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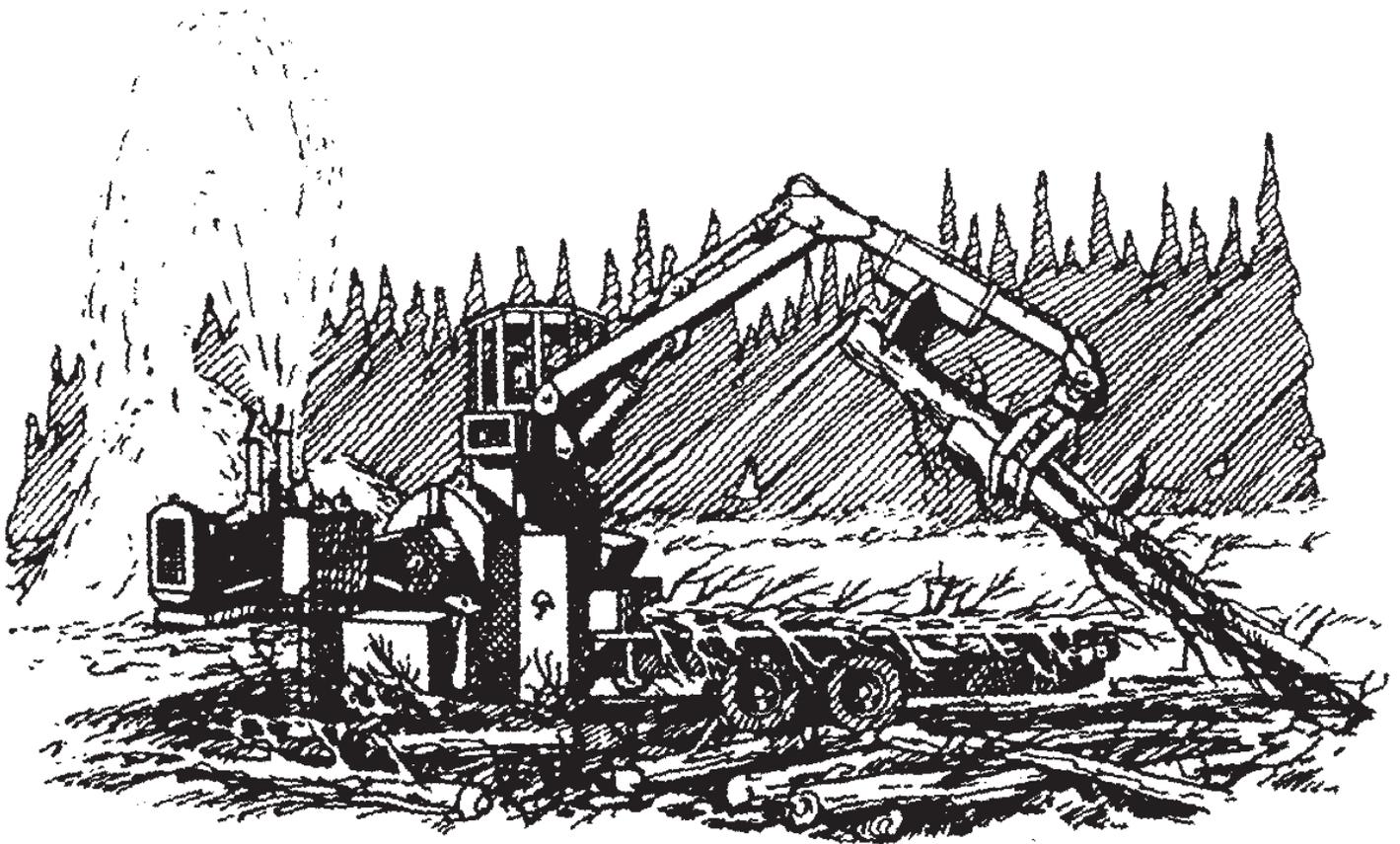
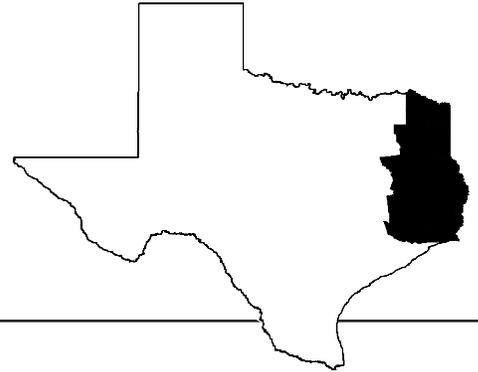


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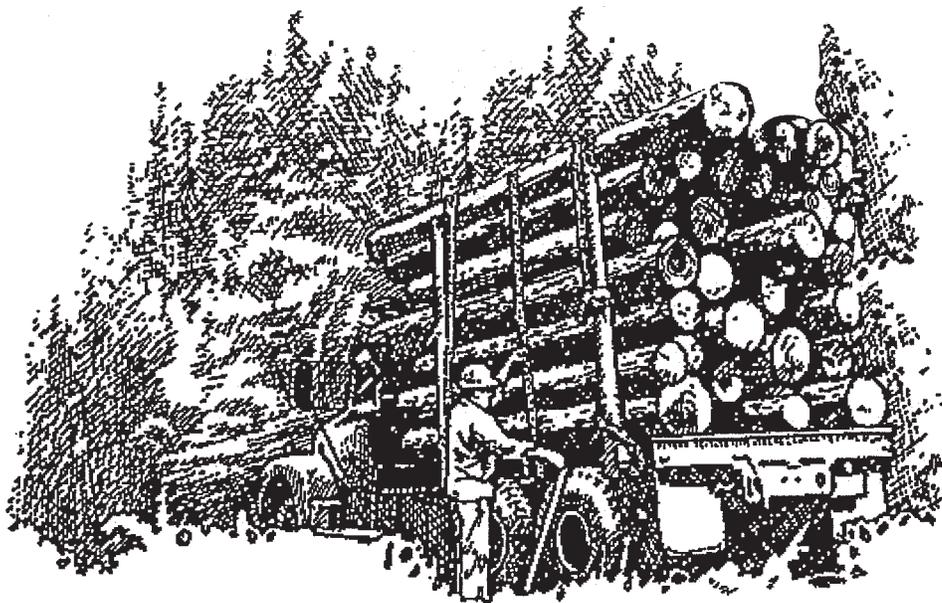
Eastern Texas Harvest and Utilization Study, 2003

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Foreword

This resource bulletin describes the principal findings of a harvest and utilization study conducted during the seventh inventory of eastern Texas' forest resources. Survey crews sampled and measured trees harvested in a variety of logging operations, and analysts calculated wood volume and percent of wood utilization. Harvest volume data and factors for growing-stock and nongrowing-stock logging residue are described and interpreted.

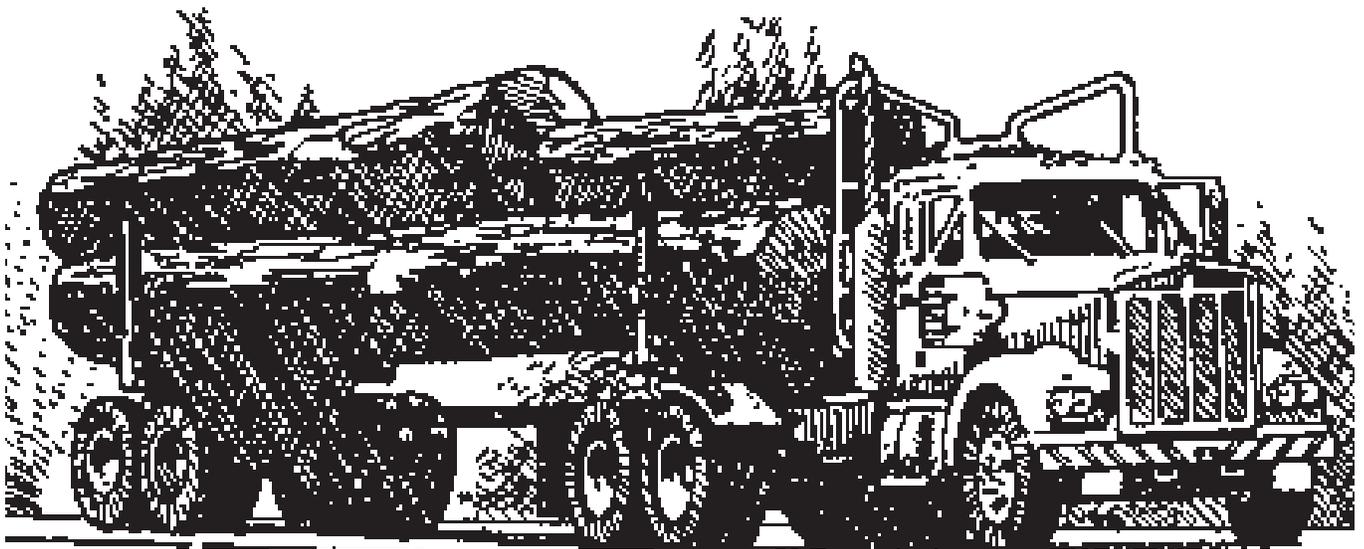
Annual surveys of America's forest resources are mandated by the Forest and Rangeland Act of 1978. Surveys and utilization studies are part of a continuing, nationwide undertaking by regional experiment stations of the U.S. Department of Agriculture, Forest Service. Inventories and utilization studies of the 13 Southern States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia) and the Commonwealth of Puerto Rico are conducted by the Southern Research Station, Forest Inventory and Analysis Research Work Unit (FIA). Unit headquarters is in Knoxville, TN, and FIA has operational offices in Asheville, NC, and Starkville, MS. The primary objective of these appraisals is to develop and maintain resource information needed to formulate sound forest policies and programs. More information about Forest Service resource inventories is available in "Forest Service Resource Inventories: An Overview" (U.S. Department of Agriculture, Forest Service 1992).

Tabular data included in FIA resource bulletins present a comprehensive array of forest resource statistics, but additional information is available to those who require more specific information. Access to data for the Southern States can be found at: www.ncrs.fs.fed.us/tools-data/mapping-tools.

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Contents

	<i>Page</i>
Introduction	1
Methods	1
Site Stratification and Selection	1
Data Collection	2
Highlights	3
Characteristics of Harvested Trees in Texas	3
Softwood Removals	5
Hardwood Removals	7
Texas Logging Workforce	9
Reliability of Data	9
References	9
Definition of Terms	10
Index of Tables	13
Tables 1–39 ^a	15

^a All tables in this report are available in Microsoft® Excel workbook files. Upon request, these files will be supplied on 3½-inch diskettes.

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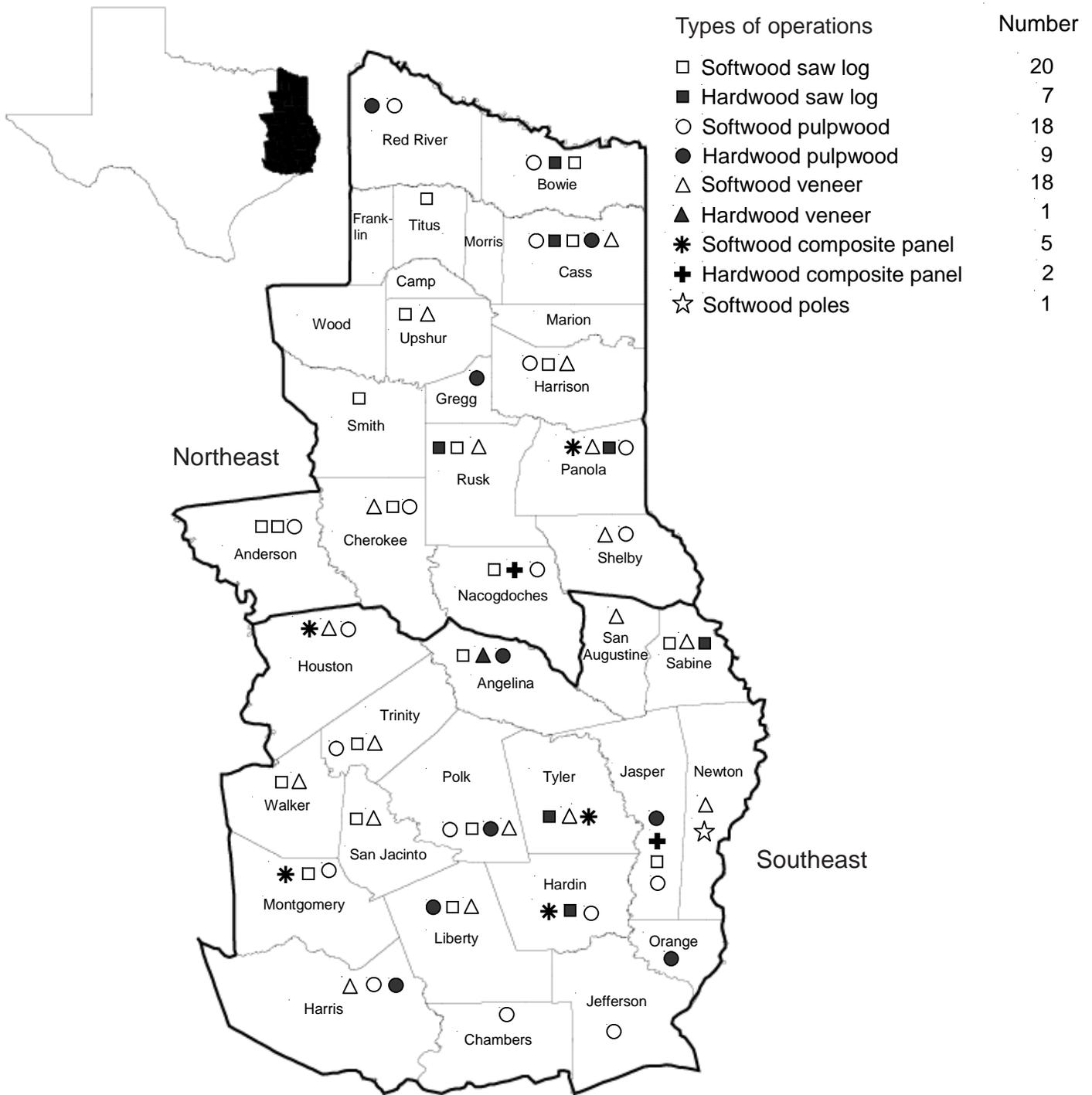


Figure 1—Harvest operations, Eastern Regions of Texas, 2003.

Eastern Texas Harvest and Utilization Study, 2003

James W. Bentley and Tony G. Johnson

Introduction

Forest planners and managers have a continuing need for information about the timber resource, and the general public is expressing increasing interest in the effects of logging. Therefore, up-to-date data on the Nation's forests—and how they are changing—are essential to well-informed decisionmaking. Information about the condition of and changes in the timber resource of eastern Texas comes from three primary sources: (1) inventory plots, which describe current conditions and quantify changes due to mortality, growth, removals, and land use; (2) mill surveys, which quantify timber volume harvested and delivered to primary wood products facilities, i.e., sawmills, pulpmills, veneer mills, composite panel mills, and pole mills; and (3) logging utilization studies, which characterize harvest operations and quantify the timber volume that is cut and utilized, and that portion that is left in the forest during the harvesting of timber.

This bulletin presents the findings of a 2003 harvest and utilization study in eastern Texas. The study's main goal was to provide an estimate of softwood and hardwood volume used, and of volume left in the woods as logging residue. Survey crews randomly selected and measured felled trees on 81 active harvest operations throughout the Eastern Forest Inventory and Analysis Research Work Unit (FIA) region of Texas (fig. 1). This bulletin also provides information on logging in east Texas and some general characteristics of trees harvested for various products, examples of which are average diameter at breast height (d.b.h.) by product, average bole length by product, average heights of residual stumps, and average diameter outside bark (d.o.b.) at the end of utilization.

Some standard FIA terms are used in this study. Two that are particularly important for understanding and interpreting study results are growing stock and nongrowing stock. A growing-stock tree is a live tree of commercial species that either contains or is capable of producing at least one 12-foot or two 8-foot logs in the saw-log portion. A nongrowing-stock tree is one that does not meet the requirements of growing stock due to poor form or rot. For

growing-stock trees, the growing-stock portion of a tree (5-inches d.b.h. or larger) includes the volume of sound wood between a 1-foot stump and a 4-inch top, d.o.b. Volume in the 1-foot stump, volume in the main stem from 4 inches to the growing top of the tree, and the volume of any limbs 4 inches or larger with at least one 5-foot section are considered nongrowing-stock volume by FIA standards. In this study, rough or rotten (nongrowing stock) trees were not sampled. Figure 2 illustrates a poletimber and a sawtimber tree and the growing-stock section of each.

Methods

Site Stratification and Selection

Producing a complete list of timber-harvesting operations and ownerships in a region such as east Texas is problematic. Because the industry is so complex, it is impossible to list the names and locations of all during the timeframe considered in this resource bulletin. A random sample would have to provide a reasonably accurate estimate of utilization, and compiling such a list is not practical. Many uncontrolled factors affect how, when, and where harvesting operations will take place; but the most common events that affect harvesting operations are weather and timber markets.

The sites selected for study were stratified by species group and product using the most recent data available from the Texas Forest Service publication "Harvest Trends 2001" (Xu 2002), which provides county-level output of timber products harvested in Texas by species group. In 2001, softwood accounted for 78 percent of the roundwood volume harvested in Texas, and hardwood volume 22 percent. Using those proportions, we designated 62 of the 81 selected sites as softwood operations, and the remaining 19 as hardwood operations. Harvest operations by product were based along these same general guidelines, although some flexibility was given to field crews for substitution due to the difficulty of locating harvesting operations for

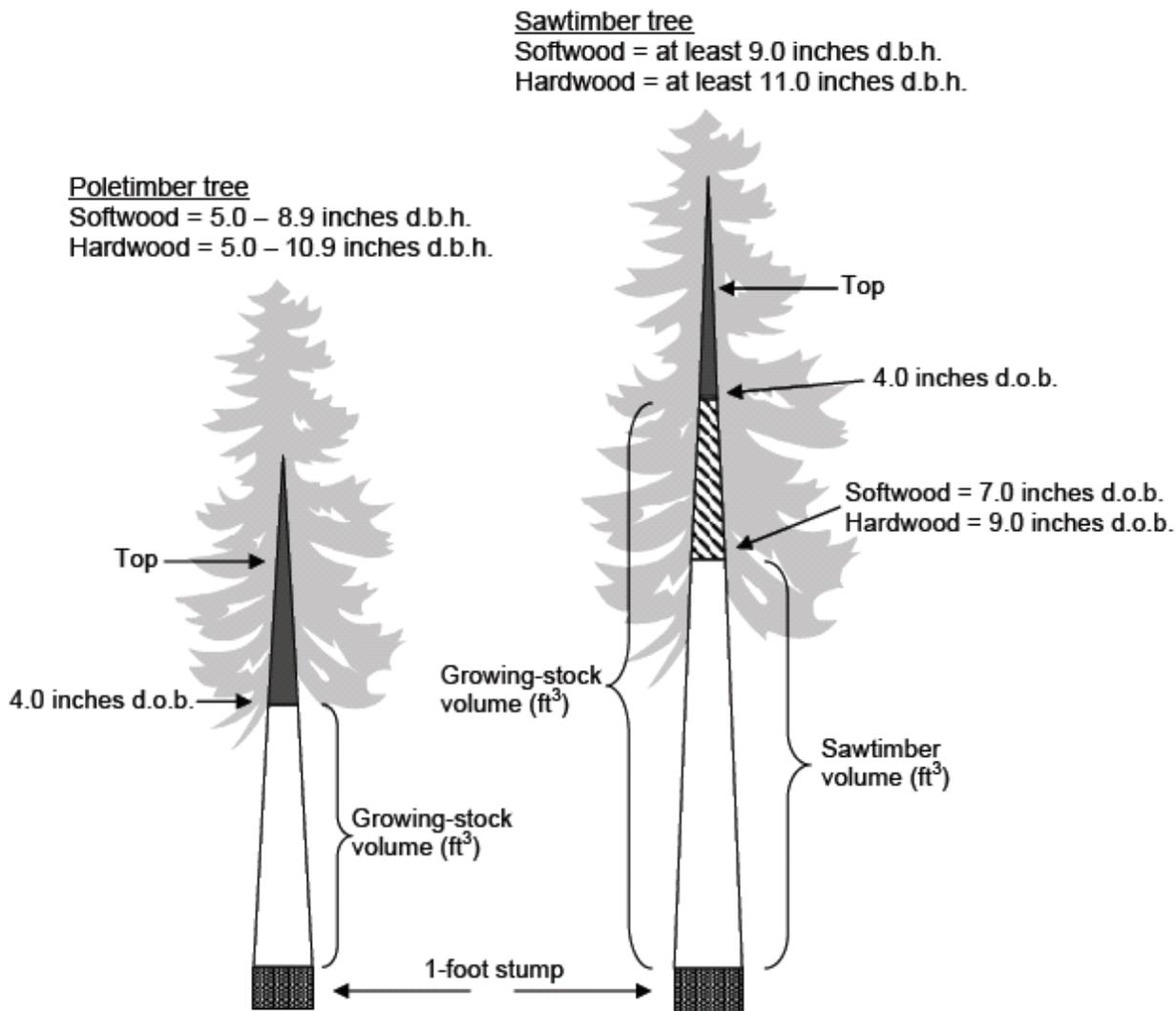


Figure 2—Stem sections of poletimber and sawtimber, 2003.

some specific products. Table I shows the final breakdown number of harvest operations and trees by species group and product type.

After the harvest operations were stratified by major species group and product, the operations were placed in the appropriate region and county in the State. Using county-level product output data from the “Harvest Trends 2001” report (Xu 2002) and a map that showed current mill locations, prospective utilization sites were selected based on a high probability of being able to locate a harvesting operation for the particular product and species group

assigned. Figure 1 shows where the final harvest operations considered in this bulletin were located.

Data Collection

In mid-April 2003, field crews were trained to collect data on felled trees at harvest locations. Using the list of operations and a map of sites, they began collecting data by county for the particular species group and designated product(s). Data were collected from mid-April to the end of May, although some prework, such as contacting county personnel and best management practice foresters, was

Table I—Number of operations and trees by product and species group, Eastern Regions of Texas, 2003

Product and species group	Operations	Trees
	<i>number</i>	
Saw logs		
Softwood	20	581
Hardwood	7	179
Total	27	760
Veneer logs		
Softwood	18	417
Hardwood	1	20
Total	19	437
Composite panels		
Softwood	5	91
Hardwood	2	61
Total	7	152
Pulpwood		
Softwood	18	438
Hardwood	9	255
Total	27	693
Poles		
Softwood	1	30
Hardwood	0	0
Total	1	30
All products		
Softwood	62	1,557
Hardwood	19	515
Total	81	2,072

done beforehand. Field crews then contacted individual loggers to arrange the best time to visit harvest operations.

At each felled-tree site, crew members talked to the logger or the person in charge of operations. Those contacts provided vital information about product(s) utilized, specific diameters, and log lengths the receiving mill(s) would accept, along with minimum diameters at the cutoff points for specific products. Crews also noted the type of logging equipment that was being used. This information was used to determine the level of mechanization for each harvesting operation.

On each felled-tree site, crew members measured 25 to 30 trees for each product to ensure an adequate representation of overutilization and underutilization for a given type of harvest operation. Trees were randomly selected and had to be at least 5-inches d.b.h. and alive prior to harvest. Although they often had been bucked, limbed, and topped, the main bole of each tree selected for measurement had to be intact to be measured for utilization. The State, unit, county, and location number were recorded for each site. Each tree was assigned a number and identified by species, diameter at breast height, tree class, product, and bole length as well as percent cull if rot was detected. Each tree was measured from the top of the cut stump to the end of utilization. Measurements were made along the main stem in sections no longer than 16 feet until the end of utilization. The end of utilization usually is determined by the sawyer, according to particular specifications set by the receiving mill(s). Again, FIA merchantability standards for growing-stock volume are defined as the volume in the main stem of the tree from a 1-foot stump to a 4-inch top. However, most trees are not cut exactly at a 1-foot stump, nor are they cut off at exactly 4 inches. For example, trees that are cut off above a 1-foot stump and below 4 inches would be considered underutilized, and that volume not utilized would be considered growing-stock residue. On the other hand, by FIA standards, trees cut below a 1-foot stump and above a 4-inch top are considered 100 percent utilized, and those portions below and above are considered overutilization. A myriad of combinations actually occur on active harvest operations. The aggregated volume from measured trees has provided overutilization and underutilization factors that can be applied to statewide inventory results for an estimate of growing-stock and nongrowing-stock logging residues. Other required measurements, besides diameter at breast height and end of utilization, are the top of the sawtimber portion (7.0 inches in softwoods and 9.0 inches in hardwoods). Those measurements allow calculation of the sawtimber and poletimber portion of the growing-stock section.

Highlights

Characteristics of Harvested Trees in Texas

Results of this study have identified several key characteristics of trees harvested, which cannot be obtained from a typical field inventory or a forest industry study that supplies product output data only. Characteristics such as average diameter at breast height by product, average bole length by product, average residual stump height, and average diameter outside bark at the end of utilization

constitute important information that can help us more fully understand the complex nature of removals. Averages discussed in this section are based on the measurement of 2,072 trees. Of those, 1,557 (75 percent) were softwood, and 515 (25 percent) were hardwood.

According to the Texas “Harvest Trends 2001” report (Xu 2002), softwood and hardwood saw-log volume together accounted for 40 percent of the total product output for the State. This study classified 581 trees as softwood saw log averaging 13.3 inches d.b.h. It classified 179 hardwood trees as saw log averaging 13.5 inches d.b.h. Veneer and plywood constitute another important component of the product mix for east Texas. Based on 417 trees measured for softwood veneer, the average d.b.h. was 11.8 inches. Advances in lathe technology at softwood plywood mills have resulted in a dramatic drop of the average diameter at breast height of peeler logs across the South. Only 20 trees were measured for hardwood veneer, and they averaged 16.9 inches d.b.h. As expected, the diameter at breast height of trees measured for pulpwood was significantly smaller. Of 438 trees total, the average d.b.h. was 7.0 inches, while the 255 trees measured for hardwood pulp averaged 7.3 inches d.b.h. Table II shows the breakdown of average diameter at breast height for each product by species group.

Bole length is the distance between a 1-foot stump and a 4-inch top. As expected, trees harvested for solid wood

products tended to have longer average bole lengths than trees harvested for pulpwood or composite panel products. The average bole length for softwood and hardwood trees measured for saw logs was 63 and 52 feet, respectively. In comparison, trees measured for pulpwood had a bole length of 33 and 27 feet, respectively. Softwood veneer trees had an average bole length of 58 feet, while softwood composite panel trees had an average bole length of 31 feet. Table III shows the average bole length by species group.

Planted sites constituted a subset of the total number of trees measured. Trees measured in planted stands tended to have shorter bole lengths than those measured in the natural stands. Table IV shows the average bole length for each product by species group and stand origin.

Residual stump height is a key component in determining utilization rates for harvested trees. By FIA standards, the stump is that portion of the tree measured at ground level from the uphill side of the tree to 1 foot up the bole. Loggers try to maximize volume harvested by cutting the tree as close to the ground as possible. Residual stump heights across the products ranged from 0.36 to 0.67 feet; however, most trees harvested had an average residual stump height of about a one-half foot. In softwoods and across all products, this accounted for about 42 percent of the stump volume being used. In hardwoods and across all products, about 36 percent of stump volume was used.

Table II—Average diameter at breast height by species group and product, Eastern Regions of Texas, 2003

Species group	Product				
	Saw logs	Veneer logs	Composite panels	Pulpwood	Poles
	<i>inches</i>				
Softwood	13.32	11.79	6.62	7.02	12.99
Hardwood	13.54	16.88	7.81	7.33	—

A dash (—) indicates no sample for the cell.

Table III—Average bole length by species group and product, Eastern Regions of Texas, 2003

Species group and stand origin	Product				
	Saw logs	Veneer logs	Composite panels	Pulpwood	Poles
	<i>feet</i>				
Softwood	63.35	57.60	31.31	33.01	84.80
Hardwood	52.19	67.60	32.92	26.96	—

A dash (—) indicates no sample for the cell.

Stump volume for both hardwood and softwood contributed to utilization of the nongrowing-stock portion of trees, i.e., overutilization. Table V shows the average residual stump heights for each product by species group.

The final component we used to determine use rates was diameter outside bark at the end of utilization. Tops and limbs constitute most of the nongrowing-stock volume, although they accounted for only 30 percent of the nongrowing-stock portion that was utilized. The average end of utilization for softwood saw logs was 4.4 inches, and for hardwood saw logs 6.3 inches. For veneer logs it was 4.1 and 9.0 inches for softwood and hardwood,

respectively. Pulpwood and composite panel products averaged 3.1 and 3.7 inches for softwoods and hardwoods, respectively. Table VI shows the average end of utilization by the different products and species group.

Softwood Removals

Results from this study document 42,797 cubic feet of softwood volume, of which 37,060 cubic feet, or 87 percent, was used for product(s). Thirteen percent, or 5,737 cubic feet, was left onsite as logging residue (fig. 3). Twenty-eight percent of the residue volume came from the

Table IV—Average bole length by species group, stand origin, and product, Eastern Regions of Texas, 2003

Species group and stand origin	Product				
	Saw logs	Veneer logs	Composite panels	Pulpwood	Poles
<i>feet</i>					
Softwood					
Natural	67.96	62.55	30.60	34.09	84.80
Planted	54.16	45.29	32.17	31.54	—
Hardwood					
Natural	52.73	67.55	32.92	28.65	—
Planted	36.67	—	—	21.11	—

A dash (—) indicates no sample for the cell.

Table V—Average residual stump height by species group and product, Eastern Regions of Texas, 2003

Species group	Product				
	Saw logs	Veneer logs	Composite panels	Pulpwood	Poles
<i>feet</i>					
Softwood	0.501	0.503	0.497	0.472	0.357
Hardwood	0.553	0.665	0.443	0.460	—

A dash (—) indicates no sample for the cell.

Table VI—Average end of utilization by species group and product, Eastern Regions of Texas, 2003

Species group	Product				
	Saw logs	Veneer logs	Composite panels	Pulpwood	Poles
<i>inches</i>					
Softwood	4.35	4.11	3.02	3.22	4.55
Hardwood	6.34	9.00	3.70	3.60	—

A dash (—) indicates no sample for the cell.

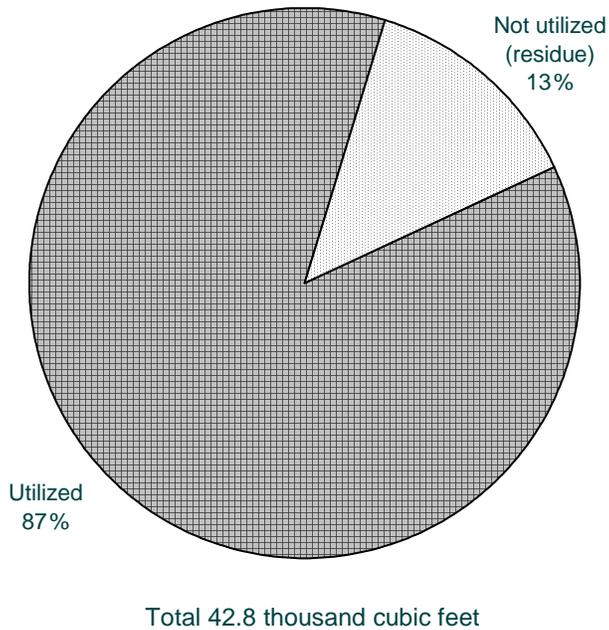


Figure 3—Disposition of total softwood harvest volume, 2003.

growing-stock portion of the tree, while 72 percent came from the nongrowing-stock portion (stumps, tops, and limbs) (fig. 4) (table 1).

The total softwood growing-stock volume measured was 37,698 cubic feet. Of that total, 95.8 percent was utilized, and 4.2 percent was logging residue (fig. 5). By FIA merchantability standards, the logging residue portion of growing-stock trees is underutilized volume. Of the total utilized volume, 945 cubic feet, or 2.55 percent, was from the nongrowing-stock portion of trees. By the same merchantability standards, that volume is considered overutilization (tables 2 and 3).

Softwood volumes and percentages are broken down further by poletimber and sawtimber, and by the various products measured (tables 4 through 7). By product, trees harvested for pulpwood and composite panels had the highest rates of utilization for the merchantable portion of the tree (97 percent) and the highest rates of overutilization (10 percent). This means that more of the nongrowing-stock portion of the tree was being used for product(s) and less was left as logging residue. Because the volume was

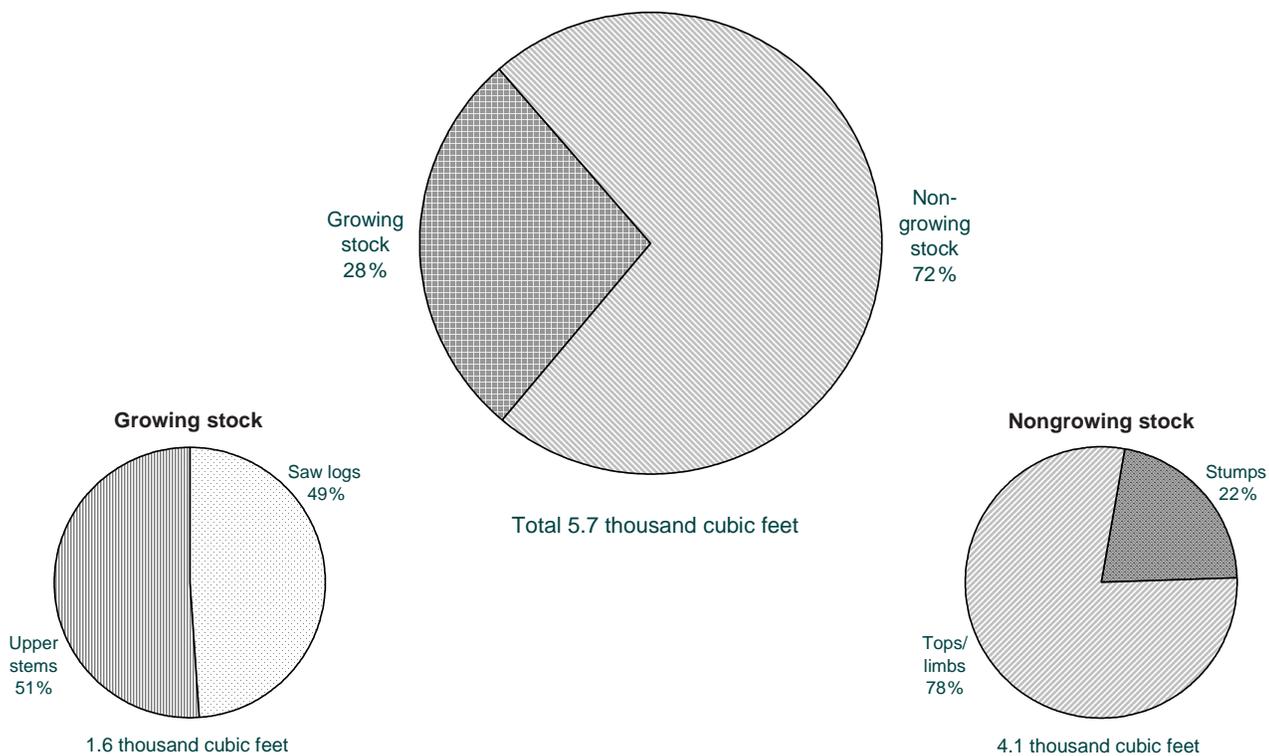


Figure 4—Softwood residue by volume type, 2003.

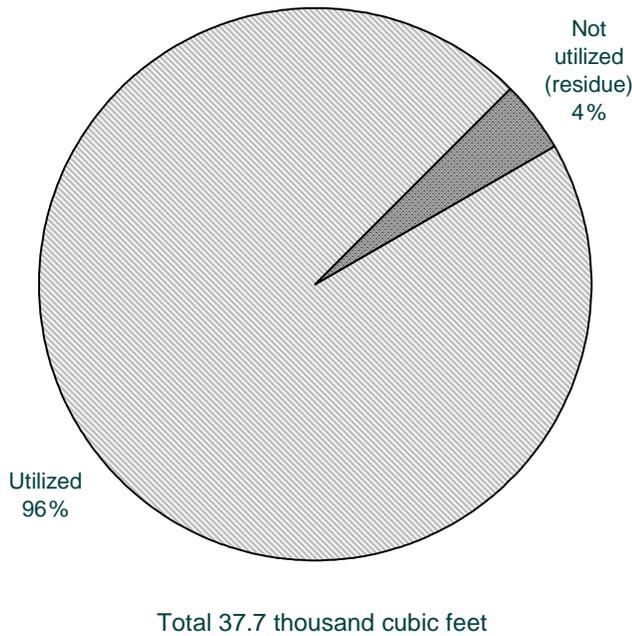


Figure 5—Disposition of softwood growing-stock volume, 2003.

collected at the county level and aggregated at the regional level, softwood volumes and percentages were tabulated for the Southeast and Northeast regions of Texas (fig. 2), as well (tables 14 through 20, and 27 through 33). Data showed very little difference in utilization rates between the regions.

Softwood percentages and volumes presented in these tables represent just trees measured in this study of 81 active harvest operations. However, it is possible to apply the percentages to inventory data from Texas' seventh survey to get an estimate of total softwood logging residues for the State. Annual softwood removal from all live trees was 506.3 million cubic feet. Softwood growing-stock removals were 493.6 million cubic feet, or 97 percent of the total. Applying the factors from this study to total softwood removals for all live trees tallied in the State survey provides an estimate of 75.9 million cubic feet total annual softwood residue. Of the total residue for all live trees, 20.73 million cubic feet, or 27 percent, was considered growing-stock residue. The remaining 73 percent, or 55.17 million cubic feet, was nongrowing-stock residue from stumps, tops and limbs, and cull trees not used.

Hardwood Removals

Results from this study document 9,958 cubic feet of hardwood volume, of which 7,592 cubic feet, or 76

percent, was utilized for product(s). Twenty-four percent, or 2,366 cubic feet, was left onsite as logging residue (fig. 6). Thirty-three percent of residue volume came from the growing-stock portion of trees, and 67 percent came from the nongrowing-stock portion (stumps, tops, and limbs) (fig. 7) (table 1).

The total hardwood growing-stock volume measured was 8,123 cubic feet. Of that total, 90.3 percent was used, and 9.7 percent was logging residue (fig. 8). By FIA merchantability standards, the logging residue portion is underutilized volume. Of the total utilized volume, 253 cubic feet, or 3.33 percent, was from the nongrowing-stock portion of trees. By the same merchantability standards, that volume is considered overutilization (tables 8 and 9).

Hardwood volumes and percentages also were measured for poletimber and sawtimber, and differentiated by the various products they provided (tables 10 through 13). At 94.5 percent, however, those trees measured for pulpwood and composite panels were more fully utilized. Also, more of the nongrowing-stock portion was used for pulpwood and composite panels. Trees measured for hardwood saw logs and veneer were the least utilized of all, although they have the most nongrowing-stock material. The hardwood volumes and percentages are also shown for the two

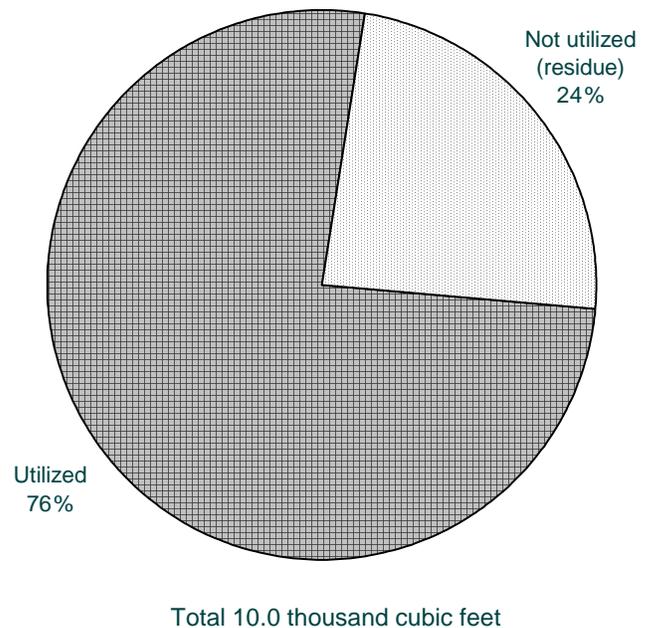


Figure 6—Disposition of total hardwood harvest volume, 2003.

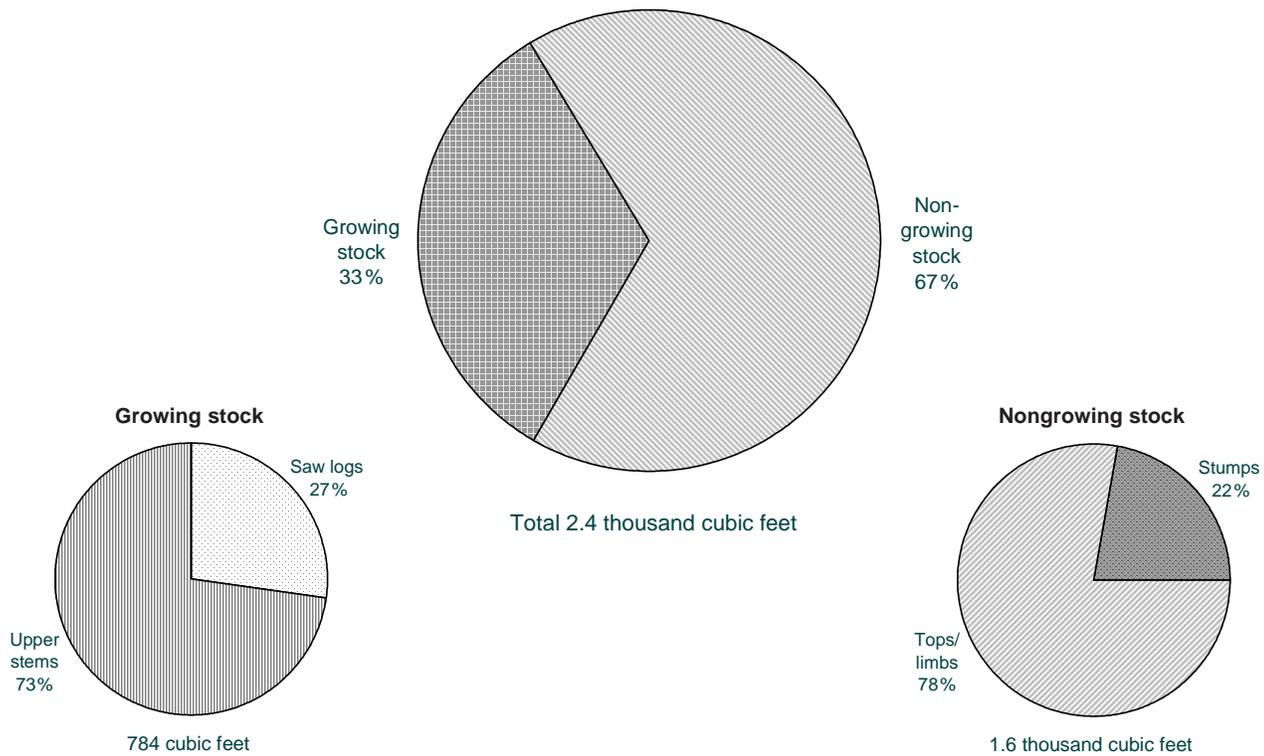


Figure 7—Hardwood residue by volume type, 2003.

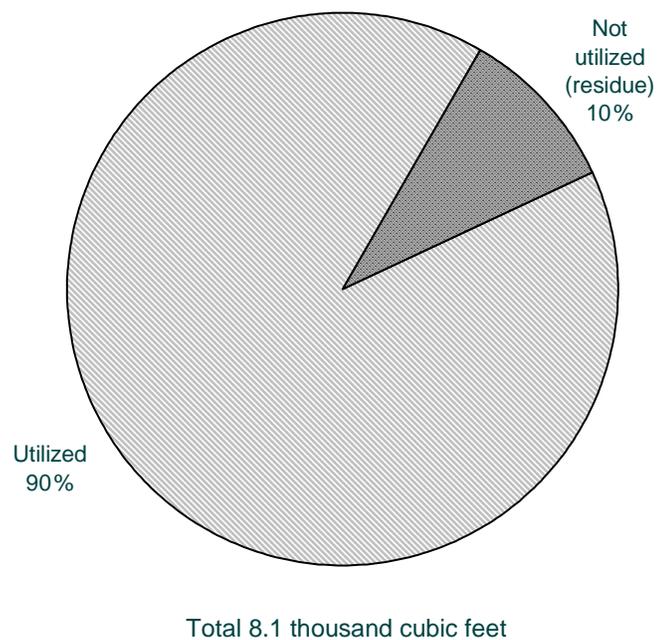


Figure 8—Disposition of hardwood growing-stock volume, 2003.

separate regions of east Texas (tables 14, 21 through 27, and 34 through 39).

Hardwood percentages and volumes presented in the tables represent just trees measured in this study of 81 active harvest operations. However, it is possible to apply the percentages to inventory data from Texas' seventh survey to provide an estimate of total hardwood logging residue for the State. Annual hardwood removals from all live trees totaled 211.4 million cubic feet. Hardwood growing-stock removals totaled 167.0 million cubic feet, or 79 percent of that total. Applying factors from this study to total hardwood removals from all live trees tallied in the State survey provided an estimate of 53.54 million cubic feet total annual hardwood residue. Of that total, 16.13 million cubic feet, or 30 percent, was considered growing-stock residue. The remaining 70 percent, or 37.41 million cubic feet, was nongrowing-stock residue from stumps, tops and limbs, and rough or rotten trees that were not used.

Texas Logging Workforce

In 2002, the Bureau of Labor Statistics reported 2,178 loggers working in 312 Texas logging firms. This represents a decline of 722 people, or 25 percent, from a mid-1990s high of 2,900 (fig. 9). There has been a general trend of increasing productivity (tons per worker) in logging, as a result of industry's focus on increased cost efficiency. This trend is supported by data presented in this bulletin. Only 7 of the 81 sites visited were considered low mechanization; i.e., those on which logging crews were using chainsaws to fell trees. Although chainsaws are used on high-mechanization sites for bucking and limbing, they typically are not used there for felling. Improved productivity has come from increasing mechanization and improved equipment capabilities. The most common logging system in the South is currently a feller buncher working with two grapple skidders, which is capable of producing about 10 loads per day of tree-length wood (Rummer 2002). (Note: Information on the Texas workforce was provided by Bob Rummer, Project Leader at the Southern Research Station's Forest Operations Research to Achieve Sustainable Management Research Work Unit in Auburn, AL).

Reliability of Data

Statistical analysis of these data indicates a 0.3 percent sampling error for total softwood volume used, and a 1.4

percent sampling error for total hardwood volume used. The underutilization factor for softwood, which is the proportion of softwood volume used (of the total merchantable softwood) had a sampling error of 0.3 percent; while the sampling error for hardwood was 1.1 percent. The overutilization factor for softwood, which is the proportion of merchantable softwood volume of the total softwood used, had a sampling error of 0.3 percent; while the sampling error for hardwood was 0.4 percent. As volumes are further processed, the samples become smaller and the sampling error increases (Zarnoch and others 2004).

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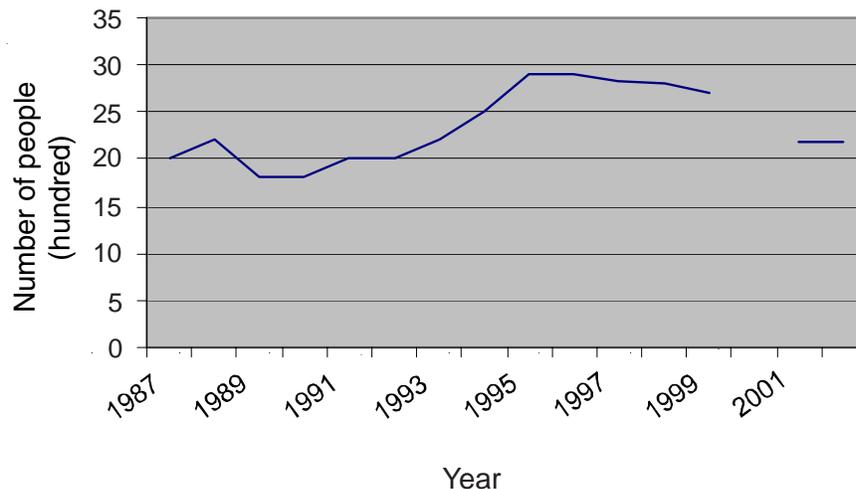


Figure 9—Employment in logging, Eastern Regions of Texas, 2003.

Definition of Terms

Board foot. Unit of measure applied to roundwood. It relates to lumber that is 1-foot long, 1-foot wide, and 1-inch thick (or its equivalent).

Composite products. Roundwood products manufactured into chips, wafers, strands, flakes, shavings, or sawdust and then reconstituted into a variety of panel and engineered lumber products.

Drain. The volume of roundwood removed from any geographic area where timber is grown.

Growing-stock removals. The growing-stock volume removed from poletimber and sawtimber trees in the timberland inventory. (Note: Includes volume removed for roundwood products, logging residues, and other removals.)

Growing-stock trees. Living trees of commercial species classified as sawtimber, poletimber, saplings, and seedlings. Growing-stock trees must contain at least one 12-foot or two 8-foot logs in the saw-log portion, currently or potentially (if too small to qualify). The log(s) must meet dimension and merchantability standards and have, currently or potentially, one-third of the gross board-foot volume in sound wood.

Growing-stock volume. The cubic-foot volume of sound wood in growing-stock trees at least 5.0 inches d.b.h. from a 1-foot stump to a minimum 4.0-inch top d.o.b. of the central stem.

Hardwoods. Dicotyledonous trees, usually broadleaf and deciduous.

Soft hardwoods. Hardwood species with an average specific gravity of 0.50 or less, such as gums, yellow-poplar, cottonwoods, red maple, basswoods, and willows.

Hard hardwoods. Hardwood species with an average specific gravity greater than 0.50, such as oaks, hard maples, hickories, and beech.

Industrial roundwood products. Any primary use of the main stem of a tree, such as saw logs, pulpwood, and veneer logs, intended to be processed into primary wood products, such as lumber, wood pulp, and sheathing, at primary wood-using mills.

International ¼-inch rule. A log rule or formula for estimating the board-foot volume of logs, allowing ½-inch of taper for each 4-foot length. The rule appears in a number of forms that allow for kerf. In the form used by FIA, a ¼-inch of kerf is assumed. This rule is used as the USDA Forest Service standard log rule in the Eastern United States.

Log. A primary forest product harvested in long, primarily 8-, 12-, and 16-foot lengths.

Logging residues. The unused merchantable portion of growing-stock trees cut or destroyed during logging operations.

Merchantable portion. That portion of live trees 5.0 inches d.b.h. and larger between a 1-foot stump and a minimum 4.0-inch top d.o.b. on the central stem. That portion of primary forks from the point of occurrence to a minimum 4.0-inch top d.o.b. is included.

Merchantable volume. Solid-wood volume in the merchantable portion of live trees.

Noncommercial species. Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land. Land that has never supported forests and land formerly forested where timber production is precluded by development for other uses.

Nongrowing-stock sources. The net volume removed from the nongrowing-stock portions of poletimber and sawtimber trees (stumps, tops, limbs, cull sections of central stem) and from any portion of a rough, rotten, sapling, dead, or nonforest tree.

Other forest land. Forest land other than timberland and productive reserved forest land. It includes available and reserved forest land that is incapable of producing annually 20 cubic feet per acre of industrial wood under natural conditions because of adverse site conditions such as sterile soils, dry climate, poor drainage, high elevation, steepness, or rockiness.

Other products. A miscellaneous category of roundwood products, e.g., cooperage, excelsior, shingles, and mill residue byproducts (charcoal, bedding, mulch, etc.).

Other removals. The growing-stock volume of trees removed from the inventory by cultural operations such as timber stand improvement, land clearing, and other changes in land use, resulting in the removal of the trees from timberland.

Other sources. (See: Nongrowing-stock sources.)

Poletimber-size trees. Softwoods 5.0 to 8.9 inches d.b.h. and hardwoods 5.0 to 10.9 inches d.b.h.

Posts, poles, and pilings. Roundwood products milled (cut or peeled) into standard sizes (lengths and circumferences) to be put in the ground to provide vertical and lateral support in buildings, foundations, utility lines, and fences. May also include nonindustrial (unmilled) products.

Primary wood-using plants. Industries that convert roundwood products (saw logs, veneer logs, pulpwood, etc.) into primary wood products, such as lumber, veneer or sheathing, and wood pulp.

Pulpwood. A roundwood product that will be reduced to individual wood fibers by chemical or mechanical means. The fibers are used to make a broad generic group of pulp products that includes paper products, as well as chipboard, fiberboard, insulating board, and paperboard.

Rotten trees. Live trees of commercial species not containing at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross board-foot tree volume in sound material.

Rough trees. Live trees of commercial species not containing at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, now or prospectively, primarily because of roughness, poor form, splits, and cracks, and with less than one-third of the gross board-foot tree volume in sound material; and live trees of noncommercial species.

Roundwood (roundwood logs). Logs, bolts, or other round sections cut from trees for industrial manufacture or consumer uses.

Roundwood chipped. Any timber cut primarily for industrial manufacture, delivered to nonpulpmills, chipped, and then sold to pulpmills for use as fiber. Includes tops, jump sections, whole trees, and pulpwood sticks.

Roundwood products. Any primary product, such as lumber, poles, pilings, pulp, or fuelwood that is produced from roundwood.

Roundwood product drain. That portion of total drain used for a product.

Salvable dead trees. Standing or downed dead trees that were formerly growing stock and considered merchantable. Trees must be at least 5.0 inches d.b.h. to qualify.

Saplings. Live trees 1.0 to 5.0 inches d.b.h.

Saw log. A roundwood product, usually 8 feet in length or longer, processed into a variety of sawn products such as lumber, cants, pallets, railroad ties, and timbers.

Saw-log portion. The part of the bole of sawtimber trees between a 1-foot stump and the saw-log top.

Saw-log top. The point on the bole of sawtimber trees above which a conventional saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber size trees. Softwoods 9.0 inches d.b.h. and larger and hardwoods 11.0 inches d.b.h. and larger.

Sawtimber volume. Growing-stock volume in the saw-log portion of sawtimber-sized trees in board feet (International ¼-inch rule).

Seedlings. Trees less than 1.0 inch d.b.h. and greater than 1 foot tall for hardwoods, greater than 6 inches tall for softwood, and greater than 0.5 inch in diameter at ground level for longleaf pine.

Softwoods. Coniferous trees, usually evergreen, having leaves that are needles or scalelike.

Standard cord. A unit of measure applied to roundwood, usually bolts or split wood. It is a stack of wood 4 feet high, 4 feet wide, and 8 feet long encompassing 128 cubic feet of wood, bark, and air space. This usually translates to approximately 75.0 to 81.0 cubic feet of solid wood for pulpwood, because pulpwood is more uniform.

Standard unit. A unit measure applied to roundwood timber products. Board feet (International ¼-inch rule) is the standard unit used for saw logs and veneer; cords are

used for pulpwood, composite panel, and fuelwood; hundred pieces for poles; thousand pieces for posts; and thousand cubic feet for all other miscellaneous forest products.

Timberland. Forest land capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization.

Timber products. Roundwood products and byproducts.

Timber products output. The total volume of roundwood products from all sources plus the volume of byproducts recovered from mill residues (equals roundwood product drain).

Timber removals. The total volume of trees removed from the timberland inventory by harvesting, cultural operations such as stand improvement, land clearing, or changes in land use. (Note: Includes roundwood products, logging residues, and other removals.)

Tree. Woody plant having one erect perennial stem or trunk at least 3 inches d.b.h., a more or less definitely formed crown of foliage, and a height of at least 13 feet (at maturity).

Upper-stem portion. The part of the main stem of sawtimber trees above the saw-log top and the minimum top diameter of 4.0 inches outside bark, or to the point where the main stem breaks into limbs.

Utilization studies. Studies conducted on active logging operations to develop factors for merchantable portions of trees left in the woods (logging residues), logging damage, and utilization of the unmerchantable portion of growing-stock trees and nongrowing-stock trees.

Veneer log. A roundwood product either rotary cut, sliced, stamped, or sawn into a variety of veneer products such as plywood, finished panels, veneer sheets, or sheathing.

Weight. A unit of measure for mill residues, expressed as oven-dry tons (2,000 oven-dry pounds).

Index of Tables

1. Harvest and utilization volume by species group, source, and volume type, Eastern Regions of Texas, 2003
2. Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Eastern Regions of Texas, 2003
3. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Eastern Regions of Texas, 2003
4. Volume of softwood growing stock by product and utilization for sawtimber, Eastern Regions of Texas, 2003
5. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Eastern Regions of Texas, 2003
6. Volume of softwood growing stock by product and utilization for poletimber, Eastern Regions of Texas, 2003
7. Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Eastern Regions of Texas, 2003
8. Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Eastern Regions of Texas, 2003
9. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Eastern Regions of Texas, 2003
10. Volume of hardwood growing stock by product and utilization for sawtimber, Eastern Regions of Texas, 2003
11. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Eastern Regions of Texas, 2003
12. Volume of hardwood growing stock by product and utilization for poletimber, Eastern Regions of Texas, 2003
13. Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Eastern Regions of Texas, 2003
14. Harvest and utilization volume by species group, source, and volume type, Northeast Region of Texas, 2003
15. Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Northeast Region of Texas, 2003
16. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Northeast Region of Texas, 2003
17. Volume of softwood growing stock by product and utilization for sawtimber, Northeast Region of Texas, 2003
18. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Northeast Region of Texas, 2003
19. Volume of softwood growing stock by product and utilization for poletimber, Northeast Region of Texas, 2003
20. Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Northeast Region of Texas, 2003
21. Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Northeast Region of Texas, 2003
22. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Northeast Region of Texas, 2003
23. Volume of hardwood growing stock by product and utilization for sawtimber, Northeast Region of Texas, 2003
24. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Northeast Region of Texas, 2003

25. Volume of hardwood growing stock by product and utilization for poletimber, Northeast Region of Texas, 2003
26. Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Northeast Region of Texas, 2003
27. Harvest and utilization volume by species group, source, and volume type, Southeast Region of Texas, 2003
28. Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Southeast Region of Texas, 2003
29. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Southeast Region of Texas, 2003
30. Volume of softwood growing stock by product and utilization for sawtimber, Southeast Region of Texas, 2003
31. Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Southeast Region of Texas, 2003
32. Volume of softwood growing stock by product and utilization for poletimber, Southeast Region of Texas, 2003
33. Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Southeast Region of Texas, 2003
34. Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Southeast Region of Texas, 2003
35. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Southeast Region of Texas, 2003
36. Volume of hardwood growing stock by product and utilization for sawtimber, Southeast Region of Texas, 2003
37. Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Southeast Region of Texas, 2003
38. Volume of hardwood growing stock by product and utilization for poletimber, Southeast Region of Texas, 2003
39. Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Southeast Region of Texas, 2003

Table 1—Harvest and utilization volume by species group, source, and volume type, Eastern Regions of Texas, 2003

Species group and source	Total tree volume	Growing stock					Nongrowing stock				
		Total	Saw log		Upper stem		Total	Stump		Tops/limbs	
			Utilized	Not utilized	Utilized	Not utilized		Utilized	Not utilized	Utilized	Not utilized
Softwood											
Sawtimber	38,528.33	34,182.41	30,953.17	774.81	1,678.38	776.05	4,345.92	540.52	775.60	79.00	2,950.80
Poletimber	4,269.12	3,515.53	—	—	3,483.27	32.26	753.59	107.81	122.95	218.06	304.77
Total	42,797.45	37,697.94	30,953.17	774.81	5,161.65	808.31	5,099.51	648.33	898.55	297.06	3,255.57
Hardwood											
Sawtimber	7,473.81	6,163.26	4,948.75	212.80	513.24	488.47	1,310.55	113.41	252.05	3.17	941.92
Poletimber	2,484.40	1,959.95	—	—	1,876.71	83.24	524.45	82.63	98.69	53.81	289.32
Total	9,958.21	8,123.21	4,948.75	212.80	2,389.95	571.71	1,835.00	196.04	350.74	56.98	1,231.24

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 2—Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
Saw logs	20,854.72	21,392.34	20,467.56	924.78	387.16	19,720.67	19,270.90	369.77	80.00
Veneer logs	11,815.22	12,070.87	11,569.80	501.07	245.42	10,276.25	10,037.52	206.80	31.93
Composite panels	486.47	447.23	432.33	14.90	54.14	56.76	53.51	3.25	—
Pulpwood	2,745.49	2,569.48	2,508.76	60.72	236.73	545.21	516.71	27.04	1.46
Poles	1,158.32	1,218.00	1,136.37	81.63	21.95	1,129.11	1,074.54	54.57	—
Total	37,060.22	37,697.92	36,114.82	1,583.10	945.40	31,728.00	30,953.18	661.43	113.39

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 3—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/total volume utilized	Nongrowing stock utilized/total volume utilized	Growing stock utilized/total growing-stock volume	Growing stock not utilized/total growing-stock volume	Saw log utilized/total saw-log volume	Cull utilized/total saw-log volume	Saw log not utilized/total saw-log volume
Saw logs	98.14	1.86	95.68	4.32	97.72	1.88	0.41
Veneer logs	97.92	2.08	95.85	4.15	97.68	2.01	0.31
Composite panels	88.87	11.13	96.67	3.33	94.27	5.73	—
Pulpwood	91.38	8.62	97.64	2.36	94.77	4.96	0.27
Poles	98.11	1.89	93.30	6.70	95.17	4.83	—
All products	97.45	2.55	95.80	4.20	97.56	2.08	0.36

A dash (—) indicates no sample for the cell.

Table 4—Volume of softwood growing stock by product and utilization for sawtimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	20,555.65	21,103.35	20,181.95	921.40	373.70	19,720.67	19,270.90	369.77	80.00
Veneer logs	10,785.47	11,084.41	10,589.65	494.76	195.82	10,276.25	10,037.52	206.80	31.93
Composite panels	77.07	77.78	72.99	4.79	4.08	56.76	53.51	3.25	—
Pulpwood	674.58	698.87	650.60	48.27	23.98	545.21	516.71	27.04	1.46
Poles	1,158.32	1,218.00	1,136.37	81.63	21.95	1,129.11	1,074.54	54.57	—
Total	33,251.09	34,182.41	32,631.56	1,550.85	619.53	31,728.00	30,953.18	661.43	113.39

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 5—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
<i>percent</i>							
Saw logs	98.18	1.82	95.63	4.37	97.72	1.88	0.41
Veneer logs	98.18	1.82	95.54	4.46	97.68	2.01	0.31
Composite panels	94.71	5.29	93.84	6.16	94.27	5.73	—
Pulpwood	96.45	3.55	93.09	6.91	94.77	4.96	0.27
Poles	98.11	1.89	93.30	6.70	95.17	4.83	—
All products	98.14	1.86	95.46	4.54	97.56	2.08	0.36

A dash (—) indicates no sample for the cell.

Table 6—Volume of softwood growing stock by product and utilization for poletimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
<i>cubic feet</i>					
Saw logs	299.07	288.99	285.61	3.38	13.46
Veneer logs	1,029.75	986.46	980.15	6.31	49.60
Composite panels	409.40	369.45	359.34	10.11	50.06
Pulpwood	2,070.91	1,870.61	1,858.16	12.45	212.75
Poles	—	—	—	—	—
Total	3,809.13	3,515.51	3,483.26	32.25	325.87

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 7—Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing- stock volume
	<i>percent</i>			
Saw logs	95.50	4.50	98.83	1.17
Veneer logs	95.18	4.82	99.36	0.64
Composite panels	87.77	12.23	97.26	2.74
Pulpwood	89.73	10.27	99.33	0.67
Poles	—	—	—	—
All products	91.45	8.55	99.08	0.92

A dash (—) indicates no sample for the cell.

Table 8—Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
		<i>cubic feet</i>							
Saw logs	4,814.00	5,271.35	4,704.28	567.07	109.72	4,093.54	3,915.42	117.94	60.18
Veneer logs	903.84	1,011.28	889.62	121.66	14.22	908.50	889.62	18.88	—
Composite panels	452.05	453.46	426.72	26.74	25.33	56.69	51.58	5.11	—
Pulpwood	1,421.84	1,387.12	1,318.10	69.02	103.74	102.82	92.13	10.69	—
Poles	—	—	—	—	—	—	—	—	—
Total	7,591.73	8,123.21	7,338.72	784.49	253.01	5,161.55	4,948.75	152.62	60.18

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 9—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing- stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	97.72	2.28	89.24	10.76	95.65	2.88	1.47
Veneer logs	98.43	1.57	87.97	12.03	97.92	2.08	—
Composite panels	94.40	5.60	94.10	5.90	90.99	9.01	—
Pulpwood	92.70	7.30	95.02	4.98	89.60	10.40	—
Poles	—	—	—	—	—	—	—
All products	96.67	3.33	90.34	9.66	95.88	2.96	1.17

A dash (—) indicates no sample for the cell.

Table 10—Volume of hardwood growing stock by product and utilization for sawtimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	4,437.54	4,898.94	4,342.70	556.24	94.84	4,093.54	3,915.42	117.94	60.18
Veneer logs	903.84	1,011.28	889.62	121.66	14.22	908.50	889.62	18.88	—
Composite panels	84.11	90.35	81.60	8.75	2.51	56.69	51.58	5.11	—
Pulpwood	153.08	162.69	148.08	14.61	5.00	102.82	92.13	10.69	—
Poles	—	—	—	—	—	—	—	—	—
Total	5,578.57	6,163.26	5,462.00	701.26	116.57	5,161.55	4,948.75	152.62	60.18

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 11—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
<i>percent</i>							
Saw logs	97.86	2.14	88.65	11.35	95.65	2.88	1.47
Veneer logs	98.43	1.57	87.97	12.03	97.92	2.08	—
Composite panels	97.02	2.98	90.32	9.68	90.99	9.01	—
Pulpwood	96.73	3.27	91.02	8.98	89.60	10.40	—
Poles	—	—	—	—	—	—	—
All products	97.91	2.09	88.62	11.38	95.88	2.96	1.17

A dash (—) indicates no sample for the cell.

Table 12—Volume of hardwood growing stock by product and utilization for poletimber, Eastern Regions of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
<i>cubic feet</i>					
Saw logs	376.46	372.41	361.58	10.83	14.88
Veneer logs	—	—	—	—	—
Composite panels	367.94	363.11	345.12	17.99	22.82
Pulpwood	1,268.76	1,224.43	1,170.02	54.41	98.74
Poles	—	—	—	—	—
Total	2,013.16	1,959.95	1,876.72	83.23	136.44

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 13—Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Eastern Regions of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing- stock volume
	<i>percent</i>			
Saw logs	96.05	3.95	97.09	2.91
Veneer logs	—	—	—	—
Composite panels	93.80	6.20	95.05	4.95
Pulpwood	92.22	7.78	95.56	4.44
Poles	—	—	—	—
All products	93.22	6.78	95.75	4.25

A dash (—) indicates no sample for the cell.

Table 14—Harvest and utilization volume by species group, source, and volume type, Northeast Region of Texas, 2003

Species group and source	Total tree volume	Growing stock					Nongrowing stock				
		Total	Saw log		Upper stem		Total	Stump		Tops/limbs	
Utilized	Not utilized		Utilized	Not utilized	Utilized	Not utilized		Utilized	Not utilized		
<i>cubic feet</i>											
Softwood											
Sawtimber	14,084.17	12,443.23	10,833.45	408.72	1,022.94	178.12	1,640.94	246.78	258.48	41.59	1,094.09
Poletimber	2,852.82	2,350.36	—	—	2,333.80	16.56	502.46	73.30	81.07	142.40	205.69
Total	16,936.99	14,793.59	10,833.45	408.72	3,356.74	194.68	2,143.40	320.08	339.55	183.99	1,299.78
Hardwood											
Sawtimber	4,372.55	3,576.96	2,929.27	107.91	202.58	337.20	795.59	59.70	154.38	—	581.51
Poletimber	1,445.00	1,128.62	—	—	1,076.50	52.12	316.38	47.02	61.94	10.30	197.12
Total	5,817.55	4,705.58	2,929.27	107.91	1,279.08	389.32	1,111.97	106.72	216.32	10.30	778.63

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 15—Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Northeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	8,710.41	8,900.71	8,517.78	382.93	192.63	8,035.80	7,776.20	253.13	6.47
Veneer logs	3,194.96	3,194.40	3,073.08	121.32	121.88	1,957.50	1,865.63	91.87	—
Composite panels	330.25	295.97	292.90	3.07	37.35	5.66	5.38	0.28	—
Pulpwood	1,300.30	1,184.50	1,170.05	14.45	130.25	114.10	111.70	2.40	—
Poles	1,158.32	1,218.00	1,136.37	81.63	21.95	1,129.11	1,074.54	54.57	—
Total	14,694.24	14,793.58	14,190.18	603.40	504.06	11,242.17	10,833.45	402.25	6.47

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 16—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Northeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/total volume utilized	Nongrowing stock utilized/total volume utilized	Growing stock utilized/total growing-stock volume	Growing stock not utilized/total growing-stock volume	Saw log utilized/total saw-log volume	Cull utilized/total saw-log volume	Saw log not utilized/total saw-log volume
<i>percent</i>							
Saw logs	97.79	2.21	95.70	4.30	96.77	3.15	0.08
Veneer logs	96.19	3.81	96.20	3.80	95.31	4.69	—
Composite panels	88.69	11.31	98.96	1.04	95.05	4.95	—
Pulpwood	89.98	10.02	98.78	1.22	97.90	2.10	—
Poles	98.11	1.89	93.30	6.70	95.17	4.83	—
All products	96.57	3.43	95.92	4.08	96.36	3.58	0.06

A dash (—) indicates no sample for the cell.

Table 17—Volume of softwood growing stock by product and utilization for sawtimber, Northeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	8,510.30	8,707.56	8,326.80	380.76	183.50	8,035.80	7,776.20	253.13	6.47
Veneer logs	2,314.60	2,353.73	2,238.03	115.70	76.57	1,957.50	1,865.63	91.87	—
Composite panels	8.72	8.72	8.43	0.29	0.29	5.66	5.38	0.28	—
Pulpwood	152.81	155.21	146.75	8.46	6.06	114.10	111.70	2.40	—
Poles	1,158.32	1,218.00	1,136.37	81.63	21.95	1,129.11	1,074.54	54.57	—
Total	12,144.75	12,443.22	11,856.38	586.84	288.37	11,242.17	10,833.45	402.25	6.47

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 18—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Northeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing- stock volume	Growing stock not utilized/ total growing- stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	97.84	2.16	95.63	4.37	96.77	3.15	0.08
Veneer logs	96.69	3.31	95.08	4.92	95.31	4.69	—
Composite panels	96.67	3.33	96.67	3.33	95.05	4.95	—
Pulpwood	96.03	3.97	94.55	5.45	97.90	2.10	—
Poles	98.11	1.89	93.30	6.70	95.17	4.83	—
All products	97.63	2.37	95.28	4.72	96.36	3.58	0.06

A dash (—) indicates no sample for the cell.

Table 19—Volume of softwood growing stock by product and utilization for poletimber, Northeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
	<i>cubic feet</i>				
Saw logs	200.11	193.15	190.98	2.17	9.13
Veneer logs	880.36	840.67	835.05	5.62	45.31
Composite panels	321.53	287.25	284.47	2.78	37.06
Pulpwood	1,147.49	1,029.29	1,023.30	5.99	124.19
Poles	—	—	—	—	—
Total	2,549.49	2,350.36	2,333.80	16.56	215.69

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 20—Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Northeast Region of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing- stock volume	Growing stock not utilized/ total growing- stock volume
	<i>percent</i>			
Saw logs	95.44	4.56	98.88	1.12
Veneer logs	94.85	5.15	99.33	0.67
Composite panels	88.47	11.53	99.03	0.97
Pulpwood	89.18	10.82	99.42	0.58
Poles	—	—	—	—
All products	91.54	8.46	99.30	0.70

A dash (—) indicates no sample for the cell.

Table 24—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Northeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing- stock volume	Growing stock not utilized/ total growing- stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	98.07	1.93	86.92	13.08	95.78	3.80	0.42
Veneer logs	98.43	1.57	87.97	12.03	97.92	2.08	—
Composite panels	96.86	3.14	94.81	5.19	94.34	5.66	—
Pulpwood	97.25	2.75	96.51	3.49	98.18	1.82	—
Poles	—	—	—	—	—	—	—
All products	98.13	1.87	87.56	12.44	96.45	3.27	0.28

A dash (—) indicates no sample for the cell.

Table 25—Volume of hardwood growing stock by product and utilization for poletimber, Northeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
	<i>cubic feet</i>				
Saw logs	151.40	150.81	145.72	5.09	5.68
Veneer logs	—	—	—	—	—
Composite panels	253.58	253.87	241.00	12.87	12.58
Pulpwood	728.84	723.93	689.78	34.15	39.06
Poles	—	—	—	—	—
Total	1,133.82	1,128.61	1,076.50	52.11	57.32

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 26—Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Northeast Region of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing- stock volume	Growing stock not utilized/ total growing- stock volume
	<i>percent</i>			
Saw logs	96.25	3.75	96.62	3.38
Veneer logs	—	—	—	—
Composite panels	95.04	4.96	94.93	5.07
Pulpwood	94.64	5.36	95.28	4.72
Poles	—	—	—	—
All products	94.94	5.06	95.38	4.62

A dash (—) indicates no sample for the cell.

Table 27—Harvest and utilization volume by species group, source, and volume type, Southeast Region of Texas, 2003

Species group and source	Total tree volume	Growing stock					Nongrowing stock				
		Total	Saw log		Upper stem		Total	Stump		Tops/limbs	
			Utilized	Not utilized	Utilized	Not utilized		Utilized	Not utilized	Utilized	Not utilized
<i>cubic feet</i>											
Softwood											
Sawtimber	24,444.17	21,739.19	20,119.73	366.09	655.44	597.93	2,704.98	293.74	517.12	37.41	1,856.71
Poletimber	1,416.27	1,165.16	—	—	1,149.47	15.69	251.11	34.51	41.88	75.65	99.07
Total	25,860.44	22,904.35	20,119.73	366.09	1,804.91	613.62	2,956.09	328.25	559.00	113.06	1,955.78
Hardwood											
Sawtimber	3,101.25	2,586.30	2,019.48	104.89	310.66	151.27	514.95	53.71	97.66	3.17	360.41
Poletimber	1,039.40	831.33	—	—	800.21	31.12	208.07	35.60	36.75	43.52	92.20
Total	4,140.65	3,417.63	2,019.48	104.89	1,110.87	182.39	723.02	89.31	134.41	46.69	452.61

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 28—Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	12,144.31	12,491.63	11,949.79	541.84	194.52	11,684.88	11,494.70	116.65	73.53
Veneer logs	8,620.26	8,876.46	8,496.71	379.75	123.55	8,318.75	8,171.89	114.93	31.93
Composite panels	156.22	151.29	139.44	11.85	16.78	51.09	48.13	2.96	0.00
Pulpwood	1,445.18	1,384.98	1,338.71	46.27	106.47	431.11	405.01	24.64	1.46
Poles	—	—	—	—	—	—	—	—	—
Total	22,365.97	22,904.36	21,924.65	979.71	441.32	20,485.83	20,119.73	259.18	106.92

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 29—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing- stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	98.40	1.60	95.66	4.34	98.37	1.00	0.63
Veneer logs	98.57	1.43	95.72	4.28	98.23	1.38	0.38
Composite panels	89.26	10.74	92.17	7.83	94.21	5.79	—
Pulpwood	92.63	7.37	96.66	3.34	93.95	5.72	0.34
Poles	—	—	—	—	—	—	—
All products	98.03	1.97	95.72	4.28	98.21	1.27	0.52

A dash (—) indicates no sample for the cell.

Table 30—Volume of softwood growing stock by product and utilization for sawtimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Sawlog-portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
	<i>cubic feet</i>								
Saw logs	12,045.35	12,395.79	11,855.15	540.64	190.20	11,684.88	11,494.70	116.65	73.53
Veneer logs	8,470.87	8,730.67	8,351.61	379.06	119.26	8,318.75	8,171.89	114.93	31.93
Composite panels	68.35	69.07	64.56	4.51	3.79	51.10	48.13	2.96	—
Pulpwood	521.76	543.66	503.85	39.81	17.91	431.10	405.01	24.64	1.46
Poles	—	—	—	—	—	—	—	—	—
Total	21,106.33	21,739.19	20,775.17	964.02	331.16	20,485.83	20,119.73	259.18	106.92

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 31—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing- stock volume	Growing stock not utilized/ total growing- stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	98.42	1.58	95.64	4.36	98.37	1.00	0.63
Veneer logs	98.59	1.41	95.66	4.34	98.23	1.38	0.38
Composite panels	94.46	5.54	93.47	6.53	94.19	5.79	—
Pulpwood	96.57	3.43	92.68	7.32	93.95	5.72	0.34
Poles	—	—	—	—	—	—	—
All products	98.43	1.57	95.57	4.43	98.21	1.27	0.52

A dash (—) indicates no sample for the cell.

Table 32—Volume of softwood growing stock by product and utilization for poletimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
<i>cubic feet</i>					
Saw logs	98.96	95.84	94.64	1.20	4.32
Veneer logs	149.39	145.79	145.10	0.69	4.29
Composite panels	87.87	82.22	74.88	7.34	12.99
Pulpwood	923.42	841.32	834.86	6.46	88.56
Poles	—	—	—	—	—
Total	1,259.64	1,165.17	1,149.48	15.69	110.16

Numbers in rows and columns may not sum to totals due to rounding.
A dash (—) indicates no sample for the cell.

Table 33—Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume
<i>percent</i>				
Saw logs	95.63	4.37	98.75	1.25
Veneer logs	97.13	2.87	99.53	0.47
Composite panels	85.22	14.78	91.07	8.93
Pulpwood	90.41	9.59	99.23	0.77
Poles	—	—	—	—
All products	91.25	8.75	98.65	1.35

A dash (—) indicates no sample for the cell.

Table 34—Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
<i>cubic feet</i>									
Saw logs	2,509.07	2,690.80	2,446.59	244.21	62.48	2,054.26	1,962.27	40.44	51.55
Veneer logs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite panels	145.29	145.27	134.21	11.06	11.08	23.46	20.23	3.23	0.00
Pulpwood	612.00	581.56	549.55	32.01	62.45	46.65	36.97	9.68	0.00
Poles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	3,266.36	3,417.63	3,130.35	287.28	136.01	2,124.37	2,019.47	53.35	51.55

Numbers in rows and columns may not sum to totals due to rounding.

Table 35—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Saw log not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	97.51	2.49	90.92	9.08	95.52	1.97	2.51
Veneer logs	—	—	—	—	—	—	—
Composite panels	92.37	7.63	92.39	7.61	86.23	13.77	—
Pulpwood	89.80	10.20	94.50	5.50	79.25	20.75	—
Poles	—	—	—	—	—	—	—
All products	95.84	4.16	91.59	8.41	95.06	2.51	2.43

A dash (—) indicates no sample for the cell.

Table 36—Volume of hardwood growing stock by product and utilization for sawtimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
	<i>cubic feet</i>								
Saw logs	2,284.01	2,469.20	2,230.73	238.47	53.28	2,054.26	1,962.27	40.44	51.55
Veneer logs	—	—	—	—	—	—	—	—	—
Composite panels	30.94	36.03	30.10	5.93	0.84	23.46	20.23	3.23	—
Pulpwood	72.08	81.07	69.31	11.76	2.77	46.65	36.97	9.68	—
Poles	—	—	—	—	—	—	—	—	—
Total	2,387.03	2,586.30	2,330.14	256.16	56.89	2,124.37	2,019.47	53.35	51.55

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 37—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization		Saw-log portion		
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume	Saw log utilized/ total saw-log volume	Cull utilized/ total saw-log volume	Sawlog not utilized/ total saw-log volume
	<i>percent</i>						
Saw logs	97.67	2.33	90.34	9.66	95.52	1.97	2.51
Veneer logs	—	—	—	—	—	—	—
Composite panels	97.29	2.71	83.54	16.46	86.23	13.77	—
Pulpwood	96.16	3.84	85.49	14.51	79.25	20.75	—
Poles	—	—	—	—	—	—	—
All products	97.62	2.38	90.10	9.90	95.06	2.51	2.43

A dash (—) indicates no sample for the cell.

Table 38—Volume of hardwood growing stock by product and utilization for poletimber, Southeast Region of Texas, 2003

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
<i>cubic feet</i>					
Saw logs	225.06	221.60	215.86	5.74	9.20
Veneer logs	—	—	—	—	—
Composite panels	114.35	109.24	104.11	5.13	10.24
Pulpwood	539.92	500.49	480.24	20.25	59.68
Poles	—	—	—	—	—
Total	879.33	831.33	800.21	31.12	79.12

Numbers in rows and columns may not sum to totals due to rounding.

A dash (—) indicates no sample for the cell.

Table 39—Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Southeast Region of Texas, 2003

Product	Overutilization		Underutilization	
	Growing stock utilized/ total volume utilized	Nongrowing stock utilized/ total volume utilized	Growing stock utilized/ total growing-stock volume	Growing stock not utilized/ total growing-stock volume
<i>percent</i>				
Saw logs	95.91	4.09	97.41	2.59
Veneer logs	—	—	—	—
Composite panels	91.05	8.95	95.30	4.70
Pulpwood	88.95	11.05	95.95	4.05
Poles	—	—	—	—
All products	91.00	9.00	96.26	3.74

A dash (—) indicates no sample for the cell.



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Bentley, James W.; Johnson, Tony G. 2004. Eastern Texas harvest and utilization study, 2003. Resour. Bull. SRS-97. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 28 p.

In 2003, a harvest and utilization study was conducted on 81 operations throughout eastern Texas. There were 2,072 total trees measured, 1,557 or 75 percent were softwood, while 515 or 25 percent were hardwood. Results from this study showed that 87 percent of the total softwood volume measured was utilized for a product, while the other 13 percent was left as logging residue. Seventy-six percent of the total hardwood volume measured was utilized for a product, while 24 percent was left as logging residue.

Keywords: Growing stock, logging residue, nongrowing stock, overutilization, product, removals, underutilization.

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