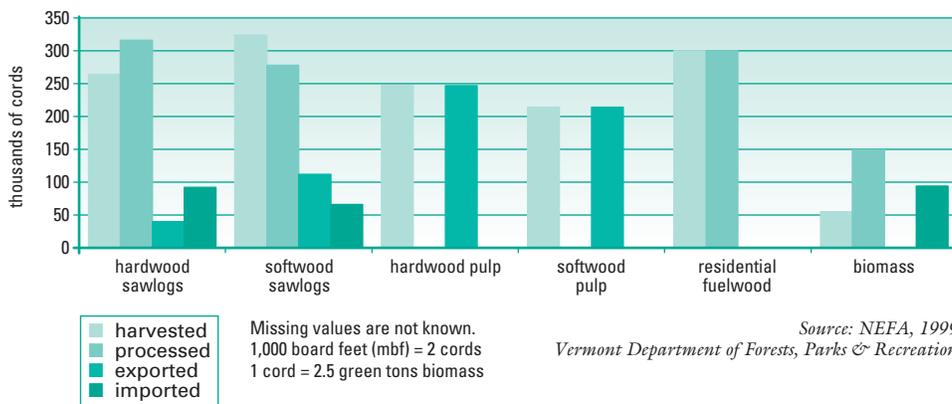
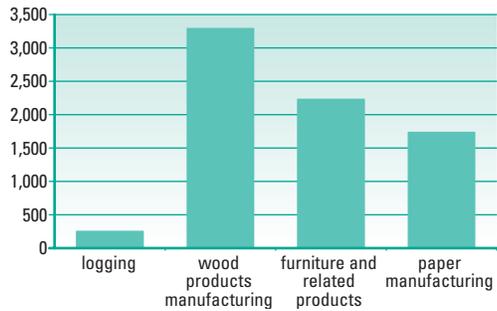


Figure 3 provides data on the harvesting, processing, importing, and exporting of wood products in Vermont for the year 1998. During that year, 123.4 million board feet of hardwood and 142.1 million board feet of softwood was harvested from Vermont’s forests, totaling 265.5 million board

feet. Vermont’s pulpwood harvest was 410,590 cords, all of which was exported to neighboring states. The whole tree chip harvest totaled 128,001 green tons.

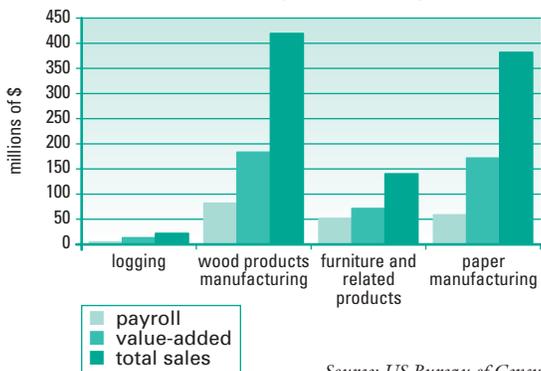
These chips are used primarily as fuel in wood-to-energy facilities. They are also used in sludge composting, playground padding, and mulch.

Figure 4. EMPLOYMENT IN FOREST-BASED MANUFACTURING INDUSTRIES, VERMONT, 1997



Source: US Bureau of Census

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



Source: US Bureau of Census

Timber harvesting includes tree felling, skidding timber to a roadside landing, processing timber into logs or bolts, and transporting the materials over roads to a primary manufacturing facility. The logging and log trucking industry is a significant portion of the employment base in northern Vermont. Census data in this category (NAICS 113310- Logging) includes cutting and transporting timber. In Vermont in 1997, there were 251 individuals employed in this sector (figure 4), with a payroll of \$5.1 million (data from state sources estimate 500 timber harvesters). The total value added for logging in 1997 was \$13.4 million and the value of shipments was \$22.0 million (figure 5).

Production of lumber and related solid wood products

In 1998, 220 sawmills in Vermont processed 154.5 million board feet of hardwood and 115.8 million board feet of softwood timber into lumber (figure 3). There are no pulp plants in Vermont, so all pulpwood is processed out of state.

Census data for sawmills is listed in Wood products manufacturing (NAICS 321) and includes: Sawmills & wood preservation; Veneer, plywood, & engineered wood products; Millwork; Prefabricated wood buildings; and Other. In Vermont in 1997, there were 3,290

individuals employed in this sector (figure 4), with a payroll of \$82.2 million. The total value added for Wood products manufacturing was \$183.5 million and the value of shipments was \$419.6 million (figure 5).

Wood energy

Wood provides 6% of electrical and heating needs in Vermont. Wood biomass fuel provides electrical light and power through two biomass plants in Vermont. Wood chips and firewood provide heat for industrial, public, and residential buildings. Twenty-three schools, five state office complexes and separate buildings, and several state highway garages are heated with wood chips. The estimated value of that energy is \$34.3 million. In addition, many sawmills and secondary wood manufacturing plants utilize wood waste to heat their manufacturing plants and dry kilns. These plants consumed 372,000 tons of biomass during 1997; 137,000 tons were harvested from Vermont's forests. The biomass market provides an important outlet for low-grade wood, a material neither



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, Vermont's 1998 sawlog harvest of 265 million board feet could build 15,588 homes.

suitable nor economical to process for lumber or paper. Revenues from sales of biomass chips in 1997 totaled \$2.4 million.

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. Residential consumption of wood in Vermont is estimated at 272,000 cords, valued at \$25 million.

The demand for biomass has affected harvesting trends in Vermont. The increase in demand for pulpwood from Vermont, for hardwood pulp in the region, and continued whole-tree chipping for pulpwood and industrial fuelwood, has leveled out the ratio of low quality to high quality wood harvested to 47 to 53%.

Secondary manufacturing

Secondary manufacturing refers to the drying, planing, cutting, and assembly of lumber into parts or finished products. A diversity of trees growing in Vermont contributes to a flourishing secondary industry, composed of several hundred dispersed companies that provide jobs and economic stability to mostly rural communities. Flooring, furniture, canoes, and woodenware are just a sample of items produced in these businesses. Vermont's secondary manufacturing industry is growing and the State Department of Economic Development estimates that the sector has the capacity to double in both employment and value of shipments.

Furniture and related products

Census data in this category (NAICS 337) includes Household and institutional furniture (non-upholstered) & Kitchen cabinet manufacturing. In Vermont, in 1997, there were 2,229 individuals employed in this sector (figure 4), with a payroll of \$52.0 million. The total value added for Furniture & related products was \$71.6 million and the value of shipments was \$140.6 million (figure 5).

Paper manufacturing

Census data in this category (NAICS 322) includes Paper mills and Paperboard mills. In Vermont, in 1997, there were 1,735 individuals employed in this sector (figure 4), with a payroll of \$59.0 million. The total value added for Paper manufacturing was \$172.0 million and the value of shipments was \$382.1 million (figure 5).

The position of forest-based manufacturing in the Vermont economy

Table 3 provides a comparison of the forest-based manufacturing sector with other manufacturing sectors in Vermont. The source of data for this table is the 1997 Economic Census, but numbers for all values conflict with ones given previously in this publication. This table should be used for comparative purposes only.

Forest-based manufacturing is an important component of manufacturing industries in Vermont, behind printing and ahead of cheese making in value of shipments. Forest-based manufacturing provides about 30% of both payroll and number of employees for all manufacturing industries in Vermont. The Manufacturing sector employs 16% of employees in Vermont. The largest number of employees are in the Services and Trade sectors.

Table 3. FOREST-BASED MANUFACTURING AND OTHER MANUFACTURING INDUSTRIES, VERMONT, 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
Printing	101	29	369,379	31	87,817	38	2,917	36
Forest-based manufacturing	169	48	367,908	30	71,838	31	2,575	32
Cheese manufacturing	13	4	277,927	23	17,180	7	639	8

Source: US Bureau of Census

Associated forest products

Vermont's forests provide other commodities besides timber and pulp. In 1998 sales of maple products totaled \$10.2 million. Sales of Christmas trees totaled \$10 million. Data were not available for Christmas wreaths. A small cottage industry dedicated to the harvesting of greens and ginseng exists, but there are no data available to quantify the effort.

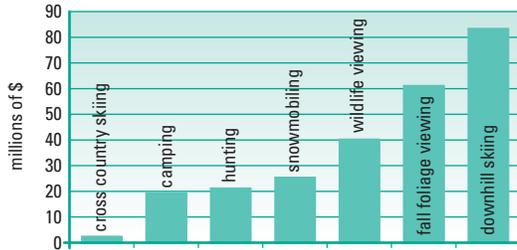
Forest-related Recreation and Tourism

Most recreation and tourism activities in Vermont are linked to the forest, but it is difficult to estimate 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 expen-

diture 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, VERMONT, 1997



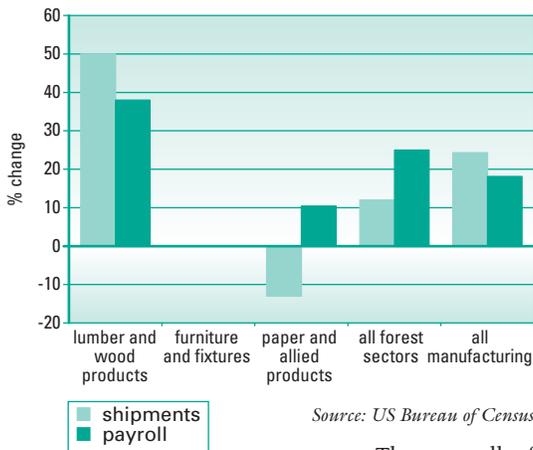
Source: NEFA, 2000

The outdoor recreation activities included in this report directly contribute \$378 million dollars in sales to the state's economy. The contribution of the forests of Vermont to recreation expenditures is estimated at \$257 million. Accommodations and the Other category accounted for the largest share of expenditures. Downhill skiing makes the largest contribution followed by fall foliage viewing and wildlife viewing, then snowmobiling, hunting, camping, and finally cross country skiing (figure 6).

Forest-based recreation and tourism provide employment for 2,393 individuals and a payroll of \$33 million. Statewide, the direct impact is 5.5% of all sales or employment in the selected sectors. However, recreation spending accounts for almost one-quarter of sales and employment in accommodations and 14% for eating and drinking establishments. These jobs are important to many rural areas, where there are few alternative employment opportunities.

Industry Trends

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



Source: US Bureau of Census

Between 1992 and 1997, Vermont's forest industry saw mixed results in the value of shipments (figure 7). For businesses classified under the SIC codes as Lumber and Wood Products, primarily sawmills, shipments increased by 50% during this time period. During this same time period, the value of shipments from all Lumber and Wood Products manufacturers in the United States increased by 30%. Comparative figures for the Furniture and Fixtures sector in Vermont are not available. Paper and Allied Products, primarily pulp and paper mills, saw the value of their shipments decrease by 13%. The value of shipments by all Vermont forest industries, a combination of Lumber and Paper, increased by 12% from 1992–1997.

The payroll of Vermont forest industries grew consistently between 1992 and 1997, with all sectors showing an increased payroll of 25% (figure 7). Lumber and Wood Products payroll grew by 38% over this time period, compared to 26% growth in this sector nationally. Comparative figures for Furniture and Fixtures are not available for this time period. Payroll in Paper and Allied Products grew by 10%, significant given a 14% reduction in number of employees during this same time period.

Conclusion

The economic importance of Vermont's forests is significant. In a predominantly rural state, the forest provides important jobs and payroll for thousands of people, and an important source of income for forest landowners. The sale of forest products adds almost \$1 billion to the state's economy. Additionally, the forest attracts millions of visitors to the state for recreation and tourism activities, contributing \$257 million. Altogether, the contribution of forest-based manufacturing and forest-related tourism and recreation to the Vermont economy is over \$1.2 billion.

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