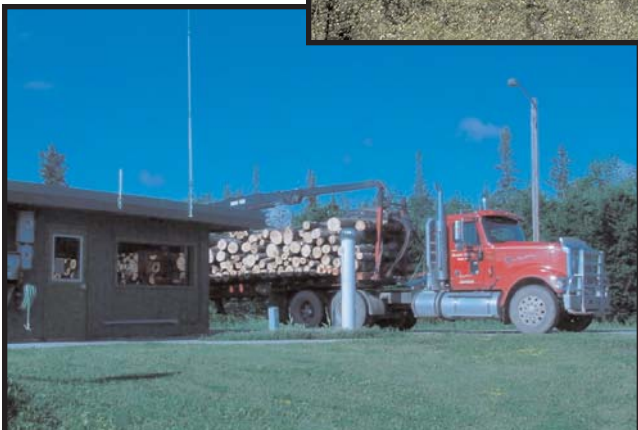
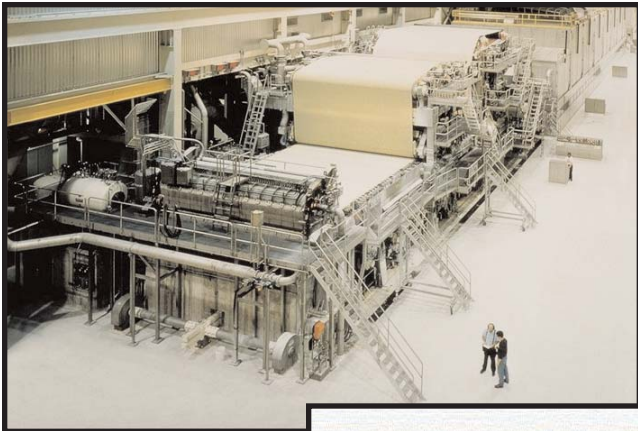


Governor's Advisory Task Force Report on the Competitiveness of Minnesota's Primary Forest Products Industry

July 2003



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Executive Summary

Description of Need

The primary forest products industry¹ is vital to Minnesota's economy and forest health. The industry is especially important to rural Minnesota, where highly paid jobs are important to local economies. A healthy forest industry is also critical to managing our state's forests because forest management is conducted mainly through commercial timber harvest. In addition, commercial harvest helps landowners and managers accomplish important wildlife habitat management and provides recreational opportunities.

The value of product output from Minnesota's primary forest industry more than doubled between the 1970s and early 1990s. New investments in this industry created new jobs and additional economic activity that benefited northern communities as well as the Twin Cities. The situation a decade later stands in stark contrast. Since 2000, the state's primary forest-based industry has reduced product capacity, resulting in a loss of over 1,000 jobs in greater Minnesota due to machine shutdowns and disinvestments (i.e. industry investments going to other states and countries). What has happened to bring about this change? The underlying causes of the contraction are numerous, ranging from local to global in scope and impact. What can Minnesota state government do to restore the state as a competitive place for investment in this industry?

Task Force Charge and Findings

In response to recent employment losses in the state's primary forest-based industries, in March 2003, Governor Pawlenty established an Advisory Task Force on the Competitiveness of Minnesota's Primary Forest Products Industry to assess the long-term competitiveness of this manufacturing sector. The nine-member task force included representatives from the Minnesota Departments of Employment and Economic Development and Natural Resources, primary forest products and logging industries, St. Louis County Land Department, and the University of Minnesota.

The Governor charged the task force to achieve two goals:

1. Describe the competitiveness of Minnesota as a site for primary forest products industry manufacturing, compared to a number of other states and countries; and
2. Identify potential policy and program changes to reduce barriers and constraints and to take advantage of opportunities for industry retention and expansion.

The Governor requested that special emphasis be placed on conditions that can have near-term impact on issues that are vital to maintaining a healthy primary forest products industry. The task force convened four times between March and June before issuing its report to the Governor.

The task force's assessment found that investment in Minnesota for new equipment and facility production capacity between 1986 and 2001 was more than \$3.5 billion. More than \$1 billion was spent on upkeep and maintenance. Market changes, raw material availability and cost, industry consolidation, and globalization were found to substantially influence the economic health of the state's primary forest products industry.

A primary focus of the task force's deliberations was identifying and assessing factors that were perceived to be major impediments to competitiveness. The task force has identified 10 factors. They are (listed in priority order):

1. Wood and fiber availability and price
2. Permitting and environmental review
3. Transportation
4. Energy costs
5. Wood and fiber quality (including third party certification)
6. Taxation
7. Labor and construction costs
8. Education and research
9. Forest land productivity
10. Technology

1. "Primary" industry refers to producers of lumber, engineered wood products, and paper that are typically inputs to other industries.

The Competitiveness of Minnesota's Primary Forest Products Industry

The task force concluded that the state has substantial influence over several important areas impacting competitiveness — most notably production costs and investment environment. These two aspects are becoming increasingly important as the industry responds to global market conditions and trends. Factors one through three have the greatest influence on the regional and global competitiveness of the state's forest products industries.

Table 1 summarizes findings of a benchmarking analysis of factors that affect Minnesota's competitiveness relative to other competitor states and nations. The colors and letters show at-a-glance how Minnesota compares to other benchmarked states and countries for each of the factors. A “B” (better than Minnesota) in a red box indicates that the competitor has an advantage over Minnesota. An “S” (about the same as Minnesota) in a yellow box indicates that the competitor is about equivalent to Minnesota. A “W” (worse than Minnesota) in a green box indicates that the competitor is at a competitive disadvantage relative to Minnesota. White boxes indicate insufficient data for an overall rating.

Table 1. Comparison of All Factors — Minnesota versus Other Locations

	Wood and Fiber Availability and Price	Permitting and Environmental Review	Transportation Vehicle Weight Limits	Energy Costs	Wood and Fiber Quality	Taxation	Labor and Construction Costs	Education	Research	Forest Land Productivity	Technology Review
Wisconsin	B		B	W	B	B	B	W	W	B	W
Michigan	B		B	W	B	Mixed	Mixed	W	B	B	
Alabama	B	B	B	B	B	W	B	W	B	B	S
Georgia	B		B	B	B	B	B	W	B	B	
Maine	B		B	W	B	B	B	W	B	B	W
Texas	B		B	S	B	Mixed	B	W	B		
Oregon	S		S	W	B	B	B	W	B	B	
Washington				W	B	B	W	W	B	B	
United States								W		B	
Canada	B		B		B					S	W
Sweden		B		B	B	Tax Systems Differ				B	B
Finland		B		W	B					B	B
Brazil	B			W	B					B	
Chile				W	W					B	

B Better than Minnesota **S** About the Same as Minnesota **W** Worse than Minnesota

The Competitiveness of Minnesota's Primary Forest Products Industry

Recommendations

To address the areas that are major barriers to enhancing the economic competitiveness of this sector within the state, the task force recommends the following:

- **Increase wood and fiber availability, quality, and production from public and private lands while continuing to protect the environment.** Previous studies² have concluded the state can support increased timber harvesting activity without compromising important ecological and amenity values provided by its forest resources, assuming adequate investments continue to be made in forest development that assures sustainability.
- **Improve the effectiveness of environmental review processes to make Minnesota more competitive while protecting the environment and providing public input.** Processes and costs for permitting and environmental review in Minnesota affect the forest products industry because timing of investments and the realized production capacity can be key to the investment payback period. Streamlining processes to allow comprehensive but efficient permitting and review will reduce the time and cost to the requesting companies without reducing environmental protection.
- **Improve the competitiveness of Minnesota's highway, rail, and intermodal transportation system.** The state's primary forest products industry depends on a reliable and cost-competitive system for transporting raw materials and finished products.
- **Promote voluntary third-party certification of federal, state, county, and private forestlands in Minnesota.** Third-party certification is a means of demonstrating that timber harvesting and forest management practices are being carried out in a manner that promotes the long-term ecological and economic sustainability of forest resources.
- **Increase investments directed at improving state, county, and private forest health and productivity.** Additional investment in and emphasis on forest management will increase the supply of wood and fiber available for the state's forest products industries while continuing to enhance other important forest resource values and uses such as wildlife habitat, tourism, water quality, and aesthetics.
- **Create a business climate that encourages capital investment in Minnesota's forest products industry.** The task force identified a number of ways the state can indicate its commitment to maintaining a competitive business climate for forest products manufacturing.
- **Create a follow-up team to work with the Governor's Office to formulate a comprehensive implementation strategy for task force recommendations.** The task force strongly encourages the Governor to give priority attention to these recommendations and implement them as soon as possible. The task force stands ready to assist in this effort.

Implementation of Task Force Recommendations

The task force's review of the economic climate for the state's primary forest products manufacturing has highlighted several significant obstacles to improving the industry's competitiveness in a global marketplace. Through this report, the task force has identified strategies to address these challenges.

Given the magnitude of these challenges and their potential impact on the viability of the state's forest products industry, there is a sense of urgency in following up on the actions needed to implement the task force recommendations. While many of these recommendations can be implemented within the state's existing policy framework, some may require legislative action. Creating a follow-up team to work with the Governor's Office is a critical first step.

2. Generic Environmental Impact Statement on Timber Harvesting and Management in Minnesota, 1994.

The Competitiveness of Minnesota's Primary Forest Products Industry

Introduction, Background and Context

Introduction

The primary forest products industry is vital to Minnesota's economy and forest health. The industry is especially important to rural Minnesota, where highly paid jobs are important to local economies. A healthy forest industry is also critical to managing our state's forests because forest management is conducted mainly through commercial timber harvest. In addition, commercial harvest helps landowners and managers accomplish important wildlife habitat management and provides recreational opportunities.

The value of product output from Minnesota's primary forest industry more than doubled between the 1970s and early 1990s. New investments in this industry brought new jobs and additional economic activity that benefited northern communities as well as the Twin Cities. The situation a decade later stands in stark contrast. Instead of new jobs, there are job losses from machine shut downs, mill closings and disinvestments (i.e. industry investments going to other states and countries). What has happened to bring about this change? What can Minnesota state government do to restore the state as a competitive place for investment in this industry?

The underlying causes of this change operate at multiple scales, from local to global, with far reaching scope and impact. Market changes, production costs, globalization, and investment environment are all factors that influence where industrial production will grow or where it will decline. These factors vary in degree of direct effect on market conditions in Minnesota. Thus the state government's ability to change outcomes varies too. Unfortunately, some of the main drivers are market based, over which state government has little influence. However, state policy can influence the production costs and investment environment within Minnesota. These two aspects become increasingly important as the industry responds to market changes.

Minnesota's Forest Products Sectors

Before exploring the causes of the changes in Minnesota's primary forest industries, it is important to identify the product sectors most relevant to Minnesota and review the most recent developments in each sector. "Primary" industry refers to producers of lumber, engineered wood products, and paper that are typically inputs to other industries. "Secondary" industry refers to producers of finished products such as cabinets, windows, doors, and similar products. Although secondary manufacturers comprise more than half of Minnesota's forest products-based production, this report focuses on the primary industry because large mills provide highly paid jobs that are important to rural communities, and because of recent job losses in the primary industry.

The primary forest products industry has three main sectors, which are often separated according to the products they produce: 1) paper/pulp, 2) engineered wood products, and 3) lumber. Minnesota is best known for its paper sector, which is produced mainly from aspen, spruce, and balsam fir. The paper sector also includes pulp, which is produced using hardwood species such as maple and aspen. Oriented strand board (OSB) and engineered wood products comprise the second sector. OSB is an important product that has replaced plywood in home construction. The third sector includes lumber and sawlogs from hardwoods (e.g. oak, birch) and softwoods (e.g. white and red pine).

Trends in the Primary Forest Products Industry

Paper producers have experienced strong product development trends over the past decade. Papers are thinner, stronger, and use less fiber. Global producers such as International Paper, Stora Enso, UPM-Kymmene, and SAPPI dominate this sector. Each of these companies, plus Boise, has a presence in Minnesota. During the last decade, producers in Finland and Sweden have been investing in new and rebuilt plants in Europe, and are now investing in China. The past decade also saw the emergence of new producers of copy and coated papers. These new entrants, such as Asia Pulp and Paper, are now producing good quality product in places such as Indonesia and other places that previously had no pulp and paper industry. New computer-controlled process controls allow manufacturers to reduce the number of higher-cost, skilled papermakers to operate the new machines. These process controls allow the use of much lower-quality (and lower-cost) fiber. Combined with very large-scale computer technology, these changes have resulted in significantly reduced cost of producing product in these new regions relative to existing locations such

as Minnesota.

Globally, there are many more pulp producers and they are geographically less concentrated than a decade ago. New investments — particularly in hardwood pulp production in Southeast Asia and Latin America, and also in the Nordic countries (Finland and Sweden) — have led to rapid growth in scale of assets. The increasing scale has driven down costs, further pressuring producers in higher-cost regions such as Minnesota.

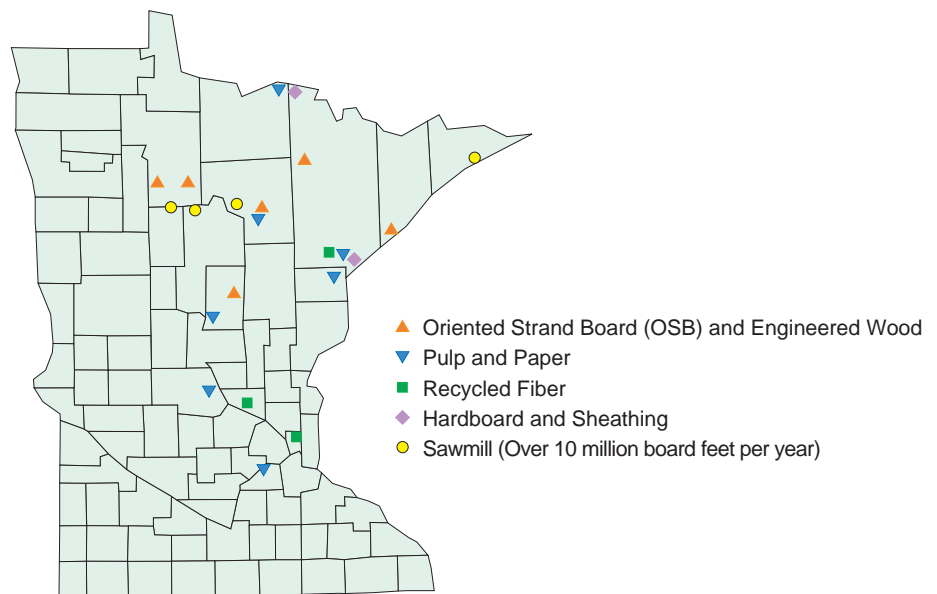
The OSB and engineered wood sector is primarily a North American market. Growth has been concentrated in areas with low wood costs, including northern Canada and selected regions in the southern United States. Aside from Potlatch's rebuild and capacity expansion of its Cook OSB mill, there has been little new OSB investment in Minnesota over the past decade.

The lumber sector is also primarily a domestic North American market characterized by a rapid production increase in Canada and a collapse in United States commodity prices. Former North American export markets in Europe are gone, and the U.S. market is now being targeted by European- and Southern Hemisphere-sourced lumber.

Location of Minnesota's Major Forest Products Employers

Figure 1 shows the location of major mills in Minnesota, including the larger OSB, pulp and paper, recycled fiber, and hardboard sheathing mills, as well as the largest sawmills. Mill location is a big factor in determining markets for wood and labor availability. All mills except sawmills utilize various species of pulpwood-sized material, with aspen being by far the largest component. Location also affects transportation options and costs for shipping raw and finished materials.

Figure 1. Major Primary Forest Products Industry Facilities in Minnesota



Source: Minnesota Department of Natural Resources, 2003

Oversight and Structure of Advisory Task Force Assessment

In March 2003 the Governor appointed a nine-member Advisory Task Force on the Competitiveness of Minnesota's Primary Forest Products Industry to lead the assessment, with the Commissioners of the Departments of Employment and Economic Development (DEED) and Natural Resources (DNR) as co-chairs. Other members represent the primary forest products and logging industries, St. Louis County Land Department, and the University of Minnesota (task force members are listed inside the front cover).

Assessment Goals

The Governor charged the task force to achieve two goals:

1. Describe the competitiveness of Minnesota as a site for primary forest products industry manufacturing compared to a number of other states and nations; and
2. Identify potential policy and program changes to reduce barriers and constraints and to take advantage of opportunities for industry retention and expansion.

The Governor requested that special emphasis be placed on conditions that can have near-term impact on barriers and constraints that are vital to maintaining a healthy forest products industry.

Approach

Guided by the task force, a working group with representatives from DEED and DNR, the Minnesota Forest Resources Council, and the University of Minnesota engaged public and private sector experts to develop this assessment. The working group conducted surveys during visits with 17 mills and 11 loggers (Appendix 2). Key factors and specific measures to be assessed were determined from these surveys as well as from input from the Advisory Task Force and public and private sector experts. Instead of conducting research, data were obtained from "off-the-shelf" sources for the specific measures, then analyzed. By gathering and synthesizing these data, the assessment describes the current competitive status of Minnesota's primary forest products industry relative to comparable industry sectors in several other states and nations.

Detailed recommendations are presented in the next section, with cross references to the Analysis of Key Competitive Factors section on pages 13-24 and the tables in Appendix 1.

The Competitiveness of Minnesota's Primary Forest Products Industry

Recommendations

The insights gained from contrasting Minnesota with other regions have led to recommendations for policy and program initiatives to address apparent competitive disadvantages in Minnesota. If implemented, these initiatives will facilitate investments to capitalize on Minnesota's strengths, and through these investments, maintain the vitality of Minnesota's primary forest industry. The Governor's Advisory Task Force on the Competitiveness of Minnesota's Primary Forest Products Industry makes the following recommendations, focused on those recommendations with a stronger local dimension. Each recommended action is followed by examples and suggestions for achieving it. The agency or organization that should be assigned responsibility for the action is noted in parentheses at the end.

Increase wood and fiber availability, quality, and production from public and private lands while continuing to protect the environment:

- Increase the volume of timber offered for sale on DNR- and county-administered lands, within sustainable harvest levels (DNR and county boards).
- Retain and enhance tax incentives for forestry investments by private forestland owners by maintaining funding for the Department of Revenue to implement the Sustainable Forestry Incentives Act [Minnesota Statutes, § 290C.03] (Department of Revenue).
- Strongly urge the Superior and Chippewa national forests to increase their allowable timber harvest levels (also called allowable sale quantity) and actually attain their full sustainable potential (Governor, U.S. Forest Service Regional Forester).
- Support research targeted at increasing forest productivity and supplementing existing wood and fiber supplies. For example, researchers should investigate forest regeneration and management practices that foster productivity, use of short rotation tree crops, use of agricultural crop residues, use of technologies for increasing paper recovery and recycling rates, and policy tools including incentives that would foster such efforts (University of Minnesota College of Natural Resources).
- Maintain adequate investments in forest sustainability to mitigate significant environmental impacts of increased timber harvesting and forest management (DNR, Minnesota Forest Resources Council).

(See pages 13-16 for supporting analysis and page 25 for benchmarking data.)

Improve the effectiveness of environmental review processes to make Minnesota more competitive while protecting the environment and providing public input:

- Strongly recommend the Minnesota Pollution Control Agency (MPCA) continue efforts to implement a streamlined process that protects the environment but allows for improvement in Minnesota's overall competitiveness (Governor, MPCA).
- Strongly recommend the Environmental Quality Board (EQB) establish a minimum threshold of additional timber harvest before requiring review of wood supply impacts of proposed forest products industry plant expansions (Governor, EQB).
- Designate an interagency environmental review project manager for large forest industry expansion projects (Governor, in consultation with MPCA and DNR).
- Devise a method whereby forest products companies could obtain construction permits before a company board approves a capital investment project (MPCA).
- Request that the Environmental Protection Agency (EPA) extend the time period for which forest products industry construction permits are valid (Governor, EPA).
- Establish a Forest Industry Group on Environmental Review and Permitting, patterned after a similar Taconite Industry Committee, to develop ways to help implement these recommendations and to further increase environmental review and permitting efficiencies (MPCA, DNR).

(See pages 16-18 for supporting analysis and page 26 for benchmarking data.)

Improve the competitiveness of Minnesota's highway, rail, and intermodal transportation system:

- Amend the law to make gross vehicle weight limits more comparable with those in neighboring states for vehicles hauling forest products (Governor, MnDOT, Legislature).
- Support efforts by the Duluth Port Authority to create an intermodal rail and truck facility for inbound and outbound forest products industry shipments (Governor, MnDOT).
- Seek competitive rail service by working with Minnesota's Congressional delegation to change federal laws that now prevent railroad competition (Governor, Minnesota Forest Industries).

(See pages 18-19 for supporting analysis and page 27 for benchmarking data.)

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Promote voluntary third-party certification of federal, state, county, and private forestlands in Minnesota:

- DNR should certify all state timberlands by 2005 (DNR).
- Encourage voluntary private land certification (DNR, Minnesota Forestry Association, Minnesota Forest Industries, U.S. Forest Service State and Private Forestry).
- Encourage county boards to voluntarily certify county timberlands (county boards).
- Evaluate the feasibility of a single statewide auditing method that meets a third-party certification program standard as well as the Minnesota Forest Resources Council (MFRC) forest management guidelines monitoring requirements (DNR, MFRC).
- Encourage the U.S. Forest Service to pilot third-party certification of the Superior and Chippewa national forests (Governor, U.S. Forest Service Regional Forester, and Minnesota's Congressional delegation).

(See page 20 for supporting analysis and page 28 for benchmarking data.)

Increase investments directed at improving state, county, and private forest health and productivity:

- Propose that the Legislature reestablish a dedicated forest management fund whereby a portion of state timber harvest receipts would be used for reinvestment in forest management and productivity on state lands³ (DNR, Legislature).
- Consider legislation that enables the DNR and county boards to use bonding funds for forest management investments to increase forest productivity on state and county lands (DNR, Minnesota Association of County Land Commissioners, Legislature).
- Fully fund reforestation and forest improvement programs on DNR-administered lands (DNR, Governor, Legislature).
- Increase funding to the University of Minnesota for research efforts targeted at improving forest productivity and augmenting fiber supplies (University of Minnesota College of Natural Resources).
- Increase funding to the University of Minnesota Extension Service for programs that promote investments in state, county, and private forest management and productivity (University of Minnesota College of Natural Resources).
- Encourage conversion of marginal and riparian farmlands to production of fast-growing trees by offering incentives to growers (Departments of Agriculture and Finance).

(See pages 13-16 and 23 for supporting analysis, and pages 25, 28 and 32 for benchmarking data.)

3. Counties already have and use a timber development fund created by MS §282.08. The DNR had such a fund from 1982 through 1989, when it was terminated by the legislature.

Create a business climate that encourages capital investment in Minnesota's forest products industry:

- Create a mechanism to enhance ongoing dialogue among county, state, and federal agencies, non-industrial private forest landowner organizations, the Governor's Office, and the forest products industry to identify issues for future government action (Governor).
- Encourage co-generation energy production by tax incentives and other means and ensure that state regulations allow excess energy from co-generation to be sold into the regional energy grid at market prices (Departments of Commerce and Finance).
- Propose legislation to institute a tax exemption rather than a tax rebate for forest products industry capital equipment purchases, and to broaden tax exemptions to entire forest industry expansion projects (DEED, Department of Finance).
- Continue to enhance other important forest resource values and uses such as wildlife habitat, tourism, water quality, and aesthetics (Superior and Chippewa national forests, DNR, county land commissioners, and MFRC).

(See page 20-22 for supporting analysis, and pages 27 and 29 for benchmarking data.)

Create a follow-up team to work with the Governor's Office to formulate a comprehensive implementation strategy for task force recommendations:

- The followup team should include high-level decision makers capable of making incisive action recommendations to the Governor and Legislature (Governor).
- Develop proposals for the 2004 and 2005 legislative sessions, based on task force recommendations (Governor's follow-up team).
- Develop additional long-term policy recommendations for enhancing the competitive position of Minnesota's primary forest products industries (Governor's follow-up team).
- Initiate and oversee activities of the Forest Industry Group on Environmental Review and Permitting (Governor's follow-up team).
- Report regularly to the Governor on progress toward implementation of these recommendations (Governor's follow-up team).

Implementation of Task Force Recommendations

The task force strongly encourages the Governor to give priority attention to these recommendations and implement them as soon as possible. The task force stands ready to assist in this effort.

The task force's review of the economic climate for the state's primary forest-based manufacturing highlighted several significant obstacles to improving the industry's competitiveness in a global marketplace. Through this report the task force has identified a number of strategies that can be taken to address these challenges — strategies the task force believes are critical to improving the economic competitiveness of this industry in Minnesota.

Given the magnitude of these challenges and their potential impact on the viability of the state's forest products industry, there is a sense of urgency in following up on the actions needed to implement the task force recommendations. While many of these recommendations can be implemented within the state's existing policy framework, some may require legislative action. Creating the follow-up team to work with the Governor's Office is a critical first step.

The Competitiveness of Minnesota's Primary Forest Products Industry

Analysis of Key Competitive Factors

Global, National, and State Context

Although the industry sector trends identified earlier are playing out globally and across the United States, there are certain factors that are affecting Minnesota more than others. In an industry where profit margins are increasingly tight, these differences become important. Wood cost and availability of wood is one such critical factor. Another is the cost of transportation. Both of these factors can be affected positively by executive and legislative actions. Other factors include what are termed “hosting conditions.” Hosting conditions define the prevailing environment for conducting business in a state or country and cover a wide array of factors. Examples include environmental permitting processes and standards, and local, state, and federal tax rates. Many hosting conditions can be changed by executive decision. For example, the permitting process can be streamlined and costs reduced, and permit conditions made standard and more predictable.

Assessment of Competitive Factors

The assessment of Minnesota's competitiveness requires an analysis of different kinds of data. The task force identified ten “factors” considered important for understanding how well Minnesota competes in the primary forest products industry, including the pulp and paper, OSB/engineered wood, and lumber sectors. This section discusses each of the competitive factors. Appendix 1 contains tables summarizing the important attributes of each factor relative to other locations. The factors are treated in priority order, as determined by the Advisory Task Force.

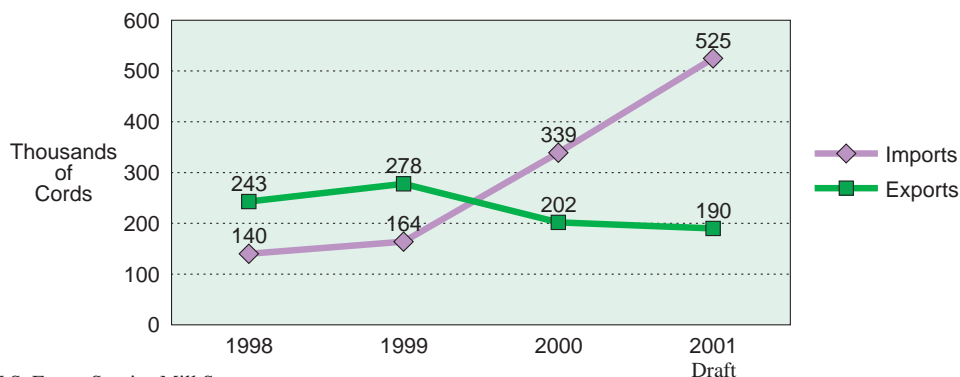
It is important to note that these factors may be interrelated. For example, Factor 1: Wood and Fiber Availability and Price, Factor 5: Wood and Fiber Quality and Factor 10: Forest Land Productivity are closely linked.

Factor 1: Wood and Fiber Availability and Price

Significantly higher timber prices, particularly for aspen and spruce/fir, are contributing to the erosion of competitiveness in Minnesota's forest industry sector. During the 1970s and 1980s the state's vast supply of aspen was among the cheapest wood available close to growing markets. This attracted substantial investments in aspen-based pulp and paper and solid wood products manufacturing. Significant expansion of aspen demand by the firms producing OSB and paper ensued. However, rapid demand growth with increasingly restricted supply has driven stumpage cost (defined as the value of standing timber) to the point where Minnesota has the highest U.S. wood costs for such grades. To illustrate this point, aspen pulpwood typically sold for \$2 per cord when interest in OSB first arose. Today, at about \$37 a cord⁴, standing aspen pulpwood in Minnesota is more expensive than southern pine, an alternative fiber for producing OSB. (Some recent aspen transactions have been approaching \$50/cord.) Similarly, strong growth in spruce/fir demand has increased stumpage costs for these species.

The tight fiber supply and relatively high wood costs lessen Minnesota's competitiveness as a manufacturing location. Companies are reluctant to invest in areas where the fiber supply cannot readily sustain increased consumption. The outcome of this is a progressive decline in the quality of assets in Minnesota, further eroding overall competitiveness. Maintaining investments is critical to sustaining the overall standard of technology to keep pace with global industry leaders and retain the long-term viability of the sector in Minnesota.

Figure 2. Minnesota's Imports and Exports of Pulpwood Roundwood and Chips



Source: U.S. Forest Service Mill Surveys.

4. George Banzhaf & Company, Regional Comparison of Timber Prices (for Minnesota Forest Industries), May 2003. This report uses 2001 data.

The Competitiveness of Minnesota's Primary Forest Products Industry

Table 2. Comparison of Net Imports and Exports of Pulpwood

	Net Import/Export* of Industrial Pulpwood (million cords)	
Minnesota**	.14 I	
Wisconsin	.09 I	Better than Minnesota
Michigan	.05 I	Better than Minnesota
Alabama	1.5 I	Worse than Minnesota
Georgia	.27 I	Worse than Minnesota
Maine	.58 I	Worse than Minnesota
Texas		
Oregon		
Washington		
United States	6.80 E	
Canada	1.10 E	Better than Minnesota
Sweden	4.90 E	Better than Minnesota
Finland	4.50 I	Worse than Minnesota
Brazil	.02 E	Better than Minnesota
Chile	.78 E	Better than Minnesota

* I = imports
E = exports

** In 2001, Minnesota's net imports rose to more than 300,000 cords (see Figure 2) due largely to high prices for Minnesota stumpage. 2001 data for other states and countries were not available.

Sources: Net I/E (U.S.): U.S. Forest Service State Pulpwood Mill Surveys 2000 (Alabama, Georgia 1999). Includes pulpwood roundwood and equivalent only.

Net I/E (international): Food and Agriculture Organization Database. Includes all industrial roundwood and equivalent, including sawlogs.

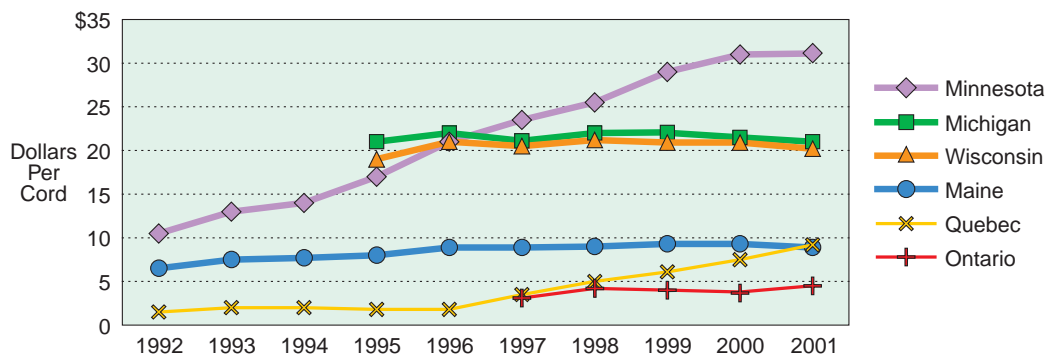
Industrial pulpwood imports are indicative of wood availability (supply) and primary forest product industrial processing capacity (demand). Minnesota was a net exporter of wood raw materials until the late 1990s, but became a net importer in 2000 (Figure 2). Imports have continued to rise since 2000, due largely to high prices for Minnesota stumpage.

Table 2 compares Minnesota's imports with those of other competitors. Minnesota exports the least pulpwood relative to total forestland acreage among comparable states. Most of Minnesota exports are to pulpwood mills in Wisconsin. Minnesota imports have continued to rise, driven largely by high price for aspen grown in Minnesota. Most of Minnesota's imports are aspen pulpwood from Canada, which has significantly less expensive aspen (Figure 3). Prices for aspen have escalated in Minnesota since the mid 1980s due mostly to increased demand (Figure 3). The increasing aspen prices are a double-edged sword — higher prices make forest management a more attractive option for landowners, but higher prices also reduce Minnesota's competitiveness in the global marketplace.

Wood prices are especially relevant to competition with Michigan and Wisconsin. When compared to these states, Minnesota has (Appendix 1, Factor 1 table, page 25):

- The highest aspen pulpwood stumpage prices;
- The most rapidly increasing hardwood and aspen pulpwood stumpage prices in the last 10 years;
- The lowest hardwood sawtimber stumpage prices (likely due to lower quality);
- Higher jack pine sawtimber stumpage costs. (Jack pine comprises 52 percent of Minnesota's softwood harvest utilized by sawmills and 26 percent of overall harvest utilized by sawmills.)

Figure 3. Aspen Pulpwood Stumpage Price Trends



Source: Regional Comparison of Timber Prices, George Banzhaf & Company, May 30, 2003.

The Competitiveness of Minnesota's Primary Forest Products Industry

Wood cost is a large component of production cost and is a key driver of competitiveness. In the OSB sector, for example, wood fiber costs account for about one-third of total production costs. Minnesota competes directly with all other regions in the pulpwood market, so pulpwood cost is an important competitive factor for the paper and OSB sectors. For hardwood pulpwood, Minnesota prices are reasonably close to those in the U.S. South, but significantly lower than in Finland, and significantly higher than in Brazil. For softwood pulpwood, however, Minnesota prices are considerably higher than in the U.S. South.

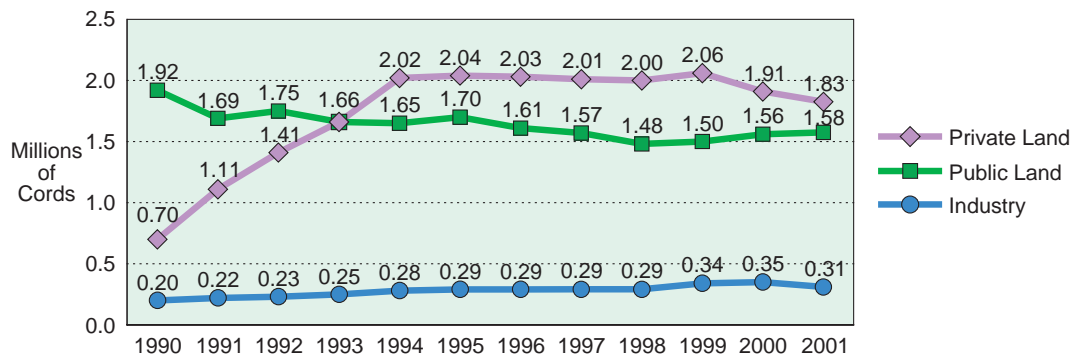
Assuring and increasing the supply and availability of fiber may ultimately help reduce upward pressure on timber prices. Other factors, however, can delay or override these price effects.

Plantation forest acreage is one indicator of public and, in many cases, private investments made to provide raw material for the primary forest industry. Minnesota has made modest investments in plantations compared to many competing states and nations (Appendix 1, Factor 1 table, page 25). Countries such as Brazil, the U.K. and China have already made huge investments in tree plantations with new capacity being developed to utilize the resulting wood. In order to be competitive, U.S. states are working to increase plantation acreage substantially over the next few decades, especially in the South. Since the 1980s, the U.S. South has increased the area of pine plantations by 60 percent, and the industrial wood output is projected to increase by more than 50 percent between 1995 and 2040⁵.

Forestland ownership is an important factor affecting wood supply, via the owners' timber management policies and intensity. The relative proportion of privately owned timberland harvested each year in the U.S. is higher than that for public timberlands. Private land harvest in Minnesota increased greatly from 1990-1994, increased very slightly through 1999, and has declined in recent years (Figure 4). Most of the reduction in timber sold and harvested from public land in Minnesota since 1990 has resulted from reduced harvests on federal land (Figure 5). Minnesota stands well below most other benchmarked states in timber availability (i.e. the percentage of total forestland available for timber harvest) (Table 1, page 2). Minnesota ranks well above Oregon and Washington, however, because of their large percentage of federal forestland. In Canada, most provincial forestland is available for timber harvest and management, and provinces are by far the largest owners of forestland in Canada.

On public lands, state lands managed by the DNR and county land departments are an important source of timber. The federal lands have undergone a period of change in which emphasis on timber production has been reduced relative to other outputs of the forests (Figure 5). In contrast, the county lands have slightly increased and state lands have significantly increased the volume sold during the past decade.

Figure 4. Volume of Timber Sold by Ownership, Minnesota

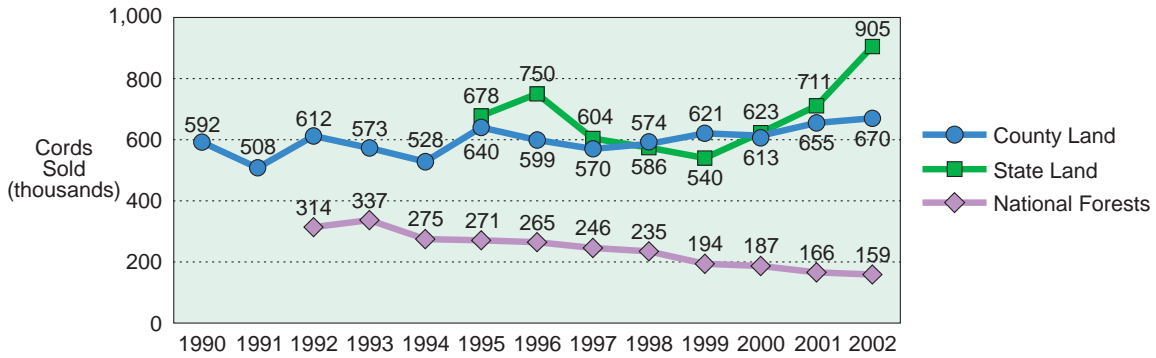


Source: Superior and Chippewa national forests, Minnesota Department of Natural Resources.

5. Prestemon, "Southern Forest Resource Assessment Highlights: The Southern Timber Market to 2040," *Journal of Forestry*, October/November 2002, Vol. 100, No. 7. pp 16-22.

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Figure 5. Volume Sold from Minnesota's Public Lands



Source: Superior and Chippewa national forests, Minnesota Department of Natural Resources, and Minnesota Forest Industries.

Private owners play a significant role in selling timber to Minnesota's forest industry. The volume sold from private land has fallen since 1999 (Figure 4). To encourage owners to manage their timberlands to maintain the long-term productive potential of the private forests, Minnesota has a new tax incentive program called the Sustainable Forest Incentive Act (SFIA) [Minnesota Statutes § 290C.03]. The SFIA provides a state-paid incentive to owners of forestland willing to make a long-term commitment to good stewardship and management of their land. Most competing states offer some form of special tax treatment for private forestland. Such incentive-based programs can help retain private timberland as a productive ongoing source of wood and fiber. Table 3 summarizes Minnesota's competitive position relative to tax treatment of private forestlands.

Table 3. Comparison of Tax Treatment of Private Forestland

	Special Tax Treatment for Private Forestland (Y=Yes, N=No)	
Minnesota	Y	
Wisconsin	Y	About the Same as Minnesota
Michigan	Y	About the Same as Minnesota
Alabama	N	Worse than Minnesota
Georgia	Y	About the Same as Minnesota
Maine	Y	About the Same as Minnesota
Texas	Y	About the Same as Minnesota
Oregon	Y	About the Same as Minnesota
Washington	Y	About the Same as Minnesota

Source: Hibbard, Kilgore, Ellefson, *Property Tax Programs Focused on Forest Resources: A Review and Analysis*, January 2001.

Factor 2: Permitting and Environmental Review

Because of variations in regulatory frameworks among competing states and countries and limited available information, the permitting and environmental review factor is especially challenging to assess. Based on available information, Minnesota is at a disadvantage relative to the permitting and environmental review processes of competing regions (Appendix 1, Factor 2 table, page 26). These processes take time and can impose operating restrictions on industry. When the processes are lengthy or unpredictable, or the compliance standards attached to permits are overly stringent, this can affect decisions on whether to invest in one state or country versus another.

The Competitiveness of Minnesota's Primary Forest Products Industry

Recent experience suggests that Minnesota can improve how it conducts permitting and environmental review and yet protect environmental quality. Potlatch Corporation and Boise Cascade Corporation both had to undergo unpredictable, long, and expensive processes to obtain permits for proposed capacity expansions in Minnesota. The Minnesota Pollution Control Agency (MPCA) has acknowledged the need for improvement, has undertaken a review of the recent experiences and has initiated a process to adopt measures to avoid a repeat of the circumstances that led to these outcomes.

Regulatory differences across states and countries are important because they represent another hurdle to overcome. To maintain competitiveness, companies must be willing to make significant investments and rebuilds of existing machinery. Timelines to implement investment and reinvestments are affected by the amount of information and analysis deemed necessary to evaluate a project's environmental consequences and determine what is needed to control those impacts. Extended permitting and environmental review processes represent an additional and sometimes ongoing cost that further erodes competitiveness.

The permitting and environmental review processes applied in different jurisdictions around the world are fundamentally similar, but the regulatory frameworks that these permitting and environmental review processes are based on can vary substantially. Some regulatory frameworks are very prescriptive with respect to technology while others allow for more case-by-case decision making. All regulatory frameworks have their advantages and disadvantages. Environmental programs around the world are intended to limit adverse impacts from inappropriate development or operation of industries. Companies propose a development project and describe the operating scenario. The likely impacts to the environment, both positive and adverse, are evaluated and mitigation is identified. These impacts are then weighed by permitting agencies, with or without public involvement, and a permit is typically issued. Permits contain certain restrictions on emissions or discharges, or include other controls on key aspects of the proposed activity. In addition, monitoring and reporting obligations are also typically imposed.

Differences in time to obtain permits among states and countries arise from the efficiency in implementing the permitting and environmental review processes within their regulatory frameworks. The timeframe to complete permitting and environmental review processes in Minnesota generally exceeds two years, and can take three to six years for controversial forest products plant expansions. In Alabama, however, OSB plants can complete required processes in two months. Comparable processes in Finland average eight months to a year, and are almost always less than two years. Permitting and environmental review processes in Sweden average 16 months, though occasionally can take up to ten years⁶.

Differences in compliance standards can vary across states, where some states assign limits that exceed federal standards and some do not. Similarly, some nations are more restrictive than the United States, but others are not.

This assessment is not suggesting that environmental protection should be reduced. The primary industry firms are committed to protecting the environment and have a long track record of environmental stewardship. Rather, the focus is on the processes and time it takes for proposals to be evaluated and how much this costs the companies proposing the projects. Protracted approval processes affect cyclical businesses such as the forest products industry, because timing of investments and the resulting increases in production capacity can be key to the payback period for the investment.

Alabama provides an example where streamlining the environmental review and permitting processes appears to be working. Alabama has implemented a cross-department one-stop approach to facilitate the permitting process. The Alabama Permit Coordination and Development Center (PCDC) coordinates all permit applications and brownfield development applications. Under this approach, firms seeking permits are guided through the permitting process by all involved state agencies working together to prevent delays. For example, the PCDC convenes a pre-application conference where the company and experts meet with agency representatives to discuss the specific requirements of the application and the necessary modeling needs. The objective of this process is to make permitting as straightforward as possible, while ending up with an outcome that meets the state and federal objectives for environmental quality. Minnesota has recently implemented a similar approach for large construction projects. This was done in conjunction with the Minnesota Chamber of Commerce and the Taconite Industry Cost Reduction Initiative.

6. *Journal of Forest Economics* 2002, Vol. 8, pp 167-168.

The Competitiveness of Minnesota's Primary Forest Products Industry

Most of Minnesota's pulp and paper mills are owned by multinational companies and therefore compete for capital with mills in other parts of the world. One of the factors a multinational company considers when deciding where to invest capital is the cost, predictability and time involved to gain environmental permits. In Scotland, it is possible for a paper mill to obtain construction permits for a generic (before detailed engineering design) facility expansion and to keep these permits in place indefinitely by renewing the permit every five years. A mill in Scotland has a large competitive advantage over its sister mill in Minnesota whenever investment decisions come before the company board of directors.

Other overseas examples illustrate the processes and standards that apply in key competing regions. European competitors are important for many of the key products manufactured in Minnesota and, consequently, the permitting environment in Finland and Sweden is relevant to Minnesota producers. Finnish and Swedish processes changed in 2000 to bring them into line with the European Union (EU) Integrated Pollution Prevention and Control directive. This change has led to some new uncertainty in the processes as the companies and agencies come to terms with how the new regulations will be implemented.

Finland, when making the changes to bring domestic legislation into line with the EU directive, modified the Finnish Environmental Protection Act to introduce a single permit for both air and water discharges. Finland also defined the process to obtain the permits and prerequisites more explicitly and required all mills to re-apply under the new act prior to 2004. This is expected to make the process more straightforward and focused. Finland also has implemented the EU Directives on Environmental Impact Assessment (EIA). The directives require EIAs for specified categories of investments. The regulatory authorities can also require EIAs for other developments at their discretion.

Sweden has similar requirements and has recently permitted substantial increases in a pulp mill's capacity without requiring an EIA because the overall level of emissions did not rise significantly as a consequence of new investments in more efficient technology and other mitigations. However, despite these areas of cooperation, there are also areas where industry and the Swedish authorities disagree, especially regarding what emission limits are technically and economically feasible.

Brazil is a major competitor in hardwood pulp and certain grades of paper. Like the United States, Brazil handles permits at a state level. The Brazilian authorities tend to follow the U.S. Environmental Protection Agency (EPA) guidelines when setting limits on discharges for pulp and paper mills. The limits for both water and gaseous emissions are relatively strict. However, countries such as Indonesia and other developing countries have emissions standards that are relatively lenient compared with those in most U.S. jurisdictions. This adds credence to the perspective that if U.S. jurisdictions become too hostile for new forest products industry investments, environmental impacts are likely to be exported to countries with less sustainable practices.

For Minnesota, state government should encourage an MPCA initiative to continue to develop and implement a streamlined process that protects the environment but allows for improvement in Minnesota's overall competitiveness.

Factor 3: Transportation

Transport costs are also factors state government can influence. Transport accounts for 20 to 30 percent of wood's cost, called "delivered cost." Transport also adds to the cost of obtaining other raw materials and getting finished products to market. When compared with competing regions, Minnesota has several disadvantages (Appendix 1, Factor 3 table, page 27). The state has relatively low gross vehicle weight limits for road transport that directly increase delivered wood prices. In addition, the state has relatively high rail costs, and a relatively low level of competition in rail rates when compared with other regions.

Minnesota's allowable gross vehicle weight is lower than most other states (Table 4). While Minnesota allows 10 percent overweight loads during frozen conditions (similar to Wisconsin) when logging is traditionally conducted, this is lower than load limits in most competing states. Because Minnesota is very reliant on truck transportation, the allowable gross vehicle weight significantly affects cost of production and competitiveness.

Minnesota does not have as good access to competitively priced rail transportation as competing states because northern Minnesota is primarily serviced by a single railroad company. This limitation, along with Minnesota's limited access to intermodal⁷ shipping options, puts Minnesota's transportation network at a competitive disadvantage.

7. "Intermodal" refers to the shipment of containerized cargo using more than one type of transportation, with or without an ocean-going link.

The Competitiveness of Minnesota's Primary Forest Products Industry

Table 4. Comparison of Allowable Gross Vehicle Weights

	Allowable Gross Vehicle Weight (thousand pounds)	
Minnesota	80	
Wisconsin	90	Better than Minnesota
Michigan	160	Better than Minnesota
Alabama	100	Better than Minnesota
Georgia	100	Better than Minnesota
Maine	99	Better than Minnesota
Texas	90	Better than Minnesota
Oregon	80	About the Same as Minnesota
Washington		
United States		
Canada	140	Better than Minnesota
Sweden		
Finland		
Brazil		
Chile		

Source: Federal Highway Administration, 2000 Highway Statistics Report www.fhwa.dot.gov/ohim/hs00/psi.htm

Finished product prices at the mill gate are determined by sales price less transport and handling cost. Consequently, Minnesota mills with higher transport costs are left with lower returns and profitability. Although Minnesota is able to serve the relatively close Midwestern markets, higher transportation costs put Minnesota producers at a disadvantage when serving the large coastal and export markets, because the supplier absorbs the transportation cost.

Minnesota producers have few transport alternatives, all of which are higher cost than those in competing states and countries. Limited rail service, conservative load limits and limited intermodal access all contribute to a higher cost and less competitive environment.

The potential for an intermodal freight terminal in the Duluth Harbor

Intermodal truck and rail service combines the speed and dependability of trucking with the low cost of rail, with the added bonus of rate competition among rail lines. But Minnesota mills are not able to take advantage of those benefits because the two nearest intermodal terminals — the only ones in the state — are hundreds of miles away in the Twin Cities. In contrast, Wisconsin mills in Fox River Valley use two nearby terminals at Neenah and Green Bay.

A recent feasibility study* for a terminal in the Twin Ports of Duluth/Superior benchmarked successful small intermodal facilities, including the Port of Montana, built in 1988 (and expanded in 1994) to serve Montana's forest products, mining, and farming industries. Financed by federal, state, and local agencies, the Port has given area industries a boost. Port Traffic Manager Bill Fogarty says, "One of the lumber companies saved over \$1 million in freight bills, helping to ensure its survivability." Area producers now call multiple carriers for rates and service, and 300 people have jobs in the terminal. The Duluth/Superior study concluded that a small, focused intermodal facility in the Twin Ports could work as well.

In many ways, the Minnesota's Duluth Twin Ports show greater potential for intermodal development than the Port of Montana did:

- Unlike the Port of Montana, the Twin Ports have water access, opening up the entire Great Lakes basin to log procurement.
- Much of the infrastructure already is in place: four Class 1 carriers** — Burlington Northern — Santa Fe, Canadian National, Central Pacific, and UP Railroad - and four feasible sites for terminals that could serve them.
- All Class 1 carriers connect to Chicago, which with 26 terminals is the third-largest intermodal hub in the world.
- The Canadian National's Winnipeg/ Chicago direct intermodal line runs through the port already, so a terminal in Duluth would only tap into Canadian National's system, not extend it.
- Duluth ships bulk commodities, but because some ore, grain, and coal shipments now are going intermodal, the port will need to begin handling containers to remain competitive.
- Small regional terminals fare best when they serve shippers of raw materials and manufactured goods, like Minnesota mills, not receivers of consumer goods.
- Shippers in the region already generate enough cargo to justify a terminal.
- Duluth Port Authority Director, Adolph Ojard, a strong proponent of an intermodal terminal, says that the port can assist in financing it.

* Richard Stewart, University of Wisconsin-Superior, "Twin Ports Intermodal Freight Terminal Study," sponsored by the U.S. Department of Transportation, Wisconsin DOT, MnDOT, and the Metropolitan Interstate Committee.

** A "class 1 carrier" is the largest class of carrier, and is a national rather than a regional carrier.

The Competitiveness of Minnesota's Primary Forest Products Industry

Other Factors

There is one factor, in addition to the original ten factors, that was identified during information gathering and deemed important: forest certification.

Forest Certification

Forest certification has become an increasingly important factor in distinguishing commodity product from one source versus the next. Forest certification is a means of affirming responsible forestry practices that enhance and protect environmental values of forests. Forest certification provides an independent third-party assurance that a forestry operation meets standards set by a certification program. Companies and landowners apply voluntarily.

Forest certification is intended to influence purchasing decisions by assuring consumers that certified products are sourced from sustainably-managed forests. The development of markets in Europe and North America has been led by buyers groups of forest product retailers and traders. The most significant members of such buyers groups are the retail home improvement chains. Home Depot recently joined the largest of these buyers groups. In addition, Time Warner recently set purchasing standards that 40 percent of purchased paper will be third-party certified by 2004, and 80 percent by 2006. These buyers have announced policies to give preference to certified products.

The certification process is reliant on forest owners and managers submitting their timberlands and management plans to a third-party audit process. It will be an increasing advantage to industry to operate from states or countries with high proportions of certified land base. As seen in Table 5, the proportion of certified timberland in Minnesota is quite large relative to most other U.S. states, but is low relative to foreign competitors. To meet anticipated demand for certified wood, Maine, Wisconsin, and Michigan are beginning the process of certification for all state-owned forestland. Canada is already significantly ahead of the Minnesota in certifying its lands. The market demand for certified wood products is currently strongest in western Europe and the United States.

Although certification is a market-based initiative, government can play a role in encouraging participation in certification. The DNR and Aitkin County voluntarily chose to certify all county and DNR-managed lands in Aitkin County, in an effort to capture markets for certified products. Minnesota should follow Maine's, Michigan's, and Wisconsin's lead in pursuing certification of all state-owned forestland, and in encouraging certification of private lands. By aggressively pursuing certification of forestland, Minnesota can sustain its existing advantage in domestic markets.

Table 5. Comparison of Third-party Certified Forestland Acres

	Acres of Third Party Certified Forestland (thousands unless noted otherwise)	
Minnesota	1,336	
Wisconsin	367	Worse than Minnesota
Michigan	155	Worse than Minnesota
Alabama		
Georgia		
Maine	6,684	Better than Minnesota
Texas		
Oregon	17	Worse than Minnesota
Washington	127	Worse than Minnesota
United States	54M	
Canada	40M	Better than Minnesota
Sweden	30M	Better than Minnesota
Finland	54M	Better than Minnesota
Brazil	3M	Better than Minnesota
Chile	873	Worse than Minnesota

Sources: Numbers include cumulative acres enrolled in the following: Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), and Pan-European Forest Certification (PEFC).

Factor 4: Energy Costs

Minnesota's industrial energy rates are below the average for the U.S., and fare well relative to most other states and nations with significant forest products industries (Appendix 1, Factor 4 table, page 27.) Since energy costs are a significant portion of operating costs for this industry, this is an important measure of competitiveness. However, the rates listed here may not reflect actual costs to a particular firm, because electricity rates are often negotiated for each plant individually, and those rates are confidential. It appears that industrial energy rates in Minnesota place the forest products industry at a slight competitive advantage, but there may be individual facilities that have higher than normal energy intensity rates.

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Energy intensity, a measure of how much energy is used to produce a unit of output, is the most critical factor in energy costs. Energy intensity is only meaningfully assessed on a plant-by-plant basis rather than by geographic or political boundaries. In the mechanical pulping and paper sector, however, energy costs comprise 15 to 30 percent of the final product cost.

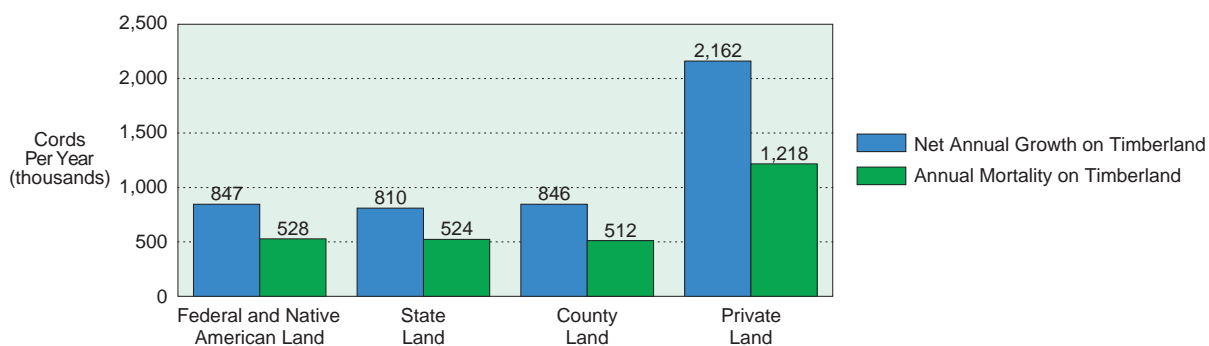
Self-generation of energy, called co-generation, is a cost-effective method to provide fuel for the operation of wood production machinery. In the U.S. overall, the forest products industry generates 63 percent of its own energy, using its wood waste products and other renewable sources of fuel. The industry self-generates more electricity than any other U.S. manufacturing group. Using bark, trimmings, and sawdust to fire boilers contributes 20 to 72 percent of energy needs at individual plants⁸. There could be considerably more co-generation in Minnesota if the environmental permitting process encouraged use of waste wood and bark as a biomass source. Canada is actively exploring the technical and economic potential of co-generation. Minnesota could benefit from increasing use of this cost-effective and environmentally sound energy production technology.

Factor 5: Wood and Fiber Quality

Wood and fiber quality is an important competitiveness factor for primary wood industries. Quality factors such as amount of decay, size, and form of trees all have an impact on usable wood supply and processing costs (Appendix 1, Factor 5 table, page 28). Minnesota currently has equal or somewhat lower quality wood fiber than its competitors and has one of the highest annual mortality to growth ratios in the U.S. Minnesota's relatively old forest generally results in high levels of decay and defect. If current forest management efforts are maintained or even increased (stable markets for wood are crucial to this effort), the quality picture can be radically improved in the next 20 years and beyond.

Wood quality is also affected by forest growth and mortality. Mortality differs by administrator due in large part to varying levels of forest management. In Minnesota, the diversity of ownership can be advantageous. Figure 6 illustrates how growth and mortality vary by ownership⁹. Specifically, private landowners have fewer losses to mortality due mainly to more intensive management activities. In total, however, Minnesota is losing significant timber volume to mortality relative to other competing states. This volume loss could be reduced greatly by more intensive forest management, with resulting benefits to forest health and Minnesota's economy.

Figure 6. Minnesota Timberlands Net Total Annual Growth and Mortality by Administrator*



* Note that differing acres of forestland in combination with differing site quality produces the annual growth. The key point of this graph is to show that private lands have a relatively lower proportional loss to mortality. Loss to mortality was 56 percent for private land, versus 61 percent for county land, 62 percent for federal and Native American land, and 65 percent for state land.

Source: Forest Inventory and Analysis (FIA) - U.S. Forest Service, 1990.

8. Minnesota Forest Industries.

9. Minnesota has a high percentage owned by counties, unlike most other states.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 6: Taxation

Taxes are difficult to compare across states, and particularly difficult to measure against competing nations. Since taxation is not one of the highest priority competitive factors for this assessment, and the timeframe to conduct the assessment was short, the data and conclusions are general. Also, because tax treatment is complex and varies for individual forest products businesses, the observations will be general.

The data (Appendix 1, Factor 6 table, page 29) indicate that Minnesota's state corporate income tax rate is higher than most of the states in the comparison group. However, Minnesota has an advantageous apportionment formula (better than all but two other states) that benefits businesses that have most of their sales outside the state. Due to this advantage and the lack of a capital value tax, corporate income taxes paid by Minnesota forest products businesses may be competitive with those paid by firms in many of the states in the comparison group. In addition, Minnesota's property tax reform in 2001 improved industrial property taxes paid by businesses. As a result, companies in Minnesota's forest products industries may find property taxes to be more competitive than expected.

The U.S. has a tax system that is heavily based on corporate and personal income taxes, but the U.S. does not have a national sales tax. In addition to corporate and personal income taxes, however, other countries rely heavily on value-added taxes, which are similar to sales taxes. As a result, the U.S. has higher corporate income and capital gains tax rates than many other countries in the comparison, but total tax revenue as a percent of GDP is lower than or competitive with nearly all countries in the comparison group.

One area where Minnesota fares poorly relative to other competing states is in rebating rather than exempting sales and use tax on capital equipment. Most competing states do not collect sales and use tax on qualifying capital equipment purchases. Minnesota firms must pay the taxes, then apply for the rebate.

Factor 7: Labor and Construction Costs

Minnesota's average wage paid is slightly higher than most states, except Washington and Oregon (Appendix 1, Factor 7 table, page 30). Economic theory suggests that, other things being equal, this reduces the industry's ability to pay for the raw material or other inputs.

The measurement of value added per \$1 indicates the efficiency of labor to produce profits. In the paper and pulp sector, Minnesota clearly lags behind most other states in value added from labor. In the OSB/engineered wood sector, Minnesota clearly has a competitive advantage. In the lumber sector, Minnesota compares favorably to half of the comparison states.

Overall, Minnesota's workers' compensation system has improved substantially over recent years, declining in cost while still meeting the needs of employers and workers. Average costs for the manufacturing industry compare well to the comparison group, while premiums in some specific occupations related to forest product industries vary with relation to the other states in the comparison group.

Minnesota's unemployment insurance system has an average cost to businesses that is roughly in the middle of the comparison group. Minnesota has a higher taxable wage base due to higher average wages. This higher wage base results in a lower average tax rate.

In terms of total employment costs, Minnesota fares poorly against other competing states, and against foreign competitors. In fact, the worldwide forestry consulting firm Jaakko Pöyry Consulting has determined that personnel costs per ton of production for some paper grades are highest in North America relative to the rest of the world¹⁰.

Industrial building construction costs in the U.S are often 15 to 20 percent higher than in Europe¹¹, even factoring in exchange rates. The depreciating value of the dollar has caused the U.S. to fall from the top 10 most expensive countries in terms of construction costs to build. Large international companies use these data, as well as other data and analyses, to decide where to locate plants. One international firm stated that "construction costs in the U.S. are generally considered to be 40 percent to 50 percent higher than in Scandinavia and Western Europe."

10. Cited in State of Wisconsin's Paper Industry, Part 1 report. Original information was presented to the North Carolina State University Pulp and Paper Foundation.

11. Jaakko Pöyry Consulting.

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Factor 8: Education and Research

Minnesota has a comparatively strong labor force in terms of forest-industry work skills and overall level of education. While labor unit costs are relatively high, the quality of the workforce partially mitigates the total labor cost in finished product versus competing states and nations.

In general, greater availability of educational opportunities leads to higher levels of educational attainment in Minnesota versus other locations (Appendix 1, Factor 8 table, page 31). This in turn should translate to a more effective and innovative work force and a superior business environment. Importantly, Minnesota has a comparative advantage over most other states in terms of educational attainment as measured by literacy rates and percentages of high school and college graduates. Both overall levels of education and high levels of forest industry-specific skills provide Minnesota with a comparatively strong labor force. Such levels are a definite advantage to increasingly high tech forest products firms seeking computer skills as well as foresters and forest products professionals. The University of Minnesota also has the top ranked undergraduate forestry program in the U.S. and a first rate wood and paper science program. At the graduate level, which is heavily oriented to research, Minnesota has the sixth ranked forestry/forest products graduate program. In terms of research investments in forestry and forest products, a surrogate measure¹² suggests Minnesota lags behind southern and western competitors.

By maintaining high-quality educational institutions that produce skilled workers for the increasingly high-technology forest industry, Minnesota can maintain this comparative advantage. Additional targeted forestry and forest products research investments would help improve the forest industry's competitive position.

Factor 9: Forestland Productivity

Minnesota has almost 17 million acres of forestland. With the limited intensity of forest management relative to countries such as Finland and Sweden, however, growth rates are low. Substantial potential productivity gains could be derived from more intensive management. For example, growth rates could be increased if tree mortality could be captured through increased thinning. The Appendix 1, Factor 9 table (page 32) suggests there is much room for improvement if investments in intensive forest management are made on a continuing basis. Such investments could also reduce the risk of catastrophic fire and improve other aspects of forest health such as susceptibility of forests to insect and disease outbreaks.

Factor 10: Technology

Technology is twofold: it is both a factor itself and a barometer of competitiveness relative to the other nine factors. In other words, technology is more an outcome than the other factors. If a state's standing relative to other factors is positive, technology investments are more likely to be made; and if negative, there will be less investment. This is important because continued investment in technology leads to higher productivity, which increases the attractiveness of additional investment. Periods of little or no investment can lead to a downward spiral.

Investment in technology in the pulp and paper sector differs by country¹³. Minnesota's technology appears marginally better than technology used in Wisconsin, Maine, and Canada. The trend has been for lower levels of investment in new pulp and paper mills in North America relative to the major competing regions in Finland and Sweden (Appendix 1, Factor 10 table, page 32). The North American asset base has been rebuilt rather than replaced. Consequently, the average technical age of mills in the United States and Canada is higher than the equivalent value for the Nordic countries. Lack of investments has reduced the competitiveness of the North American sector overall. Older machines are typically smaller, slower, and incompatible with the latest innovations in process controls and manufacturing processes. In a commodity-oriented sector, these differences are significant. Investments have gone to the Nordic countries, and regions such as Indonesia, Brazil, and Chile, where abundant, cheap wood and low labor costs have motivated industry to develop the capacity to serve international markets.

12. Ranking in federal formula research program allocations to states that involves consideration of the state match.

13. Note that this report does not address technology investment patterns in OSB and sawlog sectors.

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The investment in capital for wood products manufacturing in the United States overall fell in 2000 from 1999 by just under one percent. This followed an 11 percent increase in investment between 1998 and 1999.

Capital investment in the paper manufacturing industry in the United States was 14 percent higher in 2000 than in 1999, following a dramatic decrease of 17 percent between 1998 and 1999¹⁴. The industry-wide return on capital in the pulp and paper industry also lags behind a comparable industry: chemical and allied products. Importantly, energy capital assets consume 20 to 30 percent of capital spending in the primary forest products industry and comprise a significant portion of the existing asset base. The equipment is aging, so the need for significant investment in infrastructure improvements and replacement takes increasingly scarce capital away from the core pulp and paper making processes.

Conclusion

Minnesota's primary forest products industry is a vital part of the state's economy and has been so for more than a century. In fact, Minnesota provided much of the lumber that built the Midwest. Currently, the state has many of the world's major forest products companies operating within it. However, some of the underlying attributes that first attracted these companies have changed over time. As a result of these changes, Minnesota has become non-competitive as a place for primary manufacturers to do business.

Despite the current situation, this analysis indicates a number of opportunities for the state to improve its competitive position. The recommendations section (pages 9-10) presents suggestions from the Advisory Task Force to the Governor to pursue these opportunities. There is an urgent need for the Governor to implement the task force's recommendations. The future of Minnesota's primary forest products industry depends on timely, proactive leadership by the Governor and the Legislature.

14. U.S. Census Bureau 2002.

The Competitiveness of Minnesota's Primary Forest Products Industry

Appendix 1

This set of tables and a system of red, yellow, and green rankings shows at-a-glance how Minnesota compares with other benchmarked states and countries. A red shading indicates that Minnesota is at a competitive disadvantage compared with the other locations in terms of that particular measure. Yellow indicates a state or country is about the same as Minnesota. Green shading indicates that Minnesota has a competitive advantage relative to that location. White shading indicates insufficient data for an overall rating. Each of the factors is presented in priority order.

Factor 1: Wood and Fiber Availability and Price

	Net I/E* of Industrial Pulpwood (million cords)	Stumpage: Aspen Pulpwood (\$/cord)	Stumpage: Softwood Pulpwood (\$/cord)	Stumpage: Oak Sawtimber (\$/cord)**	Stumpage: Jack Pine Sawtimber (\$/cord)	Plantation Forest Acreage as % of Forestland	% Forestland*** Privately Owned	Special Tax Treatment for Private Forestland (Yes, No)
Minnesota	.14 I	37	27 ¹	131	49	4	43	Y
Wisconsin	.09 I	18	43 ¹	177	31	6	68	Y
Michigan	.05 I	20	23 ¹	144	45	7	62	Y
Alabama	1.50 I		17 ²	105	127 ²	25	94	N
Georgia	.27 I					27	90	Y
Maine	.58 I	9	21 ¹	90		2	95	Y
Texas		17	15 ²		106 ²	10	95	Y
Oregon							45	Y
Washington							25	Y
United States	6.80 E						58	
Canada****	1.10 E	3	4		8 ¹			
Sweden	4.90 E					25		
Finland	4.50 I				83			
Brazil	.02 E				15 ¹	1		
Chile	.78 E					13		

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

* I = imports, E = exports

** These values are averages that include varying quality of wood. For example, in northern Minnesota the quality is lower than in southern Minnesota, resulting in price differences within the state. In addition, these numbers include veneer that is significantly more expensive than sawtimber.

*** Forestland in FIA is defined as land at least 16.7% stocked by forest cover of any size, or formerly having had such tree cover, not currently developed for non-forest use.

**** Caution: Canadian timber prices are notoriously difficult to compare to U.S. prices because the systems of selling timber differ so much between the two countries. Values are from Ontario.

1 Spruce-fir

2 Southern pine

Sources: Net imports/exports: U.S. Forest Service State Pulpwood Mill Surveys 2000 (except Alabama, Georgia) and FAO Data Base 2000.

Stumpage costs: George Banzhaf & Company, Regional Comparison of Timber Prices (for Minnesota Forest Industries), May 2003.

Plantation acreage: Forest Inventory and Analysis (FIA), U.S. Forest Service; Alabama 2000, Georgia 1997, Maine 2001, Michigan 2000, Minnesota 2001, Texas 1992, Washington 1991 (plantation data unavailable), Wisconsin 2000.

Plantation acreage (U.S.): FAO Database, 2000.

% Forestland privately owned: FIA Inventory - U.S. Forest Service; Alabama 2000, Georgia 1997, Maine 2001, Michigan 2000, Minnesota 2001, Wisconsin 2000.

Special tax treatment: Hibbard, Kilgore, Ellefson, *Property Tax Programs Focused on Forest Resources: A Review and Analysis*, January 2001.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 2: Permitting and Environmental Review

	Stringency of Permit/ Regulatory Requirements for Water and Air Quality*	Timeframe to Complete Process*	Consistency in Application of Permitting Process*
Minnesota	Stricter than US EPA standards	>24 months	Lacks consistency
Alabama	US EPA standards	OSB: 2 months	Consistent
Canada			
Sweden	Stricter than US EPA standards	16 months	Consistent
Finland	Stricter than US EPA standards	Avg: 8-12 months Max:<24 months	Consistent
Brazil	US EPA standards		Lacks consistency
Chile			



Better than Minnesota



About the Same as Minnesota



Worse than Minnesota

* Limited data are available on all three measures and for permitting and environmental review processes in other states and countries. These data are based on knowledge and conclusions provided by Jaakko Pöyry Consulting.

Source: Jaakko Pöyry Consulting.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 3: Transportation

	Allowable Gross Vehicle Weight (thousand pounds)	Logistics Efficiency* (B= better than MN)
Minnesota	80	Low
Wisconsin	90	B
Michigan	160	B
Alabama	100	B
Georgia	100	
Maine	99	
Texas	90	B
Oregon	80	
Washington		
United States		
Canada**	140	
Sweden		B
Finland		B
Brazil		B
Chile		B

Factor 4: Energy Costs

	Average Industrial Rates for Electricity (cents per kWh)
Minnesota	4.1
Wisconsin*	4.5
Michigan	5.3
Alabama	3.7
Georgia	3.9
Maine	7.7
Texas	4.1
Oregon	5.0
Washington	5.1
United States	4.9
Canada**	
Sweden	3.1
Finland	5.0
Brazil	5.7
Chile	5.0

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

* Logistics efficiency refers to access to rail, and water transport and how close mills are to these transportation networks.

** Canada value is for Ontario only.

Sources: Allowable gross vehicle weights: Federal Highway Administration, *2000 Highway Statistics Report* www.fhwa.dot.gov/ohim/hs00/psi.htm.

Logistics efficiency: This qualitative assessment results from a conversation among task force staff and Doug Parsonson, Jaakko Pöyry Consulting, on June 24, 2003.

* Wisconsin provides a credit for sales taxes paid on fuel and electricity used in manufacturing which lowers net cost.

** Canada no longer reports industrial energy rates. Rates are confidential.

Sources: Electricity (U.S.): *Typical Bills and Average Rates Report*, Winter 2003, Edison Electric Institute.

Electricity (International): International Energy Agency.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 5: Wood and Fiber Quality

	"Rough* and Rotten *** Wood as % of Total Volume	LUMBER SECTOR: Grade 1 and 2** as % of Total Volume	Mortality as % of Annual Growth	Acres of Third Party Certified Forestland (thousands unless noted otherwise)
Minnesota	8	17	58	1,366
Wisconsin	12	20	39	367
Michigan	6	17	26	155
Alabama	10	28	19	
Georgia	6	31	19	
Maine	6	39	56	6,684
Texas	9	26	13	
Oregon	2		27	17
Washington	1		31	127
United States				54M
Canada				40M
Sweden				30M
Finland				54M
Brazil				3M
Chile				873

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

* Definition of rough trees: Live trees of commercial species that do not contain at least one merchantable 12 foot sawlog or two sawlogs eight feet or longer now or prospectively, and/or do not meet regional specifications for freedom from defect primarily due to roughness or poor form, and all live trees of noncommercial species. The measure is not applied perfectly consistently across all states.

** Definition of rotten trees: Live trees of commercial species that do not contain at least one merchantable 12 foot sawlog or two sawlogs eight feet or longer now or prospectively and/or do not meet regional specifications for freedom from defect primarily due to rot (that is, when more than 50 percent of the cull volume in a tree is rotten.)

*** Tree Grade: Tree grade 1 is highest quality, followed by grade 2 and grade 3. Trees below grade 3 are lowest quality for solid wood (lumber) use.

Sources: Rough and Rotten, Grade 1 and 2: Forest Inventory and Analysis (FIA), U.S. Forest Service; Alabama 2000, Georgia 1997, Maine 2001, Michigan 2000, Minnesota 2001, Oregon 1999 cycle 4 (National Forest System land not included Texas 1992 cycle 1) (Cycle 1 Eastern Texas only), Washington 1991 cycle 1 (National Forest System land not included), Wisconsin 2000.

Mortality: Forest Inventory and Analysis (FIA), U.S. Forest Service, Wisconsin 1996, Washington 1991, Texas 1992 (Eastern Texas only), Michigan 1993, Minnesota 1990, Maine 1995, Georgia 1997, Alabama 2000, Oregon 1992.

Certified Forestland: various sources. Numbers include cumulative acres enrolled in the following: Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), and Pan-European Forest Certification (PEFC).

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 6: Taxation

	State Corporate Income Tax Rate* (% of business income)	Apportionment Formula** (sales/property/income)	Capital Value Tax*** (Y=Yes, N=None)	Research and Dev. Credit (Y=Yes, N=None)	Sales and Use Tax on Capital Equipment (E=Exempt)	Industrial Property Tax (rank)****	Tax Revenue as a % of GDP*****	Capital Gains Tax (%)
Minnesota	9.8%	75/12.5/12.5	N	Y	rebated	9		
Wisconsin	7.9%	50/25/25	N	Y	E	19		
Michigan	single business tax	90/5/5	N	N	E	5		
Alabama	6.5%	33/33/33	Y	N	reduced rate	38		
Georgia	6.0%	50/25/25	Y	Y	E	12		
Maine	8.9% max	50/25/25	N	Y	E	31		
Texas	4.5%		Y	Y	E	2		
Oregon	6.6%	80/10/10	N	N		17		
Washington	business and occupation tax		N		E	32		
United States							20%	15
Canada							20%	13
Sweden							35%	28
Finland							27%	29
Brazil							20%	15
Chile							19%	16

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

* Michigan's single business tax rate is 1.8% and it applies to total compensation and income, with adjustments and offsets; Texas' franchise tax is .25% of taxable capital or 4.5% of net taxable earned surplus, whichever is higher; and Washington's Business and Occupation Tax is .138% of the value of manufactured products.

** Apportionment formulas that have higher sales factor (the first of the three numbers) benefits those companies that have a high proportion of sales out-of-state because that income is excluded.

*** A capital value tax is a recurrent annual tax on the value of a company's "capital" as defined by each state.

**** Smaller ranking number indicates higher costs. Also note that total industrial property taxes payable for \$25 million in real property and \$25 million in personal property is calculated for Minnesota and other states in rural areas. Rankings are for 2002.

***** Includes tax revenue of central government only. Excludes fees and other non-tax revenues.

Sources: Corporate income tax: 2003 All States Tax Handbook, Research Institute of America. 2003 State Tax Handbook, CCH Incorporated.

Tax revenue: Organization for Economic Cooperation and Development. Worldwide Corporate Tax Guide, Ernst & Young. World Development Indicators 2002, The World Bank.

Apportionment formula, capital value tax, Research and Development credit: 2003 All States Tax Handbook, Research Institute of America. 2003 State Tax Handbook, CCH Incorporated.

Sales and Use Taxes on capital equipment: 2003 All States Tax Handbook, Research Institute of America. 2003 State Tax Handbook, CCH Incorporated. 2002 United States Master Sales and Use Tax Guide, CCH Incorporated.

Industrial property taxes: Minnesota Taxpayers' Association, 2003. Assumes 80% of total value is personal property

Capital gains tax: Organization for Economic Cooperation and Development. Worldwide Corporate Tax Guide, Ernst & Young. World Development Indicators 2002, The World Bank.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 7: Labor and Construction Costs

	Average Wage Cost for Mill Workers (\$ per \$1)	PAPER: Value Added per \$1	OSB: Value Added per \$1	LUMBER: Value Added per \$1	2000 Premium - Logging/Lumbering	2000 Premium - Lumberyard: Other	2000 Premium - Planing/Molding Mill	2000 Premium - Saw Mills	Average Unemployment Insurance Cost (rank**)	
Minnesota	12	4.5	4.3	3.1*	33	6	5.8	21.7	24	
Wisconsin	11	4.6	3.3	2.9	36	6	5.4	10.7	35	
Michigan	11	5.1	4.0	3.2	32	5	9.9	14.1	12	
Alabama	11	5.7	2.2	2.9	19	7	5.8	12.4	37	
Georgia	11	6.8	3.9	3.2	30	7	5.8	8.0	50	
Maine	12	5.1		3.5	32	4	4.9	9.6	17	
Texas	11	5.3	3.6	3.0	16	9	5.4	11.1	36	
Oregon	16	6.3	2.6	2.9	22	4	6.8	7.1	3	
Washington	17	4.3	3.4	3.2	24	3	6.5	7.8	1	

* 1998 data
** Smaller ranking number indicates higher costs.

Sources: Wages: *Occupational Employment statistics 2001*, U. S. Department of Labor, Bureau of Labor Statistics

Value added: *Annual Survey of Manufacturers 2000*, U. S. Census Bureau.

Workers compensation: *Workers' Compensation State Rankings*, 2002 Edition, Actuarial and Technical Solutions, Inc.;

Workers' Compensation Premium Rate Ranking Calendar Year 2000, Oregon Department of Consumer and Business Services;

Unemployment insurance: U.S. Department of Labor, Employment and Training Administration, Unemployment Insurance Service.

	Industrial building construction costs (indices relative to U.S. = 100)*	Pulp/paper mill construction cost rating** (S=Same as MN, B=better)	
Minnesota	99		
Wisconsin	97	S	Better than Minnesota
Michigan	97	S	Better than Minnesota
Alabama	82	B	Better than Minnesota
Georgia	81	B	Better than Minnesota
Maine	88	S	Better than Minnesota
Texas	77	B	Better than Minnesota
Oregon	104	S	Worse than Minnesota
Washington	103	S	Worse than Minnesota
United States	100		
Canada	77	B	Better than Minnesota
Sweden	114	B	Better than Minnesota
Finland	123	B	Better than Minnesota
Brazil	41	B	Better than Minnesota

* Smaller ranking number indicates lower costs. Index includes both material and labor components of construction costs.
** This reflects total investment cost that involves both purchase and construction of the facility and equipment.

Sources: Industrial building construction costs (U.S.): *R.S. Means Building Construction Cost Data*, 60th Annual Edition
Industrial building construction costs (International): *Atkins Means Report*, April 2003.
Construction cost rating: Based on Jaakko Pöyry Consulting's experience.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 8: Education and Research

	Literacy Rate (Level 1/Level 2*) (%)	High School Graduates (%)	Have Completed College Degree or More (%)	Forestry Education Program Ranking - Undergraduate	Forestry/forest Products Education Program Ranking - Graduate	Forestry/Forest Products Research Support Rank**
Minnesota	13/35	88	27	1	6	15
Wisconsin	14/39	85	22	6	16	18
Michigan	18/44	89	22	10	23	7
Alabama	25/57	83	19	15	17	3
Georgia	23/54	79	24	11	3	1
Maine	23/51	85	23	22	5	11
Texas	18/47	76	23	16	25	8
Oregon	14/42	85	25	8	2	2
Washington	15/38	87	28	7	1	4
United States	97+	80	24			
Canada	97+		25			
Sweden	99+					
Finland						
Brazil	95					
Chile	83					

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

* The U. S. considers literacy more broadly than just the ability to read: it is an individual's ability to read, write, speak in English, compute and solve problems at levels of proficiency necessary to function on the job, in the family of the individual and in society. There are five levels of literacy; individuals at Levels 1 and 2 lack a sufficient foundation of basic skills to function successfully in society. In Minnesota, 13 percent of the population is rated as Level 1, and 35 percent at Level 2. The total is 48 percent, which is lower than all the other states shown.

** National rank among states.

Sources: Literacy rate - U.S.: U. S. Census Bureau, American Fact Finder, 2003 (<http://factfinder.census.gov/>).

Literacy rate - *International*: *CIA World Factbook*, 2001.

High school graduates: 2000 U. S. Census Bureau, American Fact Finder, 2003 (<http://factfinder.census.gov/>). Canadian statistics from provincial websites.

Completed college degree (U.S. States): 2000 U. S. Census Bureau

Forestry undergraduate program ranking: *Gourman Report*, 1998.

Forestry graduate program ranking: *Gourman Report*, 1997.

Research support: McIntire-Stennis Cooperative Forestry Research Program funding distribution rank. U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service, 2001.

The Competitiveness of Minnesota's Primary Forest Products Industry

Factor 9: Forest Land Productivity

	Forestland Area (million acres)	Current Productivity of Available Forestland (cords/acre/year)	% of Potential Productivity Achieved
Minnesota	17	.32	30
Wisconsin	16	.39	30
Michigan	19	.51	35
Alabama	22	.71	50
Georgia	24	.81	50
Maine	18	.30	40
Texas	18		
Oregon	30	.93	50
Washington	22	1.08	50
United States	747	.63	40
Canada	604	.33	30
Sweden	67	.73	70
Finland	54	.63	70
Brazil	1,343	High	70
Chile	38	High	60

Factor 10: Technology

	Average Technical Age of Equipment*
Minnesota	16.9
Wisconsin	21.1
Michigan	
Alabama	16.6
Georgia	
Maine	19.3
Texas	
Oregon	
Washington	
United States	
Canada	19.0
Sweden	13.6
Finland	12.8
Brazil	
Chile	

Better than Minnesota
 About the Same as Minnesota
 Worse than Minnesota

Sources: Forestland area (U.S.): U. S. Forest Service, 1997 *Resources Planning Act (RPA) Assessment, Final Statistics*, July 2000.

Forestland area (International): Food and Agriculture Organization website.

Productivity statistics: Calculated using data from UN FAO website; Alan Ek, Personal Communication; UN-ECE/FAO 2000 *Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand*; Smith, Vissage, Darr and Sheffield, *Forest Resources of the United States*, 2001 Forest Inventory and Analysis (FIA), U.S. Forest Service.

* These values are capacity-weighted Paper Machine Technical Age, which serves as a proxy measure for the paper machine technology differences between states and countries. Paper machine Technical Age is a value computed by Jaakko Pöyry Consulting to estimate the asset quality of each machine. The age of the machine is modified by taking into account improvements through rebuilds. A lower value (e.g. Finland) indicates more modern, technologically advanced machinery, and the converse is true.

Sources: Jaakko Pöyry Consulting.

Appendix 2

Acknowledgements

The following organizations and individuals have contributed to this report and their contributions should be acknowledged. This report represents the combined views of Advisory Task Force members only.

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The Competitiveness of Minnesota's Primary Forest Products Industry

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