



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

North East *State* Foresters Association



New Hampshire is the second most forested state in the nation with 84% of the state's total land area covered with trees. Forests are the dominate feature across the landscape but how each of us views that forest depends upon our own experiences, value system, and expectations. The primary purpose of this report is to capture the economic impact the forest has on our state knowing that this forest sustains us in many ways. Whether you are dependent upon the forest for your livelihood, as a place of recreation and great enjoyment, or you recognize and value the many ecological benefits these forests provide, we hope this publication adds to your understanding of the importance of sustaining our forest resources.

PHILIP BRYCE, Director,
New Hampshire Division of Forests and Lands

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

- The annual contribution of forest-based manufacturing and forest-related recreation and tourism to the New Hampshire economy based upon 2005 data is over **\$2.3 billion**.
- Forest-based manufacturing contributes **\$1.2 billion in value of shipments** to the economy in 2005, or **7%** of New Hampshire's total manufacturing sales.
- The forest-based manufacturing industry provides employment for 9,576 people and generates a payroll of over **\$320 million**.
- Forest-based recreation and tourism provides employment for over 11,500 and generates payrolls of **\$181 million**.
- Revenues from forest-related recreation and tourism activities totaled **\$1.1 billion** in 2005.
- New Hampshire landowners received estimated stumpage revenue in 2005 of **\$45.9 million**. Timber taxes paid to municipalities totaled **\$4.6 million**.
- The sale of Christmas trees, wreaths and maple syrup contributed approximately **\$9 million** in 2005.
- Wood provides the energy for approximately **6% of electrical** use in New Hampshire.
- Each **1,000 acres** of forest land in New Hampshire supports **2.0** forest-based manufacturing, forestry and logging jobs and **2.4** forest-related tourism and recreation jobs.
- Since its late 2006 start-up, the estimated effect of the opening of the Schiller Wood Energy Plant in Portsmouth is to increase forest based manufacturing output by **\$30 million** per year, wood consumption by **500,000 tons** of wood chips per year while increasing employment in the plant wood procurement area within the logging and trucking sector by an undeterminable amount. The estimated effect of the closure of the two pulp mills in the North Country in 2005-06 is near \$150 million of annual shipment value while reducing direct employment by over 500 and wood usage by 1.2 million tons per year. Schiller will partially make up for these losses.

Table 1. ANNUAL REVENUES FROM NEW HAMPSHIRE'S FORESTS

	Total values and per acre basis per year	
	Millions of \$	\$ per acre
Forest-based manufacturing value of shipments	\$1,223	\$252
Forest-related recreation and tourism	1,069	221
Christmas trees/maple products	9	2
Totals	\$2.301 billion	475

Cover photo: Bill Nichols



The Forest Resource in New Hampshire

New Hampshire's land area is 5.74 million acres. Eighty-four percent or 4.85 million acres, is forested. The USDA Forest Service classifies 4.67 million acres as timberland 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).

The majority of timberland in New Hampshire is privately-owned (3.58 million acres or 77%) by business concerns¹ or family forest owners. Local, State and Federal government owns just over 22% or 1.08 million acres of New Hampshire's forest (see figure 1).

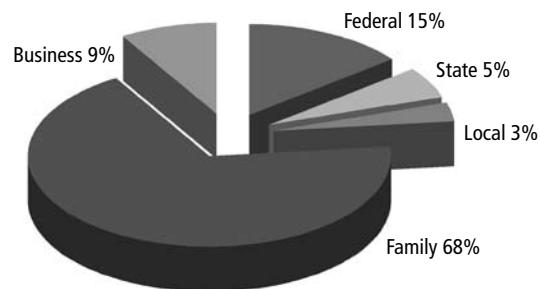
Table 2. TOTAL LAND AREA, FOREST LAND ACRES, AND TIMBERLAND ACRES, NEW HAMPSHIRE, 2006

Total land area	Forest land	Timberland
5,739,594	4,850,055	4,673,844

Source: USDA Forest Service, Forest Inventory & Analysis, 2005

Figure 1. TIMBERLAND OWNERSHIP, NEW HAMPSHIRE, 2006

Source: USDA Forest Service, Forest Inventory & Analysis, 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 New Hampshire (figure 2) and covers 2.3 million acres (48%), followed by the white/red pine, spruce/fir and aspen/birch types.

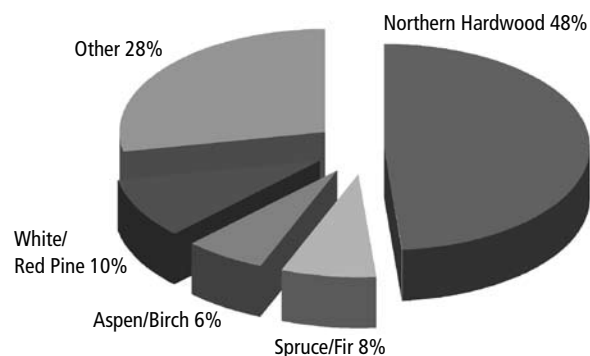
NEW HAMPSHIRE'S FOREST INDUSTRY

New Hampshire's forest products industry contains a wide variety of manufacturers including hardwood and softwood sawmills, biomass energy plants, paper making operations and the secondary manufacturing producers that add additional value to wood products. Challenges being experienced by all sectors result from global competition, high energy costs, and high insurance costs, among other factors.

¹ "Business" includes lands owned by business expressly for the purpose of generating income from the land, primarily from timber sales.

Figure 2. FOREST TYPES, NEW HAMPSHIRE, 2005

Source: USDA Forest Service, Forest Inventory & Analysis, 2005



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

New Hampshire'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 using chainsaws or mechanized felling equipment and bring the wood to a log landing with skidders or forwarders. The trees are cut into veneer logs, sawlogs, pulpwood, firewood, or processed into wood chips or other products for loading onto trucks and delivery throughout the region directly to primary manufacturing mills or to wood concentration yards.

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. If the product is pulpwood, pulp mills will be the processor and use the wood to manufacture pulp used in paper manufacturing. Another primary manufacturer is the wood energy industry which takes 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 these manufacturers sell or use the steam for other manufacturing processes such as dry kilns or greenhouses.

In New Hampshire, where the pulp and paper industry once used the majority of the wood harvested, the sawmill and wood energy industries now dominate. While three paper mills still exist in New Hampshire, two pulp mills, a smaller

facility in Groveton and the pulp mill in Berlin, traditionally the largest wood consuming mill in the state, closed in 2005 and 2006 after over 100 years of operation. As a result, pulpwood harvested is shipped to mills in Maine, New York or Quebec.

The state also has nearly fifty substantial sized sawmills and specialty wood products mills. The wood energy sector has seen a renewed resurgence as fossil fuel prices have increased. The state's five operating wood energy plants built in the 1980s² have been joined by the Schiller wood energy plant, a large 50 Megawatt plant in Portsmouth, converted from a coal plant to wood and started in 2006. Wood-fired energy production is, once again, economically feasible and popular given its renewable source. More plants are likely to be built in the state in the next five years and there is interest in starting up a closed plant in Alexandria. In just a few years it is likely that the low-grade wood market that once was found at the pulp mill in Berlin will have been replaced with an equal draw of wood from wood energy facilities around the state.

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).

TIMBER HARVESTING & WOOD FLOWS

In 2005, 55.7 million board feet³ of hardwood sawlogs and 173.9 million board feet of softwood sawlogs were harvested from the forests of New Hampshire. In that same year, 750.5 thousand green tons⁴ of hardwood pulpwood and 326.8 thousand green tons of softwood pulpwood were harvested in the State. Over 867,000 green tons of whole tree chips were harvested in 2005 as well. The estimated value of these harvested volumes to landowners in stumpage⁵ equals \$46 million. Figure 3 shows the flows of wood from the major categories of wood harvested – all calibrated in cords for easy comparison. The map that is part of Figure 3 shows the flows graphically.

Employment and Production

The US Department Labor, reported 1,717 individuals employed in the forestry and logging sector in New Hampshire in 2005 (figure 4). Employment in wood products was just over 3,600 while pulp and paper was approximately 2,700. That number was reduced by approximately 500 when the Berlin pulp mill closed in 2006. Furniture and related products employed 1,500.

Figure 3. WOOD FLOWS IN NEW HAMPSHIRE, 2005

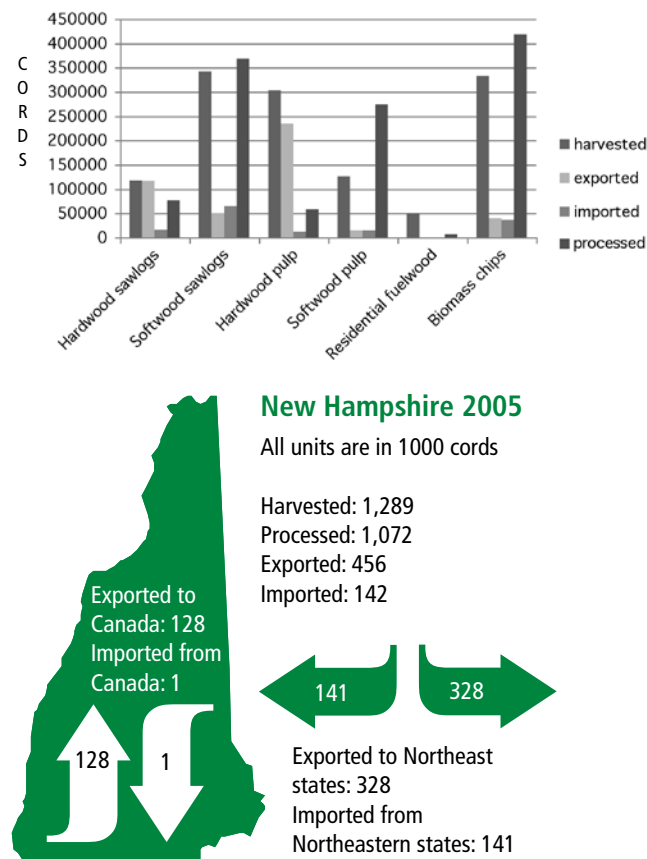


Figure 4. EMPLOYMENT IN FOREST-BASED MANUFACTURING, NEW HAMPSHIRE, 2005

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

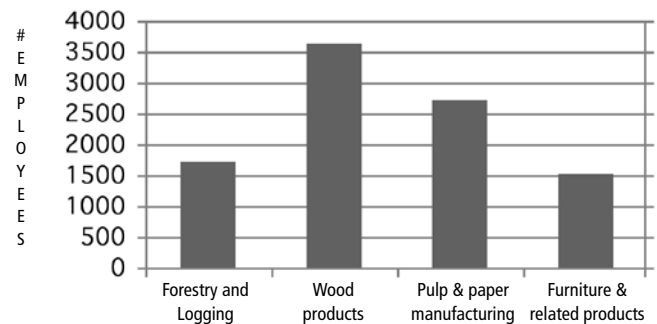


Figure 5 shows payroll, value added and value of product shipments for New Hampshire's forest products industry. All figures are from 2005 data. Payroll for forestry and logging was \$78,062,000. Payroll in the wood products sector

2 Three of the eight built in the 1980s were closed in the 1990s
 3 Board foot equals a solid piece of wood 1 inch thick by 12 inches wide by 12 inches long
 4 Green ton – weight in tons (1 ton=2000 pounds) of pulpwood or 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.

(includes sawmills, wood energy and secondary solid wood manufacturing) was \$118,991,000, while in pulp and paper \$80,330,000, and \$42,966,000 for furniture and related products.

Further review of Figure 5 occurs in sections that follow.

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

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



Forestry and Logging Sector

Foresters provide services such as timber evaluation and appraisal, the development of management plans, management of the full suite of forest resources for the landowner and the preparation, marketing and supervision of timber sales. Foresters who provide services to landowners for compensation must be licensed by the state. There are over 250 licensed foresters in New Hampshire.

The logging industry in New Hampshire is an important source of employment. Traditionally larger logging companies have been located in the north country but that has been somewhat reduced with the closure of the pulp mill in Berlin and the start-up of the Schiller wood energy plant in Portsmouth, NH. Over 1,000 loggers participate in the voluntary certification program that promotes safety and environmental awareness through the NH Timber Harvesting Council. More loggers are employed than those participating in the logger certification program and the Department of Commerce no longer reports logging as a separate employment category. The forestry and logging category reports over 1,700 employed in 2005.

Production of Lumber and Related Solid Wood Products

In 2005, sawmills in New Hampshire processed 38 million board feet of hardwood sawlogs and 184 million board feet of softwood sawlogs into lumber (figure 3). The total value added for wood products manufacturing which also includes wood preservation, millwork, wood container and pallet

manufacturing, and prefabricated wood buildings (figure 4) was \$292.7 million and the value of shipments was \$574.4 million (figure 5).

Pulp and Paper Manufacturing

Since the last NEFA report, there has been a major change in the pulp mill sector of manufacturing in New Hampshire. A small pulp mill in Groveton and a larger pulp mill in Berlin both closed (2005 and 2006). These mills used approximately 1.2 million tons of pulpwood when both were in operation. The paper mills in Groveton and Gorham, however, continue their operations in 2007 as this is being published, using purchased pulp from outside New Hampshire as raw material. In 2005, before the two pulp mills closed, the total value added for paper manufacturing was \$196.0 million and the value of shipments was \$495.5 million (figure 5). These amounts are included in the current totals.

Wood Energy

Wood provides approximately 6% of electrical and heating needs in New Hampshire (including the new 50 megawatt wood energy plant in Portsmouth). Wood fiber and bark burned for energy are referred to as biomass and come from several sources: tree tops and low quality stems of harvested trees (whole tree chips) from forestry harvests, whole tree chips from land clearing or development and, sawmill residue. The six biomass plants (again, including the Schiller facility that began operation in late 2006) consume 1.7 million tons of chips per year. The biomass market provides an important outlet for low-grade wood allowing for improvement of the overall quality of the forests and provides a market for a material that is neither suitable nor economical to process for lumber or paper. Revenues from sales of biomass chips in 2005 totaled \$30 million (assuming \$25.00/ton) or \$42.5 million if we include the Schiller plant. Sellers of commercial cordwood reported cutting 50,201 cords in 2005, valued at approximately \$10 million.

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 New Hampshire contributes to a growing secondary industry, composed of several hundred dispersed companies that provide jobs and economic stability to mostly rural communities. Cabinets, moulding, clapboards, furniture, canoe and kayak paddles and many other products are manufactured by this sector.

Furniture and Related Products

Furniture and related products, a category of manufacturing that includes wood kitchen cabinet and countertop manufacturing, non-upholstered wood household furniture manufacturing and custom architectural woodwork and

millwork manufacturing. In 2005, 1,520 individuals were employed in this sector (figure 4), with a payroll of \$50.0 million. The total value added for furniture & related products was \$43.0 million and the value of shipments was \$152.1 million (figure 5).

ASSOCIATED FOREST PRODUCTS

Sales of maple products in 2005 totaled \$2.4 million. Estimated sales of Christmas trees and wreaths totaled \$6.4 million. These products are also integral to the rich New England heritage.

THE POSITION OF FOREST-BASED MANUFACTURING IN THE NEW HAMPSHIRE ECONOMY

Table 3 provides a comparison of the forest-based manufacturing sector with the total manufacturing sector in New Hampshire. Forest-based manufacturing provides 9% of the manufacturing payroll and employs 13% of manufacturing employees. This sector provides 6% of value added receipts in manufacturing and 7% of value of shipments receipts. These percentages have not changed since the 1997 Economic Census, which was the source of data for NEFA's previous report. The Economic Census provided more comprehensive data, including additional information on the rank of forest-based manufacturing within New Hampshire's manufacturing economy. According to that 1997 source of data, forest-based manufacturing ranked third to Computer and electronic products manufacturing (42%) and Machinery manufacturing (9%) in value of shipments. Since forest-based manufacturing continues to provide equivalent percentages of employees,

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

	millions of \$
Wood products manufacturing	\$293
Furniture and related product manufacturing	\$93
Paper manufacturing	\$196
	Total \$582
GSP, Manufacturing, New Hampshire	\$12,000
GSP, Total for New Hampshire	\$55,061

Table 4 FOREST-BASED MANUFACTURING AND OTHER MANUFACTURING INDUSTRIES, NEW HAMPSHIRE, 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	9,576	13%	320,349	9%	581,545	6%	1,222,025	7%
All manufacturing	75,669		3,661,482		9,188,322		16,871,540	

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

payroll, value added, and value of shipments for New Hampshire, the sector is still positioned highly in the manufacturing economy.

Forest-Related Recreation and Tourism

In New Hampshire, as the second 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 the 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.

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 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.)



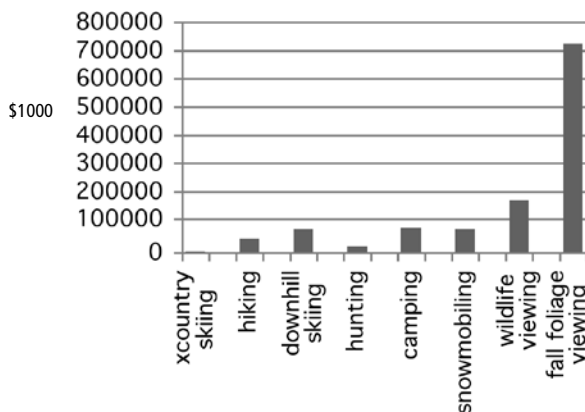
There were no direct number of visitor-days developed for hunting and wildlife viewing. Instead, direct estimates of expenditures were taken from the National Survey of Fishing, Hunting and Wildlife-Related Activities (US Dept. of Interior, 2004).

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.

The recreation activities included in this report contribute \$1.2 billion dollars in sales to the New Hampshire economy. The portion attributed to the forest resource is \$1.07 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 11,500 people are directly employed with payrolls of \$181 million due to forest-related recreation in New Hampshire.

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

Source: NEFA, 2006



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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.



CONTACT INFORMATION - Board of Directors

Philip Bryce, Director
Division of Forests and Lands
NH Department of Resources and
Economic Development
PO Box 1856
Concord NH 03302-1856
(603) 271-2214 Phone
(603) 271-6488 Fax
pbryce@dred.state.nh.us

R. Alec Giffen, Director
Maine Forest Service
Maine Department of Conservation
State House Station 22
Augusta ME 04333
(207) 287-2791 Phone
(207) 287-8422 Fax
alec.giffen@maine.gov

Robert Davies, Director
Division of Lands & Forests
New York Department of
Environmental Conservation
625 Broadway
Albany NY 12233-4250
(518) 402-9405 Phone
(518) 402-9028 Fax
rkdavies@gw.dec.state.ny.us

Steven Sinclair, Director
Division of Forests
Vermont Department of Forests,
Parks and Recreation
103 South Main Street, 10 South
Waterbury VT 05671-0601
(802) 241-3678 Phone
(802) 244-1481 Fax
steve.sinclair@state.vt.us

Anne Archie
USDA Forest Service,
State and Private Forestry
271 Mast Road, PO Box 640
Durham NH 03824
(603) 868-7694 Phone
(603) 868-1066 Fax
aarchie@fs.fed.us

Charles A. Levesque,
Executive Director
NEFA
PO Box 2911
Concord NH 03302-2911
(603) 229-4965 Phone
nefa@inrslc.com