Transportation Characteristics and Needs of Forest Products Industries Using Eastern Washington Highways Part 3: Shipments From Mills

EWITS Research Report Number 16
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by

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in cooperation with

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EWITS Research Report: 
Background and Purpose

This is the sixteenth of a series of reports prepared from the Eastern Washington Intermodal Transportation Study (EWITS). The reports prepared as a part of this study provide information to help shape the multimodal network necessary for the efficient movement of both freight and people into the next century.

EWITS is a six-year study funded jointly by the Federal government and the Washington State Department of Transportation as a part of the Intermodal Surface Transportation Efficiency Act of 1991. Dr. Ken Casavant of Washington State University is Director of the study. A state-level Steering Committee provides overall direction pertaining to the design and implementation of the project. The Steering Committee includes Jerry Lenzi, Chair and Regional Administrator (WSDOT, Eastern Region); Richard Larson, Regional Administrator (WSDOT, South Central Region); Don Senn, Regional Administrator (WSDOT, North Central Region); Charles Howard (WSDOT, Planning Manager), and Eric Berger, Executive Director, County Road Administration Board. Pat Patterson represents the Washington State Transportation Commission on the Steering Committee. An Advisory Committee with representation from a broad range of transportation interest groups also provides guidance to the study. The following are key goals and objectives for the Eastern Washington Intermodal Transportation Study:

- Facilitate existing regional and state-wide transportation planning efforts.
- Forecast future freight and passenger transportation service needs for eastern Washington.
- Identify gaps in eastern Washington’s current transportation infrastructure.
- Pinpoint transportation system improvement options critical to economic competitiveness and mobility within eastern Washington.

For additional information about the Eastern Washington Intermodal Transportation Study or this report, please contact Ken Casavant at the following address:

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DISCLAIMER

The contents of this report reflect the views of the author, who is responsible for the facts and accuracy the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

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Executive Summary

- Western states produce 63% of US softwood lumber production. Washington is the second largest producer and eastern Washington produces almost a fourth of that production. Access to markets affects this region’s competitive ability.

- Transportation issues recorded in this report deal with shipments from the mill to their respective markets. Approximately 88% of the products shipped from mills are by non-mill truckers, railroads or barge. The purpose of this report is to identify the various characteristics of forest product movements from mills to their respective markets. What modes of transportation are used for movement of wood products? What type of transportation problems exist that impede efficient movements of wood products? How many firms are there and how much tonnage do they produce? Where are the products marketed?

- Data presented in this report was derived from a survey of mills in Washington, Idaho and Oregon. These firms use eastern Washington highways and other modes to reach markets away from their locations. This survey provides a snapshot of mill shipments in one time period.

- Mills that utilize wood resources are located in rural areas of the Inland Northwest (area east of the Cascade mountains in Washington) near their source of supply. These mills are often a large and/or significant employer to the area and stimulate many indirect jobs. Some communities are dependent on the timber industry.

- Housing starts and interest rates heavily dictate the demand for most softwood products. Washington’s lumber production is driven by this demand. Eastern Washington, like the US, experienced a decline in production from 1987 to 1992; a modest increase has begun since that time.

- Mills vary greatly in tonnage produced. The median tonnage produced was in the 75,000 to 400,000 tons per annum range. The mills often are located in close proximity to each other.

- Mills producing wood products are decreasing in number and increasing in size, following a similar pattern as production agriculture in the region.

- Total volume of product shipped in 1996 as reported by firms was: raw logs (33%); hogfuel, woodchips, sawdust (37%); and plywood-post-poles and other (30%).

- Truck shipments of all wood products from mills remains in states west of the Mississippi 93% of the time. Rail movements are split; 66% go west of the Mississippi and 34% east.

- Truck movements from firms to final destination of all wood products ranged from 65% to 99%. Truck movements to river ports, ocean ports and other destinations ranged from 0.3% to 29%, depending on the commodity.

- Major transportation problems mentioned by mills were weight restrictions cited by (65%) of the firms, rates (43%), temporary road closures during the year (41%) and available drivers (38%).
Introduction

Transportation issues involving forest product industries embody a varied, often complex, number of business enterprises. Several natural product divisions and transportation uses became apparent during the course of this study of the industry and its needs; this made each segment (raw log, mills, etc.) unique in its characteristics and needs. For that reason, this overall study is being reported in a series of five written reports, as follows:

Part 1: Economic Structure of the Industry  The first publication gives a broad background on the economic structure of the wood product industry. General location, proportion of timberland, and Washington State's role in the Western Region of the United States are discussed in detail as a prelude to examining how and where products move to market.

Part 2: Movement of Raw Logs  Raw log transportation issues are set apart from the remainder of the industry. This report deals exclusively on a survey of the shipment of raw logs, from the woods, to their designated markets. Inherent characteristics of raw log movements, such as truck configurations, roads utilized, seasonal use and problem areas are some of the items discussed.

Part 3: Shipments from Mills  Transportation characteristics of wood products leaving the mill are identified in this report. Mode of transportation, origin, destination, problems encountered, rate structure, types of commodity shipped and inside/outside shipping sources receive attention.

Part 4: Commercial Movements  Shipment by sources outside of the forest industry processing firms occurs by commercial truckers. These firms tailor their equipment to meet the demand of this type of transportation need. Market characteristics, origin, destination, rate structure, roads used and timing of shipments are a few of the items discussed.

Part 5: Road Usage and Characteristics  The location and characteristics of road usage determined in the three industry surveys will be summarized in this final report. Implications for road investments are offered.
Study Area and Approach

This study investigates the importance of eastern Washington highway systems to shipments from mills. Included in the study area are Okanogan, Ferry, Stevens, Pend Oreille, Spokane, Lincoln, Whitman, Asotin, Garfield, Columbia, and Walla Walla counties in the state of Washington, and the states of Idaho, Oregon and Montana.

The overall goal is to determine seasonality, mode of transportation and problems encountered by these movements, especially in the utilization of truck transport. Specific objectives are to:

1) develop a profile of the wood products industry in eastern Washington;
2) provide transportation characteristics and needs of shipments from mills.

Data Sources

The intent of this study is to determine where and when shipments of forest products leaving mills utilize highways in eastern Washington and to identify problems that shippers encounter. Potential firms for the survey were identified from telephone books, business associations, Washington, Idaho, Montana, and Oregon Directories, forest product directories and contacts via prior business affiliation. Published research reports were reviewed and utilized in preparing this analysis.

Methodology

Accurate representation of eastern Washington freight truck movements of forest products is critical to the validity of this report. A mail survey questionnaire was planned, tested and mailed to producers of paper, lumber, consumer products, shake and shingles, wood residuals, post, poles, pilings and other commodities.

An effective data management system helped reduce errors due to collection and data entry. Mail surveys create the potential for three sources of error. First is non-response error, the main weakness of a mail survey. Second, transporters may provide inaccurate or misleading information to the questions. Third, surveys are limited in questions that can be asked. Attempting to reduce collection errors, a cover letter identifying the need for the survey, its source and the potential benefits to the firm, accompanied each questionnaire. Survey results were to be made available to the respondents and foremost; confidentiality was stressed repeatedly, striving to protect respondents while increasing the response rate and accuracy of the data. A sample questionnaire utilized in this report is in Appendix B.

The questionnaires were sent with the cover letter and a self addressed, stamped envelope. Phone and fax numbers were provided so firms could initiate contact if they had any concerns. Three follow-ups to the survey were performed. The first was two weeks after the initial mailing by letter, reminding the firm of the questionnaire, its importance, and a request that it be completed and returned in the envelope provided.
The second follow up was by telephone four weeks after the initial mailing. This proved very beneficial as firms asked many questions at this time. Long-term consequences of the data were of high interest. This also provided a time to assist or discuss further any questions they may have on the survey. After this discussion, several firms were more willing to fill out and return the questionnaire. Firms who had delayed filling out the forms stated they had lacked time to do so. The third follow up by letter occurred six weeks after the initial mailing, stating the survey's purpose, its source, the importance of the survey to the firm and a request that it be completed and returned. Another questionnaire and self-addressed stamped envelope was provided to the firm. Upon receipt of the completed questionnaire at any time during the survey period, a letter of appreciation and acknowledgment for returned questionnaires was mailed to the firm. Overall, forty firms completed questionnaires, resulting in a 47.6% response rate.

A data integrity review was performed with each survey. Any discrepancies were followed up by a telephone discussion to verify information provided. A sample grid was provided with the questionnaire in an attempt to minimize the potential for confusion in question 7, which proved beneficial in most cases (Appendix B). Problems were minor and follow up by phone rectified those encountered.

Microsoft Excel, PowerPoint and Word software were utilized for analyzing and reporting the results of the collected data. These programs are menu driven and very compatible when importing and/or exporting charts, tables and maps, etc. Excel provides expansive worksheets for these data and was the primary database for the project. Original data from each question were entered on a worksheet, and then a statistical analysis of each question was performed. Volume by weight for the year is inherent in all survey questions except for those on transportation problems and rate structure. Where repetition occurs, such as volume, the paste link function is utilized. This accomplished two things: data would not be transposed incorrectly, and any changes to the original data would carry through to any link, thus saving much time in the analysis. Integrity checks were performed on data entered in Excel worksheets. Random checks were made on computations of the data. The results of this analysis were utilized in the written presentation of this report.

One methodological issue for this survey was that during the course of this survey, four mills permanently closed and one mill's production was curtailed. Accordingly, it was uncertain as to how this might affect the survey and the other mills that remained open. The change mostly occurred in where raw logs are marketed, only 1 out of 12 questions. The effect of mill closures to the shipment of raw logs is reported in EWITS Research Report Number 15, Part 2: Movements of Raw Logs (Alderson and Casavant).
Forest Product Mills

Mills operating in eastern Washington, Idaho, Montana, eastern Oregon and Canada transport wood products on eastern Washington highways. Their supply of raw logs can be from those regions as well. Forest product mills in eastern Washington produce a multitude of different products from raw logs: paper, pallets, rough and planed lumber, post, poles, pilings, moulding, shingles, and plywood. Wood residuals are also produced and are often by-products created from smaller trees and waste generated by the production of other value added products. Wood chips, sawdust, hog fuel, decorative bark, and mulch are examples of wood residuals.

Mills are commonly located near the timber supply, generally in rural areas. Historically communities surrounding the mills were dependent on these industries and quite often few other industries were available for employment. The general trend is that forest product mills are diminishing as an economic contributor to the communities (Spokesman Review). The change is occurring due to new businesses entering areas, and an increase in retirement income in the local areas. The decline began after 1969 when, at that time, the economic share for lumber and wood products was 5.7% ($364 million in 1994 dollars) in eastern Washington, north Idaho and western Montana (Spokesman Review). By 1994 the economic percentage share had decreased to 3.9% ($519 million in 1994 dollars).
Production and Trade

The peak year for softwood lumber production was in 1987. At that time the western region (states west of the Mississippi River) accounted for 62.6% of the total US lumber production. In 1994 the west produced 51% (17.473 billion board feet (bbf)) and supplied 34% (16.14 bbf) of the softwood lumber consumed by U.S. domestic markets (Western Wood Products). Washington is the second largest lumber producer in the Western region. Eastern Washington produced 22% (917 million board feet (mmbf)) of the state’s total lumber production in 1994.

Competition from Canada is creating pressure on U.S. markets. Total imports to the U.S. from Canada amounted to 16.380 bbf in 1994; non-Canadian imports were 318 mmbf, (Western Wood Products). Lumber exports from Canada to the U.S. represented 98.1% of all imports in 1994. Of the 1.9% (318 mmbf) remaining, 4 countries were major sources: Brazil (30%), Chile (24%), Mexico (16%) and New Zealand (21%), respectively (Western Wood Products).

Softwood log imports into the U.S. have increased dramatically since 1991. At that time approximately 8.5 mmbf entered the U.S., and 95 mmbf entered in 1994, an increase of over 1,000%. Canada’s share was 69.2% and New Zealand accounted for 23.8%, a combined total of 93%.

Lumber exports of 2.19 bbf were shipped to foreign destinations from U.S. sawmills in 1994, an 8% decrease from 1993 (Western Wood Products). Western ports shipped 57.3% of all U.S. lumber exports. Washington ports account for 42.8% of the total west coast port movements; Oregon is second with 26%. All western ports experienced a decline from the previous two years, probably reflecting the declining price and availability of raw logs.

Housing starts, repair and remodeling dictate the level of demand for almost all softwood products (Sinclair). Mills meet this demand by producing lumber, plywood, paneling and other commodities. In more recent years, housing starts have been decreasing while repair and remodeling have increased (Sinclair). National and regional housing starts are portrayed in Table 1. Western states follow the same trends as the national figures.
<table>
<thead>
<tr>
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<th>Multi-Family Starts</th>
<th>Total Housing Starts</th>
<th>Private Housing Starts</th>
<th>Mobile Home Shipments</th>
<th>Total New Housing</th>
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<td>108</td>
<td>296</td>
<td>1,621</td>
<td>233</td>
<td>1,854</td>
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<tr>
<td>South</td>
<td>504</td>
<td>229</td>
<td>733</td>
<td>1,488</td>
<td>149</td>
<td>1,706</td>
</tr>
<tr>
<td>West</td>
<td>261</td>
<td>222</td>
<td>483</td>
<td>1,437</td>
<td>140</td>
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By Region and Type of Structure 1986-1994

(In thousands of units. Because of rounding, detail may not equal total)


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<td>226</td>
<td>197</td>
<td>244</td>
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Total:

| Northeast     | 1,179 | 1,147 | 1,081 | 1,003 | 895  | 840  | 1,030 | 1,126 | 1,199 |
| Midwest       | 1,179 | 1,147 | 1,081 | 1,003 | 895  | 840  | 1,030 | 1,126 | 1,199 |
| South         | 1,179 | 1,147 | 1,081 | 1,003 | 895  | 840  | 1,030 | 1,126 | 1,199 |
| West          | 1,179 | 1,147 | 1,081 | 1,003 | 895  | 840  | 1,030 | 1,126 | 1,199 |


Western housing starts declined 47.4% from 483,000 to 254,000 units between 1986 and 1991, (Chart 1). From 1991 to 1994 a 38.2% increase occurred causing an increase in quantity demanded of construction type wood products.


Lumber and structural panel production commonly follows housing starts and repair and remodeling trends, therefore any decline or increase would occur after a change in housing and/or repair and remodeling demand (Sinclair). Accordingly, housing starts and/or repair and remodeling would decrease or increase the derived demand for truck transportation of wood products on eastern Washington highways.

In 1992, 1993 and 1994, eastern Washington produced 24.4%, 22.2% and 21.8% (994 mmbf, 856 mmbf, and 917 mmbf) of the total Washington state lumber, respectively, which is typical for this region (Western Wood Products). Washington’s estimated wholesale value of lumber production in 1994 was 1.8 billion dollars. Eastern Washington’s contribution would be about 392 million dollars, making eastern Washington a significant player in the forest products industry and in the region.
Forces external to the industry affect the demand for forest products, not only in eastern Washington but the entire U.S. Interest rates have an effect on housing starts, but less on repair and remodeling (Shutt). Consequently, lumber and structural panels demand is directly affected by housing starts (Sinclair). As interest rates increase, housing starts decrease and vice versa. Interest rates are governed by federal budgetary policy, specifically the Federal Reserve. Interest rates, new residential prices, existing home sales, demographics (baby boomer and population), repair and remodeling, imports and raw log prices all have a direct impact on eastern Washington mills. Furthermore, that impact will strongly influence the demand on transportation modes for forest products to and from the mills in eastern Washington.

Mills are following the same trend that has occurred in other successful manufacturing enterprises. Automation of equipment, integration of firms (mergers), and eventually the elimination of excess labor allow firms to remain competitive (Spokesman Review).
Chart 1: Western U.S. Housing Starts


Chart 2: Eastern Washington Lumber Production

Mill Marketing and Transportation Characteristics

Location and Size

Mill locations for this mail survey are in or near the Inland Northwest region (area in and around Spokane WA, including parts of Idaho and Montana), as shown in Figure 1. Transportation is performed either by the mill or by an outside firm who is often the customer. Mill respondents were from four different states: Washington, Oregon, Idaho and Montana. The forty firms who responded to the mill survey shipped a total of 6,062,895 tons of varied forest products and are portrayed in Figure 2. A total of 84 mills had been identified for this study, resulting in a response rate of 47.6%. The geographical distribution of respondents follows the general location of all mills quite closely. Mills ranged in size from small operations to large corporate locations; tonnage by firm is classified and illustrated in Table 2. Mills reported a range in tonnage from 8 tons to 605,000 tons, with the average mill size being 146,047 tons per year. The median range for the mills is between 75,001 to 400,000 tons produced, representing 15 of the total mills (37.5%) that responded to the study. Only 4 mills were larger than the median range. All mills below the range are much smaller in number, with the exception in the 1,001 to 5,000-tonnage range, which had 7 mills reporting. Generally mill locations are near the source of supply and occur in clusters, as displayed in Figure 1.

Figure 1: Mill Locations in Region

Source: EWITS Forest Product Survey 1996
Figure 2: Mill Locations of Respondents

Table 2--Annual Mill Production by Tons

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<th>Tonnage Produced</th>
<th>Number of Firms</th>
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<td>1001-5000</td>
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<td>600001 or greater</td>
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<tr>
<td>No tonnage given</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Number of Firms</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

Source: EWITS Forest Product Survey 1996

During the course of this study from January to September 1996, four mills were permanently closed and one significantly reduced its volume of production. One mill closed in each of the north Idaho and southeastern Washington regions. In both cases the building and equipment were individually sold through public auction. The other two
mill closures occurred in northeast Washington. One firm has sold its building and equipment to China and has been shipped. The other firm, a family owned and operated mill for 47 years, is considered a permanent closure. One mill temporarily closed in Ferry county, but is currently operating at the time of this report. Prior to this study at least two other significantly sized firms in north Idaho had closed the previous year. Mills, which may have marginally existed, find it difficult to compete when pressure from imported products and market saturation occurs in the region. These firms are forced to either sell or go out of business.

In May 1996, under NAFTA negotiations, the U.S. and Canadian governments entered into an agreement that is designed to reduce lumber shipments from Canada into the U.S. It is assumed as long as demand in the U.S. is strong shipments will continue to enter. The agreement does impose a tariff of $50 per 1,000 board feet for any Canadian lumber exports exceeding 14.7 bbf and $100 per 1,000 board feet for more than 15.35 bbf per quarter (Eriksen). As long as the lumber volume remains at or below 14.7 bbf per quarter over the next five years, it is duty free.

**Mill Volume**

Raw logs entering mills are graded and sorted, with some shipped to other mills or sent west to ocean ports for exportation. Mill respondents were asked to classify the type of product they manufacture and to give an estimated annual volume. The mill survey reported 6,062,894 annual tons in movements, divided into three different product categories: 1) raw logs; 2) hogfuel, wood chips and sawdust (a.k.a. wood residuals); and 3) plywood, lumber, post, poles, pilings and other.

The volume of product shipped from responding mills is illustrated in Chart 3. Hogfuel, woodchips, and sawdust (HWS) ranged largest with 36.5% (2,214,273 tons). Raw logs ranked second at 33.1% (2,007,610 tons) of the total product shipped. Mills will transport raw logs to other mills due to size or specie differences. In one case a respondent corporate mill is currently (maybe temporarily) supplying another of their mills in an attempt to keep it supplied with logs as the majority of forest land near the mill is federal and public sales had virtually ceased. Several mills are a collection point for raw logs where the mills then grade and distribute the logs to the appropriate mill based on size or timber species. Generally, mills will specialize and manufacture a certain size and/or specie of raw logs that differs from other mills in the area (Antoine).

Wood residuals have become a large business within the forest product industry, stimulated by new product developments and environmental issues (Blatner). Environmental concerns have supported a more complete use of all tree parts, especially after it leaves the woods. Gone is the use of local teepee burners. What may have begun as an environmental issue developed into markets for these products. Heavy consumers for wood chips are paper mills and manufacturers of particleboard.
Hogfuel is any waste, sawdust, or trimming from lumber or plywood, bark, and chips of a lower quality. Hogfuel is used in the generation of electricity or as a source of heat for large or multiple building complexes. Most pulp mills generate their own electricity with their own wood scraps and residuals, which eliminates waste and reduces its power expenditure. Additionally, wood ash is easier to dispose of than coal ash, as the latter is considered hazardous waste material and must be handled accordingly (Blatner). Sawdust is mixed with other products in manufacturing panels, pellets, and presto logs or can be used as is for fuel.

Plywood, lumber, post, poles, pilings and other (PLPO) products comprise 30.4% (1,841,011 tons) of the total volume reported by firms. PLPO products are most commonly used as construction materials. Paper, shingles, shake products and landscaping bark are products fitting the “other” category.
Modal Shipments from Mills

Firms were asked whether they provided their own transportation or if an outside source was used for shipments from the mills. Outside firms moving products from mills dominated in all three-product categories, as shown in Figures 6 through 8. Almost no variation occurs among the three product categories. Generally, the customer hires a carrier to transport the forest product to their business. The forty firms reported a total of 6,061,445 annual tons. Eighty nine percent (1,780,110 tons) of raw logs are transported from the mill by an outside source. HWS products are shipped 84.4% (1,868,558 tons) of the time by an outside source, and PLPO products are shipped 88.7% (1,633,219 tons), as portrayed in Chart 5 and 6. Presumably firms concentrate on their manufacturing and leave the business of transportation to others. This relieves firms of extensive outlays for equipment, thus decreasing business risk and existence of financial detriment during a down swing in demand for wood commodities.

Chart 4: Raw Log Shipments from Mills, percent*

*Averages Weighted by Tonnage for Mill Respondents

Source: EWITS Forest Product Survey 1996
Chart 5: Hogfuel, Woodchips and Sawdust Shipments from Mills, percent*

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996

Chart 6: Plywood, Lumber, Post, Poles, Pilings and Other Shipments from Mills, percent*

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996
Timing of Shipments

Road conditions have a direct effect on the efficiency with which shippers can transport their products to market. Congested roads, inclement weather, road repair and construction delays, bad road conditions, weight restrictions and road closures are types of impediments faced by transporters. A total of 6,062,895 annual tons in this survey, identified as to shipment timing, is used for the following analysis in the three product categories (this is about 300,000 truck trips or about 600 million ton miles).

Raw Logs

Seasonal transport of raw logs by the mills is illustrated in Chart 7. Shipments from mills ranged from 11.6% to 19.6% in the different periods for the one-year period with, 2,007,610 annual tons being reported. Greater stability exists in raw log movements from the mills rather than to the mills, as established in the raw log report, Part 2 of this series (Alderson and Casavant). Mills are customarily located on or near state and federal highways, which helps decrease seasonal road problems in movements from the mills. Steady movement of raw logs ensues from July to December, a six-month period containing 57.2% (1,149,213 tons) of the total raw log movements. A slight decline begins in the January-February period (349,145 tons), down 1.8% from November-December (385,194 tons). March-April accounts for the lowest number of total shipments, with 11.6% (232,423 tons). In the May-June period shipments begin to increase modestly, increasing to 13.8% (276,828 tons) in total shipments. A 4.6% increase occurs in July-August (369,585 tons), with steady shipments for the next six months at 18% to 19%. September-October reported the highest volume in shipments per period with 394,434 tons (19.6%).

Some of the mills surveyed are small operations and may be located on county roads, which would account for some of the decreased shipments due to roadway restrictions. Generally their volume of production is much less than that of larger mills located on or near federal and state highways. A larger factor in the shipment decline is that weight restrictions may have interrupted the flow of raw logs into the mills, thereby decreasing actual shipments of logs out of the mills from March to June.
Chart 7: Seasonal Variation of Raw Log Transportation*

*Averages Weighted by Tonnage for Mill Respondents

Source: EWITS Forest Product Survey 1996

**Hogfuel-Woodchips-Sawdust**

Seasonal movement from mills for HWS products is portrayed in Chart 8. HWS products display the greatest stability in transportation of the three product categories. A range of only 16.3% to 17% exists for the 12-month period, with 2,214,273 annual tons being reported.
Drying out can damage raw logs, necessitating that logs be processed within a limited time period, as long-term storage can be detrimental. HWS products, on the other hand, can be stored for longer periods of time and there is less concern with this type of damage. This factor would result in a more stable flow throughout the year of HWS movements than for other wood products.
Another flow factor for HWS products is volume produced. Initially few mills produced wood residuals and their market price was higher. Many mills, seeing the high potential profits for wood residuals, procured chippers and entered the market. Today the market is saturated and an over supply condition exists (Weatherman and West). Accordingly, the current price is depressed and HWS products are easy to obtain. Both an over supplied market and a lesser concern for damage contributes to a more uniform movement of HWS products.

**Plywood-Lumber-Post, Poles, Pilings and Other**

Seasonal transport from mills for PLPO products is illustrated in Chart 9. A range of 15.5% to 17.8% exists for the twelve-month period of movements, with 1,841,011 annual tons being reported. July through December, a six-month period, contains 51% of the shipments (937,190 tons). A decline of 14,947 tons (0.8%) occurs from November-December (299,814 tons) to January-February (284,867 tons), when only 15.5% of total shipments occur. A slight increase occurs in March-April with 299,424 tons (16.3%) of the total PLPO product movements. May-June movements were 17.4% (319,531 tons), while July-August and September-October stabilize at 17.8% and 16.9% (326,883 and 310,493 tons), respectively.

---

*Source:  EWITS Forest Product Survey 1996*
Origin and Destinations

Raw log supplies to mills are discussed in the raw log section of this report, Part 2 of this series (Alderson and Casavant). Where and how various wood products were shipped from the mills was of interest for this study. Firms were asked to assign a percentage value to seven varying modes of truck, rail and river transport. A total of 6,062,894 tons were reported per annum: raw logs 2,007,610 tons, HWS 2,214,273 tons, and PLPO 1,841,011 tons. The importance of truck transport for all three-product categories became quickly obvious, and is evident in Figures 12 through 14.

Raw Logs

Raw log movements from mills moved by truck to final destination 54.2% (1,087,440 tons) of the time (Chart 10). Truck movements to river ports on the Snake and Columbia Rivers were second with 478,326 tons or 23.8%. Mills in the Lewiston-Clarkston, Wallula and eastern Oregon areas and others downstream utilize this mode. Mills more distant from river ports, such as those from northeast Washington, generally do not use these facilities. All truck modes comprised 1,672,920 tons (83.3%) of the total raw log movements from the mills. Rail to final destination placed third with 325,274 tons (16.2%). Generally mills located on or near rail lines will partially employ this mode of transportation, especially if longer market distances must be traversed.

Chart 10: Transportation Modes Utilized for Raw Log Shipments from Mills*

*Averages Weighted by Tonnage for Mill Respondents

Source: EWITS Forest Product Survey 1996
Hogfuel-Woodchips-Sawdust

Two modes of shipments comprised 2,199,023 tons (99%) of the transportation activity for HWS products (Chart 11). Truck to final destination was most common, with 1,394,567 tons (63%); rail to final destination was second at 804,456 tons (36.3%). Rail is used to either move large volumes of HWS products and/or reach distant market destinations. In these circumstances, this results in lower transportation cost to the firm than by truck. Firms reported river and ocean ports are rarely utilized in the transport of HWS products.

Plywood-Lumber-Post, Poles, Pilings and Other

Truck to final destination was the most common destination for the PLPO category, with 53.7% (988,365 tons) of the total movement; rail to final destination was second with 32.8% (604,183 tons) Chart 12. The two modes combined comprise 86.5% of the total PLPO shipments from mills. Together the three truck modes account for 1,159,676 tons (63%) of the movements from mills. Clearly truck modes are the dominant source of transport for all three-product categories. Rail to ocean ports included finished lumber products destined for the export market to the Pacific Rim countries.

Chart 11: Transportation Modes Utilized for Hogfuel, Woodchips, and Sawdust Shipments from Mills*

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996
Chart 12: Transportation Modes Utilized for Plywood, Lumber, Post, Poles, Pilings, and Other Shipments from Mills*

- River to Ocean Port: 1.3%
- River to Final Destination: 0.03%
- Rail to Ocean Port: 2.9%
- Rail to Final Destination: 32.8%
- Truck to Ocean Port: 5.0%
- Truck to River Port: 4.3%
- Truck to Final Destination: 53.7%

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996
Destination of Product by Truck

Firms were asked to identify the regions to which their products are marketed. Markets reached by the three product categories by truck as a final destination are illustrated in Figures 15 through 17. Averages are weighted by tonnage for mill respondents. Firms reported the following tonnage: raw logs 1,087,440, HWS 1,398,108, and PLPO 988,365. Combining the three product categories results in 3,473,913 tons in truck to final destination movements or 57.3% of the total movements reported.

**Raw Logs**

Raw logs from mills remained 60% (656,821 tons) of the time in eastern Washington (Figure 3). Interestingly, movements to all other locations are about uniform, except for states east of the Mississippi with only 39,989 tons (4%). States west of the Mississippi (exclusive of California), and California placed second and third with 92,678 tons (9%) and 92,089 tons (8%) each. Canada is fourth with 71,750 tons (7%). Western Washington and Oregon followed closely as fifth and sixth with 64,894 tons apiece (6%). Uniformity in different markets areas would indicate that eastern Washington raw logs are considered a reliable product and are in consistent demand. This could also indicate a marketing scheme whereby diversification of markets would aid the firm during a time of diminished product demand, such as a recession. It also indicates that the highway infrastructure to support truck movements and access to markets is needed in all directions.

**Hogfuel-Woodchips-Sawdust**

A different market scenario exists for HWS products than that of raw logs or PLPO products (Figure 4). Eastern Washington is the market for 506,021 tons (36%) of the HWS products transported. Canada, states west of the Mississippi, Oregon and western Washington tied at 14% each: 193,809, 192,375, 190,951, and 188,179 tons in shipments, respectively. Together Washington and Oregon comprised 885,151 tons (64%) of the market for HWS products. California receives 102,617 tons (7%) in shipments. A large volume of wood residuals move in both directions between eastern Washington and Canada in a year, as both areas can often buy wood residuals more economically from the other one than from themselves, due to variations in supply and negotiations on price. Trucks hauling wood residuals into eastern Washington return in some instances to Canada with residuals from a Washington mill. Shipments to Canada are likely destined for mills at Castlegar and Grandforks for processing (West and Shuler). Stevens county and Pend Oreille county locations were reported as transporting wood residuals to Canada. HWS products are a heavy weight, low value product. Generally HWS products are transported fewer miles to satisfy markets closer to eastern Washington.

**Plywood-Lumber-Post, Poles, Pilings and Other**

PLPO commodities are finished products made from the raw logs transported to the mills. Washington and Oregon comprised 61% (602,492 tons) of the PLPO markets (Figure 5). Eastern Washington placed first with 218,660 tons (22%). Western Washington and Oregon were second and third at 191,980 (20%) tons and 191,852 tons (19%), respectively. States west of the Mississippi ranked fourth with 128,464 tons (13%), while Canada and California were fifth and sixth with 111,321 tons (11%) and 91,866 tons (9%) apiece. States east of the Mississippi had the lowest market destination share of 54,222 tons (6%). PLPO commodities are higher in weight and value than wood residuals and seem to move to markets of greater distance.
Destination of Product by Rail

Mills transporting by rail were asked to demarcate their markets. Rail in this instance means rail to final destination only. All three-product categories are illustrated in Figures 18 through 20. Annual tonnage is reported as follows: raw logs 325,274, HWS 800,915 and PLPO 604,183. Together the three product categories comprise 28.5% in overall shipments. Several trends can be seen in all three product categories by rail as compared to truck modes: rail volumes increase to states east and west of Mississippi and decrease to Canada and eastern Washington. Rail shipments to eastern Washington were reported to be 1% or less. Averages are weighted by tonnage for mill respondents.

Raw Logs

Rail shipments to states east of the Mississippi were 34% (111,527 tons) of the raw log volume being transported (Figure 6). Western Washington receives 27% (88,840 tons), placing it second in total volume and Oregon ranked third with 44,161 tons (14%). California and states west of the Mississippi received shipments by rail 13% (40,375 tons) and 12% (40,356 tons) of the time, respectively. As was expected, a minimal volume of 15 tons remained in eastern Washington as short hauls by rail are not customary. No shipments were acknowledged to Canada by the firms. Combining Washington, Oregon, California and states west of the Mississippi, 66% (213,732 tons) of the volume remains in the western United States, a noticeably lower amount than when raw logs are transported by truck. This again demonstrates that rail may be more cost effective in reaching long distance markets than is truck.

Hogfuel-Woodchips-Sawdust

HWS commodities shipped by rail traveled longer distances compared to truck modes. As indicated earlier, truck shipments were used heavily to eastern and western Washington, Oregon and Canada. Rail shipments were the opposite; more volume is shipped away from the immediate source of origin. Firms reported 229,867 annual tons (29%) in rail shipments to states east of the Mississippi (Figure 7). States west of the Mississippi followed a close second with 212,208 tons (27%), and rail shipments to California reported 154,153 tons (19%). Western Washington, Oregon, and Canada followed with 9%, 9% and 7% apiece (75,235, 74,550 and 52,357 tons). Again rail movements in eastern Washington were very low, with only 2,545 tons remaining.

Plywood-Lumber-Post, Poles, Pilings and Other

PLPO products are a high volume, high value commodity. Again markets involving greater distances are utilizing rail transport. States east of the Mississippi received 208,388 tons (35%) of rail shipments, placing it first (Figure 8). Most common were states west of the Mississippi, receiving 180,335 tons (30%) and California, third with 83,014 tons (14%). Western Washington and Oregon followed with 10% (62,644 tons) and 9% (51,579 tons), respectively. Canada and eastern Washington remained low with 14,715 tons (2%) and 3,508 tons apiece.

Rail shipments support more market options by being able to transport goods greater distance and generally at less expense. Increased market diversification is an advantage to firms and helps them maintain a competitive posture. Thus, long distance markets become a viable option for producers when rail transport can be and is used.
Figure 3: Raw Log Shipments from Mills by Truck to Final Destination

CANADA

Western
WA
6%

Oregon
6%

California
8%

E. of Mississippi
4%

W. of Mississippi
9%

★ 60% remains in E. Washington
Figure 4: Hogfuel-Woodchips-Sawdust Shipments from Mills by Truck to Final Destination

CANADA

Western WA 14%

Oregon 14%

California 7%

E. of Mississippi 1%

W. of Mississippi 14%

☆ 36% remains in E. Washington
Figure 5: Plywood-Lumber-Post, Poles, Pilings and Other Shipments from Mills by Truck to Final Destination

CANADA

Western
WA
20%

Oregon
19%

California
9%

E. of Mississippi
6%

W. of Mississippi
13%

22% remains in E. Washington
Figure 6: Raw Log Shipments from Mills by Rail to Final Destination

CANADA

Western
WA
27%

Oregon
14%

California
13%

E. of Mississippi
34%

W. of Mississippi
12%

.005% remains in E. Washington
Figure 7: Hogfuel-Woodchips-Sawdust Shipments from Mills by Rail to Final Destination

CANADA

Western WA 9%

Oregon 9%

California 19%

E. of Mississippi 29%

W. of Mississippi 27%

7%

.03% remains in E. Washington
.06% remains in E. Washington
Truck Movements

Firms were asked to give more detail as to the destination of all truck movements from the mills. Results were again segregated into the three product categories: Raw Logs 1,672,921 tons, HWS 1,413,238 tons and PLPO 1,159,677 tons.

Raw Logs

Truck to final domestic destination for raw logs ranked lower than the other two product categories to follow, thus displaying more diversification in overall movements. Truck to final domestic destination was only 1,087,440 tons (65%) in Chart 13. River ports were the second choice with 478,326 tons (28.6%) reported and ocean ports share was 107,154 tons (6.4%). Raw logs had a higher use of river and ocean ports than the other two product categories. The higher use would suggest that raw logs are destined for foreign markets in the Pacific Rim countries.

Hogfuel-Woodchips-Sawdust

HWS products were transported by truck to final domestic destination 98.9% (1,394,567 tons) of the time (Chart 14). Truck to ocean port accounted for 11,423 tons of total shipments. Although several paper mills are located on the Columbia River, firms reported only 3,708 tons in shipments to river ports.

Plywood-Lumber-Post, Poles, Pilings and Other

The use of river ports and ocean ports are more important to producers of PLPO products than HWS products. Truck to ocean port moved 92,412 tons (8%) while truck to river port reported 78,899 tons (6.8%), indicating these products are being exported through west coast ports (Chart 15). The overriding mode was truck to final domestic destination, with 85.2% (988,365 tons). PLPO products, being a higher weight, higher value commodity, would account for the increased use of river and ocean port movements to reach extended foreign markets. Mills depend heavily on truck transportation in eastern Washington to ship these products to their respective markets. Therefore, efficient road systems continue to be crucial to eastern Washington forest industries if they are to remain competitive in a global market for these products.
Chart 13: Truck Movement of Raw Logs from Mills*

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996

Chart 14: Truck Movement of Hogfuel, Woodchips, and Sawdust Products from Mills*

*Averages Weighted by Tonnage for Mill Respondents
Source: EWITS Forest Product Survey 1996
Specific transportation problems for mills are illustrated in Table 3. Firms were given four different varying scale choices of how individual problems may affect them: often, sometimes, seldom and never. The answers are by the number of firms and data are not weighted. Only one problem was reported in the “other” category, and is explained later.

Temporary road closures due to weather or softness probably were of some importance for specific mills, with 3% reporting a problem often and 38% sometimes. Smaller mills are often located in more remote sites and their first access may be on a secondary or county highway, which increases the probability of constraints during spring thaw and road closures.

Weight restrictions were a more common problem for the mills. This problem received the highest response when compared to the other transportation problems. Twenty-one percent indicated problems often and 44% sometimes at any time during the year, thus, 65% of the mills are having at least some problems with weight restrictions. The differences in weight restrictions, it was reported, caused transporters problems when shipping from Montana to Idaho and Washington due to different requirements in each state.

Firms did experience a serious rate problem 43% of the time. Rates are discussed in more detail in the next section on rate structure. Several transportation problems were considered less serious and are as follows. Permits were less of a problem with 59% choosing seldom and only 14% sometimes. Firms reported problems with short corners due to truck length, often at 7% and 14% sometimes; meaning firms had problems 21% of the time. Short corner problems for firms are often experienced in travel through cities, exit and entrances to mill yards and county accesses to state highway systems. Safety issues were at the bottom with only 14% indicating a problem sometimes. No examples were provided. Lack of turnouts (to let cars pass) was of less concern with only 7% of the firms experiencing a problem often or sometimes. As distances were mentioned previously, most mills are located near state highways. Generally, when the product leaves the mill, it is shipped on a major highway system which accommodates heavier traffic patterns and longer truck configurations and is designed to minimize safety concerns, weight restrictions, etc., which probably accounts for the lower concern with some of these problems.
Other issues depicting moderate problems were the following: Available drivers was a problem often, 13% and sometimes, 25%, the majority of respondents (63%) had few problems. Available drivers is less of a problem for mills than the commercial and raw log firms because mills may offer more stable employment and employees can bid for such positions as they become available. Hence, mill driver employees commonly come from within the areas, whereas commercial and raw log drivers would probably come more randomly from other sources. Bridge laws (load restrictions per distance between tires) were a problem often for 10% of the firms and 7% sometimes.

Source: EWITS Forest Product Survey 1996
Rate Structure

Mill respondents were asked about the rate structure utilized for their shipments. Firms were given three different choices of varying scale ratings: always, often and seldom. The three rates offered were Washington Utilities Transportation Commission (WUTC), Modified WUTC and other. The answers are by the number of firms and data is not weighted. Description of how WUTC rates function can be found in Part 2 of this series (Alderson and Casavant).

WUTC was not the only rate structure utilized by mills, as shown in Table 4. Sixteen percent of the firms always used WUTC, and 42% did so not often or seldom. The modified WUTC rate was practiced less than the WUTC rate by firms, with only 36% choosing often and 64% seldom. The “other” rate category dominated over WUTC or its modification. Comments from mills indicated several different options for “other”; most notable were negotiated rates. Other rate comments are as follow: 1) rates are based on distance and product handled; 2) pay by the mile with accessorial (road quality conditions) charges; 3) customer pays for the freight; 4) occasionally an hourly basis on logs; and 5) rates charged by a per mile per hundred weight basis. One comment implied rates would occasionally be decreased when it will insure a back haul for the carrier. Based on firms’ comments and survey answers, many different rates exist.

Table 4--Rate Structures Utilized by Mills

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<td>30%</td>
<td>15%</td>
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Source: EWITS Forest Product Survey 1996

This variation may be in part due to the multitude of different commodities shipped out of mills. It also suggests that truckers are very competitive and are creative with rates when attempting to procure a payload; this probably indicates at times the supply of shippers is greater than the demand for their services.
Summary

Most forest product mills are located in rural areas and are valuable assets to those areas. Outside pressures determine the quantity demanded on most wood products. These pressures originate from several sources; imports by foreign countries, construction demands in both residential and non-residential sectors in the U.S., demographic changes, interest rates, etc. Mills in eastern Washington, eastern Oregon and north Idaho have similar transportation characteristics and usually opt for not shipping their own products, leaving that responsibility to either the customer or an outside shipping source. Timing of shipments, although steadier than raw logs, does tend to follow the same trend as raw logs, with most shipments occurring between July and December.

Finished products were hauled shorter distances by truck from eastern Washington than that of rail. Transportation problems were less of an obstacle to mills than to raw log shippers, probably due to most mills being located near state or federal highways and the fact most mills do not ship their own products. Environmental issues and economic pressures are forcing mills to maximize raw log utilization and develop technology and markets while using transportation alternatives to help them remain competitive in a global economy.
References


West, Steven. Telephone Interview. Kettle Falls, WA. 22 May 1996.

Appendix A

Study Contacts
## Study Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Position</th>
<th>Location</th>
</tr>
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<tr>
<td>Royal Antoine</td>
<td>Antoine &amp; Son Trucking</td>
<td>Chewelah, WA</td>
</tr>
<tr>
<td>Jim Weddell</td>
<td>Port of Clarkston</td>
<td>Clarkston, WA</td>
</tr>
<tr>
<td>Doug Parks</td>
<td>Whitman County Sheriffs Dept. Weigh Master</td>
<td>Colfax, WA</td>
</tr>
<tr>
<td>L. and B. Lawson</td>
<td>Lawson Trucking</td>
<td>Colville, WA</td>
</tr>
<tr>
<td>A. and B. Kroiss</td>
<td>Andy Kroiss Logging, Inc.</td>
<td>Colville, WA</td>
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<tr>
<td>Tom Schwartz</td>
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<td>Eric Weatherman</td>
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<td>Kathy Anderson</td>
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<td>Idaho Veneer Co.</td>
<td>Post Falls, ID</td>
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<td>Dr. Keith Blatner</td>
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<td>James Hambidge</td>
<td>Canyon Lumber Co., Inc.</td>
<td>Springdale, WA</td>
</tr>
<tr>
<td>Thomas Buche</td>
<td>Tom Buche Logging</td>
<td>Springdale, WA</td>
</tr>
<tr>
<td>Bob Lloyd</td>
<td>Lloyd Logging</td>
<td>Twisp, WA</td>
</tr>
<tr>
<td>Randal Klingbeil</td>
<td>Klingbeil Logging</td>
<td>Valley, WA</td>
</tr>
<tr>
<td>Tim Rogers</td>
<td>Louisiana Pacific Forester</td>
<td>Walla Walla, WA</td>
</tr>
<tr>
<td>Betty Walker</td>
<td>W-4 Construction, Inc.</td>
<td>Walla Walla, WA</td>
</tr>
<tr>
<td>Duane Good</td>
<td>Boise Cascade</td>
<td>Wallula, WA</td>
</tr>
<tr>
<td>Jim Canaday</td>
<td>Canaday Trucking</td>
<td>Yakima, WA</td>
</tr>
</tbody>
</table>
Appendix B

Mill Survey Questionnaire
3. How often do you experience any unusual transportation problems by truck with the following?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road closures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight restriction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short corners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of drivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge Laws</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of turn-outs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. If you answered “other” in question 3 would you please explain in detail what other problem(s) you may have encountered.

5. We are interested in the rate structure used by those who transport their forest products by truck. Would you please check the following? *Answer is confidential.*

<table>
<thead>
<tr>
<th>Rate Structure</th>
<th>Seldom</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>WUTC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified WUTC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. If you answered “other” or “modified WUTC” in question 6 would you briefly explain your preferred rate structure or attach your rate sheet.

<table>
<thead>
<tr>
<th>Name of firm</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person answering questionnaire</td>
<td></td>
</tr>
</tbody>
</table>

If you want a personal copy of the results check here [ ]
7. This question may involve several answers. Please bear with us, as it will help us to understand what mode of transportation is used and what improvements may be useful. Please give your best estimate by percentage of the forest products shipped from your facility to the following destination in an average year. (See yellow insert for an example of question 7.)

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>Truck to final destination</th>
<th>Truck to river port</th>
<th>Truck to ocean port</th>
<th>Rail to final destination</th>
<th>Rail to ocean port</th>
<th>Rail to final destination</th>
<th>River to final destination</th>
<th>EQUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Washington</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western WA (includes WA ocean ports)</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oregon (includes OR ocean ports)</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other states west of Mississippi</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>States east of Mississippi</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. If “other” was answered in question 7 above could you please specify mode(s) to destination(s)?

9. We are interested in the volume of forest products that are shipped from you facility. This question will help us to understand the volume shipped and their proportions to one another. Please provide your best estimate based on your average volume by net tons for a year.

<table>
<thead>
<tr>
<th>PRODUCT SHIPPED</th>
<th>TRUCK TO Final domestic destination (by average net tons per year)</th>
<th>River port</th>
<th>Ocean port</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw logs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hog fuel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood chips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saw dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumber</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post, poles, and/or pilings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Your comments & concerns: (If not enough room please feel free to add a separate sheet.)

Thank you for your help
7. This question may involve several answers. Please bear with us, as it will help us to understand what mode of transportation is used and what improvements may be useful. Please give your best estimate by percentage of the forest products shipped from your facility to the following destination in an average year. (See yellow insert for an example of question 7.)

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<thead>
<tr>
<th>DESTINATION</th>
<th>Truck to final destination</th>
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<th>Truck to ocean port</th>
<th>Rail to final destination</th>
<th>Rail to ocean port</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Eastern Washington</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Western WA (includes WA ocean ports)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Oregon (includes OR ocean ports)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>California</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Other states west of Mississippi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>States east of Mississippi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

8. If “other” was answered in question 7 above could you please specify mode(s) to destination(s)?

________________________________________________________________________

________________________________________________________________________