USDA
United States Department of Agriculture

Georgia Harvest and Utilization Study, 2015

David J. Wall, James W. Bentley, James A. Gray, and Jason A. Cooper

Forest Service
Southern Research Station
e-Resource Bulletin SRS–217

The Authors:

David J. Wall, Forester, U.S. Forest Service, Southern Research Station, Meadville, MS 39653; **James W. Bentley**, Forester; **James A. Gray**, Forester; and **Jason A. Cooper**, Forester, U.S. Forest Service, Southern Research Station, Knoxville, TN 37919.

All photos by Tony G. Johnson (retired), U.S. Forest Service.

Thinned loblolly pine plantation.

Cover photo: Harvested and merchandized loblolly pine pulpwood on logging deck.

April 2018

Southern Research Station
200 W.T. Weaver Blvd.
Asheville, NC 28804

www.srs.fs.usda.gov

FOREWORD

This resource bulletin describes the principal findings of a harvest and utilization study conducted during the ninth inventory of Georgia's 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 Agricultural Research, Extension, and Education Reform Act of 1998 (1998 Farm Bill). Surveys and utilization studies are part of a continuing, nationwide undertaking by regional experiment stations of the Forest Service, U.S. Department of Agriculture. 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), the Commonwealth of Puerto Rico, and the U.S. Virgin Islands are conducted by the Southern Research Station, Forest Inventory and Analysis (FIA) Research Work Unit. 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 "The Enhanced Forest Inventory and Analysis Program—National Sampling Design and Estimation Procedures" (Bechtold and Patterson 2005).

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: http://srsfia2.fs.fed.us/data/index.shtml.

ACKNOWLEDGMENTS

The authors thank David Dickinson and Risher Willard for their review and comments; and the Southern Research Station (SRS) Technical Publications Team for technical edit, layout, and overall production of this report.

The SRS gratefully acknowledges the cooperation and assistance of the Georgia Forestry Commission in collecting harvest and utilization data. Appreciation is also extended to the private landowners, forest industry, and loggers for allowing access to their land and logging operations.

Truck mounted knuckleboom loader merchandizing loblolly pine on logging deck.

Contents

[a]All tables in this report are available in Microsoft® Excel workbook files. Upon request, these files will be supplied in the format the customer requests.

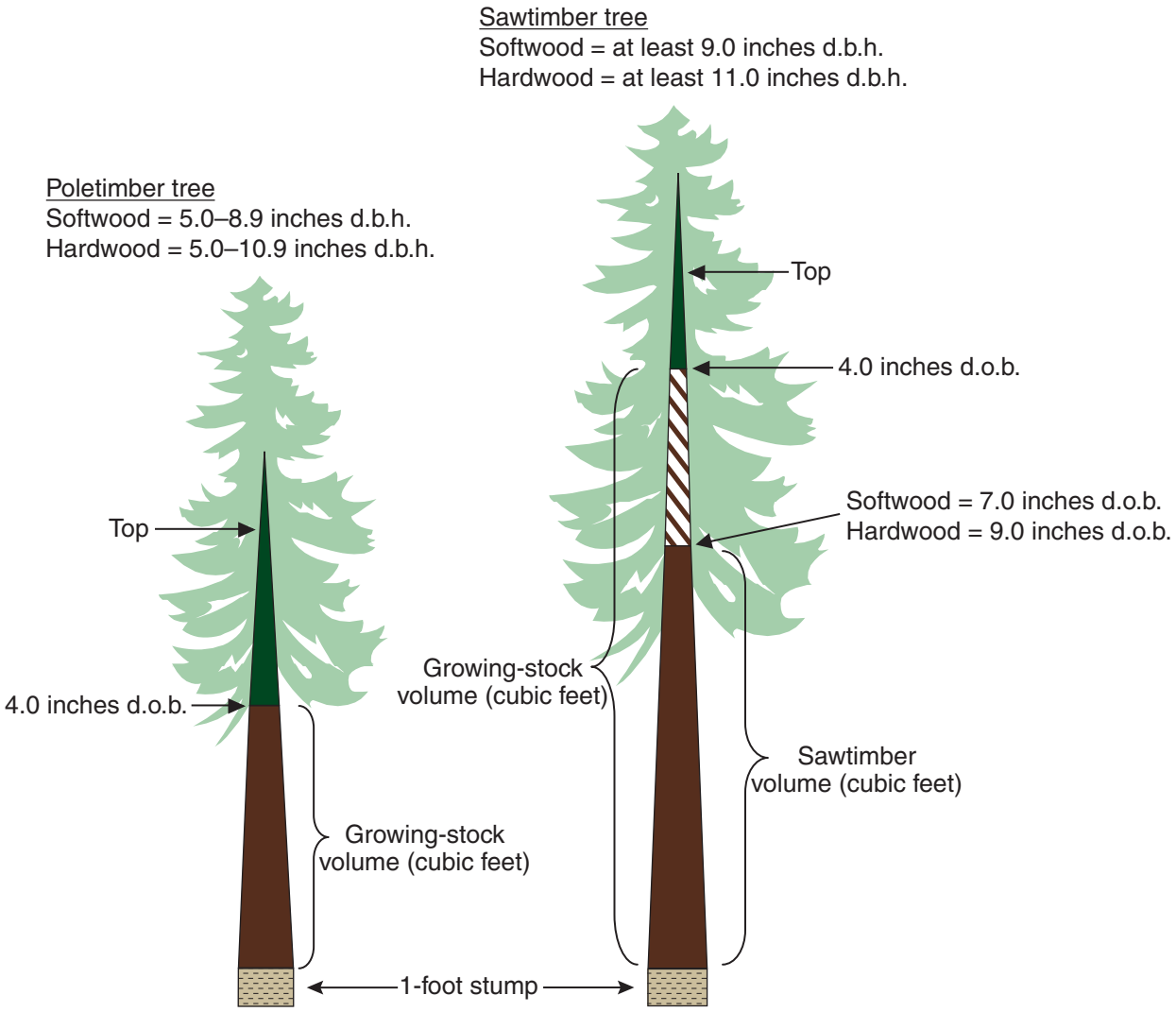

Figure 1—Stem sections of poletimber and sawtimber trees.

Georgia Harvest and Utilization Study, 2015

David J. Wall, James W. Bentley, James A. Gray, and Jason A. Cooper

INTRODUCTION

Forest planners and managers have a continuing need for information about the timber resource, and the public is expressing increasing interest in the effects of logging. Therefore, up-to-date data on the Nation's forests—and how the forests are changing—are essential to well-informed decisionmaking. Information about the condition of and changes in the timber resource of Georgia 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.

Logging residue in thinned loblolly pine plantation.

This bulletin presents the findings of a 2015 harvest and utilization study in Georgia. 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 91 active harvest operations throughout Georgia. This bulletin also provides 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 of particular importance 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 of the bole. 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. Rough or rotten trees were also sampled and make up another piece of nongrowing-stock (cull) volume. Figure 1 illustrates a poletimber tree, 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 State such as Georgia is problematic. Because of the complexity of the timber industry, it is impossible to list the names and locations of all during the timeframe considered in this resource bulletin. Many uncontrollable factors affect how, when, and where harvesting operations take place, but the most common events that affect harvesting operations are weather and timber markets. A random sample provides a reasonably accurate estimate of utilization.

The sites selected for study were stratified by species group and product using the most recent data available for county-level output of timber products harvested in Georgia by species group (Schiller and others 2009). Using those proportions, 77 of the 91 selected sites were designated as softwood operations and the remaining 14 as hardwood operations. The same guidelines were used to designate harvest operations by product but allow for more flexibility because of the difficulty in locating harvesting operations for some products. Table 1 shows the final breakdown number of harvest operations, total trees, trees planted, and percentage of trees planted by product and species group.

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 (Schiller and others 2009), prospective utilization sites were selected based on a high probability of locating a harvesting operation for the particular product and species group assigned.

Data Collection

During the ninth survey, 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 collection was from September 2010 to November 2015 on active harvest operations. To locate active harvest sites, field crews visited local mills and consulted county personnel.

At each harvest operation site, field crews talked to the logger or person in charge of operations. These contacts provided vital information about product(s) utilized, specific

Table 1—Number of operations, total trees, planted trees, and percent planted by product and species group, Georgia, 2015

Product and species group	Operations	Trees		
		Total	Planted	
	number			*percent*
Saw logs				
Softwood	28	598	439	73
Hardwood	4	48	—	—
Total	32	646	439	68
Veneer logs				
Softwood	5	106	26	25
Hardwood	—	—	—	—
Total	5	106	26	25
Composite panels				
Softwood	5	104	80	77
Hardwood	—	—	—	—
Total	5	104	80	77
Pulpwood				
Softwood	25	735	607	83
Hardwood	5	125	24	19
Total	30	860	631	73
Poles				
Softwood	5	93	52	56
Hardwood	—	—	—	—
Total	5	93	52	56
Fence posts				
Softwood	4	95	95	100
Hardwood	—	—	—	—
Total	4	95	95	100
Fuelwood				
Softwood	5	111	106	95
Hardwood	5	114	—	—
Total	10	225	106	47
All products				
Softwood	77	1,842	1,405	76
Hardwood	14	287	24	8
Total	91	2,129	1,429	67

— = no sample for the cell.

Representation of residual stump height using mechanized felling equipment.

diameters, and log lengths the receiving mill(s) would accept, along with minimum diameters at the cutoff points for specific products.

The goal of the field crew at each harvest operation site was to measure 25 to 30 trees for each product. This number ensured 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 often 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, d.b.h., tree class, product, bole length, and percentage of 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 sawyer, according to particular specifications set by the receiving mill, usually determines the end of utilization.

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 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 d.b.h. 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 Georgia

Results of this study identify several key characteristics of trees harvested. Such findings cannot be obtained from a typical field inventory or a forest industry study that supplies product output data only. Characteristics such as average d.b.h. by product, average bole length by product, average residual stump height, and average d.o.b. at the end of utilization is vital information for a full understanding of the complex nature of removals. Averages discussed in this section are based on the measurement of 2,129 trees, of which 1,842 (87 percent) were softwood and 287 (13 percent) hardwood.

According to Schiller and others (2009), softwood and hardwood saw-log volume together accounted for 34 percent of the total product output for the State. The study classified 598 trees as having softwood saw logs averaging 12.4 inches d.b.h. Seventy-three percent, or 439 trees, were classified as planted softwood saw logs averaging 11.8 inches d.b.h., about 3 inches smaller than natural softwood saw logs averaging 14 inches d.b.h. It classified 48 hardwood trees as having saw logs averaging 17.3 inches d.b.h. Veneer and plywood constitute another component of the product mix for Georgia. Based on 106 trees measured for softwood veneer, the average d.b.h. was 15.8 inches. As expected, the d.b.h. of trees measured for pulpwood and composite panels was significantly smaller. Of the 735 softwood pulpwood trees measured, the average d.b.h. was 7.4 inches, while the 125 trees measured for hardwood pulpwood averaged 8.3 inches d.b.h. Eighty-three percent, or 607 trees, of the softwood pulpwood trees were planted, averaging 7.5 inches d.b.h., little difference in d.b.h when compared to trees that come from natural stands. One hundred-four trees were measured for softwood composite panels averaging 7.5 inches d.b.h. Table 2 shows the average d.b.h. 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 trees measured for saw logs was 61 feet, while trees measured for hardwood saw logs had an average bole length of 66 feet. In comparison, trees measured for pulpwood had average bole lengths of 36 feet for both softwoods and hardwoods. Softwood veneer trees had an average bole length of 76 feet. Planted sites constituted a subset of all trees measured. Trees measured in planted stands tended to have shorter bole lengths than those measured in the natural stands. Table 3 shows the average bole length by species group.

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 0.21 to 0.82 foot; however, most softwood trees harvested had an average residual stump height of about a 0.48 foot or less, while harvested

Table 2—Average diameter at breast height by species group, stand origin, and product, Georgia, 2015

Species group and stand origin	Product						
	Saw logs	Veneer logs	Composite panels	Pulp-wood	Poles	Fence posts	Fuel-wood
	inches						
Softwood							
Natural	14.06	16.31	6.70	7.03	12.50	—	6.90
Planted	11.81	14.30	7.77	7.52	11.27	7.95	7.37
Total	12.41	15.82	7.52	7.44	11.81	7.95	7.35
Hardwood							
Natural	17.29	—	—	8.36	—	—	7.66
Planted	—	—	—	8.18	—	—	—
Total	17.29	—	—	8.32	—	—	7.66

— = no sample for the cell.

Table 3—Average bole length by species group, stand origin, and product, Georgia, 2015

Species group and stand origin	Product						
	Saw logs	Veneer logs	Composite panels	Pulp-wood	Poles	Fence posts	Fuel-wood
	feet						
Softwood							
Natural	69.73	79.03	32.13	33.73	66.80	—	32.00
Planted	58.09	68.00	35.58	36.45	62.62	40.43	38.11
Total	61.19	76.32	34.78	35.98	64.46	40.43	37.84
Hardwood							
Natural	65.60	—	—	35.90	—	—	29.97
Planted	—	—	—	37.46	—	—	—
Total	65.60	—	—	36.20	—	—	29.97

— = no sample for the cell.

hardwood trees averaged slightly higher residual stumps. In softwoods and across all products, this accounted for about 52 percent of the stump volume being utilized. In hardwoods and across all products, about 27 percent of stump volume was used. Stump volume for both hardwood and softwood contributed to utilization of the nongrowing-stock portion of trees, i.e., overutilization. Residual stump heights for trees coming from natural stands appear slightly higher than residual stump heights in planted stands. Table 4 shows the average residual stump heights for each product by species group.

The final component we used to determine use rates was d.o.b. at the end of utilization. Stumps constitute most of the nongrowing-stock volume; they accounted for 69 percent of the nongrowing-stock portion that was utilized. The average end of utilization for softwood saw logs was 4.5 inches, and for hardwood saw logs 7.0 inches. The average end of utilization for softwood and hardwood pulpwood was 3.2 and 4.3 inches, respectively. Trees coming from natural and planted stands showed little difference in the end of utilization. Table 5 shows the average end of utilization by the different products and species group.

Table 4—Average residual stump height by species group, stand origin, and product, Georgia, 2015

Species group and stand origin	Product						
	Saw logs	Veneer logs	Composite panels	Pulp-wood	Poles	Fence posts	Fuel-wood
	feet						
Softwood							
Natural	0.58	0.91	0.21	0.73	0.26	—	0.50
Planted	0.41	0.30	0.88	0.28	0.44	0.37	0.36
Total	0.46	0.76	0.72	0.36	0.36	0.37	0.36
Hardwood							
Natural	0.82	—	—	0.70	—	—	0.55
Planted	—	—	—	0.87	—	—	—
Total	0.82	—	—	0.73	—	—	0.55

— = no sample for the cell.

Table 5—Average end of utilization by species group, stand origin, and product, Georgia, 2015

Species group and stand origin	Product						
	Saw logs	Veneer logs	Composite panels	Pulp-wood	Poles	Fence posts	Fuel-wood
	inches						
Softwood							
Natural	4.83	6.37	3.32	3.84	3.84	—	4.90
Planted	4.34	4.03	3.66	3.08	6.22	3.73	3.11
Total	4.47	5.80	3.58	3.21	5.17	3.73	3.19
Hardwood							
Natural	7.01	—	—	4.39	—	—	5.05
Planted	—	—	—	3.83	—	—	—
Total	7.01	—	—	4.28	—	—	5.05

— = no sample for the cell.

Softwood Removals

Results from this study document 37,510 cubic feet of softwood volume, of which 32,462 cubic feet, or 87 percent, was used for product(s). Thirteen percent, or 5,048 cubic feet, was left onsite as logging residue (fig. 2). Twenty-seven percent of the residue volume came from the growing-stock portion of the tree, while 73 percent came from the nongrowing-stock portion (stumps, tops, and limbs) (fig. 3a) (table A.1).

The total softwood growing-stock volume measured was 32,835 cubic feet, of which 96 percent was utilized and 4 percent was logging residue (fig. 4). By FIA merchantability standards, the logging residue portion of growing-stock trees is underutilized volume. Of the total utilized volume, 981 cubic feet, or 3 percent, was from the nongrowing-stock portion of trees. By the same merchantability standards, that volume is considered overutilization (tables A.2 and A.3).

Softwood volumes and percentages are broken down further by poletimber and sawtimber, and by the various products measured (tables A.2 through A.9). By product, trees

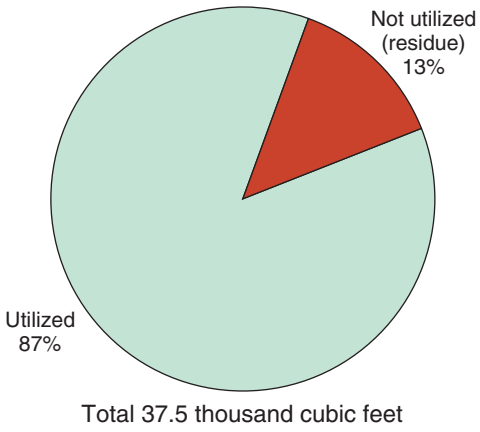

Figure 2—Disposition of total softwood harvest volume, Georgia, 2015.

harvested for pulpwood had average rates of utilization for the merchantable portion of 97 percent and a rate of overutilization of 7.2 percent, meaning that more of the nongrowing-stock portion of the tree was used for products and less was left as logging residue.

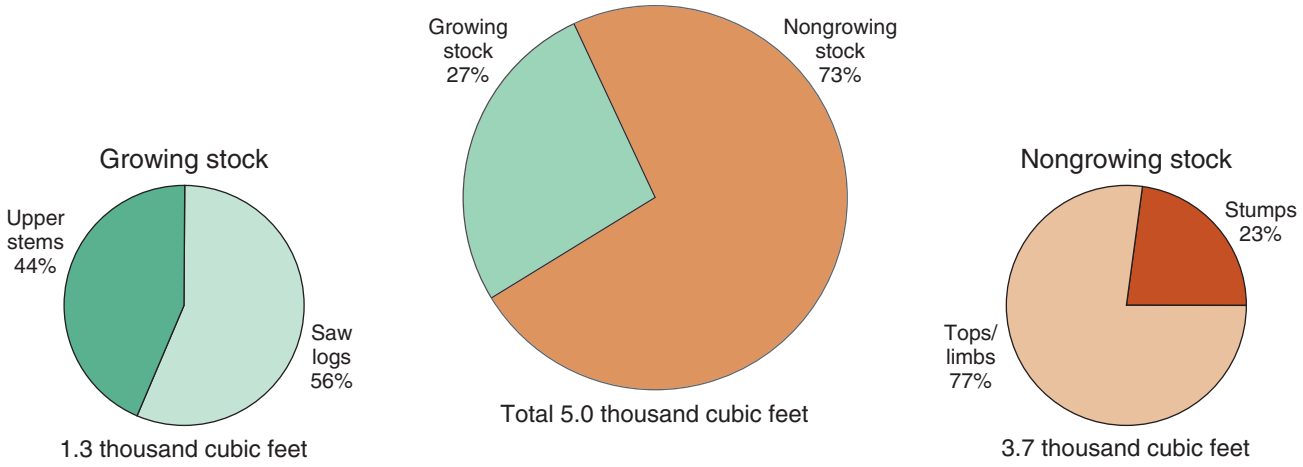

Figure 3—Softwood residue by volume type, Georgia, 2015.

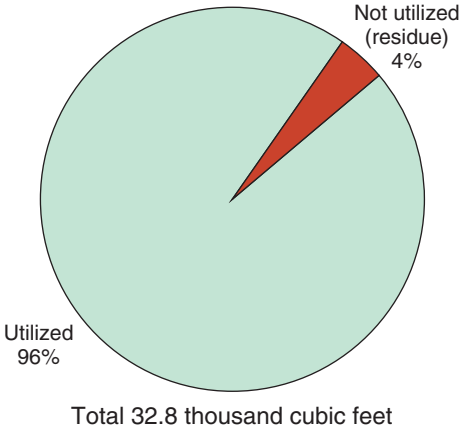

Figure 4—Disposition of softwood growing-stock volume, Georgia, 2015.

Residual logging residue after a total harvest.

Hardwood Removals

Results from this study document 5,454 cubic feet of hardwood volume, of which 4,207.03 cubic feet, or 77 percent, was utilized for product(s). Twenty-three percent, or 1,247 cubic feet, was left onsite as logging residue (fig. 5). Thirty-one percent of residue volume came from the growing-stock portion of trees, and 69 percent came from the nongrowing-stock portion (stumps, tops, and limbs) (fig. 6a) (table A.1).

The total hardwood growing-stock volume measured was 4,511 cubic feet, of which 91 percent was used and 9 percent was logging residue (fig. 7). By FIA merchantability standards, the logging residue portion is underutilized volume. Of the total utilized volume, 87 cubic feet, or 2.1 percent, was from the nongrowing-stock portion of trees. By the same merchantability standards, that volume is considered overutilization (tables A.10 and A.11).

Hardwood volumes and percentages also were measured for poletimber and sawtimber, and differentiated by the various products they provided (tables A.10 through A.17). At 98 percent, however, those trees measured for pulpwood were more fully utilized, and more of the nongrowing-stock portion was used for products. Trees measured for hardwood saw logs were the least utilized of all, although they have the most nongrowing-stock material.

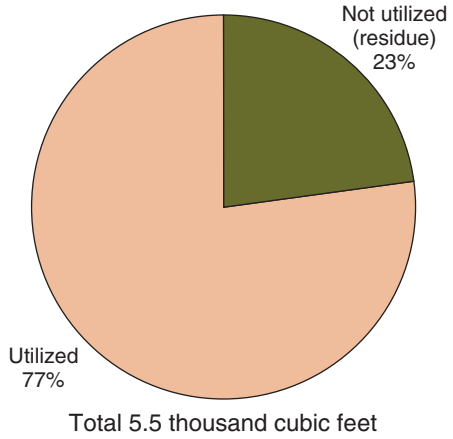

Figure 5—Disposition of total hardwood harvest volume, Georgia, 2015.

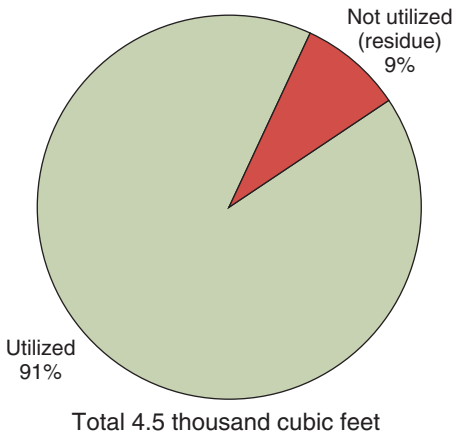

Figure 7—Disposition of hardwood growing-stock volume, Georgia, 2015.

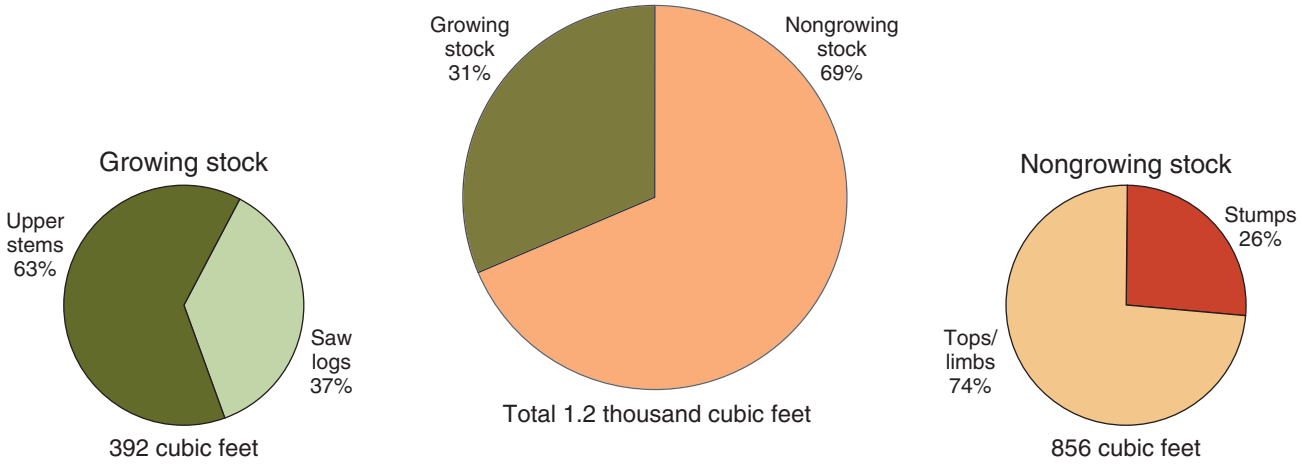

Figure 6—Hardwood residue by volume type, Georgia, 2015.

Knuckleboom loader with pull-through delimber merchandizing loblolly pine.

LITERATURE CITED

Bechtold, W.A.; Patterson, P.L., eds. 2005. The enhanced forest inventory and analysis program—national sampling design and estimation procedures. Gen. Tech. Rep. SRS–80. Asheville, NC: U.S. Department of Agriculture Forest Service Southern Research Station. 85 p.

Schiller, J.R.; McClure, N.; Willard, R.A. 2009. Georgia's timber industry—an assessment of timber product output and use, 2007. Resour. Bull. SRS–161. Asheville, NC: U.S. Department of Agriculture Forest Service Southern Research Station. 35 p.

GLOSSARY

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 ≤ 0.50, such as gums, yellow-poplar, cottonwoods, red maple, basswoods, and willows.

Hard hardwoods. Hardwood species with an average specific gravity > 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 portion of 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 Fuelwood 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 product drain. That portion of total drain used for a product.

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

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 < 1.0 inch d.b.h. and > 1 foot tall for hardwoods, > 6 inches tall for softwood, and > 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 Fuelwood forest products.

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

Grapple skidder pulling felled loblolly pine to logging deck.

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

Timber products. Roundwood products and byproducts.

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).

APPENDIX

Index of Tables

Table A.1—Harvest and utilization volume by species group, source, and volume type, Georgia, 2015

Species group and source	Total tree volume	Growing stock					Nongrowing stock				
			Saw log		Upper stem			Stumps		Tops/limbs	
		Total	Utilized	Not utilized	Utilized	Not utilized	Total	Utilized	Not utilized	Utilized	Not utilized
		cubic feet									
Softwood											
Sawtimber	31,824.26	28,158.61	25,082.00	761.65	1,765.37	549.59	3,665.65	518.03	693.19	31.89	2,422.54
Poletimber	5,686.16	4,676.22	—	—	4,634.56	41.66	1,009.94	168.29	151.00	262.26	428.39
Total	37,510.42	32,834.83	25,082.00	761.65	6,399.93	591.25	4,675.59	686.32	844.19	294.15	2,850.93
Hardwood											
Sawtimber	4,104.41	3,447.19	2,849.49	143.81	224.99	228.90	657.22	26.19	158.30	3.76	468.97
Poletimber	1,350.03	1,064.24	—	—	1,045.25	18.99	285.79	23.11	65.88	34.24	162.56
Total	5,454.44	4,511.43	2,849.49	143.81	1,270.24	247.89	943.01	49.30	224.18	38.00	631.53

— = no sample for the cell.

Table A.2—Volume of softwood growing stock by product and utilization for sawtimber and poletimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
					cubic feet				
Saw logs	16,538.56	16,954.76	16,189.82	764.94	348.74	15,236.12	14,739.99	485.46	10.67
Veneer logs	5,760.15	5,931.95	5,715.82	216.13	44.33	5,674.84	5,627.93	46.91	—
Composite panels	710.77	713.30	680.64	32.66	30.13	260.56	236.85	23.72	—
Pulpwood	5,667.73	5,405.60	5,259.65	145.95	408.08	2,194.19	2,091.27	102.92	—
Poles	2,254.71	2,347.32	2,198.96	148.36	55.75	2,117.36	2,057.21	55.95	4.21
Fence posts	788.21	772.75	751.91	20.84	36.30	270.79	256.41	14.38	—
Fuelwood	742.32	709.17	685.15	24.02	57.17	89.78	72.34	17.44	—
Total	32,462.45	32,834.85	31,481.95	1,352.90	980.50	25,843.64	25,082.00	746.78	14.88

Numbers in rows and columns may not sum to totals due to rounding.
— = no sample for the cell.

Table A.3—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber and poletimber, Georgia, 2015

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
			percent				
Saw logs	97.89	2.11	95.49	4.51	96.74	3.19	0.07
Veneer logs	99.23	0.77	96.36	3.64	99.17	0.83	—
Composite panes	95.76	4.24	95.42	4.58	90.90	9.10	—
Pulpwood	92.80	7.20	97.30	2.70	95.31	4.69	—
Poles	97.53	2.47	93.68	6.32	97.16	2.64	0.20
Fence posts	95.39	4.61	97.30	2.70	94.69	5.31	—
Fuelwood	92.30	7.70	96.61	3.39	80.57	19.43	—
All products	96.98	3.02	95.88	4.12	97.05	2.89	0.06

— = no sample for the cell.

Table A.4—Volume of softwood growing stock by product and utilization for sawtimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
					cubic feet				
Saw logs	16,138.82	16,561.09	15,804.09	757.00	334.73	15,236.12	14,739.99	485.46	10.67
Veneer logs	5,760.15	5,931.95	5,715.82	216.13	44.33	5,674.84	5,627.93	46.91	—
Composite panels	298.93	325.35	295.53	29.82	3.40	260.56	236.85	23.72	—
Pulpwood	2,542.21	2,568.22	2,444.97	123.25	97.24	2,194.19	2,091.27	102.92	—
Poles	2,219.77	2,312.78	2,164.42	148.36	55.35	2,117.36	2,057.21	55.95	4.21
Fence posts	327.21	336.59	317.61	18.98	9.60	270.79	256.41	14.38	—
Fuelwood	110.22	122.64	104.94	17.70	5.28	89.78	72.34	17.44	—
Total	27,397.31	28,158.62	26,847.38	1,311.24	549.93	25,843.64	25,082.00	746.78	14.88

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

— = no sample for the cell.

Table A.5—Percent of overutilization and underutilization for softwood growing stock by product for sawtimber, Georgia, 2015

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
	percent						
Saw logs	97.93	2.07	95.43	4.57	96.74	3.19	0.07
Veneer logs	99.23	0.77	96.36	3.64	99.17	0.83	—
Composite panels	98.86	1.14	90.83	9.17	90.90	9.10	—
Pulpwood	96.17	3.83	95.20	4.80	95.31	4.69	—
Poles	97.51	2.49	93.59	6.41	97.16	2.64	0.20
Fence posts	97.07	2.93	94.36	5.64	94.69	5.31	—
Fuelwood	95.21	4.79	85.57	14.43	80.57	19.43	—
All products	97.99	2.01	95.34	4.66	97.05	2.89	0.06

— = no sample for the cell.

Table A.6—Volume of softwood growing stock by product and utilization for poletimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
			cubic feet		
Saw logs	399.74	393.67	385.73	7.94	14.01
Veneer logs	—	—	—	—	—
Composite panels	411.84	387.95	385.11	2.84	26.73
Pulpwood	3,125.52	2,837.38	2,814.68	22.70	310.84
Poles	34.94	34.54	34.54	—	0.40
Fence posts	461.00	436.16	434.30	1.86	26.70
Fuelwood	632.10	586.53	580.21	6.32	51.89
Total	5,065.14	4,676.23	4,634.57	41.66	430.57

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

— = no sample for the cell.

Table A.7—Percent of overutilization and underutilization for softwood growing stock by product for poletimber, Georgia, 2015

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
	percent			
Saw logs	96.50	3.50	97.98	2.02
Veneer logs	—	—	—	—
Composite panels	93.51	6.49	99.27	0.73
Pulpwood	90.05	9.95	99.20	0.80
Poles	98.86	1.14	100.00	0.00
Fence posts	94.21	5.79	99.57	0.43
Fuelwood	91.79	8.21	98.92	1.08
All products	91.50	8.50	99.11	0.89

— = no sample for the cell.

Table A.8—Volume of softwood cull by product and utilization, Georgia, 2015

Product	Total volume utilized	Nongrowing stock			
		Merchantable			
		Total	Utilized	Not utilized	Unmerchantable utilized
	cubic feet				
Saw logs	—	—	—	—	—
Veneer logs	—	—	—	—	—
Composite panels	—	—	—	—	—
Pulpwood	—	—	—	—	—
Poles	—	—	—	—	—
Fence posts	—	—	—	—	—
Fuelwood	2.41	2.31	2.31	—	0.10
Total	2.41	2.31	2.31	—	0.10

Numbers in rows and columns may not sum to totals due to rounding.
— = no sample for the cell.

Table A.9—Percent of overutilization and underutilization for softwood cull by product, Georgia, 2015

Product	Overutilization		Underutilization	
	Merchantable utilized/ total volume utilized	Unmerchantable utilized/ total volume utilized	Merchantable utilized/total merchantable volume	Merchantable not utilized/ total merchantable volume
	percent			
Saw logs	—	—	—	—
Veneer logs	—	—	—	—
Composite panels	—	—	—	—
Pulpwood	—	—	—	—
Poles	—	—	—	—
Fence posts	—	—	—	—
Fuelwood	95.85	4.15	100.00	—
All products	95.85	4.15	100.00	—

— = no sample for the cell.

Table A.10—Volume of hardwood growing stock by product and utilization for sawtimber and poletimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
					cubic feet				
Saw logs	2,579.85	2,844.37	2,560.47	283.90	19.38	2,464.53	2,391.04	73.49	—
Veneer logs	—	—	—	—	—	—	—	—	—
Composite panels	—	—	—	—	—	—	—	—	—
Pulpwood	1,058.32	1,100.07	1,036.01	64.06	22.31	347.02	310.54	36.48	—
Poles	—	—	—	—	—	—	—	—	—
Fence posts	—	—	—	—	—	—	—	—	—
Fuelwood	568.87	567.00	523.25	43.75	45.62	181.75	147.91	33.84	—
Total	4,207.04	4,511.44	4,119.73	391.71	87.31	2,993.30	2,849.49	143.81	—

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

— = no sample for the cell.

Table A.11—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber and poletimber, Georgia, 2015

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
	percent						
Saw logs	99.25	0.75	90.02	9.98	97.02	2.98	—
Veneer logs	—	—	—	—	—	—	—
Composite panels	—	—	—	—	—	—	—
Pulpwood	97.89	2.11	94.18	5.82	89.49	10.51	—
Poles	—	—	—	—	—	—	—
Fence posts	—	—	—	—	—	—	—
Fuelwood	91.98	8.02	92.28	7.72	81.38	18.62	—
All products	97.92	2.08	91.32	8.68	95.20	4.80	—

— = no sample for the cell.

Table A.12—Volume of hardwood growing stock by product and utilization for sawtimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized	Saw-log portion			
		Total	Utilized	Not utilized		Total	Utilized	Cull utilized	Not utilized
					cubic feet				
Saw logs	2,513.99	2,777.08	2,495.01	282.07	18.98	2,464.53	2,391.04	73.49	—
Veneer logs	—	—	—	—	—	—	—	—	—
Composite panels	—	—	—	—	—	—	—	—	—
Pulpwood	398.02	448.32	395.50	52.82	2.52	347.02	310.54	36.48	—
Poles	—	—	—	—	—	—	—	—	—
Fence posts	—	—	—	—	—	—	—	—	—
Fuelwood	192.43	221.80	183.98	37.82	8.45	181.75	147.91	33.84	—
Total	3,104.44	3,447.20	3,074.49	372.71	29.95	2,993.30	2,849.49	143.81	—

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

— = no sample for the cell.

Table A.13—Percent of overutilization and underutilization for hardwood growing stock by product for sawtimber, Georgia, 2015

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
	percent						
Saw logs	99.25	0.75	89.84	10.16	97.02	2.98	—
Veneer logs	—	—	—	—	—	—	—
Composite panels	—	—	—	—	—	—	—
Pulpwood	99.37	0.63	88.22	11.78	89.49	10.51	—
Poles	—	—	—	—	—	—	—
Fence posts	—	—	—	—	—	—	—
Fuelwood	95.61	4.39	82.95	17.05	81.38	18.62	—
All products	99.04	0.96	89.19	10.81	95.20	4.80	—

— = no sample for the cell.

Table A.14—Volume of hardwood growing stock by product and utilization for poletimber, Georgia, 2015

Product	Total volume utilized	Growing stock			Nongrowing stock utilized
		Total	Utilized	Not utilized	
	cubic feet				
Saw logs	65.86	67.29	65.46	1.83	0.40
Veneer logs	—	—	—	—	—
Composite panels	—	—	—	—	—
Pulpwood	660.30	651.75	640.51	11.24	19.79
Poles	—	—	—	—	—
Fence posts	—	—	—	—	—
Fuelwood	376.44	345.20	339.27	5.93	37.17
Total	1,102.60	1,064.24	1,045.24	19.00	57.36

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

— = no sample for the cell.

Table A.15—Percent of overutilization and underutilization for hardwood growing stock by product for poletimber, Georgia, 2015

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
	percent			
Saw logs	99.39	0.61	97.28	2.72
Veneer logs	—	—	—	—
Composite panels	—	—	—	—
Pulpwood	97.00	3.00	98.28	1.72
Poles	—	—	—	—
Fence posts	—	—	—	—
Fuelwood	90.13	9.87	98.28	1.72
All products	94.80	5.20	98.21	1.79

— = no sample for the cell.

Table A.16—Volume of hardwood cull by product and utilization, Georgia, 2015

Product	Total volume utilized	Nongrowing stock			
		Merchantable			
		Total	Utilized	Not utilized	Unmerchantable utilized
		cubic feet			
Saw logs	—	—	—	—	—
Veneer logs	—	—	—	—	—
Composite panels	—	—	—	—	—
Pulpwood	139.69	140.65	139.51	1.14	0.18
Poles	—	—	—	—	—
Fence posts	—	—	—	—	—
Fuelwood	238.47	223.15	219.02	4.13	19.45
Total	378.16	363.80	358.53	5.27	19.63

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

— = no sample for the cell.

Table A.17—Percent of overutilization and underutilization for hardwood cull by product, Georgia, 2015

Product	Overutilization		Underutilization	
	Merchantable utilized/ total volume utilized	Unmerchantable utilized/ total volume utilized	Merchantable utilized/total merchantable volume	Merchantable not utilized/total merchantable volume
	percent			
Saw logs	—	—	—	—
Veneer logs	—	—	—	—
Composite panels	—	—	—	—
Pulpwood	99.87	0.13	99.19	0.81
Poles	—	—	—	—
Fence posts	—	—	—	—
Fuelwood	91.84	8.16	98.15	1.85
All products	94.81	5.19	98.55	1.45

— = no sample for the cell.

Wall, David J.; Bentley, James W.; Gray, James A.; Cooper, Jason A.
2018. Georgia harvest and utilization study, 2015. e-Resour. Bull. SRS–217. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 23 p.

In 2014, a harvest and utilization study was conducted on 91 operations throughout Georgia. There were 2,129 total trees measured: 1,842 or 87 percent were softwood, while 287 or 13 percent were hardwood. Results from this study showed that 87 percent of the total softwood volume measured was utilized for a product, and 13 percent was left as logging residue. Seventy-seven percent of the total hardwood volume measured was utilized for a product, while 23 percent was left as logging residue.

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

Log truck with pole trailer loaded with tree-length loblolly pine pulpwood.

How do you rate this publication?
Scan this code to submit your feedback or go to
www.srs.fs.usda.gov/pubeval.