WORCESTER MOUNTAINS PROJECT:
AN ECONOMIC PICTURE OF THE
FOREST INDUSTRY IN THE WORCESTER RANGE

Prepared by the
Vermont Natural Resources Council
9 Bailey Avenue
Montpelier, Vermont 05602

Authors:
Roger Sternberg
Miles Waite

Made possible through the generous support of the
Noricross Wildlife Foundation
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Preface

This report is the result of a two-month effort to obtain a snapshot of the forest economy and the economic trends in the Worcester Mountain Range of Vermont. A sample portion of the companies and individuals involved in forestry activities in the study area were contacted in order to determine the economic trends in the region based on their best estimate. Data on forest resources, obtained from the Forest Service, represent an extrapolation of data providing an estimate of the forest resources which should not be considered statistically reliable.

Within the imposed constraints of time, money, and information, this report paints a picture of the most abundant natural resource within the region, its forest.

The Vermont Natural Resources Council (VNRC) has long recognized the multiple assets provided by Vermont's forest lands: scenery, wildlife, recreation, watershed protection, and timber. Timber is the focus of this report, but the Council recognizes that all the forest's values need be considered if Vermont's forests are to provide the greatest benefits.

The Vermont Natural Resources Council would like to thank the following individuals and groups for their assistance in developing this report:

- Robert De Geus & Dave Stevens, Marketing, Utilization, and Development Section, Vermont Department of Forests, Parks and Recreation
- Russ Barrett, Washington County Forester and Paul Frederick, Lamoille County Forester, Vermont Department of Forests, Parks, and Recreation
- Private consulting foresters who provided information and comments
- Loggers who shared their perspectives on various forestry issues

VNRC especially thanks the individuals at sawmill and wood manufacturing companies who took their valuable time to answer our questions.
Executive Summary

This report provides a snapshot of the forests and the forest industry in and around the Worcester Mountain Range. Twenty-seven primary and secondary wood processors with facilities adjacent to the Worcester Mountains were interviewed, as were foresters and a small number of loggers to assess the forest's importance to the local economy. These groups were also asked their opinions about constraints and opportunities to increase the economic contribution made by the Range's forests, as well as their opinions of the viability of the forest economy in the area.

Primary processors rely on a far greater area than the Worcester Range for their supply of wood. They reported that 18 percent of their supply comes from forests within the study area. A conservative estimate of the current annual economic contribution of timber harvesting in the study area is $184,735 for the stumpage value. When the "value added" to these products through harvesting and trucking to the mills is considered the contribution increases to approximately $592,000. Annual harvests within the Range could be increased by about 40 percent on a sustainable basis.

It was the consensus among foresters interviewed that the economic value of the forests in the Worcester Mountains, like the rest of Vermont, could be increased if new markets for low-quality hardwoods were developed. The best solution appears to be substantial growth in the use of wood for heating and electrical generation. Successful models exist, but much more promotion and technical assistance are required.

Primary processors identified escalating health insurance costs as a critical problem affecting their viability. They would like to see a state ombudsman hired to assist forest industries comply with governmental regulations. Secondary processors reported marketing and capital procurement problems and wanted more assistance in securing low-interest loans and new markets for their products.
Highlights of Findings

- 93,000 acres of timber land in the Worcester Range have the potential to produce high-quality hardwood sawtimber; current sawtimber however is of poor quality.

- The lack of new markets for low-grade hardwoods continues to be a major problem for improving the quality of timber lands. Regionally-based wood electrical generating facilities and increased public and commercial use of wood chips appear to be one of the best solutions to this problem in the Central Vermont area.

- State, and private consulting, foresters agreed that the Use Value Appraisal Program (UVA) is playing an important role in improving the quality of timber lands in the area through active, professional forest management. Without the program, forest landowners trying to manage their land would actually lose money. There was no consensus about the effects of the program on the part of processors or loggers. Important questions about the economic impacts of the program, particularly in terms of local jobs, remain unanswered and should be investigated.

- The 16 primary wood processors interviewed used 33,442,000 board feet of sawtimber per year with a stumpage value of approximately $1,500,000 and had annual sales of $11,000,000.

- The 11 secondary processors interviewed used 2,019,000 board feet of sawtimber and had annual sales of $5,942,000.

- The primary constraint seen by processors to increased use of sawtimber from the Worcester Mountains is a consistent supply of high-quality material.

- The majority of markets for both the primary and secondary wood processors interviewed are outside of Vermont.

- Eighteen percent of the sawtimber used by the primary processors came from the Worcester Mountains area. Ninety percent of the sawtimber used came from Vermont.

- Fifty-six percent of the supply of milled wood for secondary processors came from outside Vermont.

- Sawmills owners perceive as highly doubtful the development of new, large sawmills in Central Vermont, given the potential for local political opposition (the "NIMBY" factor) and local and state regulatory hurdles.
A. Background

This report is part of the Vermont Natural Resources Council's Worcester Range Project. The goals of the Project are three-fold:

1) To protect the forest resource in the area including timber, wildlife, scenic values, and recreational opportunities;
2) To enhance the local timber economy and forest projects in the area through incentives, development loans, and similar projects;
3) To strengthen communities by promoting sustainable natural resources based economies which include recreation, working land, and economic opportunity.

Within the context of the Project, the Economic Assessment undertook to answer six fundamental questions about the area's forest economy:

• What is the size, volume, and quality of the forest land in the Worcester Range?
• What is the forest's contribution to the local economy?
• Which businesses in the region use wood products?
• How many people do they employ?
• Where do they get their supply, and where are their markets?
• What is hindering their growth?

The Worcester Mountain Range, as defined by this report, includes the towns of Elmore, Worcester, and Middlesex, as well as the eastern portions of Morrisville, Stowe, and Waterbury (Map 1). The total area of the Worcester Mountains is approximately 126,600 acres, of which approximately 90 percent or 113,940 acres is forest land.

The information used in the report was obtained from the following primary sources:

• A survey of 16 primary wood processors - sawmills, other companies that use raw logs, and one wood concentration yard - an area where logs are sorted and distributed without being processed (See Appendix A for survey questions, Appendix B for a list of companies surveyed.)

• A survey of 11 secondary wood processors - manufacturers of products from lumber.¹ Both primary and secondary wood processors were deliberately chosen to represent both small and large operators in geographically dispersed areas adjacent to the study area (Map 2).

• Meetings with Washington and Lamoille County foresters and 10 consulting foresters who have a working knowledge of the area.

• Phone conversations with five loggers who spend a considerable time working in the forests of the Worcester Range.


• Town of Elmore Forest Land Evaluation and Site Assessment Report. (Soshnick 1990)

¹ A total of 19 primary wood processors and 33 secondary wood processors were identified as potential users of wood from the Worcester Range.
B. Current Status and Potential of Worcester Mountains Forest Land

Based on the various sources of information, the forest in the Worcester Range can be briefly described as follows:

*Amount of timberland* (productive forest land) is approximately 93,000 acres or 77.5 percent out of the total 120,600 acres in the area. This figure may be somewhat lower given the greater than normal amount of inoperable terrain in the Worcester Mountains – possibly as low as 84,500 acres or 70% of the total area, based on consulting foresters' estimates.

**FIGURE 1**

PROPORTION OF STUDY AREA (120,600 ACRES)
THAT IS TIMBERLAND

![Pie chart showing 93,000 acres (77.5%) of the study area as timberland.]

*Dominant Forest Type and Sawtimber Volumes by Species* Northern hardwoods (sugar maple, yellow birch, and beech) are the dominant forest type in the area, constituting some 64,000 acres of timberland. Spruce-fir is the next largest forest type - approximately 14,000 acres.¹

Estimated volume of standing sawtimber in the area totals 286,000,000 board feet. Figure 2 on the following page indicates the breakdown of this volume by species.

*Density, Size Distribution & Current Quality* An estimate of stocking or density of the 93,000 acres of forest land in the Worcester Range indicates that 39,000 acres are are fully stocked and 20,000 acres are overstocked with trees. The breakdown by size of the trees in the area appears to be as follows:

- Sawtimber: 57,000 acres
- Poletimber: 28,000 acres
- Sapling/seedling: 8,000 acres

These data indicate that a sizable portion of the forest resource in the Worcester Range now or soon should be thinned or harvested. However, while it might seem that the predicted amount of sawtimber represents a significant economic opportunity, the quality of this resource is generally poor — close to 70 percent of the sawtimber is in the lower grades of quality in the U.S. Forest Service grading system (Fig. 3), and stumpage prices would be low.

¹ Species types, stocking levels, size classes, sawlog volumes are extrapolated from U.S. Forest Service records by the Vermont Department of Forests, Parks, and Recreation's Marketing, Utilization, and Development Section.
This picture of the resource is consistent with the working experience of the foresters with whom we met. The status of the resource is similar to the condition of much of Vermont's forest land in general.
**Estimated Annual Harvest and Its Value.** Using the same Forest Service data, a picture of the size and value of the harvest can be made for 1990.

<table>
<thead>
<tr>
<th>Product</th>
<th>Volume</th>
<th>Value/Unit</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawlogs</td>
<td>3,800 mbf</td>
<td>$45/mbf</td>
<td>$171,000</td>
</tr>
<tr>
<td>Pulpwood</td>
<td>2,305 cords</td>
<td>$4/cord</td>
<td>$9,220</td>
</tr>
<tr>
<td>Whole tree chips</td>
<td>1,505 cords</td>
<td>$3/cord</td>
<td>$4,515</td>
</tr>
</tbody>
</table>

Total value of annual harvest $184,735

The $185,000 contribution to the local economy increases substantially to $592,000 when the "value added" contribution of harvesting and trucking to the mills (but not the milling itself) is considered. This figure assumes that most of the harvesting and trucking is done by residents within the study area.

Estimates of the annual harvest of firewood were unavailable, but would probably add significantly to the total. Nor were figures available on income from sugarbushes or Christmas tree farms in the study area, which can be considered part of the forest economy.

**Estimated Value of Overall Forest Resource.** Understanding the difficulty of relying on the available data, the best estimate using the prorated U.S. Forest Service data of the value of the standing sawtimber is roughly $12,870,000. This figure is based on a stumpage price (value of the tree on the stump) of $45/mbf.¹

**Potential of the Forest Resource.** While there seems to be a consensus on the low value of the existing forest in the Worcester Range, those foresters interviewed thought that with active forest management for a period of 40 to 50 years, the resource has the potential to begin producing high-quality hardwood sawtimber.

The Elmore FLESAs report reinforces this belief. Criteria used in the FLESAs process included soil potential, topography, size, and current management — not present forest quality. The findings were that of 22,262 acres of forest land, 10,084 acres (45.2 percent) were considered to be highly productive. Another 7,940 acres fit into the mid-range category of productivity. Only 19 percent of the forest (4,338 acres) was found to be low in productivity.

Recently, forest economist Lloyd Irland emphasized the same theme of the unattained potential of Vermont’s hardwoods in presentations to the Vermont Timberland Owners Association and VNRC’s Worcester Mountain Project Steering Committee (Irland 1991). Irland also stressed the sustainability of the northern hardwood forests to produce sawtimber versus the depletion of tropical hardwood forests. Irland also pointed to a conversion in the international demand for tropical hardwoods to northern hardwoods based on consumer concerns about tropical rain forests. In Italy, for example, tropical hardwood import volumes have decreased 15 percent, with a commensurate increase in northern hardwood imports.

Active management of the Worcester Range’s forests would not only improve their quality but would substantially decrease the amount of time it would take to produce the sawtimber. Northern hardwoods silviculturist William Leak notes that it takes 196 years for a sugar maple in an unmanaged forest to reach a diameter of 16 inches; in a managed forest, however, the time is almost halved to 107 years (Leak 1986).

¹ This is a conservative figure according to Dave Stevens of the Dept. of Forests, Parks, and Recreation.
Best estimates provided by the Department of Forests, Parks, and Recreation indicate that the Worcester Mountain's forest land is accruing sawtimber volume at the rate of 1.9 percent of the inventory of sawlogs per year or approximately 5,450,000 board feet. But the annual harvest in the Range is roughly 3,800,000 board feet. In other words, about 40 percent more sawtimber could theoretically be harvested on a sustained basis, thus improving the local economy.

C. A Picture of the Forest Products Industry

The information summarized in Table 1 below was gathered from interviews of 16 primary processors and 11 secondary processors. As indicated, it provides a picture of part of the forest industry in central Vermont, rather than one centered on the Worcester Range alone.

Table 1: Results of Survey of Primary & Secondary Processors

<table>
<thead>
<tr>
<th></th>
<th>PRIMARY</th>
<th>PROCESSORS</th>
<th>SECONDARY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Mills</td>
<td>Small Mills</td>
<td>PROCESSORS</td>
</tr>
<tr>
<td>VOLS. USED/YEAR (MBF)</td>
<td>31,700</td>
<td>1,473</td>
<td>2,019</td>
</tr>
<tr>
<td>VOLS. USED FROM STUDY AREA (MBF)</td>
<td>5,385</td>
<td>537</td>
<td>10</td>
</tr>
<tr>
<td>% OF SUPPLY OUTSIDE VT. (AV.)</td>
<td>1%</td>
<td>0%</td>
<td>52%</td>
</tr>
<tr>
<td>A.V. RADIUS OF SUPPLY (MILES)</td>
<td>54</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>GROSS SALES/YEAR</td>
<td>$10,550,000</td>
<td>$494,500</td>
<td>$5,942,000</td>
</tr>
<tr>
<td>% OF SALES OUTSIDE VT. (AV.)</td>
<td>64%</td>
<td>2%</td>
<td>73%</td>
</tr>
<tr>
<td>RANGE OF CAPITAL INV. (PAST 10 YRS.)</td>
<td>$40,000-$1,000,000</td>
<td>$2,000-$118,000</td>
<td>$0-$32,000</td>
</tr>
<tr>
<td>WORKFORCE</td>
<td>150</td>
<td>9</td>
<td>101</td>
</tr>
<tr>
<td>MEDIAN YEARS IN BUSINESS</td>
<td>25</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>
When the sales of the 27 primary processors and secondary processors are combined, total annual sales amount to $16,936,000. The processors interviewed employ a total of 250 people.

The noticeable difference between the median years in business between the large mills and small ones (23 years versus 12 years) reflects the state-wide trend of stability for the large mills and the instability and decline of the smaller ones.

Like small dairy farms, small sawmills are declining in number. In this survey, two of the six small operators were considering selling out or shutting down. Daryl Bussino of Middlesex, the only primary processor identified within the Worcester Range area, recalled in the "not-too-distant past" when there were 10 to 12 mills in his immediate vicinity. Small mill owners had a variety of reasons for this decline: inability to compete with larger mills' economy of scale, difficulty in retaining reliable workers, loss of key markets, age of the owner himself. One reported that there "just wasn't enough money in it."

The decline of the smaller mills may be partially offset by the reintroduction of portable sawmills to the industry. Two of the owners of portable mills reported that the mills supplied an important part of their total income. Both focused on local custom sawing — milling logs on-site for a landowner who wants rough lumber for construction. In this case, the sawyer receives a rate per thousand board feet, and does not have the cost of log inventory or land for the mill site. Capital start-up costs are also low, and self-employed sawyers avoid the high cost of insurance, including employee workman's compensation rates of $13.08 for every $100 of labor cost. (By way of comparison, the workman's compensation rate for furniture assembly is $4.43 per $100 — 66 percent less.)

D. Volume and Flow of Forest Products

Primary Processors - Reported Volumes and Supply Based on the reports from the 16 primary processors, annual volumes of purchased sawtimber totalled 23,442,000 board feet, 96 percent of which was bought by the larger primary processors group.

Primary and secondary processors relied on an area of supply far larger than the 120,600 acres found in the Worcester Range. As reported below, even the small sawmill owners purchased timber from an area over twice the size of the study area. Out of the total volume of sawtimber purchased by the primary processors, about 18 percent was reported to come from the Worcester Range Area (Fig. 4, next page). Most of the persons responsible for sawtimber purchases had a general idea of the origin of their purchases, so that this figure represents an educated guess. (Again, the more conservative Forest Service figures are the basis for valuation of wood in the Worcester Range.) Even though the amount of sawtimber from the study area was relatively low, 97 percent of the supply did come from within the state. None of the small sawmills purchased logs outside of Vermont, and only two of the larger ones reported out-of-state purchases of between 10 and 12 percent.

Small primary processors estimated that their supply came from an average radius of 12 miles (290,000 acres in size), and larger primary processors purchased logs from an area averaging 54 miles in radius (5.8 million acres in size).

Included in the group of primary processors, was one concentration yard — an area where wood products are sorted but not processed. This particular yard, in Hardwick, has been in business less than a year, but its annualized purchase of sawtimber, some 9,000,000 board feet, is already larger than any of the individual sawmill operations and represents 28 percent of the total reported volume. Almost all of the yard's volume is shipped to Canada.
Concentration yards are not a new phenomenon; however, the magnitude of the Hardwick yard represents a dramatic shift in the flow of product in the area and a mixed blessing economically. For landowners and loggers, the yard provides a major new market which has the capacity to take both softwoods and hardwoods more readily than some of the other local mills.

Some of the loggers and mill owners reported that Canadian mills were paying more for softwood sawtimber and also had the capacity to process softwood down to five inches at the small end versus eight inches in Vermont. The combination of the higher prices paid across the border (reportedly as much as $20 -$30 per mbf for spruce), plus additional volume from each stem, suggests that the flow of softwood logs to Canada will continue.

While Vermont landowners and loggers benefit from the export market, Vermont mills lose important business. In addition, logs shipped without processing lose the potential of becoming a value-added resource which translates into lost state and local income and jobs. In 1980, for instance, the added value of primary and secondary processing to stumpage was $100 for every $3.60 of stumpage value (Bonyai and Sendak 1982). This translates into a potential value-added of $4,722,222 for the sawtimber in the Worcester Mountains area. The major economic value, therefore, is lost with whole log exports. Serious concern over this loss of was recently noted in a study of the forest industry in northern New York (Yellow Wood Associates 1991).

**Secondary Processors - Reported Volumes and Supply**

Figures on volumes of processed wood purchased, available from 10 out of 11 secondary processors and totalled 2,019,000 board feet/year. The range in amount of wood purchased was great, with the smallest processor buying only 1,000 board feet, the largest 1,600,000 board feet. Gross annual sales amounted to an estimated $5,942,000 for the ten processors. Secondary processors purchased materials an average distance of 30 miles away.

Whereas the primary processors had a good idea generally of the origin of their purchases, the secondary processors did not. They knew which mills they were purchasing from, but almost none of them knew the specifics of where the mills had obtained their supply.
FIGURE 5
SPECIES UTILIZED ANNUALLY BY PRIMARY PROCESSORS SAMPLED

TOTAL VOLUME 33,442 MBF

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Pine</td>
<td>26%</td>
</tr>
<tr>
<td>Spruce/Fir</td>
<td>23%</td>
</tr>
<tr>
<td>Hemlock</td>
<td>14%</td>
</tr>
<tr>
<td>S. Maple</td>
<td>16%</td>
</tr>
<tr>
<td>White Ash</td>
<td>3%</td>
</tr>
<tr>
<td>Y. Birch</td>
<td>5%</td>
</tr>
<tr>
<td>White Birch</td>
<td>5%</td>
</tr>
<tr>
<td>Beech</td>
<td>3%</td>
</tr>
<tr>
<td>Poplar</td>
<td>1%</td>
</tr>
<tr>
<td>Red Maple</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

FIGURE 6
SPECIES UTILIZED ANNUALLY BY SECONDARY PROCESSORS SAMPLED

TOTAL ANNUAL VOLUME 2,019 MBF

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Pine</td>
<td>15%</td>
</tr>
<tr>
<td>Hemlock</td>
<td>1%</td>
</tr>
<tr>
<td>S. Maple</td>
<td>50%</td>
</tr>
<tr>
<td>White Ash</td>
<td>5%</td>
</tr>
<tr>
<td>Y. Birch</td>
<td>3%</td>
</tr>
<tr>
<td>White Birch</td>
<td>3%</td>
</tr>
<tr>
<td>Poplar</td>
<td>1%</td>
</tr>
<tr>
<td>Red Maple</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source: Forest Statistics for VT. 1973 and 1983. USFS Bulletin NE-87

Note: MBF = thousand board feet
**Species Purchased - Primary Processors**

Figures 5 and 6 compare the species used by primary and secondary processors. Softwoods represented close to half of the primary processors' volume: 16,238,000 board feet of white pine and spruce-fir.¹

Most of the white pine was purchased by one mill, and most of that was reported to come from outside the Worcester Mountains.

More than half of the spruce-fir purchased by the primary processors, on the other hand, was reported to come from the study area. Sugar maple comprised 5,224,000 board feet or 16 percent of the total volume purchased. Only 9 percent (484,000 board feet) of the sugar maple used was reported to come from the study area — another example of the broader range of supply of the region's mills.

**Species Purchased - Secondary Processors**

Sugar maple was clearly the species used most by the secondary processors interviewed: 1,013,000 board feet, or about 50 percent out of a total of 2,019,000 board feet. This figure is weighted heavily due to purchases by the largest secondary processor of 1,000,000 board feet of sugar maple.

Approximately 75 percent of the sugar maple volume was purchased in Vermont, but when total out-of-state purchases were compared with in-state purchases, the margin was 56 to 44 percent (Fig.7). Some of the reasons for secondary processors buying more lumber from outside Vermont were due to specific product requirements, e.g., basswood of a certain size and quality found in Michigan. In another case, a manufacturer had formal business ties with an out-of-state mill. In general, however, secondary processors reported that the state's sawtimber lacked consistency in both terms of quality and quantity, which led them to buy elsewhere.

**FIGURE 7**

SUPPLY OF LUMBER FOR SECONDARY PROCESSORS SAMPLED

![Diagram showing supply of lumber for secondary processors]

1 Red spruce and balsam fir are separate species, but are normally lumped together when sold to mills.
Primary & Secondary Processor Markets

The lion's share of the market for Vermont milled and manufactured wood products is out-of-state. While small sawmill owners had few sales outside Vermont, the larger mills shipped an average of 82 percent of their products out-of-state, most to the rest of New England area or New York. Again, the concentration yard was shipping most of its product to Canada. Of the $10,550,000 of sales reported by the primary processors, 70 percent originated outside the state.

Similarly, as Figure 8 indicates, fully 73 percent of product sales generated by secondary processors went to markets outside Vermont—primarily the other New England states. While wood manufacturers reported some export sales to Japan and Germany, exports to Canada were surprisingly almost nil. Marketing specialists from the Department of Forests, Parks, and Recreation report that the Canadian market for wood products is limited and that Canadian import tariffs, which are now being phased out, historically have been impediments to exports from Vermont (Stevens 1991).

FIGURE 8

OUT-OF-STATE vs. IN-STATE SALES (1990)
FOR SECONDARY PROCESSORS SAMPLED

TOTAL SALES: $5,942,000

27%

$1,604,340

73%

$4,337,660

■ OUT-OF-STATE SALES
■ IN-STATE SALES

The heavy reliance on out-of-state markets for both primary and secondary wood processors increases their vulnerability to the vagaries of these markets, e.g., economic downturns, and potential for losing market share to other competitors. However, given the state's small population and low average per capita income, there is, in fact, little or no way of generating the reported annual sales of some $17,000,000 except to sell beyond Vermont's borders to a much larger market.
E. Perceived Constraints to Economic Stability & Growth of the Forest Industry

The survey sought to identify what the industry perceived as the primary constraints to its stability and growth.

**Government Regulation**

Government regulation was high on the list of constraints identified by the larger sawmill owners. However, when they were queried on where the regulatory problems lay, e.g., transportation, air and water quality, the majority of primary processors responded that they did not have specific problems in any one area. Rather, there was a perception that regulation was cumulatively increasing as a problem. As one owner put it, "It's getting to the point where we almost need to hire another person just to deal with all the regulations being developed." Another representative of a large sawmill expressed frustration with a lack of coordination by government regulators ("They're all hands and no head!") and inconsistent application of state regulations depending upon the administration currently in office.

Secondary processors—businesses that generally have more compliance requirements because of the toxic materials used in finishing and the toxic waste generated—did not report government regulation to be a serious problem. This was true even for the largest manufacturing companies.

Among primary processors and secondary processors, there was a consensus that it would be a significant step forward to have a state employee who would work with them to respond to regulations rather than state employees whose responsibility was primarily enforcement.

Small sawmill operators generally reported no problems with regulation, perhaps a function of their size. However, local land use regulations had been a problem for one small sawmill owner who had his land zoned as a non-conforming use in a residential area, restricting his ability to expand. According to him, the town plan created a centralized area for industry, including future sawmills. This approach may have made sense to the planning commission, but to him it flew in the face of the traditional Vermont economic model of dispersed small business.

Primary processors also seemed to share a perception among that current political attitudes and environmental concerns would make it impossible for them to develop sawmill operations in their present locations if they were to have to start up today. Local citizens and communities, they felt, were generally opposed to new industry because of environmental concerns and quality of life considerations. Ironically, even the largest processors seemed to fit well within the communities where they were located. In fact, many, like the George Adams Company of Moscow, Vermont, which employs 35 people, were almost "phantom industries," requiring diligence even to find them.

**Health Insurance Costs**

Rapidly escalating employee health insurance costs were the second major concern raised by primary and secondary processors. Sawmill operators reported having the same problems faced by the private and public sectors alike. Bell-Gates, for example, had an increase of health insurance costs of 45 percent in the last two years. Kim Adams, President of the George Adams Company, considered health insurance costs the "worst threat to the survival of small business that we have." He reinforced his position with this example:

For every $1,000 increase in health insurance costs, a wood manufacturing company with a ten percent profit margin must increase its sales by $10,000.
It is clear that the industry will not be able to sustain increased sales of this magnitude for health insurance costs alone. Even though some in the industry have joined "pooled" insurance groups, shared costs with employees, or changed carriers to decrease costs, these actions have not proved satisfactory in addressing the critical problem of health insurance costs.

**Markets**

Secondary processors reported that poor markets were currently the number one constraint to their growth, particularly during the current recession. While individual primary processors reported problems obtaining markets, as a group they did not identify markets as their principal concern. Information obtained from the survey did not help to clarify why markets were a greater issue for the secondary processors than the primary processors. Sawmills likely have an advantage in that they sell a less specialized product and may adapt more easily to market requirements than furniture manufacturers who are set up to make a finite number of specific products. It is also likely that in a recessionary climate, the purchase of more expensive finished products will be more affected than lumber. Other factors that have contributed to a poor market for manufactured wood products may include changes in consumer tastes and a shrinking of the "boom" markets of the past 10 years (De Gues 1991).

**F. Public and Private Organizational Assistance to the Forest Industry**

The two top responses by both processing groups to the general question of the kind of assistance that would be most valuable to them were: (1) marketing advice and (2) assistance in obtaining low-interest loans. Reducing energy costs was another issue high on the list.

When asked specifically how the state of Vermont could best assist the industry, marketing and securing capital were again the top choices. Sawmill operators also thought that state assistance in dealing with regulations was important, and several thought that there was a need for increased education of forest landowners to promote forest management in order to sustain supply.

Business management, waste disposal, and employee training support were not high priorities for the processors although one primary processor felt loggers needed more training in cutting to obtain maximum sawtimber value: "It takes 150 years to grow a tree and five seconds to butcher it," he said.

Several secondary processors wished the state of Vermont would increase the number of trade shows it sponsors in order to generate new markets.

The survey identified 11 trade and economic development organizations in Vermont that provide services to the industry. Sawmill operators (nine out of 16) indicated they had received the most help from the Vermont Department of Forests, Parks, and Recreation (VFP&R) in terms of evaluating production methods, identifying timber supply, and milling information. Six out of the 16 primary processors indicated that they had received help from the Vermont Timber Truckers and Producers Association; four out of 16 reported that the Associated Industries of Vermont (AIV) had been of service.

The Small Business Administration, Vermont Industrial Development Authority (VIDA), and the Lamoille Industrial Development Corporation (LIDC) appeared not to have assisted the majority of the mill operators. In some cases, mill owners indicated they hadn't sought help from these groups. It was rare to find negative comments about any of the organizations; rather, the mill owners had just not sought nor received any services from these organizations. Two of the mill owners did report that the VIDA loan application process was far too extensive and time-consuming when compared to a standard bank loan process.
Of the 11 secondary processors, three reported receiving some type of economic or other assistance from VIDA and AIV. The wood manufacturers seemed not to receive the help from VFP&R that the sawmill owners received; only one company reported being helped by VFP&R.

It appears more outreach by organizations charged with economic development would be appropriate in the form of phone calls and, ideally, personal contacts with the wood processors. Over the past four years, only 15 percent of VIDA’s loan funds ($1,500,000) have gone to the forest industry statewide (Robert Fletcher VIDA, 1991), possibly indicating a need to focus more of its monies on the forest industry.1 The capability of the various organizations to provide direct services to individual companies is not known. It may be unrealistic to expect individualized services to the forest industry. If this is the case, a focused increase coordinated economic development strategy for the forest industry should be explored.

G. Increased Utilization of the Forest Resources of the Worcester Range

Constraints to Increased Use of the Area’s Forest Resources. Asked if they saw an opportunity to use more wood from the Worcester Range area, eight of 13 primary processors said no. However, the respondents were evenly split on prospects for increasing utilization in the north-central Vermont region.

The top two constraints to increased wood utilization from the study area identified by primary processors were: (1) poor quality and quantity of supply, and (2) lack of support for forest management by public and private landowners. The latter response reflected a perception that a sizable amount of the wood supply from the Worcester Range was not going to be harvested because of landowner opposition to logging. The negative response by some sawmill owners to increased utilization may also be attributed to anticipation that production would not increase in the foreseeable future.

Secondary processors echoed their primary counterparts by identifying poor quality and quantity as the major obstacle to increased use of wood from the Worcester Range. The issue of quality of sawtimber, as stated previously, is in accord with both the available data and the perception of the foresters contacted.

The majority of the secondary processors did not necessarily favor locally-based or even Vermont-based purchases over out-of-state purchases. Price, quality, and consistency of supply dictated their purchases rather than a sense of home-state loyalty. Vermont timber needs to be competitive or it won’t be purchased by Vermont wood manufacturers.

Methods to Increase Utilization

If the timber land in the Worcester Range is to be used at its sustainable capacity, thereby increasing economic benefits to the local economy, the key lies in removing low-grade hardwoods at a cost-effective price. Existing programs, e.g., VFP&R’s "wood for energy program," need to be expanded and new strategies will need to be adopted.

Role of the Use Value Appraisal Program. One basic premise of the Use Value Appraisal (UVA) Program, or "Current Use" Program, is the public economic benefit gained through active management of forest lands. Forest landowners in the Program are required to implement a forest management plan based on accepted silvicultural principles. In return, their property taxes are reduced from the land’s fair market value value to its value as managed forest land. Without this

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1 VIDA recently assisted the Ryegate wood generating facility to obtain $26.3 million in industrial revenue bonds.
adjustment in taxes, forest land owners currently lose about $3 per acre per year after forest management revenues and expenses are calculated (Northern Vermont Resource Conservation and Development Area 1990).

The state's current financial problems have reduced the amount of money available for the Program, and a moratorium on new enrollments into the Program has been instituted. Further, there are serious concerns about the ability of the state to continue to fund UVA in FY'93. Given the current public debate over the effectiveness and cost of the program, the survey sought to find out the processors' opinion of the impact of the Program on quantity and quality.

The wood manufacturers were far less familiar with the Program than the sawmill owners and, therefore, no definitive responses were obtained from the former group. Primary processors were evenly split on whether UVA was increasing the available supply of wood. Nor did the majority of sawmill owners see an increase in quality that could be associated with the Program, though some noted that it was too early in the Program's operation to see an impact. Others noted a general decline in quality and size, which they associated with poor harvesting practices on non-UVA lands, including premature harvesting for short-term financial gain.

The processors' mixed reviews of the UVA Program contrasted with the strong support it received from the foresters contacted in the study. They saw the Program as perhaps the most important means at hand to promote wise management and utilization of the forest resource in the Worcester Range. Most foresters thought that the Program was making substantive headway in decreasing low-grade hardwoods in the area, while increasing the quality of the residual standing timber. Further, they saw the Program as essential to keeping property taxes at a level low enough for forest landowners to retain their lands for long-term management.1

Based on 1990 figures supplied by the Vermont Department of Forests, Parks, and Recreation, 30,779 acres (approximately 1/3) of the total 93,000 acres of forest land in the study area are enrolled in the UVA Program (Fig. 9, next page). That means there is little or no information on forest management occurring on a full two-thirds of the forest lands within the study area. At a time when the state is considering cutbacks in the Program, basic data on the economic effect of these cuts is lacking. What, in short, are the short- and long-term impacts on jobs and economic growth if the Program is reduced? An objective comparison of lands in and out of the Program using the Worcester Range as one case study area would assist the state in gauging the importance of the Program locally and would answer the questions about its importance on a statewide basis.

Regardless of the potential effects of the UVA Program on increased harvesting, it is absolutely clear that markets for low-grade material need to be expanded. Loggers and forest landowners in the Worcester Range and elsewhere in Vermont - whether in or out of the Program - are currently faced with a market too small to handle the volumes available. As of this writing, the out of state markets for low-grade materials are so oversupplied that some loggers in the Worcester Range have shut down their operations. The UVA Program might promote sound forest management and harvesting of poor material, but without a substantive increase in demand, there is little promise of improving the quality of the forest.

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1 It should be noted that private consulting foresters have a bias in support of the UVA Program since it results in economic benefits to them and their clients. State and county foresters interviewed, however, are independent of these economic circumstances and remained solidly behind the Program.
Expanded Local Wood Energy Use. For a number of years, state officials and the forest industry have been promoting methods of increasing the demand for low-grade hardwoods. Presently, much of this material goes to pulp mills in New York, New Hampshire, or Maine. The idea of building a pulp mill in Vermont has come up from time to time but appears unlikely since there is little chance of garnering the public and private support for development of plants like those found in Ticonderoga, NY, Berlin, NH, or Rumford, Maine.

Regional wood-fueled electrical generating plants are being promoted by both the public and private sector and may prove to be a viable new market for the area's low quality wood. Currently there is a wood-fueled plant in Burlington, and another under construction in East Ryegate. Other plants are being considered for Rockingham and Springfield, and Weathersfield, but all were dropped for a variety of reasons, including local oppositions and low electrical rates set by the Public Service Board. As with any type of energy facility, there are serious impacts to assess, including emissions and the long-term impact of intensive whole-tree harvesting on the forest nutrient cycling and the diverse ecosystems found within forest lands.

These concerns notwithstanding wood-fueled heating and electrical plants offer multiple benefits: a stable, long-term source of fuel, enhancement of local or regional economies through job creation and, lastly, the means to improve the quality of hardwood sawtimber.

On the local level in Central Vermont, there is promise in small-scale alternatives to standard methods of heating public facilities. Unbeknownst to most Vermonters, the Capitol Building in Montpelier and the state offices complex in Waterbury are completely heated by wood chips. And as the case study below indicates, East Montpelier’s Elementary School has reduced its heating bill by 95 percent by using wood chips.
The cumulative impact of the area's local public facilities converting to wood energy presents an opportunity for a small increase in the use of low-grade material in the Worcester Range. Very rough calculations on the available biomass in the Worcester Range versus potential public utilization suggest that 1 percent of its forest land base — 1100 acres — could sustainably support the wood fuel heating needs of all the public facilities within the study area. On the one hand, the opportunity to sustain the public heating needs of these communities presents an amazing alternative to reliance on other non-renewable and costly fuels. On the other hand, it shows the massive amount of poor quality wood available in the Worcester Range and the need for much larger consumption to make inroads on improving sawtimber quality.

Case Study — East Montpelier Elementary School

East Montpelier's elementary school is a prime example of a building that has benefitted from wood gasification technology. In 1988 the school installed a wood gasifier/boiler heating system to replace the existing electric heat. The system is being fueled with local chips, most of them coming from nearby secondary wood processing plants. The German-built gasifier operates at 75-80 percent efficiency, and is rated at slightly more than one million BTUs per hour. A very flexible system, it can burn a wide variety of biomass fuels with moisture content of up to 60 percent, and can idle indefinitely at a level as low as five percent capacity. Very closely monitored, backed up by two oil burners, and modified for the safety of the school children, the system is working as planned.

- total cost of wood energy system = $86,000
- annual heating cost with previous system = $38,800
- annual heating cost with chip gasification system = $2,500
- silo holds approximately 1,400 cubic feet of fuel (14-16 tons)
- annual fuel requirement = 120 tons
- 1990 delivered fuel price = $21/ton
- average cost per million BTU = $3.33/MM BTU
- approximate life cycle of system = 30 years

Thus, much larger public and private markets need to be developed to begin to utilize the area's low-grade biomass potential. The conversion of commercial facilities, e.g., granite sheds, and large public facilities like hospitals, to efficient methods of wood heat should be thoroughly investigated.
H. Conclusions/Areas for Further Investigation & Action

The forest resources of the Worcester Range area are valuable. At the present time, the estimated $185,000 per year generated by harvesting represents a small but nonetheless constant source of jobs and dollars entering the local and regional economy. When the "value added" to these products is considered for harvesting and transportation to the mills, but not milling itself, the contribution increases substantially - to $592,000. This figure assumes that most of the harvesting and trucking are done by residents within the study area.

There is greater potential for increased short-term local economic benefits — perhaps as much as $2,592,000 per year — that could be realized with active forest management of areas identified for timber production. Further gains could be made should the area effectively manage its forest lands for high quality hardwood sawlogs.

Jobs and economic growth generated from a renewable and sustainable natural resource are exactly the kind of "clean" enterprises local and state governments should be supporting. Trees grow well in the the Green Mountains; 70 to 80 percent of the state is covered with them, and they can be cut and grown again. But like farmland, Vermont's most productive forest lands will remain undeveloped and available for non-economic public benefits only so long as forestry remains economically viable. The recommendations listed below are based on this premise. They are points of discussion and debate rather than final conclusions.

Increased government attention and financial support for improving the productivity of Vermont's forest lands and forest industry are essential and should be at least as high a priority as that given Vermont agriculture. In 1985 - 1986 a "Vermont Forest Resources Plan" was prepared through a cooperative effort of state and federal government, the forest products industry, and Vermont-based non-profit organizations. The Plan identified specific actions to increase forest productivity and support for the forest industry. Over the last five years, to its credit, the Department of Forest, Parks and Recreation has implemented a number of these actions. Recommendations with an "*" after them have common elements with action identified in the Plan. They have not been implemented to date or require more follow-up.

Recommendations:

- The relationship between social and economic issues has never been more evident than with the health cost crisis facing Vermonters and Vermont's forest industry and other businesses. The idea of containing medical costs and developing a national health care system has been debated for years. Neither the average Vermonter nor Vermont's businesses can afford rates that double every five years. This is an issue of the highest priority that needs to be resolved nationally. It is also one of the areas that gives the Canadian wood processing industry a distinct cost advantage over Vermont producers.

- The State of Vermont should measure the present and projected economic impacts of the UVA Program over the last 10 years. The Worcester Range area could be used one of the bases of the study.

- The state should identify an ombudsman for the forest products industry to assist with compliance with local, state, and federal regulations.
The Department of Forests, Parks, and Recreation and the Department of Development and Community Affairs should create a permanent staff position to increase the attention given to the forest industry within Development and Community Affairs and coordinate economic development strategies between themselves and other regional economic development organizations. FP&R currently has a staff person stationed in the Public Service Department acting as an advocate for wood energy. This approach might also be effective in Development and Community Affairs.¹

The departments of Forests, Parks, and Recreation, and Development and Community Affairs, and the Vermont Resource Conservation and Development Areas should create a task force with forest industry representatives to study key capital investments in infrastructure that are needed in Vermont's mills to make them more competitive with Canadian mills. Retention of value-added product in Vermont is important, and it may be worthwhile to contract with a wood manufacturing professional with expertise in Canadian mills to develop a strategy for the next decade.

The Vermont Industrial Development Authority should contact forest industry representatives about the prospects of streamlining the process for securing VIDA loans. Further, the small percentage of loans made to the forest industry by VIDA merits additional attention to determine if more investment in the forest industry could occur.

The forest industry, state, and other economic development agencies should organize a meeting with loan officers from Vermont banks to discuss the special needs of the industry and discuss how best to meet them.²

The Vermont League of Cities and Towns, Regional Planning Commissions, VNRC, and Development and Community Affairs should use their publications to periodically highlight forest industries, like farm industries, which are compatible with the rural character and environment of Vermont. Commercial logging, sawmills and wood manufacturing plants may not be "pretty," but they are a traditional part of Vermont's working landscape and an important source of employment for working-class Vermonters.

Long-term economic and environmental costs and benefits of wood gasification should be studied to determine if a massive conversion to wood heat should occur in the decades to come. The current pilot project for a facility in Bennington may be in trouble due to lack of federal funding. Industry, state and non-profit organizations should work with Vermont's congressional delegation to secure funds to continue the project.

¹ At a conference on Forests, Planning, Use and Management held in 1989, Economic Development Commissioner Arthur Sanborn called for an "increase in interdepartmental coordination between Forests, Parks and Recreation and Economic Development, perhaps through a sub-cabinet of department commissioners." This action merits consideration as a means to increase the forest industry's importance within the Agency of development and Community Affairs.
² Commissioner Sanborn also identified the "need to educate financial institutions with regard to the forest products industry."
• The Department of Forest, Parks, and Recreation and the Public Service Department should work with the private sector to increase its educational efforts to promote wood heat as an alternative to non-renewable fuel resources. Too few Vermonters are aware of the extent of wood-heating plants in operation, the cost savings afforded, and the connection between increased utilization of low grade hardwoods and improvement of the forest resource.

• As part of its Forest Stewardship Program, the Department of Forests, Parks, & Recreation should work with private forest landowners and consulting foresters to establish demonstration forests on private lands and regularly conduct on-site tours for forest landowners who are not actively managing their woodlands. In the Worcester Range area alone, two to three demonstration forests should be identified.

• The Board of the Vermont Natural Resources Council should consider adopting an energy policy that endorses the use of Vermont's forests as a means for heating public and commercial facilities and generating electricity in the state at a level that is consistent with maintaining a healthy forest ecosystem.

• The Vermont League of Cities and Towns, regional planning commissions, the Department of Forests, Parks, and Recreation should work with the forest industry to study the effects of centralized industrial zones on the forest industry, particularly sawmills. Model language dealing specifically with sawmills might be drafted for consideration by local planning commissions.
APPENDIX A
SURVEY QUESTIONS

FACILITIES

1. What type of large equipment do you have?
   A. [] circular saw
   B. [] band saw
   C. [] Planer
   D. [] grapple
   E. [] skidder
   F. [] fork lift
   G. [] dimension mill
   H. [] sorting equipment
   I. [] computerized networks
   J. [] logging equipment
   K. [] other

2. Do you own a dry kiln?
   A. [] yes
   B. [] no

3. What is its heat input capacity?
   __________ MBF

4. What percentage of your gross revenue is reinvested in capital improvements on an annual basis?
   __________ %

5. What have been the major capital investments you've made within the past ten years?

6. Was this equipment purchased in state or out of state?
   A. [] in state
   B. [] out of state

7. Would you be willing to share how much that investment was?
   __________

8. How is the power at your millshop provided?
   A. [] municipal or private power company
   B. [] diesel generator
   C. [] wood burning facility
   D. [] combination
   E. [] other

LABOR

9. How large is your labor workforce?
   __________

10. Are you able to attract and keep qualified labor?
    A. [] yes
    B. [] no

11. If workers require training, what type is needed?
    A. [] safety/first aid
    B. [] product quality/grade
    C. [] maintenance
    D. [] lumber grading
    E. [] management
    F. [] other on the job training program

12. Is employee turnover a problem for your productivity? If yes, what is the annual rate of turnover? (if possible, list reasons)
    A. 96%
    B. 89%
    C. 28%
    D. 59%
    E. 99%

13. What other benefits do you provide for your employees other than social security and worker's compensation?
    A. [] health insurance
    B. [] life insurance
    C. [] retirement
    D. [] vacation time
    E. [] vocational training
    F. [] other

14. Are health benefits and/or worker's compensation affecting your organization's profitability? (if possible, give examples of problems)
    A. [] no
    B. [] to a small degree
    C. [] moderately
    D. [] seriously

15. If you answered yes to #14, are you seeking any remedies to your insurance problems?
    A. [] pooling
    B. [] changing companies
    C. [] other

SUPPLY

16. What is the approximate total volume of wood, in MBF, used in your production process? (refer to map of study area)

<table>
<thead>
<tr>
<th>Wood Type</th>
<th>Total</th>
<th>Volume from</th>
<th>Average Delivered</th>
<th>Volume</th>
<th>Study Area</th>
<th>Price per MBF (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. [] white pine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. [] spruce/pine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. [] hemlock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. [] sugar maple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. [] white ash</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. [] yellow birch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. [] white birch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. [] beech</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
17. Can you estimate the approximate percentage of your supply that originates from the Worcester Mountains area?
   [ ] none
   [ ] 5%
   [ ] 10%
   [ ] 15%
   [ ] 20%
   [ ] 30%
   [ ] 50%
   [ ] 75%
   [ ] 100%

18. Do you buy from brokers, independent loggers, or mills?
   A. [ ] brokers
   B. [ ] loggers
   C. [ ] mills

19. How many different loggers do you buy from?
   [ ] 10 - 10
   [ ] 10 - 20
   [ ] 20 - 40
   [ ] 40 - 60
   [ ] greater than 60

20. What is the radius of your Vermont supply?
   [ ] less than 10 miles
   [ ] 10 - 50 miles
   [ ] 50 - 100 miles
   [ ] 100 - 150 miles
   [ ] more than 150 miles

21. Approximately what percent of your supply originates outside of: Vermont? the United States?
   [ ] none
   [ ] 5%
   [ ] 10%
   [ ] 25%
   [ ] 50%
   [ ] 75%
   [ ] 100%

22. Do you see any opportunities to expand your use of wood from the study area?
   From North-Central Vermont?
   [ ] no

23. Do you consider any of the following a constraint(s) to using more wood from the study area? (Give specific examples)
   A. [ ] poor quality/grade of timber
   B. [ ] small quantity of marketable timber
   C. [ ] price of the timber/tree logs
   D. [ ] ability to market product
   E. [ ] poor access to private timberlands
   F. [ ] poor access to public timberlands
   G. [ ] other

24. Has there been a noticeable increase in the local supply of timber as a result of the Use Value Appraisal Program (Current Use)? What about the quality of supply?
   [ ] yes
   [ ] no

25. If yes, do you perceive this as a good or bad trend?
   A. [ ] good
   B. [ ] bad

MARKETS

26. Approximately what percent of your product do you sell to brokers?

27. How many primary accounts do you have? (What is the distribution of your accounts?)

28. Do you make any retail sales?
   [ ] yes
   [ ] no

29. If yes, approximately what percent of your sales does this account for?

30. Have you noticed an increase in the market demand for temperate hardwoods? (If yes, why?)
   [ ] yes
   [ ] no

PRODUCTION

31. What are the three primary products of your operation?

32. Do you produce any specialty products?

33. How long have you been in business?

34. Do you see any of these as barriers to the stability and growth of your business? (Please rank)
   A. [ ] government regulation
   B. [ ] poor markets
   C. [ ] lack of capital
   D. [ ] lack of supply
   E. [ ] fluctuating costs
   F. [ ] competition
   G. [ ] other
35. Do you face any regulatory constraints in the following areas? (Please rank)
   A. | Environmental issues
   B. | Land use regulations
   C. | Solid waste
   D. | Air quality
   E. | Water quality
   F. | Hazardous waste
   G. | Vermont Occupational Health and Safety Act (VOSHA)
   H. | Other

36. What is your annual total gross sales?

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ $1,000,000</td>
<td>≤ $1,000,000</td>
</tr>
<tr>
<td>$100,000 - 500,000</td>
<td>$10 - 50,000</td>
</tr>
<tr>
<td>$500,000 - 1,000,000</td>
<td>$50,000 - 100,000</td>
</tr>
<tr>
<td>$1,000,000 - 5,000,000</td>
<td>$500,000 - 1,000,000</td>
</tr>
<tr>
<td>$5,000,000 - 10,000,000</td>
<td>$1,000,000 - 2,000,000</td>
</tr>
<tr>
<td>&gt; $10,000,000</td>
<td>&gt; $1,000,000</td>
</tr>
</tbody>
</table>

37. Do you have additional sources of revenue outside the wood processing?

38. What is your annual volume in raw log sales to the export market?

39. Please rank the greatest cost components of your operation?
   A. | Electricity
   B. | Labor
   C. | Equipment (machinery)
   D. | Raw material
   E. | Insurance
   F. | Other

40. Is disposal of your by-product a significant problem?
   [ ] Yes
   [ ] No

41. Do you utilize your waste or by-product for:
   A. | Energy
   B. | Agro/Long-term storage
   C. | Other products

42. Is there a market(s) for your by-product?

43. Approximately what percent of your products (in $) are directly exported out of the state?
   [ ] None
   [ ] <10%
   [ ] 10-25%
   [ ] 25-50%
   [ ] >50%

44. Where are your products being shipped to? (Give approximate % of products that are exported)
   A. | N. Vermont
   B. | Central Vermont
   C. | S. Vermont
   D. | New England/Boston
   E. | New York
   F. | Mid-Atlantic states
   G. | West Coast
   H. | Southern states
   I. | Midwest
   J. | Out of the country

RELATIONSHIP WITH ECONOMIC DEVELOPMENT AND TRADE ORGANIZATIONS

45. Have you had contact with any of the following economic development organizations?
   A. | Vermont Industrial Development Authority (VIDA)
   B. | Northeastern Economic Development Corp. (NEDC)
   C. | New England Regional Development Corp. (NERDC)
   D. | Northern Vermont Regional Development Corporation (NVRDC)
   E. | Vermont Forestry, Parks and Recreation Department (FPR)
   F. | Chamber of Commerce
   G. | Vermont Timber Tourists and Producers Association (VTTPA)
   H. | Vermont Furniture and Accessories Manufacturing Association (VFAMA)

46. Similar with helpful not helpful
   [ ] VIDA
   [ ] AIV
   [ ] SBA
   [ ] DCA
   [ ] LIDC
   [ ] CVRDC
   [ ] NVRDC
   [ ] FPR
   [ ] COC
   [ ] VTTPA
   [ ] VFAMA

47. What type of technical assistance, if any, would be most valuable to your business?
   A. | Obtaining additional capital
   B. | New production techniques
   C. | Reducing energy costs
   D. | Business management
   E. | Waste disposal
   F. | Computer training
   G. | Marketing advice
   H. | Regulatory support
   I. | Business/personal management
48. How could local or state government most effectively help reduce costs and/or help your business?
   A. low interest loans  
   B. marketing support  
   C. other ____________________________

49. Has your company grown in the last five years? If yes, how much? (employees, volume of sales, etc.) ____________________________

50. Where do you see yourself five years from now?
# APPENDIX B
## PROCESSORS SURVEYED

### PRIMARY

<table>
<thead>
<tr>
<th>LARGE (&gt; 100 MBF ANNUALLY)</th>
<th>PRODUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GEORGE F. ADAMS &amp; CO.</td>
<td>turnings/dowels</td>
</tr>
<tr>
<td>2. BELL-GATES</td>
<td>hw lumber</td>
</tr>
<tr>
<td>3. BERNO LUMBER</td>
<td>dimension lumber, beams</td>
</tr>
<tr>
<td>4. DAVIS CONTRACTING SERVICE</td>
<td>whole logs</td>
</tr>
<tr>
<td>5. M.B. HEATH &amp; SONS</td>
<td>sw lumber, post &amp; beam</td>
</tr>
<tr>
<td>6. LAMELL LUMBER</td>
<td>sw lumber</td>
</tr>
<tr>
<td>7. MANCHESTER LUMBER</td>
<td>hw lumber</td>
</tr>
<tr>
<td>8. PELLETIER</td>
<td>sw lumber, industri. crates</td>
</tr>
<tr>
<td>9. P &amp; R LUMBER</td>
<td>sw lumber</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMALL (&lt; 100 MBF ANNUALLY)</th>
<th>PRODUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. ADAMANT TIMBER</td>
<td>dimension lumber</td>
</tr>
<tr>
<td>11. BUSSINO LUMBER</td>
<td>dimension lumber, beams</td>
</tr>
<tr>
<td>12. CAMBRIDGE FIREWOOD CO.</td>
<td>firewood</td>
</tr>
<tr>
<td>13. KELLY RIVER LUMBER CO.</td>
<td>dimension lumber</td>
</tr>
<tr>
<td>14. MERRILL LOCKE</td>
<td>sw lumber</td>
</tr>
<tr>
<td>15. TALMAN'S LUMBER</td>
<td>sw lumber</td>
</tr>
<tr>
<td>16. WEST HILL LUMBER CO.</td>
<td>logs,lumber,firewood</td>
</tr>
</tbody>
</table>

### SECONDARY

| 1. A & D WOODWORKING        | cabinets/furniture |
| 2. CUT-IT-OUT               | chain saw sculptures |
| 3. ELWOOD TURNER            | toys |
| 4. MONTGOMERY SCHOOLHOUSE   | turnings/toys |
| 5. NEUDORFER                | furniture |
| 6. RENAISSANCE WOODWORKS    | cabinets/stairs |
| 7. STANNARD MOUNTAIN BASKETRY| baskets |
| 8. VT. ARCHITECTURAL MILLWORK| cabinets/furniture |
| 9. VT. PRECISION            | furniture/piano parts |
| 10. VT. WEATHERBOARD        | siding/panelling |
| 11. WOODY SCOVILLE          | furniture/cabinets |

*sw = soft wood
*hw = hard wood*
APPENDIX C
GLOSSARY OF SELECTED TERMS

**Board foot.** A unit of lumber measurement 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent.

**Forest land.** Land that is at least 10 percent stocked with trees of any size, or that formerly had such tree cover and is not currently developed for a nonforest use. The minimum area for classification of forest land is 1 acre.

**Hardwoods.** Dicotyledonous trees, usually broad-leaved and deciduous.

**Net growth.** The change, resulting from natural causes, in growing-stock volume during the period between surveys, divided by the number of growing seasons. Components of net growth are ingrowth plus accretion, minus mortality, minus cull increment.

**Pulpwood.** Roundwood converted into 4- or 5-foot lengths or chips, and chipped plant byproducts that are prepared for manufacture into woodpulp.

**Saplings.** Live trees 1.0 inch through 4.9 inches d.b.h.

**Sawlog.** A log meeting regional standards of diameter, length, and freedom from defect, including a minimum 8-foot length and a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods.

**Sawtimber trees.** Live trees of commercial species at least 9.0 inches d.b.h. for softwoods or 11.0 inches for hardwoods, containing at least one 12-foot sawlog or two noncontiguous 8-foot sawlogs, and meeting regional specifications for freedom from defect.

**Seedlings.** Live trees less than 1.0 inch d.b.h. and at least 1 foot in height.

**Softwoods.** Coniferous trees, usually evergreen and having needles or scale-like leaves.

**Standard cord.** A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Fuelwood cord estimates can be derived from cubic-foot estimates of growing stock by applying an average factor of 80 cubic feet of solid wood per cord. For pulpwood, a conversion of 85 cubic feet of solid wood per cord is used because pulpwood is more uniform.

**Stocking.** The degree of occupancy of land by trees, measured by basal area and/or number of trees in a stand compared to the basal area and/or number of trees required to fully use the growth potential of the land (or the stocking standard). In the Eastern United States this standard is 75 square feet of basal area per acre for trees 5.0 inches d.b.h. and larger, or its equivalent in numbers of trees per acre for seedlings and saplings.

Two categories of stocking are used in this report: all live trees and growing-stock trees. The relationships between the classes and the percentage of the stocking standard are: Nonstocked = 0 to 15, poorly stocked = 16 to 59, moderately stocked = 60 to 99, fully stocked = 100-129, and overstocked = 130 to 160.

**Timberland.** Forest land producing or capable of producing corps of industrial wood (more than 20 cubic feet per acre per year) and not withdrawn from timber utilization. Formerly known as commercial forest land.
REFERENCES


