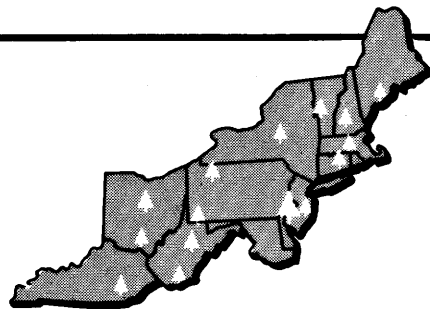


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FOREST SERVICE, U.S. DEPT. OF AGRICULTURE, 6816 MARKET STREET, UPPER DARBY, PA. 19082

A STUDY OF LOGGING RESIDUE AT WOODS LANDINGS IN APPALACHIA

CURTIS D. GOHO

*Forestry Technician
USDA Forest Service
Northeastern Forest Experiment Station
Forest Products Marketing Laboratory
Princeton, W. Va.*

Abstract.—A study of residue on five woods landings in West Virginia showed that short lengths, poor quality, and low volumes are obstacles to utilization of this material. Short lengths and dirt accumulation would also pose serious problems for conversion to chips. Some local use for firewood and specialty products is possible.

In most logging operations, the tree stems are hauled to a landing where they can be cut into logs and bolts, stored, and loaded onto trucks for hauling to a mill. These activities create some woody residue—unmerchantable stems or logs, limbs, trimmings, chunks of defective wood, etc. (fig. 1).

This residue is not marketed by the logger or the landowner: it is left in the woods when the landing is abandoned. Some loggers leave it scattered about the landing; others treat the landing site by leveling the residue piles, covering the area with soil, and sowing grass seed (fig. 2). Many loggers in

Appalachia treat their landings in this manner even though cleaning up a landing is time-consuming and costly.

This treatment is beneficial in several ways. It hastens the decomposition of the residue, improves the appearance of the landing area, and provides small clearings for use by wildlife.

An alternate, and possibly more beneficial, solution for treatment of this residue at woods landings would be to utilize it for products: chips, mine material, pallet parts, and the like. But before we can consider utilization of this residue, we need to know more about the quantity and quality available.



Figure 1.—Residue left on a landing after logging operations have ceased.

Figure 2.—Some landings, like this one, are cleaned up and sown to grass.



The Study

To find out how much if any of this logging residue is actually usable, our Forest Products Marketing Laboratory in West Virginia conducted an exploratory study of woods landings after all logging activities had ceased. While we knew that most of this material was from long-bucked logs, limbs, defective tree portions, and an occasional overlooked log, we had little knowledge of those characteristics that are the key to po-

tential utilization: size, volume, weight, and amount of defect.

We selected five woods landings in West Virginia for study, each on a separate hardwood logging operation. We determined the boundaries of the landing site and tallied all pieces of wood left on the landing. (Residue from clearing the landing or felling of nearby trees was excluded because this material would normally be classed with logging or road construction residue.) For each piece, we recorded the small- and large-end

diameters, length, sweep, amount of defect, and weight.

Results

All pieces.—We measured more than 1,200 pieces (table 1) of wood left on the 5 landings. The pieces ranged in size from short chunks to log lengths, with an occasional whole tree stem. Short lengths predominated on all the landings, 55 percent of all pieces being less than 4.0 feet long. This is below the minimum length required for pulpwood and many other products. Eighty-three percent of all pieces were less than the minimum 8-foot length required for sawlogs. The average length of all pieces was 4.7 feet.

Although lengths were short, diameters were fairly large. Nearly all pieces had small-end diameters equal to or exceeding the minimum diameter requirements for many products. Less than 3 percent of all pieces had diameters of less than 4.0 inches, and 87 percent had diameters of 8.0 inches or more. The average small-end diameter for all pieces was 12.3 inches.

The total gross volume of all pieces was 5,815 cubic feet. More than a third of this volume was in pieces less than 4.0 feet long, and nearly three-fourths of the gross volume was in pieces less than 8.0 feet long. Scalable defects, including sweep, reduced the gross volume (5,815 cubic feet) by 15 percent. Though the amount of defect was relatively small, nearly 65 percent of all pieces were defective in some manner.

Ninety-three percent of all the residue came from the upper portions of tree stems. No information was recorded on surface characteristics other than sweep, but it was obvious that numerous knots, scars, and other degrading features would seriously affect the quality of much of this material. Nearly all of the butt sections contained rot and other interior defects.

The total weight for all pieces amounted to 315,455 pounds, nearly 158 tons of bark and wood fiber. More than one-half of this was in pieces 8 feet or less in length. Accurate weight figures were difficult to obtain because much of the material was covered with dirt or mud from logging activities. Though efforts were made to eliminate as much of this excess weight as possible, our weight figures do reflect some error due to this.

Sawlog-size material.—Of the more than 1,200 pieces measured, only 180 pieces (15 percent) met both the minimum 8-inch small-end diameter and 8-foot length requirement for sawlogs.

Most of the sawlog-size pieces were in lengths of 8 to 16 feet, only 3 percent requiring further bucking (table 2). More than 50 percent of the sawlog-size pieces had diameters greater than 12 inches. This sawlog-size material had an average small-end diameter of 13.2 inches and an average length of 10.9 feet.

Of the 180 pieces considered for sawlogs, 140 were of extremely low quality because of

Table 1.—Characteristics of woods landing residues: all pieces

Dimensions	Pieces		Gross volume		Weight	
<i>Length:</i> (feet)	No.	Pct.	Cu. ft.	Pct.	Lbs.	Pct.
3.9 or less	666	55	2,138	37	121,001	38
4.0 - 7.9	339	28	2,046	35	109,944	35
8.0 or more	212	17	1,631	28	84,510	27
Total	1,217	100	5,815	100	315,455	100
[Average length: 4.7 feet]						
<i>Diameter:</i> (inches)	No.	Pct.	Cu. ft.	Pct.	Lbs.	Pct.
3.9 or less	33	3	34	1	2,340	1
4.0 - 7.9	125	10	295	5	17,440	5
8.0 or more	1,059	87	5,486	94	295,675	94
Total	1,217	100	5,815	100	315,455	100
[Average diameter: 12.3 inches]						

Table 2.—Characteristics of woods landing residue: sawlog size only

Dimensions	Pieces		Doyle gross volume		International gross volume		Weight	
	No.	Pct.	Bd. ft.	Pct.	Bd. ft.	Pct.	Lbs.	Pct.
<i>Length:</i> (feet)								
8	72	40	4,623	39	5,075	35	43,490	36
10	41	23	1,498	12	2,070	14	20,020	17
12	27	15	2,472	21	2,855	20	22,890	19
14	23	13	1,415	12	1,980	14	17,060	14
16	11	6	1,070	9	1,395	10	9,660	8
16+	6	3	856	7	1,065	7	7,580	6
Total	180	100	11,934	100	14,440	100	120,700	100
[Average length: 10.9 feet]								
<i>Diameter:</i> (inches)								
7.6 - 10.5	52	29	1,072	9	1,880	13	19,330	16
10.6 - 12.5	39	22	1,312	11	1,835	13	18,090	15
12.6 - 14.5	33	18	2,131	18	2,675	18	22,810	19
14.6 - 16.5	24	13	2,326	19	2,775	19	23,380	19
16.6 - 18.5	18	10	2,128	18	2,310	16	17,200	14
18.6+	14	8	2,965	25	2,965	21	19,890	17
Total	180	100	11,934	100	14,440	100	120,700	100
[Average diameter: 13.2 inches]								

knots, sweep, interior defect, and other degrading features. However, 40 logs (22 percent of the 180) were good enough to warrant utilization. Apparently these logs had been overlooked or left behind for unknown reasons.

There was a total of nearly 12,000 board feet (Doyle) of sawlog-size pieces with defect amounting to 30 percent. Much of this defect was contained in the butt sections. The 180 pieces of sawlog-size material weighed a total of 120,700 pounds. This accounted for nearly 40 percent of the total weight of all pieces measured.

Conclusions and Discussion

The short length of the residues found on the woods landings precludes its use as a source of raw material for most sawn products. Most present-day sawmill equipment would be unable to handle 83 percent of all the pieces measured.

The low quality of 78 percent of the sawlog-size material would not justify processing as sawlogs. This material might, however, provide a source of pulpwood.

The extremely low quality of most of this

material prevents its utilization for many other products. For example, though the mining industry occasionally uses short material, its requirements for soundness and strength qualities are stringent and would reject a large portion of the landing residue. The minimum requirements for pulpwood would reject 55 percent of all the pieces.

Converting the landing residue to chips might be one solution. However, feeding the short lengths into a chipper might be extremely difficult; and dirt accumulation would seriously hamper chipper operations. The volume per landing would not be sufficient to supply a chipper unit for very long. Indeed, the total volume (5,815 cubic feet) from the five landings studied would provide less than 1 day's supply of material for a large chipper.

The immediate prospects for utilization of woods-landing residues are slim. Some of this material is being used for firewood and specialty products, but the markets are local and demand is limited.

If the demand for firewood increases as the Nation's energy crisis continues, the useful residues at woods landings might become important in the development of future firewood markets.