

**A Profile of Wood Supplied to Pallet Manufacturers by Sawmills along the
Front Range of Colorado**

Final Draft

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Table of Contents (Outline)

Chapter/Section	Page
1.0 Introduction	1
1.1 Research Objectives	2
1.2 Scope of Research	2
2.0 The Lumber Industry along the Colorado Front Range	2
2.1 A survey of Colorado Sawmills	3
2.2 A Profile of Lumber Manufacture in Colorado	5
2.2.1 Source of Logs	5
2.2.2 Species	6
2.2.3 Volume	7
2.2.4 Grades	9
2.2.5 Products and Markets	9
2.3 Issues of Concern to Colorado Lumber Manufacturers	10
2.3.1 Resource (Log) Availability	10
2.3.2 Residue Disposal	11
2.3.2.1 Slabs	11
2.3.2.2 Sawdust, Shavings, and Bark	13
3.0 A Profile of Wood being Supplied to Colorado Pallet Manufactures from Colorado Forests	13
3.2.1 Species	14
3.2.2 Volume	14

3.2.3	Sizes and Grades	15
4.0	The Potential for Increasing the Volume of Colorado Wood used to Manufacture Pallets	16
4.1	The Potential for Manufacturing Pallet Components from Slabs	19
5.0	Summary and Conclusions	20
6.0	Literature Cited	23

1.0 Introduction

Over the past 25 years, timber policy on Federal and State Land has led to an abundance of small to mid-sized diameter trees in the public forests of Colorado. Development of a effective policy for increased harvest of timber on these lands would:

1. Increase forest diversity.
2. Decrease the risk of fire and disease.
3. Provide a stable economic foundation for the local economies involved with the harvest and utilization of these trees.

To implement such a policy, uses for the harvested wood must be found.

Because small to mid-sized diameter trees found in Colorado generally have wood of low quality, potential uses are limited. However, the Colorado pallet industry could potentially utilize this resource, particularly wood harvested from the forests along the front range. This industry relies heavily on low cost wood which is generally of lower quality, currently consuming an estimated 50 million board feet of lumber annually (Mackes, 1997). Approximately 95 percent of this wood is imported from out-of —state. To increase the amount of Colorado wood used to manufacture pallets there is a need to evaluate the factors which prevent Colorado sawmills from supplying more wood to

pallet manufacturers and identify the conditions which favor increased utilization of Colorado wood.

1.1 Research Objectives

The objective of this research is to present a profile of wood supplied to pallet manufacturers along the front range by Colorado lumber mills and evaluate the potential for increasing the amount of wood from Colorado forests used to manufacture pallets.

1.2 Scope of Research

To develop a profile of wood currently supplied to pallet manufacturers by sawmills along the front range, a survey of these sawmills was conducted. A general overview of lumber manufacture in this region is presented. A profile of Colorado wood being supplied to pallet manufacturers from mills along the front range is then given. The potential for increasing this volume is evaluated, along with the potential for manufacturing pallet components from slabs.

2.0 The Lumber Industry along the Colorado Front Range

To achieve the objectives of this research, potential suppliers of wood from Colorado forests to pallet manufacturers along the front range were surveyed. Because pallet manufacturers typically purchase raw material in the

form of dimension lumber, the survey focused on Colorado sawmills. Based on this survey, a profile Colorado sawmills was developed. Issues of concern to Colorado sawmills are also identified. The survey and related issues are discussed subsequently.

2.1 A survey of Colorado Sawmills

Sawmills along the front range which could potentially supply lumber to pallet manufacturers were surveyed. The survey area included the front range of Colorado from Fort Collins south to Walsenburg. Sawmills in North Park, Middle Park, and the San Luis Valley were also surveyed. A contact list was compiled using the *Colorado Forest Industries Directory* (CSFS, 1998) and the *Yellow Pages*. Sawmills were surveyed over the phone during June and July of 1998. The survey questions asked are outlined in Appendix A.

A summary of information collected from phone surveys is presented in Table 2.1. Of the 23 mills surveyed, 22 were operating, cutting primarily rough sawn dimension lumber and timbers (cants) to order. One mill was currently being established and was not operational when surveyed. One of the companies surveyed operates a *Wood Miser* portable sawmill. Two sawmills surveyed are operated primarily for personal use. Further discussions of survey results are presented subsequently.

Table 2.1. Summary of Sawmills Surveyed.

COMPANY NAME	STATUS
Casey's Lumber	DL/T, SLP/SPC, US
Dochter Lumber	DL/T, SLP/SPC, US
Forest Products, Inc.	
Forks Lumber Company	DL/T, SLP, US
Geiger Logging	*
Griffin Farms	DL/T, DNSLP, US
Hayden Forest Products	DL/T, DNSLP, US
Hester's Log and Lumber	DL/T, SLP, US
Hostetters Sawmill	DL/T, DNSLP, US
Jackson Lumber Company	DL/T, SLP, DNUS
Kolisch Lumber	T, DNSLP, DNUS
Log Design Work	T, DNSLP, DNUS
McCornb Lumber	DL/T, SLP/SPC, US
Mountain Valley Lumber Co.	DL/T, SLP, US
Mountain View Lumber Co.	DL/T, DNSLP, DNUS
Old Time Lumber	DL/T, SLP, US
Owl Mountain Enterprises	
Ron Jones Lumber Company	DL/T, DNSLP, DNUS
Stucker Wood Products	DL/T, DNSLP, US, **
U. S. Forest Products	DL, SLP, DW
United Wood Products	DL/T, DNSLP, US
Whiskey Spring Lumber Mill	DL/T, DNSLP, DNUS
Woodworks Lumber & Sawmill	DL/T, DNSLP, US

DL — Produce Rough sawn Dimension Lumber T - Produce Rough Sawn Timbers (Cants)

SPC - Sell Pallet Components

SLP - Sell Lumber to Pallet Manufacturers

DNSLP - Do Not Sell Lumber to Pallet Manufacturers

US - Utilize Slabs

DNUS - Do Not Utilize Slabs

* - Setting up lumber mill, mill is currently not operational.

** — Portable Wood Miser sawmill.
Small sawmill for personal use.

2.2 A Profile of Lumber Manufacture in Colorado

Except for one mill in the San Luis Valley which employs approximately 100 people and annually processes over 60 million board feet (mmbf) of lumber, the typical Colorado mill is a small-sized business, with fewer than 20 employees, annual sales of less than 2 million dollars, and annually processing less than 5 mmbf. The source of logs, species, volume, and grades processed by Colorado mills, along with products and markets for the wood processed, are discussed in subsequent sections.

2.2.1 Source of Logs

Most Colorado lumber mills rely heavily on timber obtained from private land. On average, mills are getting at least 80 to 85 percent of their logs from private sources, with several mills getting 100 percent of their wood from private lands. Most mill owners stated that they are trying to use as little wood from public land as possible. Several reasons account for the preference of wood from private land. Wood from private land is more reasonably priced. Sales also tend to be relatively small and easily financed. Sale administration restrictions imposed on public lands reduce profitability of these sales. For example, one mill owner commented that in a recent public sale, logging was restricted in the spring and early summer because of elk calving and then again in the fall

because of the hunting season which now runs from September to mid—November. The loggers were expected to work primarily in the heat of summer and deep snow of winter when it is more expensive to operate. Such restrictions are more reasonable on private lands. Private timber sales are also viewed as more reliable, both in terms of availability and inventory.

2.2.2 Species

Generally, the Colorado sawmills surveyed are cutting commercial species available in their area.

Species which are being utilized include:

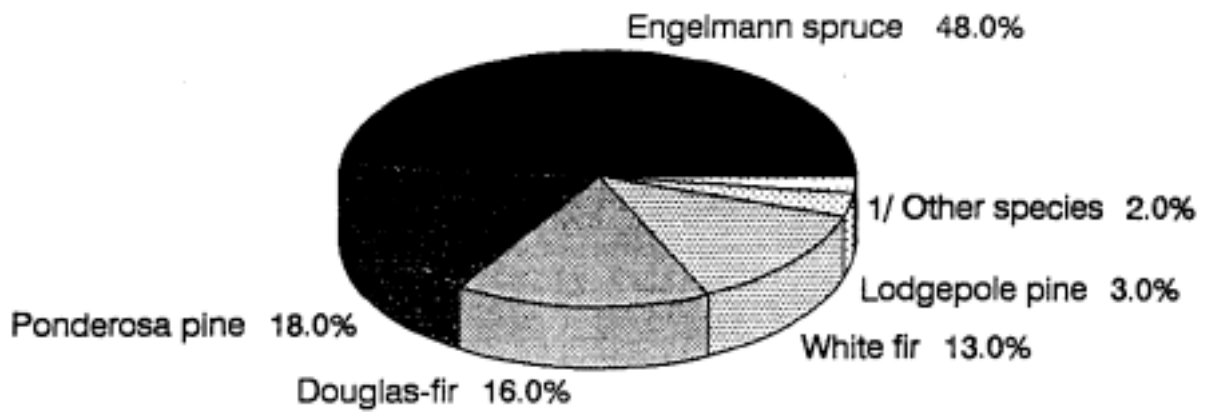
1. Ponderosa pine
2. Lodgepole pine
3. Douglas-fir
4. Engelmann spruce
5. Subalpine fir
6. Aspen

The percentage of a given species cut by a mill varies primarily as function of the location or region they are getting their logs from. These percentages can vary significantly between timber sales. For example, one mill along the front range is currently cutting almost exclusively ponderosa pine. However, two months ago they were cutting almost all Engelmann spruce and lodgepole pine.

Unless a customer specifies a particular species, the majority of mills surveyed do not discriminate against individual species and utilize logs that are available. Therefore, log availability generally dictates which species are predominantly processed at a sawmill. Approximate percentages of wood processed by species based on production volume are discussed further in Section 2.2.3.

2.2.3 Volume

The sawmills surveyed produce over 80 mmbf of rough sawn dimension lumber and timbers annually. Based on volume, the percentage of annual production by species is presented in Figure 2.1. Engelmann spruce accounts for 48 percent production in the region, followed by ponderosa pine at 18 percent and Douglas-fir at 16 percent. However, there is considerable variation based on location and source of logs. Because one sawmill in the San Luis Valley accounts for over 75 percent of production in the survey region, species cut by this mill are heavily represented in terms of volume. This is particularly true for white fir. Only one other mill reported cutting white fir, a very small percentage at that. Generally, sawmills along the front range reported cutting higher percentages of ponderosa pine and lodgepole pine, but in terms of volume these mills do not produce as much.



1/ Other species processed include aspen, subalpine fir, cottonwood, etc.

Figure 2.1. Percentage of Wood Processed by Species Based on Volume.

2.2.4 Grades

Although some mills can and do grade stamp lumber, the majority of mills do not. Nonetheless, most mills do sort out lumber with severe defects. Exceptionally prime lumber can sell for up to \$900.00 per thousand board feet (mbf). However, all the mills surveyed reported producing a high percentage of lower grade economy lumber and timbers which they typically sell for between \$300.00 and \$750.00 per mbf. Lumber for pallet manufacture is usually priced between \$150.00 to \$300.00 per mbf.

2.2.5 Products and Markets

The majority of mills surveyed cut dimension lumber and timbers to order. However, at least one mill surveyed does produce dimension lumber to stock sizes for sale. Lumber is sold for a wide range of uses including pallet manufacture. Uses for timbers include beams for houses, mine timbers, and railroad ties.

Other products produced by the mills surveyed include house logs, paneling, flooring, furniture components, siding and fencing. Several mills also produce posts and poles. Most mills sell by-products, including firewood, mulch, and animal bedding.

2.3 Issues of Concern to Colorado Lumber Manufacturers During surveys, Colorado lumber mill operators were

asked if they had concerns regarding current operations and future plans. Although there were many expressed, two areas of concern within the scope of this project seemed to predominate, resource (log) availability and residue disposal, which are discussed in subsequent sections.

2.3.1 Resource (Log) Availability

Without exception, all of the sawmills surveyed rely heavily on private lands for their supply of logs. The reasons given for minimizing the use of logs from public lands are:

1. Public sales being “lumped” together increase the difficulty of financing sales.
2. High stumpage costs relative to the quality and size of timber being sold.
3. Discrepancies between what is purchased based on forest inventories and what is actually harvested.
4. Sale restrictions, including restrictions on road construction, harvesting methods and procedures, and times when logging or log transport can be conducted.
5. Inconsistent supply both in terms of volume and quality.

Mill operators have concluded that these factors act to increase the cost of doing business making logs harvested from public land less profitable to process. Because

securing an adequate supply of quality logs for processing is crucial to the survival of all the sawmills surveyed, it comes as no surprise that most sawmill operators are concerned about whether there is adequate timber reserves on private lands to sustain current production levels.

2.3.2 Residue Disposal

In years past, lumber mills simply burned wood residues. However, with ever increasing restrictions on wood burning in Colorado, residue disposal has become more of a concern for mills. Generally, sawmills close to urban or agricultural areas are successfully disposing of these residues. However, residue disposal is still a concern for the majority of mills, particularly those in more remote areas of the state. Residues of concern include slabs, sawdust, shavings, and bark. Disposal of these residues is discussed further in subsequent sections.

2.3.2.1 Slabs

Generally, sawmills are able to sell the majority of slabs produced. At least two sawmills along the front range stated that there was higher demand for slabs than availability. However, the majority of sawmills produce more than can be sold and mills in remote areas sometimes can not give them away.

Both edged and unedged slabs are sold for interior and exterior siding and fencing material. Better slabs are usually edged. Common widths include 4, 6, and 8 inches, although widths up to 16 inches are available. Slabs are sold either by the piece, board foot, or lineal foot. Typically, most mills are getting about a \$1.00 for a good edged slab. Unedged slabs usually sell for less than half the amount of edged slabs. Unedged slabs are often sold by bundle, although some mills also sell them by the piece.

Many slabs are sold or given away for firewood. Sawmills get up to \$40.00 per cord for firewood slabs, although the average is probably around \$20.00 per cord. Again, in remote areas, some mills can not give them away for firewood.

Several mills have looked into chipping slabs, but did not proceed citing the poor market for chips. Several mills are looking into producing shavings from slabs which can be sold for animal bedding. Slabs are also ground or chipped up and utilized for mulch.

At least three mills surveyed are recovering boards from slabs down to 1x4 inch boards having lengths of at least 48 inches. These boards are generally sold to pallet manufacturers. The remaining residues from this recovery process are ground and/or chipped up for mulch.

2.3.2.2 Sawdust, Shavings, and Bark

Sawdust and shavings can be sold for animal bedding. These residues are usually sold by the cubic yard or pickup load. Prices range up to \$5.00 per cubic yard or about \$10.00 to \$20.00 per pickup load. Although sawmills in more populated areas can usually sell all of the sawdust and shavings they produce, mills in more remote areas have a more difficult time disposing of these residues. At least three mills surveyed consider disposal of sawdust, shavings, and bark to be more of an issue than slabs. One large mill in the San Luis Valley is currently paying to have sawdust and shavings composted. Sawdust and shavings that can not be sold for animal bedding are often mulched with bark, which is then sold or given away. Several smaller mills simply spread out the sawdust and shavings they produce around the yard and let mother nature take its course.

3.0 A Profile of Wood being Supplied to Colorado Pallet Manufacturers from Colorado Forests

Although the majority of sawmills surveyed do not supply wood to pallet manufacturers, data was obtained from nine sawmills that currently do supply wood. None of these sawmills actively produce pallet components as a primary product, with lumber sold to pallet manufacturers comprising 10 percent or less of the wood volume processed by the mill. Perhaps one mill operator put it best when asked if they

produce lumber for sale to pallet manufacturers, saying “not on purpose.” They generally sell low quality boards to pallet manufacturers which can not be sold for other uses, such as economy 2x4’s, 1x4’s, and 1x6’s.

At least three mills are selling boards recovered from slabs and one mill is selling boards resawn off of cants for pallets components. Information was obtained on species, volume, and the sizes and grades of wood currently being supplied to pallet manufacturers. These issues are discussed further in subsequent sections.

3.2.1 Species

All commercial tree species found in Colorado are suitable for making pallets (Mackes, 1997). The sawmills surveyed are supplying almost exclusively softwoods to pallet manufacturers along the front range. Softwood species being supplied are primarily ponderosa pine, lodgepole pine, Douglas-fir, and Engelmann spruce. None of the sawmills surveyed indicated that they were supplying aspen to pallet manufacturers, although at least one manufacturer along the front range is using aspen when available (Mackes, 1997).

3.2.2 Volume

Because many manufacturers were not exactly certain how much or if they were even supplying rough sawn lumber and/or

timbers to pallet manufacturers, it was not possible to precisely estimate the actual amount. However, based on available information, the sawmills surveyed are annually selling 6 to 7 mmbf to pallet manufacturers. Approximately 50 percent of this material is being shipped to pallet manufacturers outside the state. Destinations outside Colorado include pallet manufacturers in Arizona, Nebraska, New Mexico, and Texas. Therefore, 3 to 3.5 mmbf of wood is annually supplied to Colorado manufacturers. Because it is conservatively estimated that 50 mmbf of lumber are used annually by Colorado pallet manufacturers (Mackes, 1997), approximately 6 to 7 percent or less of this material comes from the sawmills surveyed. The amount of lumber being sold to end users precut to size is probably less than 0.5 mmbf.

3.2.3 Sizes and Grades

The majority of raw wood material supplied to the pallet industry by sawmills along the front range is in the form of dimension lumber. Some sawmills supply cants to the larger producers which are resawn to size at the pallet plant. The dimension lumber is either sold precut to size or in longer lengths which are then cut to size.

The majority of sawmills currently selling wood to pallet manufacturers are supplying deckboard material, with the most common dimensions being nominal 1x4's, and 1x6's.

At least one sawmill is supplying 2x4's which are used for stringers. At least one sawmill is selling precut pallet components to end users who are doing their own assembly work.

The majority of lumber being supplied is low grade economy material. This material is usually not grade stamped, although it has been sorted. The better boards are generally removed and sold for higher prices than those obtained for pallet stock. The majority of wood being supplied is in the green condition, although some seasoned (air—dried) lumber is also supplied. None of the sawmills surveyed indicated that they were supplying conventional kiln dried lumber to the pallet industry.

4.0The Potential for Increasing the Volume of Colorado Wood used to Manufacture Pallets

Generally, it would seem that conditions are favorable for increasing the amount of wood from public lands in Colorado used to manufacture pallets. Conservatively, the Colorado pallet industry currently utilizes over 50 mmbf of low quality lumber which represents a considerable demand. Colorado forests have large quantities of small to mid-sized diameter trees with wood of relatively low quality. This wood can be used to manufacture pallets and could

potentially represent a significant source of supply, replacing wood currently imported from out-of-state.

The primary reason sawmills cited for not supplying more wood to pallet manufacturers is the low prices paid by manufacturers for pallet material. Good quality lumber for pallets brings between \$200 and \$300 per mbf. Lower quality wood and cants to be resawn sell for less, \$150 to \$200 per mbf. Colorado sawmills can generally get more selling lumber and timbers (cants) for a wide range of other products listed previously in Section 2.2.5. Most mills supplying wood to pallet manufacturers are selling low quality lumber to recover operating costs, rather than to generate a profit.

Several economic factors must be considered for establishing a sawmill specifically to cut pallet material. These factors include stuxnpage costs, logging costs, hauling costs, and cutting costs. These factors are discussed subsequently.

Stumpage costs must be minimized if it is going to be feasible to economically harvest small to mid-sized diameter trees in Colorado and use the wood from these trees to manufacture pallets. Stumpage prices for public timber have been as much as \$200.00 per mbf or even higher. Because of low prices paid for pallet material, stumpage costs would

have to be considerably lower or even eliminated to cut primarily pallet material from these trees.

Sawmills indicated that logging and the cost of hauling logs to the mill are running up to \$250.00 per mbf depending on the length of the haul, typically running between \$150.00 and \$200.00. Processing costs, including profit, for the sawmills surveyed were running up to \$250.00 per mbf. This would explain why most mills are selling dimension lumber between \$500.00 and \$750.00 per rmbf. Obviously, these costs would have to be minimized to profitably cut lumber for pallets. However, even if these costs can be minimized, it is still not certain that a mill cutting strictly lumber for pallets could operate profitably.

One possibility is to operate a portable mill in conjunction with a logging operation. Higher quality sawlogs could be transported to a sawmill to be cut into higher quality dimension lumber and timbers. Smaller diameter logs could be cut into cants and shipped directly to pallet manufacturers which have resaws. These cants would have to be delivered to pallet manufacturers for approximately \$150.00 to \$200.00 per mbf. Success would depend on the following:

1. Establishing a plan which would ensure a consistent supply of timber.

2. Development of a plan that minimizes logging and hauling costs.
3. Minimizing processing costs.
4. Arranging contracts between the sawmill and pallet manufacturers.
5. Ability to dispose of mill residues in the woods.

Assuming that logging, processing, and hauling costs could be minimized so that cants produced can be sold at competitive prices, such an operation might be feasible.

4.1 The Potential for Manufacturing Pallet Components from Slabs

There are currently at least three mills recovering boards from slabs and selling them to pallet manufacturers. Although at least two sawmill operators expressed skepticism that full-length boards could be obtained from slabs, generally most felt that shorter boards suitable for pallet components could be obtained from most slabs.

Assuming that boards suitable for pallet components can be recovered from most slabs, several factors must be considered to recover them economically:

1. A sufficient, stable supply of slabs.
2. An economically efficient method of board recovery.
3. An established market for the recovered lumber.

Sawmills that are currently recovering boards from slabs, generally have a sufficient quantity of slabs to justify

doing so. However, because most Colorado mills are relatively small, most do not produce enough slabs to recover pallet components from them economically.

One possibility is to build a recovery mill specifically designed to produce lumber from slabs. This mill would have to operate at a relatively high production rate to be economically feasible. Therefore, it would have to rely on slabs from several (many) sawmills for a sufficient supply, either traveling from mill to mill or collecting and transporting slabs to a recovery location. Because the success of a recovery mill would ultimately depend on the yield of lumber that can be obtained from the slabs, data which is currently unavailable, it is not certain that this can be accomplished economically. However, once boards are recovered, the pallet industry provides an established, stable market for the lumber.

5.0 Summary and Conclusions

In this research, 23 sawmills which can potentially supply lumber to pallet manufacturers along the front range were surveyed. The combined output of these mills exceeded 80 mmbf of rough sawn lumber and timbers. The primary tree species processed include Engelmann spruce, ponderosa pine, Douglas-fir, white fir, and lodgepole pine.

Nine of the 23 sawmills surveyed are currently supplying between 3 to 3.5 mmbf of lumber to Colorado pallet manufacturers. This wood is primarily economy 1x4's, 1x6's, and 2x4's. At least one sawmill is currently supplying precut pallet components to end-users who do their own assembly. However, none of the sawmills surveyed produce primarily pallet components. Lumber sold for pallet components usually comprises 10 percent or less of the wood volume processed by the mill.

There is potential for producing lumber for pallet components from small to mid-sized trees found in Colorado forests. Stumpage costs would have to be minimal or eliminated. Logging, hauling, and processing costs would also have to be minimized. One possibility is utilizing a portable sawmill to cut cants from logs at the logging site to minimize hauling and processing costs. However, additional research would be required to determine the economic feasibility of such an operation.

There is also potential for recovering boards from slabs. At least three sawmills are currently recovering boards from slabs and selling them to pallet manufacturers. However, because most Colorado sawmills are small, they do not produce enough slabs to make board recovery economical. Additional research is required to determine the feasibility

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of developing a slab recovery mill which would either travel from mill to mill or collect slabs for processing.

6.0 Literature Cited

1. Colorado State Forest Service (CSFS). 1998. Colorado Forest Industries Directory. 70 pp.

2. Mackes, Kurt H. 1997. Study of Pallet Production in Colorado. Prepared for Colorado State University by KH Consulting. Colorado State University, Fort Collins, CO. 33 pp.

Appendix A. Lumber Mill Questionnaire used during Phone Interviews.

Lumber Mill Questionnaire Conducted for Colorado State University By KH Consulting
Date: _____

Manufacturer Information

Company Name: _____

Location/Address:

Phone: _____ Fax: _____

Contact: _____

Position: _____

Number of Employees: _____

Estimated Annual Sales: _____

Estimated Annual Production (Lumber): _____mbf

Lumber Manufacturing Questions

Species:

1. _____ Volume: _____ mbf _____
2. _____ Volume: _____ rmbf _____
3. _____ Volume: _____ mbf _____ %
4. _____ Volume: _____ mbf _____
5. _____ Volume: _____ mbf _____ %

Primary Grades:

1. _____ Volume: _____ mbf _____
2. _____ Volume: _____ mbf _____%
3. _____ Volume: _____ mbf _____
4. _____ Volume: _____ mbf _____
5. _____ Volume: _____ mbf _____%

Source:

1. _____ Volume: _____ mbf _____%
2. _____ Volume: _____ mbf _____%
3. _____ Volume: _____ mbf _____
4. _____ Volume: _____ mbf _____%
5. _____ Volume: _____ xmbf _____

Pallet Component Questions

Does mill produce lumber for pallet components?

Y/N _____

If yes, continue!

If no, why? _____

Does mill sell pallet components? Y / N _____

Does mill produce pallets?

Y / N _____

Types of Pallet Components Produced:

1. _____ Volume: _____ mbf _____
2. _____ Volume: _____ mbf _____
3. _____ Volume: _____ mbf _____
4. _____ Volume: _____ mbf _____
5. _____ Volume: _____ xmbf _____%

Species Manufactured into Pallet Components:

1. _____ Volume: _____ mbf _____%
2. _____ Volume: _____ zmbf _____
3. _____ Volume: _____ mbf _____%
4. _____ Volume: _____ mbf _____
5. _____ Volume: _____ mbf _____

Slab Questions

Volume and Size of Slabs Produced by Species 1. _____

Volume: _____ Size: _____

2. _____ Volume: _____ Size: _____

3. _____ Volume: _____ Size: _____

4. _____ Volume: _____ Size: _____

5. _____ Volume: _____ Size: _____

Does mill currently utilize slabs? Y / N _____% If yes, continue!

If no, how are they disposed of

What types of products are manufactured from slabs?

1. _____ Volume: _____ mbf _____

2. _____ Volume: _____ mbf _____%

3. _____ Volume: _____ mbf _____

4. _____ Volume: _____ mbf _____

5. _____ Volume: _____ mbf _____%

Would the mill be willing to participate in a *Slab Study*? Y / N

Comments: