

**AN ASSESSMENT OF PALLET
LUMBER SUPPLY AND
MANUFACTURING IN COLORADO**

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ABSTRACT

Objectives of this research were to determine the size and scope of the existing pallet industry in Colorado, where it gets its current supply of wood, and the possibilities for increasing the use of small-diameter wood from Colorado forests to manufacture pallets. We found that Colorado pallet manufacturers currently use over 50 million board feet (BF) of low quality lumber to build approximately 2.5 million new pallets annually. It is estimated that only 6 to 7 percent of the wood used to build new pallets in Colorado comes from forests within the state. Colorado sawmills currently supply only 3 to 3.5 million BF of lumber annually to in-state pallet manufacturers. If changes can be made in forest policy and attitudes, small-diameter trees so abundant in Colorado public forests could probably yield a considerable volume of lumber well suited for pallet manufacture. Reduction of forest density would also improve forest health and public safety concerns. To make it economically feasible to use small-diameter wood, some existing costs have to be minimized or eliminated.

In the public forests of the Rocky Mountain and Intermountain regions, there are millions of acres of stands that are overcrowded with excess numbers of small-diameter trees (4). In Colorado, forest policy on federal and state lands, the urbanization of private lands, and public "environmental" attitudes that resist the cutting of trees have all led to an overabundance of small-diameter (less than 12 inches diameter at breast height) trees (3,5,8-10). These small-diameter, dense stands present ideal conditions for insect and disease problems as well as increased potential for catastrophic fires followed by floods (2). In addition to forest health problems, there are concerns about reduced water flows in streams and rivers, as well as the lack of diversity in forests. This lack of forest management has resulted in a very limited and inconsistent supply of wood from public for-

ests to forest industries. Thus, the existing forest industry is very limited in size and technology. It consists mostly of family businesses using wood from private lands.

Development of an effective policy for increased utilization of small-diameter timber from public forest lands would:

1. Improve forest health and diversity;
2. Decrease the risks to public safety from catastrophic fire and flooding;
3. Provide a stable economic foundation for small businesses involved with

the harvest and utilization of trees from these dense forests.

To implement such a policy, there must be a consistent supply of material at a reasonable cost. Also, potential uses for this small-diameter wood must be found, along with economical methods of removal and processing.

Unfortunately, small-diameter trees in Colorado generally have wood of low quality. Thus, potential uses of the wood are limited. Typical processing facilities for small-diameter wood are missing from the Front Range area of Colorado, which extends along Interstate 25 from Fort Collins south to Walsenburg. There is only one stud mill and one OSB plant in Colorado and there are no pulp mills.

However, there is one often-overlooked segment of the wood products industry in Colorado that may be able to utilize some of this small-diameter resource. The pallet industry relies on lower quality lumber. This industry is primarily located along the Front Range, with most firms located in the Denver area. Immediately adjacent to these manufacturing facilities are forests that suffer most from forest health problems and create the greatest threat to public safety in terms of catastrophic fires and resulting floods.

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The interesting potential for utilization of small-diameter wood from these forests in the existing pallet industry led to this research. Objectives of this research were to determine the size and scope of the existing pallet industry in Colorado, where it gets its current supply of wood, and the potential for increasing the use of small-diameter wood from Colorado forests, particularly those along the Front Range, to manufacture pallets. The following discussion presents the survey methods used, survey results for both the Colorado pallet industry and local sawmills, and comments on the potential for increasing the volume of small-diameter wood harvested for pallet manufacture.

METHODS

To assess the potential for increasing the use of small-diameter wood from public forests in Colorado to build pallets, both pallet manufacturers and saw

mills in the state were surveyed. The Colorado pallet industry was surveyed over a 6-week period from early June to mid-July, 1997. All pallet manufacturers were contacted by telephone and interviewed. Companies that produced a high percentage of new pallets were asked to complete a longer questionnaire that was faxed to them. The questionnaires used to complete the survey, along with more detailed discussion of results, are presented in a report by Mackes (7).

Sawmills along the Front Range that could potentially supply lumber to pallet manufacturers were surveyed during June and July of 1998. 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. The survey covered all known sawmills in these areas and included both telephone interviews and written questionnaires. The

survey questions and a more detailed discussion of survey results are presented by Mackes (6).

COLORADO PALLET MANUFACTURERS SURVEY RESULTS

Based on production figures provided by manufacturers, it is conservatively estimated that 2.5 million new pallets were manufactured in Colorado during 1997, requiring approximately 50 million board feet of lumber. Approximately 93 percent of the wood used to manufacture pallets in Colorado comes from out-of-state. Softwoods are transported to Colorado primarily from the Pacific Northwest, Inland Empire, and Canada. Hardwoods are transported primarily from eastern Nebraska, eastern Kansas, and Missouri.

Approximately 90 percent of the pallets manufactured in Colorado are stringer pallets and 90 to 95 percent are manufactured exclusively with lumber decks. About 80 percent of the pallets manufactured in the state are comprised of softwoods. Manufacturers use a wide range of softwood species to build pallets, including ponderosa pine, lodge-pole pine, Douglas-fir, Engelmann spruce, southern pines, cedar, and hemlock. Hardwoods used include oak, aspen, and cottonwood.

Colorado pallet manufacturers purchase the majority of their raw material in the form of dimension lumber. The most common dimensions are nominal 2by4's, 1 by4's, and 1 by6's. The 2by4's and 1 by 4's are used for stringers and the 1 by 4's and 1 by 6's for deckboards. The majority of lumber used in pallet manufacture is low-grade economy material. Assuming the wood is of acceptable quality, most manufacturers seem more concerned about price than grade. Both green and seasoned lumber is used to manufacture pallets in Colorado. The price paid for wood used to manufacture pallets is quite variable ranging from \$120 per 1,000 board feet (MBF) to \$400/MBF. The average price paid is more in the range of \$200/MBF to \$250/MBF.

Approximately 90 percent of the pallets manufactured in Colorado are sold within the state. **Figure 1** illustrates this trend. About 75 percent of these pallets

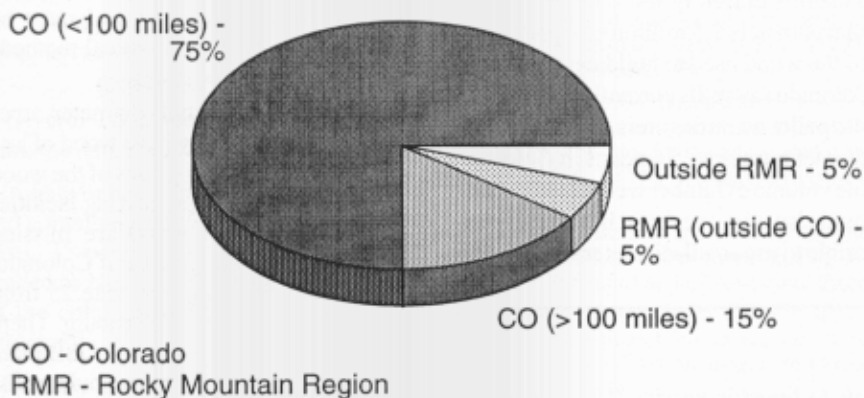


Figure 1. — Current sales by region for pallets manufactured in Colorado.

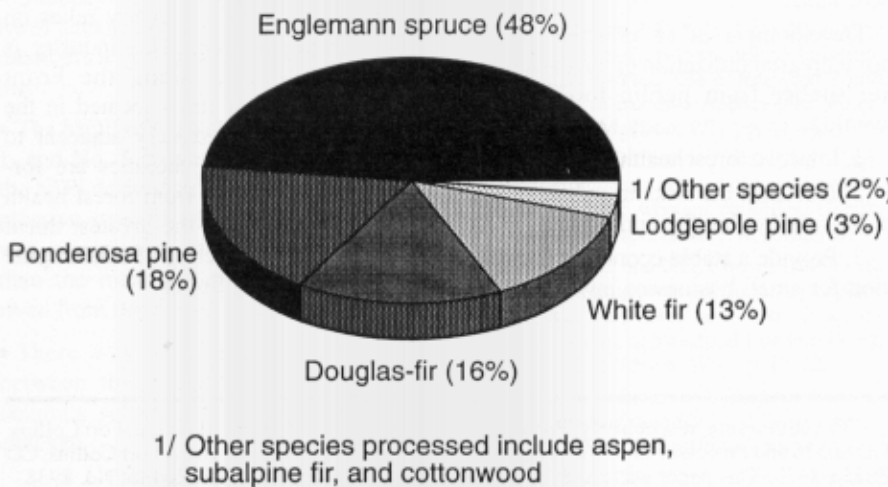


Figure 2. — Percentage of wood processed by species based on volume.

are sold within a 100-mile radius of the plant where they were manufactured. Only about 10 percent of the pallets manufactured in Colorado are sold out-of-state.

Generally, pallet manufacturers in Colorado reported that the demand for pallets has increased steadily over the past 5 years. They attribute this trend in part to the steady population growth and the strong Colorado economy, particularly along the Front Range. They anticipate continued strong demand for pallets in the future.

COLORADO SAWMILL SURVEY RESULTS

The typical Colorado sawmill is a small-sized business with fewer than 20 employees, annual sales of less than 2 million dollars, that annually processes less than 5 million board feet (MMBF). The mills surveyed produce over 80 MMBF of rough-sawn dimension lumber and timber annually. It should be noted, however, that one mill in the San Luis Valley accounts for over 75 percent of production in the survey region.

Most Colorado sawmills rely heavily on timber harvested from private land. On average, mills are getting 80 to 85 percent of their logs from private and state lands. Several mills get 100 percent of their wood from private lands. Given the relatively small amount of private forest land in the state, this is not a sustainable situation.

The Colorado sawmills surveyed generally cut commercial species available in their area. Species utilized include ponderosa pine, lodgepole pine, Douglas fir, Engelmann spruce, white fir, subalpine fir, and aspen. The percentage of a given species cut by a mill varies primarily as a function of the location or region they are getting their logs from. Based on volume, the percentage of annual production by species is presented in Figure 2. Engelmann spruce accounts for 48 percent of 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.

Although some of the sawmills surveyed grade-stamp lumber, the majority do not.

Nonetheless, most mills sort out lumber with severe defects. The majority of mills surveyed cut dimension lumber and timbers to order. Lumber is sold for a wide range of uses. Uses for sawn

timbers include beams for houses, mine timbers, landscape timbers, and railroad ties. Exceptionally prime lumber can sell for up to \$900/MBF. However, all the mills surveyed reported producing a high percentage of lower-grade economy lumber and timbers, which they typically sell for between \$500/MBF and \$750/MBF.

The majority of Colorado sawmills surveyed do not supply wood to pallet manufacturers. Those that do supply wood, do not produce pallet components as a primary product. They generally sell pallet manufacturers low quality boards that cannot be sold for other uses. Lumber sold to pallet manufacturers typically comprises 10 percent or less of the wood volume processed by the mill. At least three mills are selling boards recovered from slabs and one mill is selling boards resawn off of cants for pallet components. Pallet lumber is usually priced between \$150/MBF to \$300/MBF.

The sawmills surveyed also produce other products including 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.

Sawmill operators were asked if they had concerns regarding current operations and future plans. Although there were many expressed, one principal area of concern within the scope of this research seemed to predominate: resource (log) availability.

DISCUSSION

With one exception, all Colorado pallet manufacturers surveyed indicated that they would use Colorado wood if available and priced competitively with wood imported from out-of-state. Generally, all commercial species found in Colorado are suitable for making pallets. The majority of mills had no objections to Colorado species. The four manufacturers that said they were currently using wood from Colorado forests all found the wood to be of satisfactory quality.

Reasons cited for the low volume of Colorado wood currently used to manufacture pallets include:

1. High cost of pallet lumber as a result of high stumpage costs on federal lands;

2. Unreliable lumber supply because of inconsistent timber supply policy;

3. Threat of supply interruptions due to appeals, law suits, and subsequent delays brought by "environmental" (political action) groups;

4. Perceived poor quality of Colorado wood (particularly ponderosa pine from Front Range forests).

With the exception of number 4, the reasons given are issues that occur at the harvesting level, not at the pallet manufacturing level. These harvesting issues are of concern because they affect lumber supply and Colorado pallet manufacturers have resolved them by importing most of their wood from out-of-state.

Several mills, however, had quality concerns with ponderosa pine. The large knots and associated grain distortions present in the wood are the primary source of these concerns. This is particularly true of unseasoned ponderosa pine, which distorts as it dries and does not run well in automated equipment used to assemble pallets. There are also concerns regarding failure of deck-boards in the vicinity of large knots.

Specifications required for wood used to build pallets are minimal. Because the majority of wood used in pallet manufacture is low grade "economy" dimension lumber, manufacturers generally purchase the least expensive lumber that will do the job.

The primary reason sawmills cited for not supplying more wood to pallet manufacturers is the low price paid by manufacturers for pallet material. Good quality lumber for pallets brings between \$200/MBF and \$300/MBF. Lower quality wood and cants to be resawn bring less: \$150/MBF to \$200/MBF. Colorado sawmills can generally make more money selling better quality lumber and timbers (cants) for a wide range of other uses. Most mills supplying wood to pallet manufacturers are selling their lowest quality lumber to recover operating costs, rather than to generate a profit.

Sawmills indicated that logging and hauling costs to the mill are running up to \$250/MBF depending on the length of the haul, but typically running between \$150/MBF and \$200/MBF. Processing costs, including profit, for the sawmills surveyed were running up to \$250/MBF. Obviously,

these costs would have to be minimized to profitably cut lumber for pallets. However, even if these costs can be minimized it is doubtful that a mill cutting only pallet lumber could operate profitably because the value of pallet lumber is too low. Therefore, a majority of higher value lumber and timber products would likely have to be cut to achieve profitability.

If a steady supply of small-diameter timber were harvested from the public federal forests of Colorado, this saw-timber could not only support existing sawmills, but potentially additional mills as well. However, even if the sawtimber were available, it is not certain that sawmills could process this material profitably. Results from research by Wagner et al. (11) and Fiedler et al. (1) indicate that small-diameter timber may have to be subsidized to allow for profitable processing. The typical small-sized sawmills currently operating in Colorado are not the type of mills likely to process small-diameter, saw-timber profitably. Utilizing more modern technology, such as high-speed, curve-sawing sawmills, would likely improve profitability. Several of these mills are operating in Washington and Idaho, but none are currently operating in Colorado. Another possibility is to harvest using small but efficient equipment, such as is often used in European countries. There is also potential for partial in-woods processing into cants that could be delivered to firms capable of efficiently re-sawing and utilizing them, depending upon grade.

CONCLUSIONS

This study has shown that demand for pallet lumber in Colorado is substantial. At the same time, on the supply side, none of the Colorado sawmills surveyed are deliberately producing pallet corn-

ponents; and Colorado sawmills currently supply less than 10 percent of pallet manufacturers' needs. The current level of log acquisition from private lands is not sustainable. State lands have also been a consistent source of material but, again, are limited in size and production potential. However, it appears that small-diameter trees found abundantly in public federal forests of Colorado could yield a considerable volume of wood well suited to pallet manufacture. In addition, the removal of such trees could improve forest health and reduce fire and flooding problems. To achieve economic success in the utilization of this timber, several things would have to change. A publicly supported forestry program that would insure a consistent supply of small-diameter timber at reduced or zero stumpage costs, based on improving forest health and public safety, would have to be implemented. Harvesting and processing costs would have to be minimized. Given the "environmental" tendencies and urban nature of the public along the Front Range, utilizing appropriate technology to minimize the environmental impact of both harvesting and processing would likely be required. And finally, although not mentioned previously, the disposal of totally unusable small-diameter material and processing residues at cost or preferably at a profit would have to be addressed. We are deliberately avoiding the suggestion of government-subsidized removal of trees, believing that this is not a sustainable situation. Clearly, further studies and demonstrations will be needed to clarify the potential for processing pallet lumber from small-diameter trees found in Colorado's forests.

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