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Empirical Yields of Timber and Forest Biomass in the Southeast

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Empirical Yields of Timber and Forest Biomass in the Southeast

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ABSTRACT

Measurements and classifications recorded at 24,775 Forest Survey plots established randomly throughout the Southeast comprise a vast source of information on timber stand development. Empirical yield tables developed from this source are reported for major forest types in the Region. These tables also serve as guides to yields of forest biomass by tree size and species groups.

Keywords: Southeast, yield tables, forest biomass.

Introduction

This Paper contains yield tables that show stand structure and development on Forest Survey plots in major forest types in the Southeastern States of Florida, Georgia, North Carolina, South Carolina, and Virginia. These yield tables were developed empirically from the average conditions observed on selected plots. In selecting the samples for construction of these yield tables, we screened measurements and classifications recorded at 24,775 Forest Survey plots established randomly throughout the Region. Only plots in timber stands classed as fully stocked by Forest Survey standards were used. The average yields shown represent a broader range of stocking and sites than is conventionally used in constructing yield tables, but they are reasonable guides to proven stand performance. These tables fill many of the voids in existing information on timber yields in the Southeast. In addition, they include the first comprehensive guides to yields in the Region expressed in terms of forest biomass.

Methods

Any good sample plot data may be used in the construction of empirical yield tables (Spurr 1952). Yield table construction requires an adequate sample from a specific forest type within the area or region to be served by the table. In general, stands are suitable for sampling when there are no recognizable factors measurably affecting growth other than those being evaluated: age, site, and stand density (Bennett 1966). Since the purpose of a yield table is to estimate productive potential rather than production based purely on stand history, the ideal method is to periodically measure carefully selected stands over the span of their development. This method is a slow, meticulous process that discourages yield table construction. We have attempted to use Forest Survey sample plots in the Southeast to shortcut the conventional method without violating acceptable standards.

In recent years, several mensurationists and resource analysts have probed the use of Forest Survey data to construct empirical yield tables (Cost and McClure 1982; Essex and Hahn 1976; Hahn and Raile 1982; Knight 1978; Knight and McClure 1981; Knight and Sheffield 1980). Although Forest Survey plots are neither designed nor intended for this purpose, they comprise a vast source of information on stand development across the full range of forest sites and conditions. Over the years, Forest Survey in the Southeast altered its procedures to accannodate this kind of use.

Field guides document the establishment and measurement of the Forest Survey samples plots used in this study. A copy of "Field Instructions for the Southeast, 1982" is available upon request. These field instructions also define the forest types included in this Paper.

Stand Age

Stand age is one of the key data elements required for sample plots used to construct yield tables. Prior to 1963, Forest Survey in the Southeast did not collect stand age on its sample plots. Instead, it used stand-size classes--seedling-sapling, poletimber, and sawtimber--to monitor and describe stand development. Although Forest Survey added stand age in 1963, it was applied and recorded in lo-year classes. Furthermore, the 10-point-cluster sample plot used at the time was allowed to straddle two or more distinct stands.

Forest Survey in the Southeast corrected both of these deficiencies in 1973 at the start of the fourth inventory of North Carolina (Knight and McClure 1975). Since then, to the extent possible, stand age has been determined to the nearest year and the cluster sample plot has been confined to a single stand as identified by point 1. These changes opened up the opportunity to use Forest Survey plots in the Southeast to construet empirical yield tables.

Generally, timber stands in the Region are even-aged. Although many of the stands have been high-graded from time to time, there is very little true selection cutting practiced in the Region. The origin of most stands can be traced to regeneration following a final harvest, some natural disturbance, or the reversion of agricultural land to forest. Although the stands are perceived and described as even-aged, many of the young stands contain a scattering of older, residual trees from a former stand and some of the older stands contain significant numbers of understory trees and pockets of advance reproduction. Crews record the age of the most prevalent stand. The stand age specified in these yield tables is the midpoint of a 5-year class. For example, the lo-year age class includes stands 8 through 12 years of age.

Site

Site is another key factor affecting timber yields. Forest Survey uses the height and age of a dominant tree, representative of the prevalent species in a stand, as an indicator of potential timber yield. Forest Survey groups these sites into productivity classes, expressed in cubic feet of growth per acre, for fully stocked natural stands at culmination of mean annual increment. Each of these site classes spans a wide range of site indexes. In this Paper, high sites include all sites capable of growing 85 cubic feet or more per acre; medium sites, 50 to 85 cubic feet; and low sites, 20 to 50 cubic feet. Where a comparative range of site indexes is indicated, height at age 50 is the base for both planted and natural stands.

In this Paper, the yield tables are for high sites, medium sites, or all sites. Low sites account for less than 20 percent of the commercial forest land in the Region, and fully stocked stands occupy only a portion of these low sites. For most forest types, the sample of fully stocked stands on low sites is too small to consturct yield tables.

Density

Density is another critical variable in empirical yield tables. In this Paper, the yield tables represent fully stocked stands measured against the Forest Survey stocking standard applied in the Region. This stocking standard is summarized below and is also included in each of the conventional Resource Bulletins (Tansey 1983).

In the measurement and classification of the sample plots, crews tallied overtopped trees but these trees were not permitted to

Stocking Standard

D.b.h. class (inches)	Minimum number of trees per acre for full stocking	Minimum basal area (ft^2) per acre for full stocking
Seedling	600	--
2	560	--
4	460	--
6	340	67
8	240	84
10	155	85
12	115	90
14	90	96
16	72	101
18	60	106
20	51	111

contribute to stocking. In screening out the plots used to construct these yield tables, the authors did not permit seedlings to contribute to the required stocking in stands 18 years or older. Saplings in the intermediate crown class were not permitted to contribute to the stocking requirement in any stand. In pine forest types, the stocking requirement had to be satisfied by yellow pine species. In hardwood types, all species were allowed to contribute to the stocking requirement. For all types, the stocking requirement had to be satisfied with growing stock; the stocking of rough and rotten trees was excluded.

Merchantability Standards

By precisely defining our merchantability standards, we hope to avoid a weakness common in many existing yield tables. In our tables, all volumes expressed in cubic feet are solid wood; they exclude bark and all rotten and missing wood detected in the trees. The total aboveground volume includes all solid wood above the ground line in all live trees 1.0 inch in diameter and larger at breast height (d.b.h.), excluding the volume in twigs and lateral limbs smaller than 0.5 inch in diameter.

Volume of growing stock is the solid wood in the central stem and forks of all growing-stock trees 5.0 inches d.b.h. and larger from a l-foot stump to a minimum 4.0-inch top diameter outside bark (d.o.b.). Growing-stock trees are live trees of commercial species that meet specified standards for sawtimber or will likely meet such standards when they reach minimum sawtimber size--9.0 inches d.b.h. for softwoods and 11.0 inches d.b.h. for hardwoods. Volume in the sawlog portion of sawtimber trees is the solid wood from a l-foot stump to a minimum 7.0-inch top d.o.b. for softwoods and a minimum 9.0-inch top d.o.b. for hardwoods. This saw timber volume is expressed in net board feet, based on the International 1/4-inch log rule. The technique used to measure standing trees for developing volume-prediction equations for tree species in the Southeast is documented and available upon request (Cost 1978).

In these tables, we define forest biomass as the green weight of aboveground wood and bark (excluding foliage) in all live trees 1.0 inch d.b.h. and larger. Foliage includes leaves, needles, buds, fruit, twigs, and lateral limbs smaller than 0.5 inch in diameter. Studies by the Utilization of Southern Timber Research Work Unit at the Forestry Sciences Laboratory in Athens, Ga., provided the vital linkage between volume and weight (Clark 1979; McClure and others 1981; Saucier 1979).

Screening

To construct these empirical yield tables, we developed special summary records for each of the 24,775 sample plots on commercial forests in the Southeast. These plot summaries include 20 screening variables, ranging from location to stocking. Next, we wrote a special computer program for screening and compiling these plot summaries into specified groupings. This computer program selects or excludes individual plot records using any specified combination of the 20 screening variables. The tables in this Paper are part of the output from the computer program.

Discussion

We tried to validate the empirical yield tables developed from Forest Survey plot data by comparing them with other published information on yields. We reviewed numerous yield table studies and carefully examined the procedures used and the published results. In most cases, valid comparisons were impossible because of significant differences either in the procedures used or in the way the results were presented.

We established the following criteria for selecting an existing yield table for comparison: (1) the table should be based on a large sample of a well-defined forest condition over a broad geographic area, (2) the independent variables used in the table should be age, site, and stocking, (3) one or more of the units of measure should be comparable, and (4) the merchantability standards should be essentially the same as ours. With these criteria, the choice boiled down to the tables published by Schumacher and Coile (1960). From the host of yellow pine species contained in the Schumacher and Coile publication, we selected loblolly pine because it had the widest geographic range and a sample of 420 plots.

Although a few differences exist between the two data sets, these differences are small and could easily compensate for one another. For example, Schumacher and Coile estimated the cubic-foot volume of the

entire tree stem (inside bark) based on the height of dominant stand and 1.0-inch diameter classes. We computed the total aboveground cubic volume of sample trees individually using total height and actual d.b.h. Another minor difference between the two data sets involves the selection of the sample plots. Schumacher and Coile purposely selected even-aged stands judged to be well stocked, undisturbed by past cutting, and representative of a homogeneous site. The Forest Survey sample differs in that all plots used in a specific yield table were selected from the regionwide summary records by sequentially screening each plot through specific type, site, age, and stocking criteria.

Table 1 compares our results with those of Schumacher and Coile for natural loblolly pine stands in the Coastal Plain of the Southeast. From Schumacher and Coile, the cubic volume for the entire stand (inside bark, stump to tip) for site index 70 was compared with Forest Survey's total aboveground volume of southern yellow pine. Since the yields published by Schumacher and Coile apparently excluded all hardwood volume encountered on the sample plots, any hardwood volume was excluded from the Forest Survey yields for the comparison. Since 100 percent or more stocking of southern yellow pine was required in the Forest Survey samples, any hardwood volume would likely be in small trees of tolerant species in the understory.

In the comparison, we first plotted the Schumacher and Coile yields for site index 70 over stand age and drew a freehand curve through the plotted points to establish a reference curve between 5 and 85 years of age. Next, we plotted the Forest Survey yields averaged by 5-year age classes and noted the number of samples in each average. Displayed in this manner (fig. 1), it is obvious the Schumacher and Coile curve is well within the central area of the plotted points throughout the range of the data.

This comparison leads the authors to conclude that Forest Survey data compare favorably with the highly respected yields developed by Schumacher and Coile. Since the

Table 1.--Comparison of yields for well-stocked, natural stands of loblolly pine on medium sites[a] in the coastal plain of the Southeast

Stand age (years)	Schumacher and Coile (entire stand)	Forest Survey (total aboveground)			Number of plots
		Yellow pines	All species		
			Volume	Standard error	
	Cubic feet per acre				
5	--	77	78	40	13
10	--	717	773	155	10
15	--	1,254	1,479	137	20
20	1,690	1,694	2,014	83	40
25	--	2,311	2,636	128	25
30	2,540	2,452	2,795	82	43
35	--	2,659	3,160	153	30
40	3,100	2,714	3,148	139	29
45	--	3,018	3,361	102	22
50	3,460	3,636	4,227	181	14
55	--	3,270	3,643	264	6
60	3,720	3,367	3,966	451	5
65	--	5,351	6,286	--	1
70	3,910	4,060	4,682	--	1
75	--	3,591	4,079	205	3
80	4,050	2,763	3,074	247	3
85	--	4,295	5,754	--	1

[a]Schumacher and Coile, Site Index 70; Forest Survey, Site Class 4 (Site Index 60-78).

other empirical yields presented in this Paper were developed by using methods similar to those used for loblolly pine, the entire series should compare favorably when fairly tested against the results of other, good yield studies.

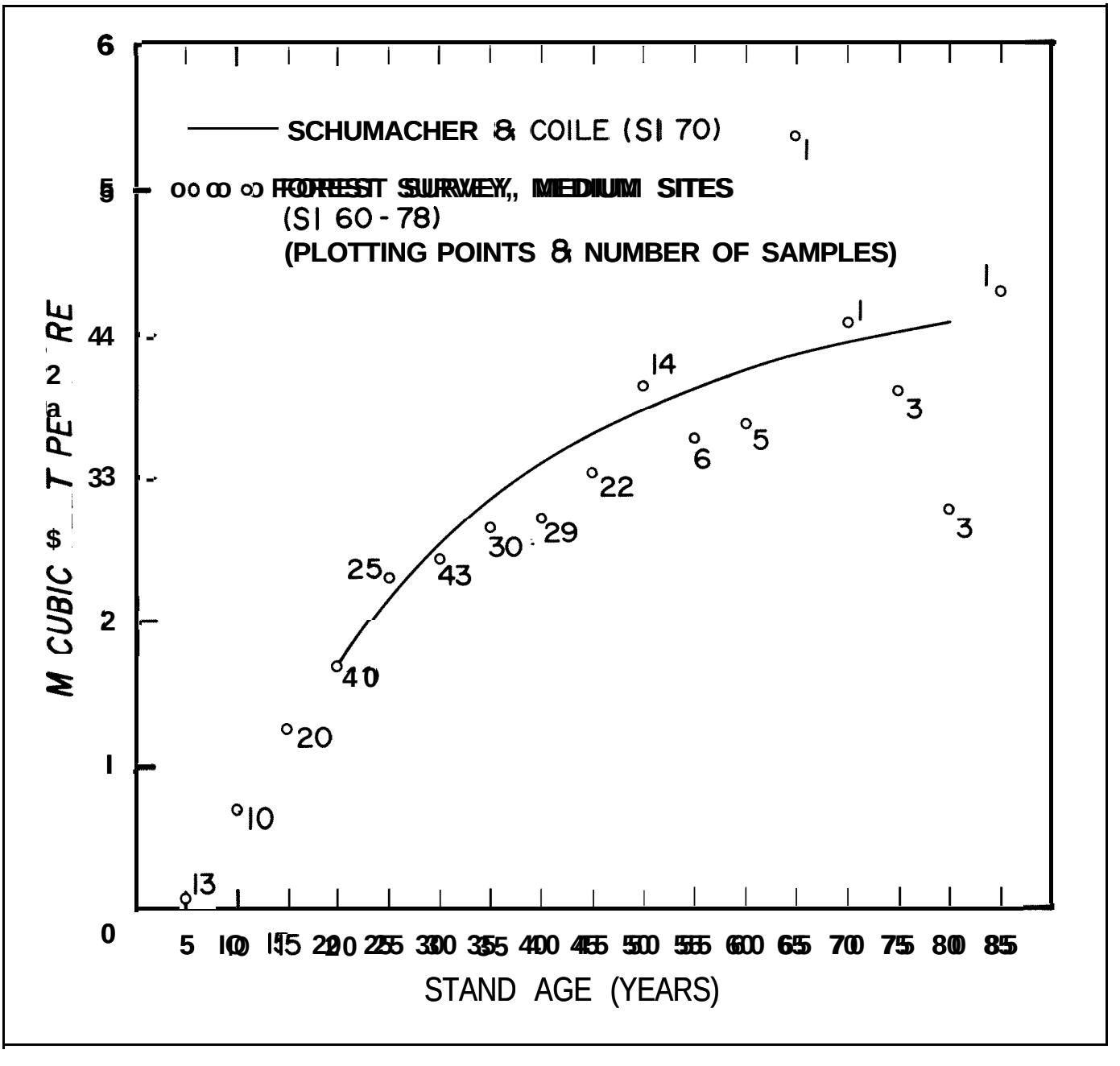

Figure I .--Yields for fully stocked natural loblolly stands on medium sites in the Coastal Plain of the Southeast.

Literature Cited

Bennett, Frank A. Construction and use of volume and yield tables. In: Measuring the southern forest; 15th annual forestry symposium proceedings; 1966. Baton Rouge, LA: Louisiana State University School of Forestry; 1966: 17-29.

Clark, Alexander, III. Suggested procedures for measuring tree biomass and reporting tree prediction equations. In: Forest resource inventories; Workshop proceedings; 1979 July 23-26; Fort Collins, CO: Colorado State University; 1979: 615-628. vol. 2.

Cost, Noel D. Multiresource inventories: a technique for measuring volumes in standing trees. Res. Pap. SE-196. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1978. 18 p.

Cost, Noel D. ; McClure, Joe P. Multiresource inventories: forest biomass in Florida. Res. Pap. SE-235. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1982. 24 p.

Essex, Burton L. ; Hahn, Jerold T. Empirical yield tables for Wisconsin. Gen. Tech. Rep. NC-25. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; 1976. 22 p.

Hahn, Jerold T. ; Raile, Gerhard K. Empirical yield tables for Minnesota. Gen. Tech. Rep. NC-71. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; 1982. 212 p.

Knight, Herbert A. Average timber characteristics of the better-stocked, natural stands in North Carolina and Virginia. Res. Note SE-257. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1978. 10 p.

Knight, Herbert A. ; McClure, Joe P. North Carolina's timber, 1974. Resour. Bull. SE-33. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1975. 52 p.

Knight, Herbert A. ; McClure, Joe P. Multiresource inventories: forest biomass in South Carolina. Res. Pap. SE-230. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1981. 27 p.

Knight, Herbert A. ; Sheffield, Raymond M . Thinning opportunities in pine plantations in the Southeast during the 1980's. In: Thinning southern pine plantations: integrating economics and biology; 1980 March 3-5; Long Beach, MS. Southern Forest Economics Workshop Proceedings; 1980 : 18-26.

McClure, Joe P. ; Saucier, Joseph R. ; Biesterfeldt , Robert C. Biomass in southeastern forests. Res. Pap. SE-227. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1981. 38 p.

Saucier, Joseph R. Estimation of biomass production and removal. In: Proceedings, impact of intensive harvesting on forest nutrient cycling; 1979 August 13-16; Syracuse, NY : State University of New York; 1979: 172-189. [unnumbered.]

Schumacher, Francis X. ; Coile, Theodore S. Growth and yield of natural stands of southern pines. Durham, NC: T.S. Coile, Inc.; 1960. 115 p.

Spurr, Stephen H. Forest inventory. New York: Ronald Press Co.; 1952. 476 p.

Tansey, John B. Forest statistics for Georgia, 1982. Resour. Bull. SE-69. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station; 1983. 50 p.

Yield Tables for *Fully* Stocked Stands

Tables la, 2a, 3a, ... 34a show the average empirical yields of timber expressed in numbers of trees, basal area, and volumes per acre for fully stocked stands for specific timber types, sites, and regions, by 5-year age classes.

Table lb, 2b, 3b, ... 34b are companion tables which show the average empirical yields of forest biomass expressed in green tons per acre, by tree size and species group.

Table la.--Average empirical yields of timber for fully stocked stands

Type: Natural loblolly pine Site: Medium (SI 60-78) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	23	1,391	82	--	--	--	16	744	107	186	--	--
15	39	1,417	202	19	--	--	53	1,495	117	709	110	581
20	70	1,567	257	29	3	--	70	1,968	78	1,065	257	1,368
25	56	1,142	308	49	7	1	95	2,497	79	1,586	567	3,005
30	77	1,036	294	75	11	1	106	2,739	69	1,927	882	4,677
35	62	1,131	286	80	14	1	107	2,947	115	2,090	1,042	5,519
40	55	882	253	95	19	2	110	3,124	105	2,326	1,407	7,459
45	44	947	236	93	24	3	109	3,217	110	2,422	1,602	8,484
50	17	1,083	214	116	39	8	124	4,043	180	3,163	2,509	13,279
55	12	965	198	100	35	7	113	3,556	181	2,815	2,174	11,519
60	11	1,011	217	96	34	8	114	3,468	298	2,610	2,054	10,877
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--		--	--	--	--	--					
75	--		--	--	--	--		--	--	--		
80	--		--	--	--	--		--				--

Table lb.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural loblolly pine Site: Medium (SI 60-78) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	26.4	3.7	10.1	--	--	--	23.3	--	1.1	1.0	0.9	0.2
15	54.4	4.2	35.6	7.6	--	--	48.3	--	2.7	1.2	1.9	.3
20	72.3	2.9	51.8	15.8	3.3	--	61.9	0.1	3.8	1.9	3.5	1.1
25	91.5	2.9	75.4	30.5	9.8	3.4	81.6	.3	4.4	1.8	2.8	.7
30	101.1	2.6	89.1	48.2	13.9	3.1	88.8	.4	4.8	3.0	2.6	1.5
35	109.0	4.3	95.8	56.1	17.3	2.2	93.3	.1	5.4	3.6	4.0	2.5
40	115.5	3.9	104.7	73.7	25.8	5.5	99.0	.5	5.7	2.7	5.1	2.5
45	118.5	4.0	107.3	79.4	34.1	7.1	104.1	.6	5.4	2.9	4.0	1.5
50	149.1	6.5	136.4	117.7	62.8	18.6	126.7	--	9.2	7.1	3.5	2.7
55	130.9	6.9	121.0	101.3	54.5	15.2	117.2	.4	5.2	3.4	3.7	.9
60	129.0	11.0	116.2	94.9	54.2	18.5	107.4	.5	2.2	4.3	7.9	6.6
65	--	--	--	--	--	--	--	--	--		--	
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 2a .--Average emprical yields of timber for fully stocked stands

Type: Natural loblolly pine Site: High (SI 79+) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	8	995	185	6	--	--	40	969	245	447	46	246
15	9	1,620	216	26	3	--	61	1,889	382	1,031	279	1,474
20	22	841	285	74	13	2	106	2,762	189	1,994	993	5,251
25	61	857	274	84	17	3	112	2,975	90	2,210	1,196	6,341
30	87	927	292	106	25	4	128	3,633	92	2,790	1,696	8,980
35	71	816	251	121	33	5	131	3,954	113	3,114	2,222	11,768
40	65	788	237	116	41	7	133	4,305	131	3,403	2,601	13,795
45	36	724	221	117	52	11	137	4,581	173	3,711	3,026	16,055
50	26	728	197	118	59	13	138	4,809	209	3,954	3,420	18,155
55	14	692	234	128	50	9	142	4,514	330	3,431	2,805	14,886
60	5	950	174	97	49	12	120	4,159	341	3,273	2,937	15,593
65	7	690	176	122	73	23	154	5,588	480	4,616	4,410	23,415
70	3	804	171	103	57	13	126	4,323	563	3,526	3,178	16,877
75	2	727	157	128	67	14	146	5,330	20	4,097	4,020	21,253
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 2b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural loblolly pine Site: High (SI 79+) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches) 5.0+	9.0+	13.0+	17.0+	Species group: Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	35.3	9.2	23.6	3.1	--	--	31.8	--	1.8	0.1	1.2	0.4
15	68.3	14.0	48.6	15.5	4.7	--	64.6	--	2.7	.7	0.2	.1
20	102.0	7.1	92.4	51.2	17.8	6.1	94.9	0.1	4.6	.5	1.6	.3
25	110.1	3.3	100.5	62.7	23.1	6.2	97.1	.2	3.9	3.9	4.2	.7
30	134.6	3.4	124.2	85.8	34.7	9.2	117.0	.3	7.5	4.1	4.6	1.1
35	145.8	4.1	135.8	108.3	48.5	11.6	128.6	.2	6.8	4.3	4.8	1.0
40	158.8	4.8	148.0	122.5	67.4	17.9	133.9	.2	8.8	5.9	7.3	2.7
45	168.7	6.4	160.0	137.9	87.6	28.1	143.3	.7	9.6	7.1	6.3	1.7
50	177.3	7.8	170.0	153.7	105.3	33.1	150.4	.1	10.9	5.5	7.4	3.1
55	161.3	10.0	153.5	134.1	81.5	24.8	130.1	.2	10.0	6.3	6.8	7.9
60	153.7	12.8	140.2	127.0	93.7	35.5	128.4	--	5.2	7.2	10.6	2.3
65	206.0	17.9	199.0	188.2	150.1	67.4	172.9	.7	12.8	4.3	10.3	5.0
70	158.7	22.0	150.1	138.0	104.5	34.7	132.7	1.0	11.6	6.0	3.8	3.6
75	189.5	7.5	179.2	173.7	126.7	44.0	167.5	--	5.3	1.1	.7	14.9
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 3a.--Average empirical yields of timber for fully stocked stands

Type: Natural loblolly pine Site: Medium (SI 60-78) Region: Coastal Plain

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	10	1,463	63	--	--	--	12	773	155	139	--	--
15	20	1,444	184	13	--	--	46	1,479	137	645	73	385
20	40	1,646	237	28	4	--	67	2,014	83	1,053	275	1,465
25	25	1,128	295	50	11	2	94	2,636	128	1,698	721	3,822
30	43	1,091	274	76	13	2	103	2,795	82	1,944	957	5,067
35	30	1,279	292	80	16	1	109	3,160	153	2,202	1,122	5,934
40	29	885	255	96	18	2	110	3,148	139	2,320	1,364	7,225
45	22	871	212	97	29	4	110	3,361	102	2,564	1,868	9,880
50	14	1,052	209	119	43	9	127	4,227	181	3,315	2,669	14,126
55	6	1,120	170	108	33	7	108	3,643	264	2,859	2,314	12,252
60	5	1,129	209	100	43	11	123	3,966	451	3,028	2,495	13,201
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 3b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural loblolly pine Site: Medium (SI 60-78) Region: Coastal Plain

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	27.1	5.3	7.5	--	--	--	24.7	--	1.5	--	0.9	
15	53.9	4.8	32.7	5.6	--	--	45.0	--	3.4	1.6	3.5	0.3
20	74.3	3.0	51.9	16.7	4.2	--	61.6	--	3.8	2.6	5.0	1.4
25	97.3	4.8	81.1	37.1	15.0	4.4	84.5	0.2	4.8	2.4	4.2	1.0
30	103.5	3.0	90.3	51.5	16.5	3.6	90.1	.4	5.2	3.2	3.2	1.3
35	117.4	5.7	101.8	59.5	20.0	2.6	97.6	[illegible]	6.5	4.1	6.5	2.6
40	116.7	5.2	105.7	72.7	23.1	4.6	99.7	--	5.2	2.9	5.4	3.5
45	124.2	3.7	112.9	89.2	43.3	9.9	110.6	.2	4.4	3.0	5.0	1.0
50	155.8	6.5	143.0	124.5	69.5	20.7	133.1	--	8.9	7.2	3.7	2.9
55	135.0	9.9	122.1	109.4	53.0	15.2	119.9	.8	4.6	3.6	4.7	1.5
60	147.2	17.2	133.2	111.8	72.9	27.4	123.2	.9	1.9	6.3	11.2	3.7
65	--		--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 4a.--Average empirical yields of timber for fully stocked stands

Type: Natural loblolly pine Site: Medium (SI 60-78) Region: Piedmont

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	13	1,336	96	--	--	--	18	721	152	222	--	--
15	17	1,379	217	23			58	1,466	211	741	134	710
20	26	1,490	279	33	2	--	74	1,905	162	1,068	240	1,276
25	29	1,171	319	45	3	1	95	2,371	98	1,466	413	2,189
30	33	954	318	72	9	1	110	2,654	121	1,905	792	4,203
35	32	993	281	80	13	1	105	2,748	166	1,984	967	5,130
40	26	877	251	95	21	3	110	3,097	161	2,332	1,455	7,719
45	21	1,041	256	89	19	2	106	3,051	201	2,257	1,345	7,134
50	3	1,231	237	103	20	4	111	3,187	183	2,455	1,764	9,324
55	6	809	226	91	38	7	118	3,468	268	2,771	2,033	10,787
60	--	--	--	--			--	--	--	--	--	--
65					--	--	--	--	--	--		--
70	--	--	--	--	--	--	--				--	--
75								--	--	--		
80	--	--	--	--							--	--

Table 4b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural loblolly pine **Site:** Medium (SI 60-78) **Region:** Piedmont

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	25.9	5.3	12.2	--	--	--	22.1	--	0.8	1.8	0.9	0.3
15	53.3	7.6	37.4	8.8	--	--	50.8	0.1	2.0	0.4		--
20	69.5	6.0	51.3	15.3	2.3	--	62.3	.2	4.2	.9	1.5	*5
25	86.3	3.6	69.8	23.6	4.7	2.5	78.5	.3	4.0	1.3	1.8	.4
30	97.7	4.5	87.7	44.2	10.9	2.6	86.4	.4	4.4	2.8	1.9	1.8
35	101.1	6.1	90.2	52.9	14.7	2.0	89.2	--	4.3	3.2	1.8	2.5
40	114.2	6.0	103.6	74.8	28.8	6.5	98.2	1.0	6.2	2.5	4.9	1.5
45	111.9	7.3	100.7	69.9	25.8	4.4	96.9	1.0	6.1	2.7	3.1	2.1
50	117.7	6.4	106.1	85.8	31.7	9.0	97.0	--	10.4	6.3	2.7	1.4
55	126.7	10.1	119.9	93.1	55.9	15.3	114.5	.1	5.9	3.2	2.7	.4
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 5a.--Average empirical yields of timber for fully stocked stands

Type: Planted loblolly pine Site: Medium (SI 60-78) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	96	1,217	78	--	--	--	14	643	49	139	--	--
15	44	1,230	266	17	--	--	65	1,602	113	855	97	515
20	35	907	351	35	1	--	98	2,276	154	1,460	251	1,327
25	22	841	366	63	1	--	112	2,684	149	1,877	463	2,444
30	3	521	335	127	2	--	134	3,199	313	2,576	1,057	5,583
35	2	851	360	105	33	--	144	3,511	481	2,739	1,381	7,297
40	--	--	--	--	--	--	--	--	--	--	--	--
45	--	--	--	--	--	--	--	--	--	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--	--
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 5b.--Average empirical yields of forest biomass for fully stocked stands

Type: Planted loblolly pine Site: Medium (SI 60-78) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	22.9	1.8	8.0	--	--	--	20.6	--	0.8	0.5	0.6	0.3
15	58.6	4.2	43.1	6.9	--	--	54.4	0.2	1.0	1.0	1.5	.5
20	83.9	5.7	71.5	16.1	1.0	--	79.9	.1	1.2	.9	1.4	.5
25	99.5	5.6	89.4	29.9	1.1	0.4	93.1	[illegible]	1.8	1.1	2.7	.6
30	117.6	10.3	115.1	64.4	2.3	--	117.2	--	.4	--	--	--
35	129.9	17.3	124.4	70.6	35.5	--	127.9	--	.8	[illegible]	--	.8
40	--			--	--	--	--	--	--	--	--	--
45												
50												
55												
60												
65				--	--	--	--					
70								--	--	--	--	--
75		--	--	--	--	--	--	--	--	--	--	--
80		--	--	--	--	--	--	--	--	--	--	--

Table 6a.--Average empirical yields of timber for fully stocked stands

Type: Planted loblolly pine Site: High (SI 79+) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International k-inch rule
	---	Number					Square feet	Cubic feet				Board feet
10	39	928	168	3	--	--	36	989	143	440	15	80
15	28	888	340	51	1	--	101	2,360	158	1,565	377	1,989
20	28	834	355	76	2	--	119	2,933	160	2,122	632	3,341
25	26	560	333	116	9	1	133	3,388	168	2,660	1,314	6,943
30	11	481	284	120	15	--	125	3,382	230	2,731	1,513	7,993
35	1	834	235	146	39	2	143	4,818	--	3,974	3,158	16,717
40	2	338	188	130	44	3	126	3,607	231	2,858	2,301	12,185
45	--	--	--	--	--	--		--	--	--	--	--
50	--								--	--	--	--
55	--	--	--	--	--	--	--		--	--	--	--
60	--	--										
65	--		--	--	--	--	--	--	--	--	--	--
70	--						--					
75	--	--					--		--	--	--	
80	--		--	--	--	--						

Table 6b. --Average empirical yields of forest biomass for fully stocked stands

Type: Planted loblolly pine Site: High (SI 79+) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons er acre											
10	35.6	5.2	22.9	1.0	--	--	34.0	--	0.7	0.4	0.3	0.2
15	87.1	5.9	75.9	24.0	0.5	--	83.5	0.2	.9	1.7	.5	.3
20	108.5	5.9	98.7	39.1	2.2	--	103.4	--	1.6	1.3	2.0	.2
25	125.3	6.2	121.3	73.5	10.6	1.2	123.6		1.2	.3	.2	.1
30	124.8	a.5	120.3	81.9	20.1	1.2	120.2	--	3.2	1.1	--	.3
35	177.0	--	171.4	151.9	58.7	5.1	156.0	--	6.8	5.1	--	9.1
40	132.8	9.5	131.0	118.8	59.1	9.2	111.1	--	5.6	4.2	10.3	1.5
45	--	--	--	--	--	--	--	--	--	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--	--
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 7a.--Average empirical yields of timber for fully stocked stands

Type: Natural slash pine Site: Medium (SI 62-80) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches) 1.0+	5.0+	9.0+	13.0+	17.0+	Basal area per acre trees 5.0+ inches	Volume per acre: Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International k-inch rule
	Number						Square feet	Cubic feet				Board feet
10	3	863	22	--	--	--	5	255	41	76	--	--
15	2	1,100	199	5	--	--	41	1,421	653	635	65	345
20	9	1,107	282	26	2	--	76	2,161	237	1,137	218	1,152
25	36	1,085	326	49	5	1	96	2,746	134	1,742	573	3,026
30	22	954	301	55	8	2	96	2,719	156	1,743	666	3,517
35	23	1,129	343	56	7	1	106	3,189	179	2,094	799	4,228
40	19	888	319	76	15	3	111	3,316	248	2,285	1,153	6,088
45	12	572	250	95	15	1	107	3,188	168	2,407	1,388	7,333
50	5	972	359	110	11	2	132	3,956	370	2,831	1,444	7,621
55	8	820	258	107	26	5	124	3,771	192	2,872	1,883	9,976
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 7b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural slash pine Site: Medium (62-80) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	9.5	1.4	3.8	--	--	--	9.1	--	--	0.5	--	--
15	51.7	24.1	32.1	3.3	--	--	48.0	3.4	--	.3	--	--
20	80.8	8.9	55.7	12.2	0.9	--	79.5	--	0.8	.2	0.1	0.2
25	103.6	5.1	83.4	31.3	6.5	1.9	96.2	3.3	1.3	1.1	1.4	.4
30	101.1	5.9	83.5	36.8	10.2	3.8	91.2	1.4	3.0	4.0	.6	1.0
35	120.1	6.9	98.7	42.4	9.7	1.6	110.7	.7	2.0	5.9	.3	.5
40	124.8	9.3	107.4	60.2	20.3	5.6	108.7	8.4	4.0	1.5	2.2	--
45	122.2	6.6	111.2	73.3	20.2	1.5	117.6	--	.9	--	3.3	.3
50	147.4	13.0	130.6	79.2	15.4	3.1	119.5	16.3	9.7	1.9	--	--
55	141.4	7.7	127.7	93.9	39.0	10.9	119.4	7.0	10.0	3.2	[illegible]	1.0
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 8a.--Average empirical yields of timber for fully stocked stands

Type: Natural slash pine Site: High (SI 81+) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	--	--	--	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--	--	--	--
20	5	1,002	342	48	16	1	108	2,671	347	1,587	398	2,102
25	25	923	333	81	6	1	111	3,254	184	2,288	1,000	5,286
30	39	615	263	102	14	2	114	3,479	130	2,697	1,677	8,864
35	28	631	252	106	23	2	118	3,652	164	2,852	1,868	9,867
40	20	592	267	108	25	2	122	3,789	158	3,007	1,991	10,529
45	21	584	216	110	37	6	120	3,935	199	3,142	2,531	13,374
50	2	628	268	128	51	23	154	4,900	2,317	4,015	3,522	18,662
55	2	596	206	145	50	2	143	4,893	647	3,864	3,263	17,261
60	5	963	231	115	55	13	143	5,017	498	4,078	3,367	17,889
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 8b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural slash pine Site: High (SI 81+) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	--	--	--	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--		--	--
20	96.7	12.1	79.6	24.3	9.7	0.6	89.7	0.1	2.1	0.7	0.5	3.6
25	123.2	6.9	106.1	55.2	8.3	2.1	117.6	.5	2.3	1.0	1.4	0.3
30	132.7	5.0	122.2	86.0	22.7	4.6	128.7	.2	1.2	1.0	1.4	--
35	139.4	6.3	129.4	94.2	33.3	4.7	130.8	1.6	3.0	2.2	1.6	--
40	144.3	5.8	135.3	99.8	36.1	4.2	136.9	--	4.5	2.4	.3	.1
45	149.9	7.4	140.7	119.5	61.3	14.8	136.6	2.8	5.5	3.1	1.7	.2
50	187.3	88.5	180.3	158.7	113.5	68.4	157.9	--	10.5	5.0	10.9	2.9
55	186.9	25.5	174.8	160.3	78.9	5.7	169.0	--	6.0	7.9	3.9	--
60	188.4	18.4	179.4	153.8	106.2	39.4	151.9	4.5	21.6	3.1	7.3	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 9a.--Average empirical yields of timber for fully stocked stands

Type: Planted slash pine Site: Medium (SI 62-80) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
		Number					Square feet	Cubic feet				Board feet
10	74	699	55	--	--	--	9	587	49	101		--
15	123	774	236	2			47	1,341	45	604	11	57
20	138	734	320	11	1	--	76	1,894	58	1,144	96	508
25	48	664	327	26	1	--	88	2,247	87	1,500	231	1,223
30	11	592	270	63	1	--	90	2,409	276	1,733	602	3,180
35	4	574	314	51	7	1	97	2,287	429	1,537	527	2,800
40	3	727	227	74	25	3	98	2,709	344	2,119	1,458	7,719
45			--	--			--	--	--	--	--	--
50	--	--										
55			--	--	--	--			--	--		
60	--	--					--	--				
65			--	--	--	--			--	--		
70	--	--	--	--	--	--						
75							--	--				
80	--	--	--	--	--	--	--		--	--	--	

Table 9b.--Average empirical yields of forest biomass for fully stocked stands

Type: Planted slash pine Site: Medium (SI 62-80) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	21.4	1.8	5.5	--	--	--	20.8	--	--	--	0.5	--
15	49.7	1.7	31.8	0.7	--	--	48.6	--	0.1	0.2	.6	0.2
20	71.5	2.3	57.4	5.6	0.6	--	69.4	0.1	.1	.3	1.5	.2
25	85.5	3.4	73.1	13.7	1.3	--	83.9	--	.3	.1	1.0	.1
30	91.4	10.1	81.9	35.4	1.3	0.2	87.1	2.2	.3	.6	.6	.6
35	87.0	16.6	76.4	30.3	8.8	2.0	83.7	--	--	--	3.3	--
40	104.7	13.4	96.8	69.7	33.5	4.8	94.2	--	2.1	--	8.5	--
45	--	--	--	--	--	--	--	--	--	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--	--
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 10a.--Average empirical yields of timber for fully stocked stands

Type: Planted slash pine Site: High (ST 81+) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	13	693	173	1	--	--	37	1,002	189	415	5	27
15	29	771	330	11	1	--	76	1,875	146	1,113	89	472
20	76	743	375	39	2	--	104	2,636	89	1,832	347	1,832
25	61	496	331	70	2	--	111	2,874	103	2,246	713	3,767
30	7	496	248	115	16	--	109	3,057	389	2,448	1,538	8,125
35	3	626	185	123	22	1	110	3,513	402	2,938	2,369	12,514
40	4	364	169	140	49	2	131	4,500	650	3,933	3,427	18,105
45	--	--	--	--	--	--	--	--	--	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--	--
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 10b.--Average empirical yields of forest biomass for fully stocked stands

Type: Planted slash pine Site: High (SI 81+) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
			Green tons per acre									
10	36.9	7.2	21.3	0.4	--	--	36.8	--			0.1	
15	70.2	5.6	56.0	5.4	0.7	--	68.6	--	0.8	0.3	.4	0.1
20	100.4	3.4	89.3	21.3	2.1	0.2	97.1	--	1.3	.6	1.2	.2
25	110.1	4.0	105.8	42.2	2.7	.3	108.2	--	.9	.3	[illegible]	.2
30	116.2	14.8	109.8	81.5	20.2	--	113.8	--	2.4	.1	--	
35	134.4	16.4	129.1	117.6	30.0	3.1	133.1	--	[illegible]	--	.5	[illegible]
40	173.8	25.3	172.4	161.5	75.6	4.6	172.4	--	--	.3	1.1	--
45		--	--	--	--	--	--	--			--	--
50			--	--	--				--	--	--	--
55			--	--	--						--	--
60			--	--	--	--	--	--				--
65			--	--	--							
70			--	--	--						--	
75			--	--	--	--	--	--			--	--
80		--	--	--	--	--	--	--	--	--	--	--

Table 11a.--Average empirical yields of timber for fully stocked stands

Type: Natural shortleaf pine Site: Medium (SI 54-71) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
											Saw-log portion	International 6-inch rule
	Number						Square feet	Cubic feet				Board feet
10	4	1,283	14	--	--	--	2	319	89	18	--	--
15	9	1,458	181	13	--	--	45	1,212	216	590	58	309
20	11	1,363	308	26	3	--	79	2,025	190	1,138	180	954
25	18	1,149	313	35	3	--	88	2,168	134	1,351	286	1,515
30	18	1,282	293	44	5	--	91	2,490	192	1,540	431	2,294
35	21	1,099	318	67	6	--	104	2,665	124	1,822	657	3,482
40	16	880	266	83	12	1	108	2,868	131	2,144	973	5,186
45	6	1,275	295	78	4	--	97	2,720	238	1,798	689	3,663
50	3	1,235	203	79	13	--	86	2,874	421	1,923	1,144	6,052
55	8	716	295	106	18	3	126	3,703	224	2,870	1,620	8,658
60	4	795	310	101	15	2	127	3,461	296	2,567	1,264	6,712
65	4	799	249	88	12	1	99	2,625	180	1,948	1,052	5,555
70	3	1,184	217	75	19	1	96	2,990	109	2,188	1,289	6,811
75	1	632	232	165	43	--	139	3,822	--	3,140	2,296	12,169
80	2	680	229	142	65	12	158	4,957	473	4,019	3,355	17,867

Table 11b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural shortleaf pine Site: Medium (SI 54-71) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	12.3	3.5	1.2	--	--		11.0	0.4	--		0.2	0.7
15	43.0	7.6	26.7	5.1	--	--	35.1	.5	3.1		.1	.3
20	71.2	6.8	51.3	11.7	3.0	--	61.9	1.8	2.6	2.4	1.4	1.1
25	76.6	4.7	61.1	17.0	2.7	0.3	66.6	1.2	2.8	2.6	1.2	2.1
30	89.4	7.0	69.3	25.8	4.9	.4	72.1	1.4	5.7	2.1	4.9	3.3
35	95.1	4.6	80.6	37.7	6.3	.6	81.2	1.3	4.7	2.6	1.7	3.6
40	103.3	4.8	92.6	53.7	15.2	3.3	88.0	1.2	1.7	3.7	5.1	3.6
45	98.1	8.6	79.7	44.1	4.3	.5	73.3	.1	5.4	8.1	2.8	8.4
50	104.1	16.2	80.8	57.8	16.7	--	86.5	1.7	3.7	1.4	7.0	3.8
55	135.0	8.5	126.2	89.0	28.0	8.1	106.0	--	4.0	6.2	13.8	5.0
60	127.7	9.7	117.1	71.2	17.6	3.8	110.8	--	5.1	1.8	7.6	2.4
65	93.8	6.3	85.4	56.3	13.0	1.1	84.5	.6	2.0	1.5	1.8	3.3
70	108.3	5.0	92.3	61.5	23.1	2.8	97.9	1.5	3.9	0.4	2.7	1.9
75	138.0		133.5	124.0	46.0	--	110.1	3.2	20.4	--	4.2	--
80	178.2	15.9	173.3	155.6	97.9	27.0	147.8	.9	14.2	11.9	--	3.4

Table 12a.--Average empirical yields of timber for fully stocked stands

Type: Natural longleaf pine Site: All sites Region: Southeast

Stand age (years)	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
	Sample plots						Total aboveground	Standard error	Crowing stock	Sawtimber	
	1.0+	5.0+	9.0+	13.0+	17.0+		1.0+ trees			Saw-log portion	International ¼-inch rule
	Number					Square feet	Cubic feet				Board feet
10	2	152	33	12	--	--	15	410	--	345	155	818
15	2	871	22	22	2	--	13	533	53	226	168	888
20	2	921	121	3	--	--	32	811	610	416	27	140
25	10	866	236	50	--	--	75	2,105	287	1,375	582	3,073
30	17	720	182	534	7		67	1,829	182	1,269	641	3,390
35	14	690	236	55	11	1	86	2,494	235	1,785	911	4,811
40	21	539	218	79	15	1	91	2,541	172	1,979	1,211	6,398
45	31	555	198	79	15	1	86	2,449	136	1,894	1,250	6,605
50	23	437	201	97	22	1	99	3,121	191	2,512	1,834	9,692
55	19	460	165	104	27	3	99	3,247	225	2,653	2,147	11,343
60	11	350	161	96	22	2	88	2,588	173	2,155	1,723	9,101
65	4	773	217	126	30	4	121	4,115	994	3,415	2,666	14,095
70	11	366	177	114	32	2	108	3,368	297	2,839	2,406	12,729
75	8	317	112	76	34	2	78	2,615	442	2,201	1,983	10,473
80	3	504	138	78	25	7	83	2,591	527	2,191	1,989	10,506

Table 12b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural longleaf pine Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	16.0	--	15.7	8.2		--	16.0	--	--	--	--	--
15	19.5	2.1	9.8	9.8	1.2	--	19.5	--	--		--	
20	29.4	22.1	19.6	1.4		--	29.1	--			0.3	--
25	80.0	11.1	66.0	31.5	3.9	--	68.8	--	3.0	3.9	3.6	0.7
30	69.4	7.0	59.5	34.3	8.6	0.9	65.4	--	0.5	0.7	2.1	.7
35	95.4	9.2	84.1	45.5	16.3	1.9	91.9	--	.4	.3	2.6	.1
40	98.2	6.8	91.3	61.5	19.0	1.9	93.9	--	.7	.2	1.8	1.6
45	94.6	5.4	87.6	63.0	20.2	1.8	89.6	--	.9	.7	3.2	.1
50	121.1	7.5	114.4	90.0	31.1	3.4	117.9	0.3	.3	.3	2.1	.2
55	126.5	8.9	119.2	103.3	41.9	7.8	123.2	--	1.8		1.4	
60	101.9	6.9	97.9	84.1	30.8	5.2	97.5	--	--	.1	3.6	.8
65	159.8	38.0	152.6	130.8	49.6	8.9	151.6.	.3	1.3	4.3	2.2	
70	132.3	11.7	128.5	115.0	49.6	7.2	127.0	--	.4	--	4.9	
75	102.3	17.4	98.7	90.2	54.1	6.0	99.7	--	.3	--	2.1	.2
80	101.2	21.1	98.0	89.8	49.4	20.1	100.4	--	.2	--	.3	.3

Table 13a.--Average empirical yields of timber for fully stocked stands

Type: Natural Virginia pine Site: Medium (SI 57-66) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	14	1,154	61	--	--	--	12	751	107	135	--	--
15	14	1,985	149	6	--	--	33	1,770	168	457	18	95
20	27	1,821	210	11	1	--	50	2,127	133	730	68	367
25	30	1,203	297	34	3	--	83	2,562	127	1,398	283	1,505
30	21	1,024	344	53	5	--	106	3,002	118	1,927	490	2,593
35	22	1,068	310	56	5	--	95	2,850	160	1,789	505	2,678
40	14	923	309	68	6	--	106	2,914	197	2,064	676	3,592
45	8	744	357	119	7	--	135	3,882	179	2,917	1,274	6,762
50	4	1,243	269	137	13	1	118	3,596	121	2,511	1,481	7,851
55	3	1,115	281	75	11	2	101	2,994	229	2,069	798	4,285
60	2	879	259	52	3	--	79	2,602	242	1,526	508	2,738
65	3	871	304	109	19	1	129	3,739	606	2,793	1,286	6,965
70	1	709	308	100	29	--	143	3,953	--	3,002	1,812	9,609
75	--	--	--	--	--	--	--	--	--	--	--	--
80	1	717	217	107	33	2	116	3,343	--	2,717	1,623	8,574

Table 13b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural Virginia pine Site: Medium (SI 57-66) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches) 5.0+	9.0+	13.0+	17.0+	Species group: Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	28.4	4.0	8.9	--	--	--	25.9	0.5	0.2	0.7	0.6	0.5
15	66.4	6.2	25.7	3.0	--	--	59.7	3	1.5	2.4	1.2	1.4
20	80.2	4.9	39.9	5.7	0.8	--	70.0	1.2	1.0	3.5	1.5	3.1
25	97.3	4.7	70.6	18.8	3.5	0.8	84.9	1.4	2.6	2.4	2.4	3.6
30	113.3	4.5	92.9	30.1	4.8	.5	99.4	1.8	.9	3.2	3.6	4.4
35	107.6	5.9	85.2	32.1	5.3	.7	93.3	.2	2.8	2.7	5.9	2.7
40	109.2	7.4	96.5	43.3	5.5	.3	92.5	1.4	5.0	5.7	2.5	2.2
45	144.5	6.0	133.7	79.5	9.7	.6	127.0	.1	3.5	4.4	6.r)	3.5
50	132.8	4.1	113.3	88.9	16.8	2.1	112.2	.8	2.5	6.6	2.9	7.6
55	115.2	10.7	99.2	54.7	16.2	5.1	83.5	1.1	2.0	2.2	21.9	4.4
60	96.7	10.7	70.5	31.6	4.4	.0	84.7	--	.3	1.9	2.3	7.5
65	144.4	23.9	132.7	85.5	24.6	1.3	93.5	--	4.0	5.8	38.1	3.0
70	146.9	--	136.7	92.3	36.1	--	130.8	2.3	--	4.4	--	9.3
75	--	--	--	--	--	--	--	--	--	--	--	--
80	122.0	--	115.2	86.0	37.8	3.6	115.2	.5	--	--	--	6.3

Table 14a.--Average empirical yields of timber for fully stocked stands

Type: Natural Virginia pine Site: High (SI 67+) Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches) 1.0+	5.0+	9.0+	13.0+	17.0+	Basal area per acre, trees 5.0+ inches	Volume per acre: Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	3	1,438	138	--	--	--	38	1,369	730	388	--	--
15	2	1,128	228	12	--	--	59	2,410	656	1,066	61	323
20	7	1,169	212	14	2	1	56	2,098	191	923	135	743
25	11	780	313	54	2	--	98	2,614	154	1,721	426	2,265
30	14	902	329	70	4	--	107	3,040	124	2,040	615	3,252
35	11	900	387	90	7	--	118	3,615	179	2,635	1,003	5,354
40	13	1,000	320	97	13	2	124	3,746	253	2,766	1,220	6,457
45	3	547	246	132	20	--	124	3,614	519	2,871	1,707	9,016
50	6	729	316	103	18	3	129	4,107	294	3,242	1,562	8,329
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	1	767	267	125	5	2	128	3,956	--	2,743	1,364	7,266
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 14b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural Virginia pine Site: High (SI 67+) Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	51.8	28.5	26.9	—	—	--	48.6	--	--	--	0.2	2.9
15	90.2	27.0	51.9	4.5	--	--	89.9	--	0.1	--	--	0.2
20	79.7	7.6	47.9	9.6	3.8	1.4	69.8	1.7	--	1.2	3.1	3.9
25	98.4	5.6	84.6	28.7	3.0	--	91.4	1.5	.4	2.5	2.2	.3
30	114.4	4.5	96.6	38.8	4.1	0.5	109.1	--	1.2	3.1	.7	.3
35	135.7	7.0	119.8	62.5	9.9	5.0	119.4	1.3	1.2	5.1	6.7	2.0
40	140.1	9.2	125.3	70.6	16.1	.7	126.8	1.3	1.5	3.1	2.9	4.6
45	132.2	18.5	124.7	94.6	22.2	--	126.9	--	--	2.0	.7	2.6
50	154.3	11.4	147.0	88.9	27.3	8.0	133.3	0.8	--	5.8	8.3	6.0
55	--	--	--	--	--	--	--	--	--	--	--	--
60	--	--	--	--	--	--	--	--	--	--	--	--
65	146.9	--	135.4	95.0	9.5	4.9	115.8	--	--	20.1	--	11.0
70	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 15a.--Average empirical yields of timber for fully stocked stands

Type: Natural pond pine Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	4	558	8	--	--	--	2	81	53	19	--	--
15	13	824	52	6	--	--	12	440	101	133	36	190
20	13	1,169	117	12	1	--	31	802	137	388	98	522
25	22	1,194	201	29	2	--	59	1,494	135	862	254	1,343
30	30	1,053	200	34	5	1	63	1,563	169	968	361	1,907
35	20	1,108	267	58	8	--	91	2,293	197	1,615	662	3,500
40	25	911	232	57	10	2	85	2,039	177	1,496	737	3,894
45	26	1,054	222	70	17	3	91	2,394	181	1,777	1,047	5,537
50	17	925	270	65	14	1	96	2,529	274	1,859	967	5,112
55	6	1,058	195	83	18	3	90	2,578	251	1,921	1,374	7,298
60	14	1,406	223	97	22	4	105	3,144	93	2,258	1,534	8,120
65	3	1,938	136	64	16	1	73	2,397	22	1,504	1,108	5,852
70	3	1,016	150	74	24	5	86	2,384	311	1,777	1,387	7,340
75	4	1,702	153	80	17	2	85	2,558	364	1,767	1,316	6,950
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 15b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural pond pine Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons er acre											
10	3.0	1.9	0.9	--	--	--	3.0	--	--	--	--	--
15	17.5	4.0	7.2	2.4	--	--	16.0	0.1	0.3	1.0	--	0.1
20	30.9	4.9	19.3	5.8	0.7	--	26.9	--	.4	1.1	1.6	[illegible]
25	56.9	4.7	41.2	14.7	2.1	0.3	50.9	.9	1.6	2.9	0.2	.4
30	60.4	5.9	46.6	20.1	6.4	2.5	53.1	1.0	2.9	1.9	1.2	.2
35	84.5	6.4	73.7	37.4	9.4	.4	72.8	1.9	3.5	4.1	.3	1.8
40	77.5	5.7	67.5	38.8	13.9	4.2	68.2	.9	4.7	3.1	.3	.2
45	88.6	6.1	78.3	52.9	22.5	5.3	77.7	--	2.8	6.0	1.4	.8
50	94.3	9.1	82.9	50.3	20.3	2.6	79.0	--	2.4	11.4	.8	.7
55	93.1	9.3	82.8	65.7	27.1	7.6	79.7	.1	7.9	4.8	--	.5
60	113.7	3.5	97.2	75.2	33.8	9.8	91.9	--	4.6	14.8	.3	2.1
65	87.7	1.3	64.9	52.1	21.2	2.8	68.8	--	11.9	3.3	.6	3.1
70	89.2	9.5	79.1	64.8	33.5	10.4	74.5	2.5	8.3	1.3	1.0	1.5
75	94.8	11.8	77.6	64.1	21.4	3.2	75.9	1.9	10.2	4.4	--	2.3
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 16a.--Average empirical yields of timber for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	21	967	42	—	—	--	10	464	75	122	--	
15	16	1,502	110	14	--		30	1,100	139	443	71	386
20	30	1,512	205	30	4		61	1,963	111	989	261	1,430
25	31	1,320	222	41	9	1	74	2,145	145	1,214	437	2,358
30	36	1,255	253	53	10	2	86	2,425	106	1,470	541	2,946
35	40	1,122	243	67	17	4	96	2,809	138	1,802	856	4,662
40	44	1,102	240	63	12	2	90	2,615	83	1,695	717	3,904
45	38	1,011	245	78	18	5	104	3,028	90	2,036	949	5,211
50	44	984	249	92	25	5	115	3,430	126	2,356	1,294	7,019
55	23	925	229	85	24	6	107	3,199	179	2,218	1,204	6,574
60	23	1,043	239	91	31	5	115	3,541	211	2,324	1,411	7,656
65	14	1,061	213	81	30	7	108	3,185	186	2,105	1,339	7,254
70	18	743	247	86	31	10	120	3,489	188	2,516	1,627	8,935
75	8	831	183	87	32	8	105	3,265	203	2,366	1,669	9,103
80	9	940	205	91	33	8	112	3,417	161	2,429	1,513	8,341

Table 16b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	17.6	2.8	6.1	--	--	--	6.3	0.6	5.4	1.6	2.1	1.6
15	42.0	5.3	22.5	7.0	--	--	15.8	1.0	10.1	5.3	7.0	2.8
20	73.7	4.1	49.7	19.2	5.3	--	29.8	3.7	9.0	12.9	13.9	4.3
25	80.1	5.2	61.0	28.9	11.0	2.7	32.8	3.0	14.8	8.7	14.9	5.9
30	90.8	3.8	73.0	38.4	14.4	4.4	36.5	2.4	15.0	11.1	19.3	6.4
35	104.7	4.8	88.6	55.5	25.9	9.3	38.0	9.0	18.1	10.2	23.2	6.2
40	99.3	3.0	82.7	48.4	16.8	4.0	38.6	3.1	12.5	9.0	28.7	7.5
45	113.8	3.2	99.0	65.5	29.3	11.8	41.1	5.3	12.2	15.3	31.6	8.4
50	127.9	4.5	112.3	81.9	38.5	13.7	46.9	8.7	23.5	15.0	24.6	9.2
55	120.7	6.4	107.9	79.0	39.3	15.7	41.2	11.3	11.0	16.2	34.9	6.1
60	131.3	7.2	113.5	86.1	46.1	12.5	45.7	10.2	23.2	13.7	29.7	8.7
65	119.9	6.9	102.7	77.9	45.8	16.8	42.3	13.1	12.4	16.0	29.4	6.7
70	131.8	6.5	122.6	95.1	59.0	30.0	49.5	3.0	13.4	17.9	36.9	11.0
75	123.4	6.4	114.3	96.4	59.2	21.5	50.3	--	14.7	13.7	32.8	11.9
80	127.3	7.7	114.2	92.8	56.1	22.1	46.0	4.0	16.5	25.8	29.9	5.1

Table 17a.--Average empirical yields of timber for fully stocked stands

Type: Natural oak-pine Site: High Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	4	1,099	75	28	--	--	29	964	170	574	204	1,115
15	5	1,112	87	18	5	--	29	936	79	507	233	1,234
20	7	1,214	248	55	16	3	93	2,577	303	1,560	629	3,429
25	2	1,449	197	22	10	2	62	1,742	238	1,112	433	2,297
30	30	991	258	78	25	7	111	3,278	130	2,299	1,286	6,956
35	25	866	251	80	23	6	111	3,205	145	2,200	1,216	6,615
40	31	871	228	86	33	10	117	3,596	151	2,567	1,641	8,925
45	28	759	229	87	37	12	120	3,636	128	2,672	1,814	9,967
50	17	792	234	100	38	12	129	4,056	183	3,006	2,001	10,994
55	20	712	217	87	38	11	118	3,788	173	2,818	1,875	10,296
60	15	898	217	88	41	13	122	3,920	196	2,807	2,094	11,461
65	6	771	175	99	51	21	138	4,751	297	3,514	2,933	16,298
70	11	682	176	92	53	25	139	4,850	238	3,726	3,229	17,686
75	2	579	180	94	62	19	134	4,092	624	3,007	2,743	14,752
80	4	1,035	244	99	46	17	142	4,976	843	3,650	2,831	15,479

Table 17b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural oak-pine Site: High Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	35.8	6.5	26.1	18.7	--	--	15.0	--	5.2	8.6	6.9	0.2
15	35.3	2.5	24.8	15.4	6.5	--	11.1	4.3	5.3	5.5	6.1	3.1
20	94.2	11.6	80.4	45.5	23.5	9.2	34.7	4.8	18.5	20.9	14.1	1.1
25	66.2	9.0	52.8	20.6	13.7	4.2	37.6	--	10.2	7.4	8.3	2.8
30	122.4	4.6	107.6	72.8	39.7	16.1	51.9	0.7	28.7	14.8	22.0	4.3
35	119.7	5.3	106.7	74.9	37.3	15.6	46.7	.7	25.1	15.2	23.1	8.9
40	134.4	5.7	121.9	94.6	59.7	27.8	51.2	4.1	20.1	19.9	32.7	6.3
45	136.4	4.8	126.6	101.5	68.8	33.3	50.1	4.0	29.2	13.4	32.4	7.3
50	150.1	6.9	139.1	113.9	74.6	37.0	52.8	1.4	37.5	22.1	27.8	8.5
55	143.1	6.6	132.0	106.6	70.9	30.3	47.0	2.7	23.5	20.5	37.2	12.3
60	147.2	7.8	136.6	114.9	84.2	43.3	58.3	.3	31.0	18.6	27.4	11.6
65	182.6	9.7	172.7	158.4	126.5	76.5	54.6	4.8	39.1	14.9	63.1	6.1
70	182.4	8.8	172.4	155.5	128.9	86.8	65.9	9.0	45.7	26.8	29.5	5.5
75	162.4	25.8	156.3	141.6	121.2	56.3	70.5	26.0	4.6	--	53.7	7.6
80	185.0	31.3	170.6	144.6	108.1	62.0	62.1	17.0	37.3	31.1	26.3	11.1

Table 18a.--Average empirical yields of timber for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Coastal Plain

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International $-inch rule
	Number						Square feet	Cubic feet				Board feet
10	10	946	45	--	--	--	9	482	134	121	--	--
15	5	1,879	118	11	--	--	31	1,252	213	445	69	364
20	21	1,420	202	33	5	--	63	1,925	126	1,025	312	1,707
25	20	1,364	227	48	10	1	78	2,342	182	1,354	559	3,001
30	14	1,092	322	62	12	3	106	2,805	158	1,794	703	3,792
35	25	1,161	250	74	20	5	103	3,039	195	1,968	1,054	5,719
40	15	1,204	236	61	16	2	90	2,768	178	1,694	853	4,567
45	15	995	218	75	20	5	101	3,017	164	1,997	1,046	5,679
50	28	1,035	254	96	25	5	117	3,470	183	2,389	1,345	7,241
55	13	804	234	95	33	9	118	3,520	193	2,517	1,544	8,399
60	15	1,119	246	101	35	6	122	3,850	278	2,441	1,581	8,547
65	7	1,254	195	77	33	5	100	3,083	334	1,935	1,342	7,186
70	9	907	242	92	35	14	128	3,902	259	2,763	2,059	11,221
75	5	877			35	9	109	3,445	300	2,458	1,786	9,791
80	5	1,005	205	80	33	7	107	3,257	258	2,259	1,388	7,641

Table 18b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Coastal Plain

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
							Green tons per acre					
10	18.0	5.0	6.1	--	--	--	7.5	0.8	6.5	1.0	1.5	0.8
15	48.0	8.6	22.9	5.3	--	--	21.4	--	13.6	4.0	7.8	1.2
20	72.0	4.7	50.9	21.8	6.3	--	29.1	4.9	10.6	11.1	13.4	2.9
25	86.8	6.3	66.4	34.0	12.3	2.8	37.7	2.7	19.9	7.6	13.8	5.2
30	102.9	6.0	87.6	44.8	16.6	5.7	41.4	2.1	21.5	15.1	19.4	3.3
35	111.1	6.8	95.0	63.7	30.8	11.8	43.5	12.4	22.3	10.5	16.4	5.9
40	102.5	6.3	82.0	49.3	21.1	3.6	42.4	7.7	17.0	10.9	18.2	6.4
45	112.2	5.1	95.9	65.8	32.5	14.9	43.7	10.4	13.8	14.2	25.8	4.2
50	126.8	6.5	111.0	81.8	38.0	12.9	49.5	10.7	33.6	13.2	17.0	2.8
55	131.0	6.9	120.1	93.9	53.5	21.9	49.1	12.4	17.3	17.0	30.0	5.1
60	140.4	9.7	120.0	94.1	51.7	14.4	49.0	11.9	32.6	17.6	22.7	6.6
65	114.0	12.1	93.1	71.9	45.6	11.8	45.3	19.3	18.0	14.1	15.4	1.9
70	146.0	9.2	133.6	109.5	73.7	42.9	60.7	5.5	22.2	17.4	24.7	15.6
75	129.1	9.0	120.2	103.4	66.2	26.7	50.2	--	18.8	18.3	29.8	12.0
80	121.7	13.4	109.1	85.9	55.5	16.6	44.7	1.6	22.0	17.5	33.3	2.7

Table 19a.--Average empirical yields of timber for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Piedmont

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International $-inch rule
	Number						Square feet	Cubic feet				Board feet
10	9	936	47	--			11	465	102	138	--	--
15	11	1,330	106	15	--		30	1,031	180	441	72	395
20	7	1,820	206	27	2	--	58	2,105	294	912	162	878
25	11	1,241	214	29	7	1	66	1,786	210	958	216	1,191
30	19	1,365	197	49	9	1	72	2,144	121	1,250	460	2,522
35	15	1,057	231	55	13	2	a5	2,424	129	1,527	528	2,899
40	25	1,060	243	63	11	2	91	2,566	92	1,712	682	3,743
45	20	983	265	79	17	4	107	3,053	118	2,099	899	4,974
50	14	923	231	88	25	6	110	3,397	126	2,315	1,247	6,878
55	5	1,224	184	68	13	2	81	2,481	220	1,495	683	3,830
60	6	966	219	66	20	4	94	2,714	140	1,886	967	5,312
65	3	825	225	86	36	12	123	3,504	95	2,476	1,664	9,149
70	6	613	267	81	30	8	116	3,252	246	2,430	1,285	7,185
75	1	367	187	52	34	3	90	2,926	--	2,355	1,804	9,668
80	3	946	212	109	34	6	118	3,637	202	2,639	1,687	9,276

Table 19b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural oak-pine Site: Medium Region: Piedmont

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches) 5.0+	9.0+	13.0+	17.0+	Species group Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	17.8	3.8	6.8	--	--	--	6.9	0.4	4.2	2.4	2.3	2.5
15	39.3	6.8	22.4	7.8	--	--	13.2	1.4	8.6	5.9	6.7	3.5
20	79.8	10.5	48.2	14.5	2.7	--	33.2	1.3	6.7	17.1	12.6	9.0
25	67.8	8 . I.	51.3	19.7	8.6	2.6	24.0	3.5	5.7	10.6	16.9	7.1
30	81.1	4.4	62.3	35.5	12.8	3.2	30.9	2.5	12.3	9.0	19.0	7.4
35	93.9	5.0	77.9	41.9	17.8	5.1	28.8	3.2	11.2	9.6	34.4	6.7
40	98.6	3.5	83.8	48.3	16.3	4.4	38.2	.9	11.7	6.2	33.6	8.0
45	115.4	4.5	101.6	64.9	28.0	10.5	40.9	.7	12.7	16.1	35.1	9.9
50	131.5	4.7	115.6	85.8	41.8	17.2	44.4	3.2	6.5	19.0	38.8	19.5
55	96.2	8.3	78.4	55.9	20.3	5.5	31.6	3.0	4.2	9.6	39.3	8.5
60	104.4	4.9	90.7	61.9	29.4	8.5	35.7	5.4	7.1	4.6	36.9	14.7
65	132.7	3.9	120.9	94.4	60.3	30.8	45.2	--	14.8	32.8	19.0	20.9
70	123.7	7.3	117.5	85.7	52.8	21.4	37.2	--	6.9	26.8	43.4	9.5
75	108.5	--	102.4	77.8	60.1	10.8	61.3	--	23.7	--	23.3	0.3
80	133.0	7.6	118.4	99.4	52.9	18.1	54.7	1.1	12.9	44.3	15.3	4.8

Table 20a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: Medium Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	27	917	33	--	--	--	7	347	59	94	--	--
15	39	1,173	92	12	--	--	25	911	99	336	43	241
20	14	1,577	117	23	5	--	37	1,446	137	551	150	859
25	31	1,365	199	40	7	1	67	2,101	83	1,125	309	1,736
30	55	1,280	221	44	8	2	76	2,279	78	1,310	380	2,169
35	44	1,154	213	55	13	3	82	2,474	110	1,472	515	2,942
40	80	860	234	76	19	4	99	2,864	77	1,878	712	4,103
45	73	871	240	76	21	4	102	2,997	88	1,987	771	4,428
50	67	854	228	78	21	5	102	3,023	87	2,035	814	4,708
55	60	706	213	85	30	8	110	3,200	70	2,195	1,101	6,356
60	59	664	212	92	33	9	114	3,402	86	2,394	1,241	7,168
65	37	642	205	88	33	8	111	3,296	88	2,367	1,237	7,198
JO	55	608	182	94	40	14	117	3,640	124	2,612	1,584	9,197
75	26	733	193	82	38	13	113	3,581	147	2,526	1,481	8,595
80	27	608	189	87	43	16	125	3,784	138	2,748	1,789	10,284

Table 20b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: Medium Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	14.1	2.4	5.3	--	--	--	2.3	0.1	1.4	2.2	5.8	2.3
15	35.6	3.7	20.2	608	--	--	3.3	.7	6.1	8.5	11.8	5.2
20	57.3	5.0	30.6	15.8	5.6	--	4.9	--	5.4	13.2	26.4	7.3
25	81.9	3.2	60.4	29.4	10.1	3.7	9.3	1.4	14.2	13.1	32.2	11.5
30	89.5	3.0	69.9	36.1	14.5	7.1	9.9	[illegible]	10.8	11.1	45.3	12.0
35	96.5	4.1	78.3	47.4	20.2	7.5	6.4	.8	13.1	20.2	39.6	16.4
40	112.6	2.8	99.9	68.2	31.8	12.6	6.1	.7	12.7	20.2	54.8	18.1
45	118.0	3.5	105.0	71.1	34.5	11.3	7.7	1.5	10.4	19.4	61.6	17.4
50	120.2	3.5	107.0	74.9	36.9	14.8	6.2	1.5	9.1	16.6	69.0	17.9
55	126.8	2.8	117.2	91.5	54.5	23.6	9.0	1.3	10.1	20.6	69.4	16.4
60	135.1	3.2	125.6	101.7	61.2	26.6	5.8	3.2	9.1	20.0	75.2	21.9
65	132.2	3.5	125.0	102.1	63.7	27.9	4.6	1.0	10.4	17.6	71.1	27.5
70	145.6	5.0	137.2	119.9	83.2	42.7	4.9	2.5	10.2	20.3	81.9	25.7
75	144.8	6.2	134.7	112.3	80.6	41.6	5.4	1.2	9.4	19.2	83.8	25.7
80	150.0	5.8	142.2	122.9	92.5	53.1	3.5	9.8	9.8	22.2	78.6	26.2

Table 21a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: High **Region:** Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. (inches) class 1.0+	5.0+	9.0+	13.0+	17.0+	Basal area per acre, trees 5.0+ inches	Volume per acre: Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	6	1,201	57	10	--	--	18	560	119	243	50	283
15	4	615	64	12	3	--	23	729	232	377	165	920
20	8	768	197	41	11	3	77	2,109	250	1,493	585	3,368
25	7	1,060	239	62	9	1	85	2,479	251	1,506	526	2,972
30	22	913	222	77	24	5	100	2,905	169	1,975	939	5,389
35	29	872	232	88	26	5	111	3,319	132	2,342	1,119	6,406
40	45	746	232	95	33	8	118	3,486	119	2,523	1,337	7,631
45	40	744	231	91	35	11	120	3,660	134	2,607	1,395	7,989
50	45	645	220	90	35	11	118	3,470	100	2,492	1,344	7,712
55	37	668	206	90	43	15	125	4,073	149	3,014	1,927	11,052
60	26	589	192	95	45	18	127	4,090	169	3,034	2,054	11,808
65	19	621	205	89	41	14	121	3,726	171	2,737	1,599	9,207
70	13	711	194	95	49	16	129	4,088	165	3,028	2,055	11,827
75	8	534	191	102	53	22	144	4,839	323	3,726	2,705	15,645
80	16	460	172	91	51	23	133	4,414	220	3,159	2,273	13,171

Table 21b.--Average empirical yields of forest biomass for fully stocked stands

Type : Oak-hickory Site: High Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	22.5	4.5	14.1	6.4	--	--	3.7	--	1.9	6.6	7.5	2.9
15	28.3	8.9	21.5	11.1	5.2	--	3.9	--	4.8	5.9	11.8	1.9
20	79.3	8.7	70.7	39.6	22.7	11.1	3.7	0.7	8.9	33.0	15.3	17.8
25	94.5	9.5	74.6	44.0	13.8	2.7	12.4	1.2	21.0	21.7	26.3	11.9
30	110.8	6.1	97.0	71.2	38.0	15.1	8.3	.4	23.5	39.6	23.9	15.1
35	127.4	4.9	115.9	87.2	46.8	17.5	9.1	.8	24.9	36.1	41.2	15.4
40	133.2	4.5	122.7	96.7	55.9	21.8	12.0	.5	24.5	37.3	42.8	16.1
45	140.4	5.3	129.1	101.3	64.6	30.1	10.7	.1	27.3	39.9	48.5	14.0
50	134.2	3.8	125.3	99.4	62.5	28.8	6.1	3.3	21.8	34.1	45.2	23.6
55	158.1	5.5	147.8	125.5	90.0	48.7	12.5	1.2	29.7	38.5	52.1	24.2
60	158.8	6.3	150.6	132.9	97.6	56.5	10.8	.1	35.4	35.4	51.8	25.3
65	144.6	6.1	135.8	113.3	80.0	42.2	6.0	2.6	18.3	40.8	52.0	24.8
70	159.9	6.2	150.7	133.7	103.3	51.1	11.5	.1	26.1	40.6	51.9	29.7
75	189.2	12.9	184.1	167.5	130.3	79.4	6.8	1.1	49.6	41.9	61.5	28.2
80	174.8	8.7	168.1	155.1	126.7	82.9	8.0	1.0	17.7	31.9	83.5	32.7

Table 22a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: Medium Region: Coastal Plain

Stand age (years)	Plots	Live trees per acre, by d.b.h. class (inches) 1.0+	5.0+	9.0+	13.0+	17.0+	Basal area per acre, trees 5.0+ inches	Volume per acre: Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	13	721	36	--	--	--	8	299	69	104	--	--
15	16	1,105	87	15	--	--	25	903	117	350	54	300
20	5	1,385	77	11	3	--	22	915	127	314	84	465
25	11	1,171	213	40	7	2	69	2,120	173	1,133	326	1,818
30	20	1,181	214	47	10	4	78	2,343	172	1,400	515	2,920
35	13	1,203	213	58	15	3	84	2,723	184	1,577	531	3,032
40	22	797	223	76	21	7	101	2,850	194	1,805	826	4,732
45	11	903	203	68	20	5	92	2,815	199	1,883	762	4,405
50	15	986	254	87	26	6	116	3,440	256	2,337	1,001	5,772
55	18	661	197	86	34	11	112	3,283	134	2,251	1,309	7,543
60	13	663	209	92	32	12	120	3,708	165	2,645	1,514	8,746
65	9	716	207	94	35	7	114	3,573	142	2,566	1,395	8,072
70	9	456	165	87	45	21	124	4,082	441	2,929	2,050	11,972
75	9	922	185	76	34	12	110	3,745	273	2,656	1,631	9,431
80	5	654	182	82	45	18	130	4,069	333	3,084	2,271	12,828

Table 22b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: Medium Region: Coastal Plain

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
			Green tons per acre									
10	12.1	2.8	5.5			--	2.3		1.9	2.3	4.6	1.0
15	36.1	4.4	20.6	8.1		--	3.2	0.2	7.2	4.7	15.6	5.1
20	38.2	5.1	16.8	7.6	2.4	--	4.8		a.3	2.8	19.4	2.9
25	82.5	6.4	63.1	30.5	11.1	3.6	9.7		18.2	13.4	36.3	4.8
30	91.1	6.7	74.3	42.5	19.7	11.7	9.8	.2	16.5	12.2	44.0	a.4
35	105.9	6.4	85.3	52.0	24.5	9.6	6.3	--	19.7	21.8	41.9	16.2
40	108.7	6.2	97.4	69.8	35.7	18.7	8.8	.3	19.9	16.7	46.4	16.7
45	112.7	8.1	100.7	69.3	34.7	13.1	a.2	.5	14.4	a.2	70.3	11.1
50	135.2	10.5	122.7	86.1	43.8	16.6	6.6	.5	21.8	15.2	77.2	14.0
55	127.9	5.3	120.2	99.3	64.7	31.1	11.5	.2	20.5	25.2	54.9	15.8
60	144.7	6.2	135.4	111.7	70.2	38.6	a.1		22.6	24.2	68.5	21.2
65	141 .a	5.9	132.4	110.3	67.2	26.3	6.1	1.5	30.4	18.3	57.5	28.9
70	164.6	la.0	159.9	144.9	114.3	73.8	5.3		16.3	15.9	106.5	20.5
75	151.7	11.6	139.7	116.3	82.4	44.1	9.1	1.0	17.3	il.8	90.1	22.3
80	155.7	16.2	147.9	130.5	106.2	66.1	11.1	18.4	31.7	21.2	32.8	40.5

Table 23a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: High Region: Coastal Plain

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Crowing stock	Sawt imber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International k-inch rule
		Number					Square feet	Cubic feet				Board feet
10	3	1,135	42	8	--	--	15	548	140	278	88	490
15	2	393	42	11	3	--	15	469	410	182	68	382
20	1	766	165	17	12	3	60	1,854	--	1,285	587	3,278
25	1	1,054	276	31	--	--	75	2,741	--	1,459	384	2,155
30	6	1,135	206	71	29	7	99	2,913	394	1,952	1,036	5,929
35	5	1,098	181	72	31	11	100	3,167	195	2,102	1,188	6,796
40	7	780	206	98	45	12	127	3,833	266	2,772	1,713	9,720
45	7	695	235	88	32	14	116	3,666	397	2,504	1,343	7,667
50	3	474	221	101	25	8	121	3,439	263	2,555	1,347	7,576
55	8	629	206	105	50	14	135	4,555	375	3,397	2,221	12,703
60	4	593	203	96	34	11	120	3,809	351	2,832	1,891	10,784
65	1	227	227	116	76	51	188	5,945	--	4,477	3,586	20,704
70	2	595	194	81	45	12	116	3,412	350	2,432	1,629	9,413
75	3	709	182	113	55	25	151	5,422	598	4,122	3,097	17,785
80	3	408	141	77	53	26	139	4,611	880	3,124	2,578	14,809

Table 23b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: High Region: Coastal Plain

Stand age (years)	Total	Standard error	D.b.h. class (inches)				Species group					
	1.0+		5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	22.2	5.5	13.7	6.2	--	--	4.6	--	1.4	3.9	12.3	--
15	18.4	16.1	12.8	7.5	3.4	--	3.1	--	5.1	2.5	7.5	0.1
20	72.0	--	64.2	29.2	24.6	9.7	12.5	--	25.9	--	28.8	4.9
25	110.7	--	79.0	25.4	--	--	8.0	--	23.6	0.1	79.0	--
30	110.2	13.5	94.8	70.8	42.9	18.5	12.2	--	35.6	34.0	21.3	7.1
35	125.1	7.2	114.0	89.0	60.6	28.1	10.4	--	31.0	11.2	64.4	8.0
40	149.4	11.4	139.0	116.8	80.8	35.4	19.6	--	27.3	15.5	85.2	1.9
45	142.7	16.5	130.7	103.8	65.0	36.9	11.6	0.8	31.1	32.2	54.4	12.7
50	128.9	10.7	124.3	96.3	41.6	21.0	20.7	--	31.1	12.0	61.9	3.3
55	175.3	13.2	166.2	143.9	102.6	46.3	15.1	2.0	61.0	29.5	57.9	9.7
60	147.6	11.9	139.5	120.7	81.7	46.1	15.9	--	52.1	12.0	60.7	6.9
65	219.5	--	219.5	201.0	179.7	147.3	--	--	48.8	145.0	15.9	9.8
70	134.6	11.0	129.5	110.5	87.1	42.8	7.6	--	28.9	11.4	46.8	39.9
75	210.9	28.1	204.8	192.0	146.1	91.8	12.9	2.9	93.4	19.2	72.5	10.1
80	182.1	36.4	178.2	166.5	145.8	103.6	20.0	--	43.8	10.3	99.2	8.9

Table 24a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: Medium Region: Piedmont

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	9	1,010	37	--	--	--	8	391	142	101	--	--
15	19	1,205	105	10	--	--	27	972	175	357	35	199
20	9	1,683	140	30	6	--	45	1,740	113	682	187	1,078
25	18	1,465	192	39	5	1	65	2,075	72	1,119	272	1,546
30	28	1,354	224	40	8	2	74	2,283	88	1,272	307	1,758
35	24	1,137	202	53	12	3	77	2,272	147	1,356	502	2,873
40	41	917	240	76	19	3	99	2,919	97	1,934	668	3,865
45	43	860	238	81	23	4	104	3,099	127	2,067	836	4,796
50	36	836	221	75	20	4	98	2,919	101	1,963	785	4,542
55	26	760	203	84	30	9	107	3,182	90	2,239	1,127	6,521
60	29	600	208	92	33	8	113	3,306	129	2,383	1,234	7,142
65	13	603	188	87	38	10	112	3,325	130	2,437	1,409	8,212
70	30	599	176	99	40	12	115	3,548	176	2,568	1,532	8,892
75	11	562	180	84	43	14	114	3,604	225	2,571	1,588	9,225
80	9	588	161	95	50	19	128	4,008	231	2,915	1,925	11,265

Table 24b.--Average empirical yields of forest biomass for fully stocked stands

Type : Oak-hickory Site: Medium Region: Piedmont

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches) 5.0+	9.0+	13.0+	17.0+	Species group Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	15.9	5.7	6.6	--	--	--	2.8	--	1.0	1.2	8.5	2.3
15	37.2	6.6	21.6	6.4	--	--	3.8	1.4	6.3	11.1	9.5	5.1
20	67.9	3.9	38.2	20.4	7.5		5.0	--	3.8	18.9	30.4	9.8
25	81.2	3.0	58.3	27.9	8.1	3.1	9.2	1.0	13.4	12.1	30.2	15.3
30	90.1	3.4	68.4	32.4	12.3	4.9	10.1	0.7	8.4	11.0	47.3	12.6
35	88.5	5.5	71.6	44.5	18.9	6.6	7.5	.4	13.2	18.4	35.5	13.5
40	116.2	3.9	102.1	68.4	30.3	9.0	5.9	[illegible]	13.1	18.1	60.7	17.9
45	122.0	5.1	108.1	76.3	36.8	11.1	8.9	1.8	13.2	19.6	61.7	16.9
50	116.4	4.1	102.2	72.2	35.5	13.2	7.7	1.2	6.6	16.2	67.2	17.6
55	127.2	3.6	117.4	93.1	56.2	26.0	8.2	.9	7.9	19.4	75.5	15.3
60	131.7	5.0	123.9	100.4	60.2	24.0	6.8	1.9	7.5	20.5	76.4	18.6
65	133.9	5.5	128.5	109.2	74.0	34.4	5.3	.2	6.7	23.1	73.5	25.2
70	142.0	6.9	133.8	118.0	78.5	35.7	5.9	1.2	12.8	17.8	76.8	27.5
75	145.4	9.4	135.6	116.6	88.0	46.1	4.8	.9	7.2	29.6	75.4	27.4
80	164.2	9.6	158.1	144.2	113.9	63.8	3.5	.3	11.4	12.7	112.7	23.6

Table 25a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: High Region: Piedmont

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	2	1,778	36	--	--	--	8	363	145	52	--	--
15	1	970	70	17	a	--	30	1,128	--	750	450	2,477
20	5	630	217	46	12	5	88	2,239	400	1,647	647	3,754
25	3	1,163	322	69	11	2	111	2,878	399	1,838	498	2,837
30	a	825	239	75	18	6	101	2,856	183	1,893	856	4,910
35	19	800	243	88	25	4	111	3,251	125	2,328	1,074	6,161
40	26	774	231	93	29	5	112	3,217	127	2,324	1,126	6,426
45	25	705	222	90	37	11	121	3,625	1.57	2,588	1,395	8,013
50	24	588	224	88	37	11	120	3,486	149	2,563	1,404	8,109
55	19	722	203	82	41	16	119	3,823	215	2,809	1,834	10,542
60	10	568	202	99	47	18	129	4,022	321	2,981	1,948	11,200
65	12	665	196	84	35	13	115	3,581	118	2,644	1,523	8,755
70	7	687	199	97	51	18	135	4,257	216	3,227	2,247	12,868
75	3	511	191	103	55	21	144	4,586	513	3,610	2,657	15,405
80	6	516	192	99	50	23	134	4,407	184	3,309	2,258	13,074

Table 25b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: High Region: Piedmont

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	14.9	5.5	2.7	--	--	--	3.1	--	3.5	3.2	4.0	1.0
15	41.8	--	33.9	21.4	13.8	--	9.3	--	8.8	11.8	9.6	2.3
20	84.1	13.9	77.0	44.1	25.1	15.9	1.0	--	5.6	39.9	18.3	19.3
25	107.6	12.7	88.4	46.2	15.7	6.3	11.9	2.8	40.3	26.7	11.2	14.7
30	110.1	6.9	96.4	68.8	36.1	18.9	7.5	1.0	26.9	27.1	31.8	15.8
35	124.9	5.0	114.1	84.5	44.1	13.7	9.2	0.3	24.8	31.1	44.5	14.9
40	122.7	4.8	111.5	85.7	44.8	13.4	11.4	--	23.2	34.2	37.0	16.9
45	139.4	6.1	128.6	100.9	65.7	29.8	9.0	--	30.4	36.2	49.9	13.9
50	135.7	5.5	128.8	102.6	67.8	30.8	5.1	.7	29.0	32.0	43.0	25.9
55	148.6	8.0	136.7	115.2	84.8	47.8	12.0	--	22.0	40.4	50.1	24.1
60	158.1	12.5	149.8	131.1	94.3	52.5	11.3	--	24.3	33.0	52.1	37.4
65	139.0	4.3	129.1	106.8	72.4	40.1	9.3	--	24.3	32.3	46.4	26.7
70	164.4	7.8	154.6	137.9	109.3	56.4	14.7	--	31.4	52.0	31.6	34.6
75	178.6	17.7	173.5	157.0	123.6	73.1	5.2	--	11.1	77.9	47.7	36.7
80	174.3	5.6	165.5	151.3	117.9	73.1	9.8	--	6.6	42.1	71.4	44.4

Table 26a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: Medium Region: Mountain

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	5	1,276	20	--	--	--	5	404	122	57	--	--
15	4	1,299	50	6			14	656	174	176	35	200
20	--	--	--	--	--	--	--	--	--	--	--	--
25	2	1,535	184	45	14	4	71	2,239	846	1,143	543	3,000
30	7	1,267	232	51	7	2	78	2,079	128	1,203	293	1,666
35	7	1,122	251	58	10	2	94	2,709	290	1,676	528	3,010
40	17	800	233	75	18	4	98	2,748	121	1,838	669	3,862
45	19	879	266	69	20	5	105	2,871	130	1,865	628	3,607
50	16	773	218	75	18	6	99	2,864	113	1,912	706	4,084
55	16	668	249	86	25	4	112	3,136	164	2,063	824	4,752
60	17	772	221	92	31	8	112	3,334	146	2,222	1,044	6,005
65	15	632	219	85	27	8	109	3,105	154	2,187	992	5,794
70	16	710	203	88	38	13	116	3,565	111	2,516	1,419	8,209
75	6	760	230	90	35	11	117	3,291	280	2,250	1,060	6,185
80	13	604	211	84	36	14	120	3,519	190	2,503	1,508	8,626

Table 26b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: Medium Region: Mountain

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	16.6	5.1	2.7	--	-d	--	1.6	0.5	0.7	3.5	4.5	5.7
15	25.6	6.6	11.4	3.9	--	--	0.7	--	.2	11.2	7.4	6.0
20	--	--	--	--	--	--	--	--	--	--	--	--
25	84.8	31.5	64.3	37.4	22.0	9.6	a.4	13.1	--	20.9	28.7	13.7
30	82.6	5.2	62.7	32.6	8.3	2.7	9.2	--	4.2	7.9	41.4	19.8
35	106.4	12.1	88.0	49.0	16.6	6.6	2.8	3.6	.4	23.4	49.5	26.6
40	108.7	4.9	98.0	65.8	30.5	13.3	2.8	2.2	2.3	29.6	51.4	20.5
45	112.0	5.1	100.7	60.2	29.4	10.5	4.6	1.5	1.8	25.3	56.5	22.3
50	114.8	4.6	103.2	70.6	33.4	16.9	2.6	3.0	2.6	18.7	65.4	22.5
55	124.9	6.7	113.5	80.3	40.2	11.4	7.5	3.3	1.9	17.4	75.9	19.0
60	133.7	5.6	121.2	96.1	55.9	22.0	2.2	7.7	1.6	15.9	78.3	28.0
65	124.9	6.1	117.7	91.0	52.7	23.3	3.2	1.9	1.5	12.5	77.1	28.6
70	141.6	4.5	130.8	109.4	74.6	38.4	3.0	6.2	1.8	27.6	77.7	25.3
75	133.2	12.0	125.7	98.5	64.4	29.5	.7	2.2	1.3	11.4	89.8	27.8
80	138.1	7.0	128.9	105.3	72.4	40.7	.5	13.1	.2	29.2	72.6	22.4

Table 27a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: High Region: Mountain

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International k-inch rule
		Number					Square feet	Cubic feet				Board feet
10	1	248	148	35	--	--	49	991	--	519	39	228
15	1	704	103	11	--	--	30	850	--	395	75	440
20	1	1,481	81	19	19	--	38	1,735	--	997	615	3,505
25	2	881	161	66	9	--	66	2,043	456	1,222	525	2,956
30	4	714	249	109	38	6	123	3,604	297	2,619	1,247	7,207
35	3	656	222	103	14	3	105	3,187	315	2,263	891	5,074
40	6	567	240	113	36	11	129	4,030	521	3,042	1,691	9,755
45	3	823	289	108	35	--	126	3,530	635	2,546	1,023	5,889
50	12	829	217	92	28	8	109	3,272	153	2,249	1,112	6,316
55	5	459	206	102	43	12	133	4,181	207	3,097	1,747	10,104
60	5	501	161	78	51	19	122	3,912	290	2,797	1,938	11,283
65	6	599	218	93	46	10	124	3,645	310	2,632	1,420	8,195
70	1	693	193	112	65	31	154	4,640	--	3,534	2,605	15,164
75	--	--	--	--	--	--	--	--	--	--	--	--
80	3	456	202	99	49	18	134	3,875	510	2,444	1,530	8,902

Table 27b.--Average empiric' yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: High Region: Mountain

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	38.6	--	37.8	19.5	--	--	2.1	--	--	21.4	--	15.2
15	34.6	--	26.4	8.0	--	--	--	--	0.2	6.8	22.6	5.1
20	64.4	--	43.6	31.6	31.6	--	--	5.6	--	41.3	--	17.4
25	78.3	22.7	60.0	45.7	13.3	--	11.2	--	--	25.9	24.4	16.8
30	137.2	10.7	124.8	99.4	51.8	12.9	3.3	--	1.8	76.4	21.6	34.0
35	119.4	11.8	105.2	79.9	23.1	8.4	1.6	5.2	.7	74.1	--	37.8
40	153.3	18.3	146.5	124.9	71.2	31.4	2.9	3.6	2.0	77.6	33.5	33.8
45	131.2	24.9	116.2	86.4	39.1	--	6.5	--	3.6	72.4	25.1	23.6
50	127.4	6.1	114.0	89.0	50.9	23.1	2.7	11.0	1.8	33.3	53.5	25.1
55	165.3	10.8	158.9	136.5	91.7	42.7	--	5.6	1.0	53.3	38.0	67.4
60	151.5	11.2	141.6	123.9	102.0	53.0	--	--	.6	60.1	49.6	41.1
65	143.4	12.1	135.4	111.7	78.5	28.7	0.4	8.3	1.3	40.5	69.2	23.6
70	180.4	--	174.8	163.8	134.1	82.9	--	0.8	--	78.0	61.5	40.0
75	--	--	--	--	--	--	--	--	--	--	--	--
80	153.2	20.1	145.8	131.3	97.5	57.4	--	5.3	4.1	20.3	111.1	12.5

Table 28a.--Average empirical yields of timber for fully stocked stands

Type: Oak-gum-cypress Site: Medium Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees	Standard error: 1.0+	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International 1/4-inch rule
	Number						Square feet	Cubic feet				Board feet
10	7	1,202	22	--	--	--	5	350	104	85	--	--
15	7	1,520	27	6	--	--	9	796	225	117	38	197
20	16	2,294	191	29	3	--	52	2,096	226	746	189	991
25	23	2,020	246	46	10	3	85	2,797	237	1,340	445	2,449
30	46	1,566	293	59	13	4	103	3,233	191	1,714	550	3,067
35	62	1,264	308	80	21	6	117	3,421	144	1,959	733	4,098
40	87	1,052	312	96	29	8	136	3,801	128	2,351	1,016	5,668
45	82	973	299	102	28	7	134	3,812	147	2,411	1,042	5,843
50	110	975	304	110	32	9	145	4,052	123	2,530	1,194	6,677
55	79	872	275	111	40	10	145	4,126	142	2,680	1,351	7,616
60	108	886	296	122	41	11	155	4,530	135	3,014	1,603	8,955
65	70	843	310	133	50	15	171	4,800	170	3,225	1,864	10,410
70	63	877	280	139	56	18	174	5,126	216	3,462	2,104	11,788
75	49	877	293	129	55	18	173	4,950	208	3,271	1,928	10,817
80	48	879	280	131	58	21	176	5,062	246	3,468	2,188	12,267

Table 28b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-gum-cypress Site: Medium Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	13.1	3.6	3.8	--	--	--	2.2	0.8	3.8	4.7	0.2	1.4
15	30.9	8.6	6.3	2.5	--	--	3.8	3.5	8.0	8.1	6.7	0.8
20	73.3	8.0	36.0	15.4	3.1	--	5.2	22.2	29.5	15.0	1.2	.2
25	98.7	8.4	66.6	34.6	16.5	9.0	7.9	19.9	38.3	22.7	7.5	2.3
30	113.3	6.7	86.3	46.8	20.7	10.1	5.8	13.4	46.4	29.7	12.6	5.3
35	118.1	4.6	97.4	61.6	30.6	12.7	6.3	18.9	46.3	31.0	11.2	4.3
40	131.4	4.7	115.5	79.1	43.5	20.1	5.1	23.8	54.9	28.7	9.4	9.5
45	132.9	5.2	117.8	83.2	44.2	18.6	4.3	24.8	57.9	20.4	18.9	6.6
50	141.8	4.3	126.6	94.0	51.2	22.5	5.2	23.8	59.0	28.0	13.6	12.1
55	143.9	4.9	130.0	101.1	62.1	25.5	3.4	24.6	67.5	21.7	13.0	13.6
60	159.5	4.9	146.3	115.5	68.8	30.6	5.9	35.0	61.0	25.7	21.2	10.7
65	170.4	6.3	158.7	128.8	82.5	38.8	3.2	41.8	66.1	24.2	21.5	13.5
70	180.9	7.5	169.1	144.2	96.6	50.0	2.4	41.8	70.8	24.8	21.2	19.9
75	174.0	7.5	161.6	134.0	92.1	46.5	1.5	37.3	78.1	25.0	14.2	17.9
80	181.2	9.6	170.6	145.5	103.9	58.4	3.1	39.0	82.9	24.5	21.3	10.5

Table 29a.--Average empirical yields of timber for fully stocked stands

Type: Oak-gum-cypress Site: High Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches) 1.0+	5.0+	9.0+	13.0+	17.0+	Basal area per acre trees 5.0+ inches	Volume per acre: Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber: Saw-log portion	Sawtimber: International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	6	1,499	18	13	--	--	9	597	162	198	63	346
15	3	1,143	177	26	4	--	46	1,559	1,056	811	225	1,187
20	2	1,443	213	41	13	6	83	2,266	318	1,414	738	4,266
25	6	1,319	272	61	22	5	103	3,198	200	2,013	744	4,177
30	18	1,203	278	87	28	6	118	3,630	192	2,290	1,032	5,895
35	34	765	249	98	28	8	123	3,704	144	2,552	1,215	6,873
40	45	799	262	115	38	12	144	4,306	209	2,935	1,582	8,966
45	42	812	244	108	43	12	139	4,325	177	2,997	1,653	9,469
50	53	765	251	115	47	14	148	4,614	160	3,255	1,940	11,033
55	18	737	210	108	49	17	139	4,338	203	3,105	1,937	11,050
60	40	753	265	117	51	15	156	4,737	190	3,298	2,020	11,486
65	21	674	215	110	55	19	153	4,846	305	3,345	2,257	12,978
70	22	738	257	130	63	22	174	5,545	394	3,942	2,682	15,154
75	13	780	235	125	63	31	182	5,729	650	4,050	2,979	16,708
80	19	596	201	99	54	29	159	4,974	321	3,474	2,603	14,747

Table 29b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-gum-cypress Site: High Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	23.4	6.0	8.9	7.8	--	--	2.6	--	8.2	7.1	5.0	0.5
15	58.9	39.0	39.2	16.5	5.2	--	10.5	--	30.2	9.4	8.6	.1
20	84.8	6.0	69.4	45.0	26.4	17.0	3.6	--	13.8	33.5	28.7	5.1
25	118.8	8.0	96.7	54.3	30.3	11.9	12.9	--	57.3	19.5	26.2	2.9
30	130.1	7.2	108.3	77.2	42.4	14.7	7.4	0.3	54.5	49.0	13.6	5.3
35	133.6	5.1	121.4	91.9	47.0	21.2	9.3	5.9	51.3	42.3	16.4	8.4
40	153.7	7.6	142.1	115.2	67.3	34.7	5.7	12.4	71.4	40.2	13.6	10.4
45	159.2	6.5	147.3	119.9	77.2	34.8	6.9	3.9	65.7	36.1	35.3	11.4
50	167.0	6.1	155.7	130.9	85.9	41.2	8.5	10.8	68.5	42.2	26.8	10.2
55	159.6	7.9	149.1	128.7	91.5	47.0	11.9	4.6	65.4	36.7	32.5	8.5
60	173.0	6.9	163.4	137.2	96.3	47.3	7.9	11.7	77.8	35.4	28.1	12.1
65	177.4	10.3	169.2	149.9	113.5	63.6	5.3	6.8	77.5	27.3	43.8	16.6
70	199.2	14.3	190.8	167.9	124.6	68.0	7.0	28.3	108.7	23.0	14.2	18.0
75	214.0	27.4	203.9	182.9	144.7	102.1	7.5	38.4	99.0	28.1	26.4	14.6
80	187.4	14.3	178.0	160.3	135.0	99.0	3.4	24.2	93.0	32.7	24.3	9.9

Table 30a.--Average empirical yields of timber for fully stocked stands

Type: Natural yellow pine Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
								Total aboveground trees 1.0+	Standard error	Crowing stock	Sawtimber	
		1.0+	5.0+	9.0+	13.0+	17.0+					Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	58	1,220	69	--	--	--	14	683	68	158	--	--
15	97	1,420	167	13	--	--	41	1,341	78	566	71	378
20	166	1,475	245	27	2	--	66	1,975	55	1,005	221	1,171
25	267	1,075	292	55	7	1	94	2,612	50	1,704	662	3,505
30	326	972	284	77	13	2	106	2,963	54	2,112	1,061	5,616
35	278	988	283	85	17	2	111	3,225	61	2,348	1,292	6,841
40	247	841	261	92	22	3	114	3,384	71	2,555	1,573	8,337
45	175	818	245	98	27	4	115	3,481	82	2,679	1,825	9,670
50	102	813	241	104	31	6	119	3,811	121	2,979	2,153	11,410
55	65	816	237	113	33	5	124	3,895	126	3,008	2,207	11,703
60	48	1,006	232	100	28	5	114	3,530	140	2,689	1,981	10,498
65	26	829	230	109	40	8	128	4,180	296	3,315	2,582	13,699
70	15	683	203	116	37	4	122	3,853	215	3,141	2,515	13,317
75	10	788	172	123	54	11	133	4,703	483	3,853	3,551	18,785
80	10	1,027	251	119	46	6	137	4,279	582	3,345	2,522	13,363

Table 30b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural yellow pine Site: All sites Region: Southeast

Stand age (years)	Total	Standard error	D.b.h. class (inches) 1.0+	5.0+	9.0+	13.0+	17.0+	Species group: Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre												
10	25.0	2.5	9.3	--	--	--		22.6	0.2	0.5	0.6	0.6	0.5
15	49.3	2.8	28.6	5.3	--	--		44.4	.2	1.7	1.0	1.4	.5
20	13.0	2.0	49.4	13.7	2.2	--		64.7	.5	2.6	1.8	2.1	1.3
25	97.2	1.9	80.2	36.2	9.9	2.7		87.6	1.0	2.8	2.3	2.5	1.0
30	110.3	2.0	96.6	56.1	17.9	4.3		98.3	.6	4.3	2.9	2.9	1.3
35	119.7	2.3	105.8	66.8	23.4	4.6		106.2	.6	4.4	3.5	3.3	1.6
40	125.7	2.6	114.0	79.3	32.7	7.7		109.6	1.2	5.2	3.3	4.1	2.3
45	129.3	3.0	118.8	89.6	41.4	10.6		113.9	.7	5.0	4.0	4.2	1.5
50	141	.a	4.5	131.0	103.5	52.1	14.5	124.1	1.2	5.5	4.1	4.2	2.6
55	143.9	4.4	133.1	108.3	51.5	12.6		123.1	1.1	6.3	4.4	5.7	3.4
60	130.9	5.2	118.2	93.8	47.5	14.6		110.7	.6	5.4	5.6	5.7	2.9
65	155.0	11.3	145.6	120.7	72.1	23.3		131.0	.4	5.5	4.9	9.9	3.3
70	145.5	a.7	138.0	119.2	58.1	10.3		132.4	.7	4.5	1.6	4.2	2.2
75	172.8	17.1	165.4	155.7	102.9	38.4		154.4	.3	7.1	4.2	2.3	4.5
80	156.3	20.3	145.5	120.3	71.2	16.0		124.2	10.0	4.6	11.4	3.3	2.8

Table 31a.--Average empirical yields of timber for fully stocked stands

Type: Planted yellow pine Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	238	944	78	--	--	--	14	629	30	142	--	--
15	243	893	244	9			55	1,472	46	745	62	329
20	298	793	327	27	1	--	86	2,168	51	1,390	224	1,183
25	167	626	333	60	3	--	106	2,686	67	1,973	604	3,191
30	33	525	279	100	10	--	112	2,976	160	2,326	1,165	6,157
35	11	680	267	84	18	1	107	3,030	326	2,265	1,376	7,277
40	10	517	211	110	37	2	117	3,659	359	2,990	2,355	12,452
45			--	--			--	--	--	--	--	
50					--	--	--		--	--		--
55	--	--							--	--		
60					--	--	--		--	--		
65	--	--	--	--				--				
70					--	--	--	--			--	--
75	--	--							--	--		
80	--	--	--	--	--	--						

Table 31b.--Average empirical yields of forest biomass for fully stocked stands

Type: Planted yellow pine Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	22.6	1.1	7.9	--	--	--	21.3	--	0.4	0.3	0.5	0.2
15	54.4	1.7	38.0	4.1	--	--	52.4	0.1	.4	.5	.8	.2
20	81.6	1.9	68.2	13.8	1.1	--	18.5	.1	.7	.5	1.6	.3
25	101.5	2.5	93.3	35.5	3.3	0.3	98.8	--	.9	.3	1.2	[illegible]
30	111.5	5.8	105.0	64.3	12.0	.5	107.9	.7	1.7	.6	.3	.3
35	113.7	12.4	103.5	69.7	23.2	2.0	109.8	--	.8	.5	1.4	1.1
40	139.9	14.0	134.3	113.8	53.0	5.1	131.8	--	1.7	1.0	5.0	.3
45	--	--	--	--	--	--	--	--	--	--	--	--
50				--	--	--	--	--	--	--	--	--
55				--	--	--	--	--	--	--	--	--
60				--	--	--	--	--	--	--	--	--
65				--	--	--	--	--	--	--	--	--
70				--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--

Table 32a.--Average empirical yields of timber for fully stocked stands

Type: Natural oak-pine Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International &inch rule
	Number						Square feet	Cubic feet				Board feet
10	23	939	39	--	--	--	9	433	72	112	--	--
15	25	1,338	97	13	--	--	26	951	100	388	74	397
20	36	1,591	203	30	4	--	61	1,984	100	995	257	1,412
25	39	1,361	205	38	9	1	68	2,014	124	1,106	406	2,188
30	73	1,172	246	60	16	4	92	2,672	105	1,729	806	4,368
35	75	1,095	235	66	17	4	95	2,807	107	1,797	896	4,878
40	83	1,032	229	69	19	5	97	2,913	97	1,953	1,028	5,592
45	73	944	236	78	24	7	107	3,155	90	2,189	1,219	6,693
50	67	958	241	90	26	7	114	3,477	114	2,415	1,393	7,591
55	49	875	212	81	28	7	106	3,268	142	2,315	1,390	7,617
60	47	943	230	85	30	8	112	3,462	148	2,342	1,460	7,965
65	22	994	202	84	34	10	114	3,549	217	2,442	1,705	9,353
70	31	746	221	86	37	15	124	3,900	194	2,877	2,126	11,667
75	11	788	181	85	38	9	107	3,332	219	2,410	1,784	9,721
80	13	969	217	93	37	11	121	3,897	331	2,805	1,919	10,537

Table 32b.--Average empirical yields of forest biomass for fully stocked stands

Type: Natural oak-pine Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	D.b.h. Standard error	class (inches) 5.0+	9.0+	13.0+	17.0+	Species group: Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	16.5	2.7	5.5	--	--	--	5.9	0.7	4.9	1.6	2.0	1.5
15	36.2	3.8	19.5	6.7	--	--	14.0	1.8	8.0	4.3	5.7	2.4
20	74.3	3.7	50.0	19.3	5.5	--	29.0	4.4	9.4	13.7	14.0	3.9
25	75.3	4.5	55.7	26.7	10.9	2.7	31.4	3.2	12.8	8.3	14.4	5.2
30	99.8	3.8	83.0	49.7	23.6	8.8	41.2	1.9	19.9	12.0	19.7	5.1
35	104.7	3.9	88.2	57.1	27.5	10.7	39.4	5.6	18.7	11.5	22.6	6.9
40	109.6	3.6	94.1	63.4	31.7	12.6	41.7	4.2	14.9	12.9	29.2	6.7
45	118.6	3.3	105.5	75.4	42.5	19.3	43.0	4.9	17.9	14.1	30.9	7.9
50	129.3	4.2	114.3	85.3	45.1	18.5	46.7	7.0	25.0	16.3	25.1	9.3
55	123.6	5	110.6	84.8	49.1	19.9	41.2	6.5	14.9	16.9	34.9	9.2
60	129.9	5:;	115.4	88.1	52.7	21.5	48.2	5.1	21.9	13.2	32.1	9.4
65	134.6	8.3	119.4	96.7	64.9	31.8	44.1	11.1	19.8	14.3	39.0	6.3
70	147.4	7.0	137.1	113.3	81.2	48.6	53.8	5.0	24.6	20.2	34.7	9.0
75	127.8	8.2	119.0	101.3	69.4	26.4	51.1	4.7	12.0	11.2	38.5	10.3
80	145.0	12.7	131.6	108.8	72.1	34.4	51.0	8.0	22.9	27.4	28.8	6.9

Table 33a.--Average empirical yields of timber for fully stocked stands

Type: Oak-hickory Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
	Number						Square feet	Cubic feet				Board feet
10	34	967	35	--	--	--	8	359	53	97	--	--
15	50	1,160	86	11	--	--	23	857	86	306	40	227
20	24	1,505	119	21	5	--	38	1,434	107	579	153	872
25	43	1,345	199	43	7	2	68	2,125	77	1,159	339	1,910
30	85	1,185	217	50	12	3	79	2,377	79	1,422	494	2,825
35	76	1,036	220	66	17	4	92	2,764	97	1,781	732	4,188
40	132	828	232	79	23	5	104	3,032	71	2,051	896	5,142
45	121	828	236	79	25	6	107	3,149	81	2,135	940	5,392
50	121	774	226	82	25	7	107	3,150	66	2,165	985	5,674
55	109	695	216	85	33	10	114	3,440	81	2,427	1,332	7,656
60	91	680	206	91	35	11	116	3,543	86	2,515	1,426	8,218
65	65	643	205	85	33	10	111	3,300	90	2,361	1,263	7,311
70	79	635	185	91	39	13	116	3,588	103	2,581	1,558	9,032
75	39	691	199	90	39	14	120	3,783	149	2,708	1,636	9,486
80	45	568	185	90	45	18	128	3,973	126	2,856	1,908	11,010

Table 33b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-hickory Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches) 5.0+	9.0+	13.0+	17.0+	Species group: Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	14.6	2.1	5.4	--	--	--	2.5	0.1	1.5	2.5	6.1	1.9
15	33.5	3.2	18.5	6.4	--	--	3.0	.6	5.3	8.7	11.6	4.4
20	56.4	3.9	31.2	14.9	5.8	--	4.3	.2	4.9	15.4	24.5	7.1
25	82.7	2.9	61.4	32.0	11.1	4.0	9.5	1.6	13.9	14.4	32.4	10.8
30	92.6	2.9	73.9	42.6	19.4	8.5	8.8	.4	13.4	18.4	39.2	12.5
35	107.0	3.6	91.5	61.3	29.8	11.1	7.5	.8	17.4	25.5	40.2	15.6
40	118.0	2.6	105.5	75.3	38.9	15.3	7.8	.6	16.1	25.3	51.0	17.1
45	122.9	3.1	110.5	78.6	43.0	17.1	8.4	1.0	15.4	25.4	56.8	15.9
50	124.0	2.6	112.3	82.4	45.1	19.4	6.4	2.1	13.7	22.6	60.1	19.1
55	135.3	3.0	125.6	99.7	63.8	30.9	10.6	1.4	16.3	25.3	63.5	18.2
60	139.8	3.2	129.9	107.3	69.0	33.9	7.2	2.4	16.1	23.7	67.8	22.5
65	130.8	3.4	122.7	99.5	64.1	30.1	5.0	2.0	11.6	23.2	63.7	25.2
70	142.9	4.1	134.3	116.1	80.9	40.5	5.9	2.1	12.8	22.3	75.5	24.4
75	151.6	5.9	142.5	120.9	84.9	45.4	6.0	1.1	16.6	22.1	80.9	24.9
80	157.6	5.1	150.1	132.8	102.0	61.7	5.1	6.2	12.2	24.9	81.0	28.2

Table 34a.--Average empirical yields of timber for fully stocked stands

Type: Oak-gum-cypress Site: All sites Region: Southeast

Stand age (years)	Sample plots	Live trees per acre, by d.b.h. class (inches)					Basal area per acre, trees 5.0+ inches	Volume per acre				
		1.0+	5.0+	9.0+	13.0+	17.0+		Total aboveground trees 1.0+	Standard error	Growing stock	Sawtimber	
											Saw-log portion	International ¼-inch rule
		Number					Square feet	Cubic feet				Board feet
10	13	1,343	15	--	--	--	3	374	121	52	--	--
15	14	1,614	60	6	--	--	14	1,001	197	190	49	257
20	27	2,511	159	25	4	--	45	1,927	194	647	188	986
25	42	2,045	231	43	11	4	80	2,774	192	1,321	474	2,607
30	84	1,643	292	62	15	4	103	3,213	135	1,723	599	3,360
35	106	1,123	289	82	22	6	117	3,448	106	2,096	855	4,796
40	153	1,050	293	96	29	8	133	3,828	112	2,395	1,108	6,210
45	133	962	276	101	32	8	132	3,874	117	2,519	1,196	6,761
50	182	941	292	109	35	10	144	4,138	96	2,679	1,370	7,700
55	116	880	273	108	39	10	142	4,075	117	2,652	1,369	7,713
60	158	861	286	119	43	12	154	4,537	108	3,043	1,690	9,476
65	104	825	294	121	47	14	162	4,634	139	3,107	1,828	10,264
70	99	917	287	130	54	18	170	5,023	178	3,349	2,056	11,530
75	69	915	282	128	53	19	171	4,986	208	3,327	2,019	11,314
80	82	889	270	121	52	21	168	4,864	185	3,266	2,101	11,778

Table 34b.--Average empirical yields of forest biomass for fully stocked stands

Type: Oak-gum-cypress Site: All sites Region: Southeast

Stand age (years)	Total 1.0+	Standard error	D.b.h. class (inches)				Species group					
			5.0+	9.0+	13.0+	17.0+	Yellow pines	Other softwood	Gums	Soft hardwood	Oaks	Hard hardwood
	Green tons per acre											
10	14.3	4.6	2.3	--	—	—	1.5	0.6	7.4	3.5	0.6	0.8
15	37.6	7.2	9.6	3.1	--	--	3.9	1.9	17.2	9.7	4.5	.5
20	67.6	6.6	31.8	14.4	3.9	--	4.0	22.7	25.0	13.6	2.3	.1
25	98.3	6.7	64.8	34.6	17.4	8.8	7.9	16.8	39.4	23.7	8.7	1.8
30	111.9	4.8	84.3	48.5	22.7	9.4	5.0	14.1	48.0	29.9	10.2	4.6
35	120.3	3.6	101.9	68.2	33.9	14.6	7.4	16.9	46.1	32.5	11.9	5.6
40	133.3	4.1	117.0	84.0	46.4	22.3	4.8	22.9	56.4	30.8	9.8	8.5
45	137.5	4.3	123.2	91.7	52.6	22.8	4.9	19.0	58.2	24.3	23.0	8.1
50	145.7	3.5	131.3	100.8	58.8	26.5	6.2	23.0	58.6	30.3	16.2	11.4
55	142.4	4.2	128.8	100.4	61.9	27.2	4.7	26.3	61.7	23.3	15.0	11.5
60	161.1	4.0	148.7	119.2	74.6	34.5	6.3	30.2	64.0	27.9	21.9	10.9
65	164.5	5.2	153.5	124.3	82.5	41.0	3.3	37.8	62.7	23.0	24.6	13.1
70	177.6	6.4	165.3	138.5	94.8	49.4	3.5	40.8	74.7	22.1	17.8	18.8
75	177.0	8.0	164.1	137.5	95.4	53.2	2.6	38.1	80.4	24.3	15.5	16.0
80	174.4	7.4	162.9	138.4	99.8	60.9	3.5	40.5	79.0	23.6	18.1	9.9

McClure, Joe P.; Knight, Herbert A.
Empricial yields of timber and forest biomass in the Southeast. Res. Pap. SE-245. Asheville, NC: U.S. Department of Argiculture, Forest Service, Southeastern Forest Experiment Station; 1984. 75 p.

Measurements and classifications recorded at 24,775 Forest Survey plots established randomly throughout the Southeast comprise a vast source of information on timber stand development. Raw, empricial yield tables developed from this source are reported for major forest types in the Region. These tables also serve as guides to yields of forest biomass by tree size and species group.

KEYWORDS: Southeast, yield tables, forest biomass.

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