



United States
Department of
Agriculture

Forest Service

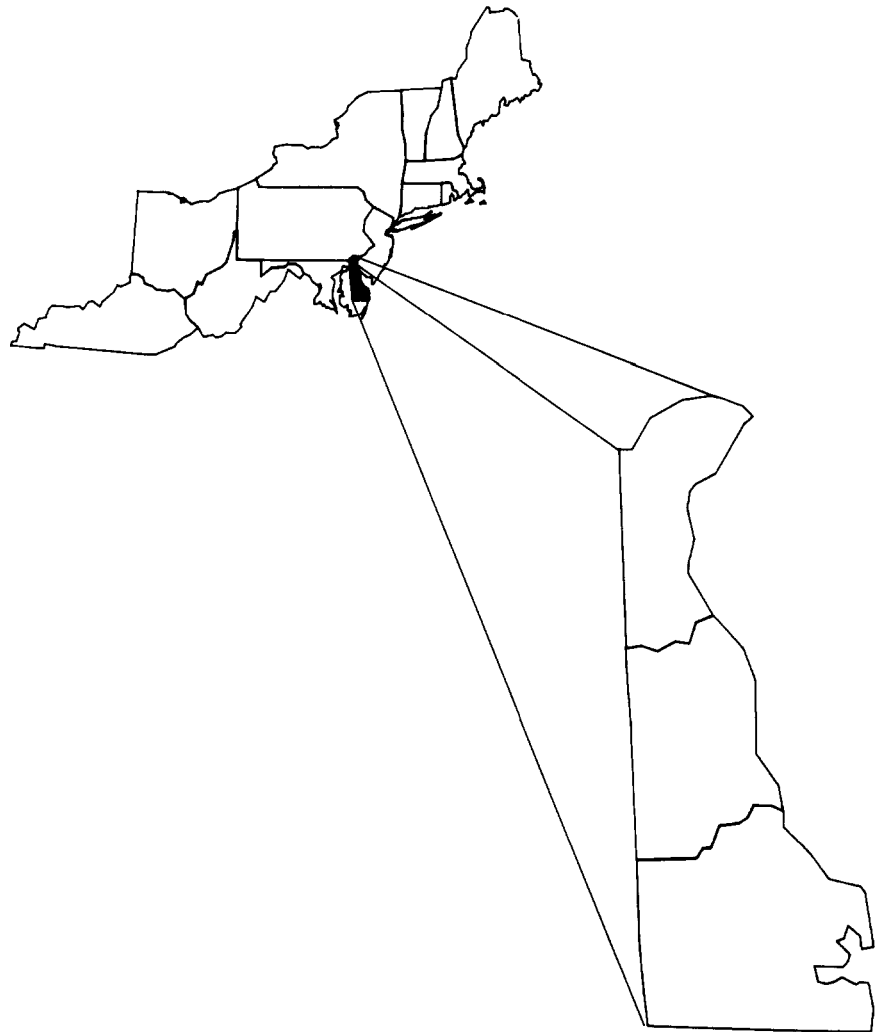
**Northeastern Forest
Experiment Station**

Resource Bulletin NE-109



Forest Statistics for Delaware — 1972 and 1986

Thomas S. Frieswyk
Dawn M. DiGiovanni



Abstract

A statistical report on the third forest survey of Delaware conducted in 1985-86 by the Forest Inventory and Analysis Unit, Northeastern Forest Experiment Station. Statistics for forest area, numbers of trees, timber volume, tree biomass, average annual growth and timber products output are displayed at the state and county levels. The current inventory indicates that the state has approximately 643.9 million cubic feet of growing-stock volume, or 39.0 million tons of net green weight of live trees, on 376,400 acres of timberland. For use in trend analysis, this report includes estimates derived from reprocessing the 1972 data using current methods and standards.

Foreword

The third inventory of Delaware was under the overall direction of John R. Peters, Project Leader of the Forest Inventory and Analysis Unit. Thomas W. Birch assisted in the development and administration of the operating plan. Charles T. Scott was responsible for the design of the inventory and sample selection. David J. Alerich supervised the interpretation of aerial photos and collection of data. He was assisted by Joseph G. Reddan. Members of the field staff were:

Theresa Arre	Michael J. Longo
Vanessa Artman-Bailey	Frank M. Lopez
Dawn M. DiGiovanni	Wayne C. Noll
Thomas V. Gabriel	Glen A. Onusseit
David W. Guest	Stephen C. Parrett
Robert E. Ilgenfritz	Jennifer L. Quinn
Ann K. Kessler	James E. Semp
Wayne R. Kettlewood	Jonathan W. Spencer
Melanie Leavitt	

Thomas S. Frieswyk and Dawn M. DiGiovanni applied FINSYS (Forest INventory SYStem), a generalized data processing system, to the specific needs of the Delaware inventory and produced summary tables for the state and counties. Thomas W. Birch and Dawn M. DiGiovanni were instrumental in assuring that the area estimates were consistent with the two previous inventories. Rosemary K. Venit produced graphics and was involved in rewriting parts of the FINSYS table generating routine.

Robert L. Nevel, Jr., Richard H. Widmann, and Eric H. Wharton, with the assistance of the Delaware Department of Agriculture, Forestry Section, collected and compiled the data on timber products output and timber removals.

Marie Pennestri was responsible for administrative and secretarial services. Carmela M. Hyland typed the text for this report.

The Forest Inventory and Analysis Unit would like to thank the landowners of Delaware for their cooperation and assistance during this inventory.

Forest Statistics for Delaware--1972 and 1986

The Authors

Thomas S. Frieswyk, forester, Forest Inventory
and Analysis Unit, Northeastern Forest
Experiment Station, USDA Forest Service,
Broomall, PA.

Dawn M. DiGiovanni, forester, Forest Inventory
and Analysis Unit, Northeastern Forest
Experiment Station, USDA Forest Service,
Broomall, PA.

Manuscript received for publication 20 August 1988

Northeastern Forest Experiment Station
370 Reed Road, Broomall, PA 19008

February 1989

Contents

Highlights	1
Forest Area	1
Biomass	1
Timber Volume	2
Growth/Removals	2
Introduction	3
Reliability of the Estimates	3
Comparison Between Inventories	4
Definition of Terms	5
References	12
Oaks of the Northeast	13
Tree Species of Delaware	14
Ecological Importance and Relative Distribution of Lesser Woody-Stemmed Species, Delaware	16
Log Grade Classification	19
Metric Equivalents	22
Index to Tables	23
State	23
County	25
Core Table Cross-Reference	26

Highlights

- * The report contains both 1986 tables and updated 1972 tables.

Forest Area

- * Delaware, with 389,500 acres of forest land, is 31.5 percent forested.
- * Ninety-seven percent of Delaware's forest land, 376,400 acres, is classified as timberland (formerly known as commercial forest land).
- * There was a slight decrease in both forest land and land classified as timberland.
- * The area of sawtimber stands has increased 12.1 percent since the 1972 inventory; sawtimber stands now total 237,900 acres or 63 percent of the timberland. An 11.7 percent decrease in the area of seedling and sapling stands has reduced these stands to 68,800 acres, or 18 percent of the timberland.
- * Oak/hickory is the dominant forest-type group occupying 42 percent of the timberland and accounting for 36 percent of the growing-stock volume.
- * Ninety-six percent of Delaware's timberland is privately owned.

Biomass

- * Dry weight tables are available for the first time.
- * The net green weight of all live trees on timberland is 38.9 million tons or 103.3 tons per acre. Softwoods account for 8.1 million tons or 21.5 tons per acre; hardwoods account for 30.8 million tons or 81.8 tons per acre.
- * A little more than 23.6 million tons, or 60.1 percent of the net green weight of all live trees, is in growing-stock material. Of the remaining 15.3 million tons of all-live-tree weight, 54 percent is in growing-stock tops, 32 percent is in saplings, and 14 percent is in cull trees.
- * An additional 1.7 million tons of biomass is contained in salvable dead trees.
- * The net dry weight of all live trees on timberland is 21.7 million tons or an average of 57.7 tons per acre. Softwoods account for 3.6 million tons or 9.6 tons per acre; hardwoods account for 18.1 million tons or 48.1 tons per acre.

Timber Volume

- * Growing-stock volume is 643.9 million cubic feet, an average of 1,711 cubic feet per acre. This is a 10.3 percent increase over the 1972 inventory.
- * Sawtimber volume is 1,787 million board feet, an average of 4,748 board feet per acre. This is a 16.6 percent increase over the 1972 survey.
- * Although loblolly pine growing-stock volume decreased 11.3 percent between inventories, it remains the number one species. With 143.1 million cubic feet, loblolly pine accounts for over 22.2 percent of the growing-stock volume.

Growth/Removals

- * Annual net growth of growing-stock volume in Delaware is 2.1 percent of the inventory.
- * Average annual net growth of growing-stock volume for all species exceeded removals on a statewide basis (1.4:1); however, for softwoods, removals exceeded growth by a ratio of 1.1:1.

Introduction

Under the authority of the McSweeney-McNary Forest Research Act of 1928 and subsequent acts, including the Renewable Resources Planning Act of 1974 and the Renewable Resources Research Act of 1978, the USDA Forest Service conducts periodic forest inventories of all states to provide up-to-date information on the forest resource of the Nation. The initial inventory of Delaware's resources was conducted in 1956. The second inventory was completed in 1971. This report presents the forest resource data from the third inventory completed in 1986. This inventory involved a cooperative effort of the Delaware Department of Agriculture, Forestry Section, the USDA Soil Conservation Service, and the Northeastern Forest Experiment Station.

The Forest Inventory and Analysis Unit of the Northeastern Forest Experiment Station conducted the inventory on all forest land, developed the resource tables, and prepared this report.

The sampling procedure used during the current resurvey utilized aerial photography, the remeasurement of a sample of the ground plots established in the earlier inventories, and establishment of new ground plots. In Delaware this required remeasurement of 122 (80 forest and 42 nonforest) plots from the earlier inventories, classification of 3,670 new points, and reclassification of 122 points from the second survey on aerial photographs into land-use and cubic-foot volume classes, and establishment of 118 (66 forest and 52 nonforest) new ground plot locations as a subsample of the new photo points. The data collected were summarized using the FINSYS computer system developed at the Northeastern Forest Experiment Station.

The resurvey of Delaware's forest resources involved several associated studies and considerable analysis. Reports discussing the State's private forest-land owners and its primary forest products industry are being prepared. Additional reports will also be published containing detailed 1986 biomass and wildlife statistics.

The forest area, numbers of trees, timber volume, biomass, and growth statistics shown in this report are but a summary of the information collect-

ed. Other information or additional summaries may be developed. For information about these, contact the Forest Inventory and Analysis Unit, USDA Forest Service, 370 Reed Road, Broomall, PA 19008 (phone 215-690-3037).

The four eastern Forest Experiment Stations have agreed to include a set of 25 core tables in each of their state resource bulletins. The format of any one of these tables will be identical for all 37 states in the Stations' territories. Rather than being grouped as a set, these core tables have been interspersed throughout this publication according to their level of data and content. A list of the core table numbers and their corresponding numbers as presented in this publication follows the index of tables.

Reliability of the Estimates

The data in this report were based on a carefully designed sample of forest conditions throughout Delaware. However, because the field crews did not measure every tree or every acre in the state, the data are estimates. The reliability of the estimating procedure can be judged by two important statistical measures: accuracy and precision. Among statisticians, accuracy refers to the success of estimating the true value, precision refers to the clustering of sample values about their own averages or to the variation among repeated samples. We are mainly interested in the accuracy of the inventory, but in most cases we can only measure its precision.

Although accuracy cannot be measured exactly, it can be checked. Preliminary tables are sent to other agencies and to outside experts familiar with the resources of Delaware. If questions arise, the data are reviewed and reanalyzed to resolve the differences. Also, great care is taken to keep all sources of procedural error to a minimum by careful training of both field and office personnel, frequent inspection of field and office work, and application of the most reliable inventory methods.

Because of the care exercised in the inventory process, estimates of precision afford a reasonable measure of the inventory's adequacy. The precision of each estimate is described by its sampling error. Sampling errors are given with

several tables in this report. The others are available upon request.

Briefly, here is an example of how the sampling error is used to indicate reliability: The estimate of timberland for Delaware is 376,387 acres. Its sampling error is 3.0 percent, or 11,292 acres. This means that if there are no errors in the procedure and we repeated the inventory in the same way, the odds are 2 to 1 (66 percent probability) that the estimate would be between 365,095 and 387,679 acres ($376,387 \pm 11,292$). Similarly, the odds are 19 to 1 (95 percent probability) that the estimate would be within $\pm 22,583$ acres. It is worth noting that the state estimates have the smallest sampling errors and therefore are the most precise or reliable. County estimates are less reliable. In Delaware for example, the sampling error for the state area tables is 3.0 percent; while the sampling error for Kent/New Castle County is 5.3 percent. Thus, county-level estimates are often considerably less reliable than state-level estimates. In general, as the size of the estimate decreases in relation to the total, the sampling error, expressed as a percentage of the estimate, increases.

Comparison Between Inventories

To evaluate the condition of the forest resource, it is useful to compare the current estimates with those from the previous inventory. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency of the inventory, we have made several changes in procedures and definitions since 1972.

Because these changes make the direct comparison of the 1986 estimates with those published by Ferguson and Mayer (1974) inappropriate, data collected in 1972 have been reprocessed using the 1986 procedures and standards. State tables containing the recalculated 1972 data have been included in this report. The tables provide area and volume data for comparison and trend analysis. They are printed in italic type to distinguish them from the current tables. Tables of recalculated data at the county level could not be provided because plots were selected at the state level in 1972; therefore, individual counties

do not have enough plots to develop statistically sound data. The changes that have had an effect on the results of our computations follow:

A major change was made in the design of the plots established in 1985-86. In addition to the traditional data gathered to estimate forest area and tree volumes, information was collected to describe forest wildlife habitat, forest soils, and forest tree biomass.

New height and volume equations were developed for both growing stock and sawtimber (Scott 1979, 1981). These equations are derived by nonlinear regression techniques; in 1972 linear regression was used. The nonlinear method is used because it yields estimates with smaller errors between predicted and actual values.

Stand size is a classification of forest land based on the size of the trees that dominate an area, i.e., seedling/sapling, poletimber, sawtimber, or non-stocked. In the 1972 inventory only growing-stock trees were considered in determining stand size; the 1986 procedure considers all live trees. This change caused a shift in acres among classes, especially between seedling/sapling and poletimber.

The procedures used to determine forest type have also been modified. In 1972, plots on which red maple made up the plurality of stocking were put into the oak/gum/red maple group. In 1986, such plots were examined more closely and according to their moisture class and the other species present, were placed in either the northern hardwoods group (red maple/northern hardwoods), oak/hickory group (red maple/central hardwoods), or elm/ash/red maple group.

The basic building block for estimating forest area and timber volume has been changed from the state level or geographic-unit level, to the county level. In the past, the statistics were developed at the state or unit level and prorated back to the county level on the basis of distribution of photo-interpretation points. Direct development of county-level data helps users interested in more precise

local data, but can make comparisons with past county estimates developed by the pro-ratation technique uncertain.

Definition of Terms

Acceptable tree. (a) Live sawtimber trees that do not qualify as preferred trees but are not cull trees. (b) Live poletimber trees that prospectively will not qualify as preferred trees, but are not now or prospectively cull trees.

Accretion. The estimated net growth on growing-stock trees that were measured during the previous inventory, divided by the number of growing seasons between surveys. It does not include the growth on trees that were cut during the period, nor those trees that died.

Agricultural/herbaceous land. Land with herbaceous plant cover, both grasses and/or forbs, including cropland, pasture land, and natural grass lands.

Aquatic edge. An edge condition created when a terrestrial land use abuts a lake, pond, river, stream, or major wetland.

Basal area class. A classification of forest land in terms of basal area (cross sectional area of a tree stem at breast height in square feet per acre) of all live trees of all sizes.

Board foot. A unit of lumber measurement 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent.

Board-foot stand-volume class. A classification of forest land in terms of net board-foot volume of sawtimber trees per acre.

Bog/Marsh/Swamp. Land that has less than 10.0 percent stocking with live trees; and which characteristically supports low, generally herbaceous or shrubby vegetation, and which is intermittently covered with water during all seasons; includes tidal areas that are covered with salty or brackish water during high tides.

Browse. Forage resource; defined here as current twig growth of woody-stemmed plants occurring between 1 and 8 feet in height.

Cabin log. A relatively slender roundwood product that is cut to standard sizes; meets specifications of strength, straightness, and soundness; and is finished for use in constructing cabins, barns, and other buildings.

Coarse residues. Manufacturing residues suitable for chipping, such as slabs, edgings, and veneer cores.

Commercial species. Tree species presently or prospectively suitable for industrial wood products. Excludes species of typically small size, poor form, or inferior quality, such as hawthorn or sumac.

Condition class. Classification of trees based on live or dead and condition of top of the tree (i.e. intact, broken, dead).

Cord. See Standard cord.

County and municipal lands. Lands owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

Cropland. Land that currently supports agricultural crops including silage and feed grains, bare farm fields resulting from cultivation or harvest, and maintained orchards.

Cubic-foot stand-volume class. A classification of forest land in terms of net cubic-foot volume of all live trees per acre.

Cull tree. A rough tree or a rotten tree.

Cull increment. The net volume of growing-stock trees on the previous inventory that became rough or rotten trees in the current inventory, divided by the number of growing seasons between surveys.

Cultural land. Land with human development as the major land cover; includes industrial, commercial, and residential land uses.

Diameter at breast height (d.b.h.). The diameter outside bark of a standing tree measured at 4-1/2 feet above the ground.

Dry weight. The weight of wood and bark, oven-dry basis. It is usually expressed in pounds or tons.

Farmer-owned lands. Lands owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from non-farm owners.

Federal lands. Lands (other than National Forests) administered by Federal agencies.

Fine residues. Manufacturing residues not suitable for chipping, such as sawdust and shavings.

Forest industry lands. Lands owned by companies or individuals that operate primary wood-using plants.

Forest land. Land that is at least 10 percent stocked with trees of any size, or that formerly had such tree cover and is not currently developed for a nonforest use. The minimum area for classification of forest land is 1 acre.

Forest type. A classification of forest land based on the species that form a plurality of live tree basal area stocking.

Forest-type group. A combination of forest types that share closely associated species or site requirements. The many forest types in Delaware were combined into the following major forest-type groups (the descriptions apply to forests in Delaware):

a. *White/red pine*--forests in which white pine, hemlock, or red pine make up the plurality of the stocking, singly or in combination; common associates include maple, oak, and yellow-poplar.

b. *Spruce/fir*--forests in which red spruce, northern white-cedar, balsam fir, white spruce, black spruce, or tamarack, singly or in combination, make up a plurality of the stocking; common associates include paper birch, red maple, aspen, white pine, hemlock, and sugar maple.

c. *Loblolly/shortleaf pine group*--forests in which loblolly, shortleaf or other southern yellow pines (except longleaf or slash pine) singly or in combination, comprise a plurality of the stocking; common associates include oaks, red maple, and blackgum.

d. *Oak/pine*--forests in which northern red oak or white ash, singly or in combination, make up a plurality of the stocking but where pines or eastern redcedar contribute 25 to 50 percent of the stocking; Virginia and loblolly pine, southern red oak, hickory, and blackgum are associates.

e. *Oak/hickory*--forests in which upland oaks, red maple (when associated with central hardwoods), or hawthorn, singly or in combination, make up a plurality of the stocking and in which white pine makes up less than 25 percent of the stocking; common associates include hard pine, ash, yellow-poplar, beech, blackgum, sugar maple, and red maple.

f. *Oak/gum/cypress*--bottomland forests in which wet-site oaks, sweetgum, or baldcypress, singly or in combination, comprise a plurality of the stocking and in which pines comprise less than 25 percent of the stocking; common associates include American elm, red maple, blackgum, and green ash.

g. *Elm/ash/red maple*--forests in which black ash, elm, red maple (when growing on wet sites), willow, or green ash, singly or in combination, make up a plurality of the stocking; common associates include bottomland oaks, blackgum, river birch, and silver maple.

h. *Northern hardwoods*--forests in which sugar maple, beech, yellow birch, red maple (when associated with northern hardwoods), pin cherry, or black cherry, singly or in combination, make up a plurality of the stocking; common associates include red maple, northern red oak, hemlock, white ash, and basswood.

Fuelwood. Round, split, or chipped woody material (with or without bark) that is converted to household, commercial, or industrial energy.

Geographic unit. A county or a group of counties within a state that is large enough to provide an adequate sample that will yield statistically reliable estimates of timberland area, volume, and components of change.

Green ton. A unit of measure of green weight equivalent to 2,000 pounds or 907.1848 kilograms.

Green ton stand-volume class. A classification of forest land in terms of net green weight of the aboveground components of all live trees per unit area. It is usually expressed in green tons per acre.

Green weight. The weight of wood and bark as it would be if it had been recently cut. It is usually expressed in pounds or tons.

Gross growth. The sum of accretion and ingrowth.

Growing-stock trees. Live trees of commercial species classified as sawtimber, poletimber, saplings, or seedlings; that is, all live trees of commercial species except rough and rotten trees.

Growing-stock volume. Net volume, in cubic feet, of growing-stock trees 5.0 inches d.b.h. and larger from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. Net volume equals gross volume, less deduction for cull.

Hardwoods. Dicotyledonous trees, usually broad-leaved and deciduous.

Harvested cropland. All land from which crops were harvested or hay was cut and all land in orchards, citrus groves, vineyards, and nursery and greenhouse products.

Idle farmland. Former cropland or pasture that has not been tended within the last 2 years and that has less than 10.0 percent stocking with live trees, (established seedlings or larger trees) regardless of species.

Improved/maintained pasture. Land that is currently used and maintained for grazing (not including grazed cropland).

Indian lands. (a) Lands held in trust by the United States or States for Indian tribes or individual Indians. (b) Lands owned in fee by Indian tribes whether subject to Federal or State restrictions against alienation or not.

Industrial and commercial land. Supply yards, parking lots, factories, etc.

Industrial products. All roundwood products except fuelwood.

Ingrowth. The estimated net volume of growing-stock trees that became 5.0 inches d.b.h. or larger during the period between inventories, divided by the number of growing seasons between surveys.

International 1/4-inch rule. A log rule or formula for estimating the board-foot volume of logs. The mathematical formula is:

$$(0.22D^2 - 0.71D)(0.904762)$$

for 4-foot sections, where D=diameter inside bark at the small end of the log section. This rule is used as the USDA Forest Service standard log rule in the Eastern United States.

Land area. (a) Bureau of Census: The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than 1/8 statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area. (b) Forest Inventory and Analysis: same as (a) except that the minimum width of streams, etc., is 120 feet, and the minimum size of lakes, etc., is 1 acre.

Land use edge. A condition created by the juxtaposition of two differing land uses.

Logging residues. The unused portions of growing-stock trees harvested or killed in the process of logging.

Manufacturing plant residues. Wood materials that are generated when round timber (round-

wood) is converted into wood products. This includes slabs, edgings, trimmings, bark, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screening. If these residues are used, they are referred to as plant byproducts.

Mast. Seed produced by woody-stemmed, perennial plants, generally refers to soft (fruit) and hard (nuts) mast.

Mining and waste land. Surface mining, gravel pits, dumps.

Miscellaneous private lands. Privately owned lands other than forest industry and farmer-owned lands.

Mortality. The estimated net volume of growing-stock trees at the previous inventory that died from natural causes before the current inventory, divided by the number of growing seasons between surveys.

National Forest lands. Federal lands legally designated as National Forests or purchase units and other lands administered as part of the National Forest System by the USDA Forest Service.

Net change. The difference between the current and previous inventory estimates of growing-stock volume, divided by the number of growing seasons between surveys. Components of net change are ingrowth plus accretion, minus mortality, minus cull increment, minus removals.

Net green weight. The green weight of woody material less the weight of all unsound (rotten) material.

Net growth. The change, resulting from natural causes, in growing-stock volume during the period between surveys, divided by the number of growing seasons. Components of net growth are ingrowth plus accretion, minus mortality, minus cull increment.

Noncensus water. Streams/ivers between 120 feet and 1/8 mile in width, and bodies of water between 1 and 40 acres in size. The Bureau of the Census classifies such water as land.

Noncommercial forest land. Productive-reserved, urban, and unproductive forest land.

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

Nonforest land. Land that has never supported forests, or land formerly forested but now in non-forest use such as cropland, pasture, residential areas, and highways.

Nonsalvable dead tree. A dead tree with most or all of its bark missing that is at least 5.0 inches in diameter at breast height and is at least 10 feet in height.

Nonstocked area. A stand-size class of forest land that is stocked with less than 10 percent of minimum full stocking with all live trees.

Other cropland. Includes cropland used for cover crops; legumes, soil-improvement.

Other farmland. All nonforest land on a farm excluding cropland, pasture, and idle farmland; includes farm lanes, stock pens, and farmsteads.

Ownership class. A classification of forest land based upon ownership and nature of business or control of decision-making for the land. It encompasses all types of legal entities having ownership interest in the land, whether public or private.

Pasture land. Includes any pasture land other than cropland and woodland pasture. Can include lands which had applied lime fertilizer, seed, improved by irrigation, drainage, or control of weeds and brush.

Pastured cropland. Includes rotation pasture and grazing land that would have been used for crops without additional improvement.

Piling (piles). Relatively slender structural round-wood products that are cut to the maximum length possible (within top circumference and other specifications of strength, straightness, and soundness) that when nearly buried in the ground provide vertical or lateral support for buildings, foundations, bridges, docks, and other structures.

Plant byproducts. Wood products, such as pulp chips, recycled from manufacturing plant residues.

Poletimber stand. A stand-size class of forest land that is stocked with at least 10 percent of minimum full stocking with all live trees with half or more of such stocking in poletimber or sawtimber trees or both, and in which the stocking of poletimber exceeds that of sawtimber.

Poletimber tree. Live trees of commercial species meeting regional specifications of soundness and form and at least 5.0 inches in d.b.h., but smaller than sawtimber trees.

Preferred tree. A high-quality tree, from a lumber viewpoint, that would be favored in cultural operations. General characteristics include grade 1 butt log (if sawtimber size), good form, good vigor, and freedom from serious damage.

Productive-reserved forest land. Forest land sufficiently productive to qualify as timberland, but withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas tree production.

Primary manufacturing plant. A plant that converts round timber into wood products such as woodpulp, lumber, veneer, cooperage, and dimension products.

Pulpwood. Roundwood converted into 4- or 5-foot lengths or chips, and chipped plant byproducts that are prepared for manufacture into woodpulp.

Recreation site. Parks, campgrounds, playing fields, tracks, etc.

Removals. The net growing-stock volume harvested or killed in logging, cultural operations--such as timber stand improvement--or land clearing, and also the net growing-stock volume neither harvested nor killed but growing on land that was reclassified from timberland to noncommercial forest land during the period between surveys. This volume is divided by the number of growing seasons.

Rights-of-way. Highways, pipelines, powerlines, canals.

Rotten tree. A live tree of commercial species that does not contain at least one 12-foot sawlog or two noncontiguous sawlogs, each 8 feet or longer, now or prospectively, and does not meet regional specifications for freedom from defect primarily because of rot; that is, more than 50 percent of the cull volume in the tree is rotten.

Rough tree. (a) The same as a rotten tree, except that a rough tree does not meet regional specifications for freedom from defect primarily because of roughness or poor form; also (b) a live tree of noncommercial species.

Roundwood products. Logs, bolts, total tree chips, or other round timber generated by harvested trees for industrial or consumer uses.

Salvable dead trees. A tree at least 5.0 inches in diameter at breast height that has recently died and still has intact bark. The tree may be standing, fallen, windthrown, knocked down, or broken off.

Sampling error. A measure of the reliability of an estimate, expressed as a percentage of the estimate. The sampling errors given in this report correspond to one standard deviation and are calculated as the square root of the variance, divided by the estimate, and multiplied by 100.

Saplings. Live trees 1.0 inch through 4.9 inches d.b.h.

Sapling-seedling stand. A stand-size class of forest land that is stocked with at least 10 percent of minimum full stocking with all live trees with half or more of such stocking in saplings or seedlings or both.

Sawlog. A log meeting regional standards of diameter, length, and freedom from defect, including a minimum 8-foot length and a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods. (See specifications under Log-Grade Classification).

Sawlog portion. That part of the bole of a sawtimber tree between the stump and the sawlog top; that is, the merchantable height.

Sawlog top. The point on the bole of a sawtimber tree above which a sawlog cannot be produced.

The minimum sawlog top is 7.0 inches diameter outside bark (d.o.b.) for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stand. A stand-size class of forest land that is stocked with at least 10 percent of minimum full stocking with all live trees with half or more of such stocking in poletimber or sawtimber trees or both, and in which the stocking of sawtimber is at least equal to that of poletimber.

Sawtimber trees. Live trees of commercial species at least 9.0 inches d.b.h. for softwoods or 11.0 inches for hardwoods, containing at least one 12-foot sawlog or two noncontiguous 8-foot sawlogs, and meeting regional specifications for freedom from defect.

Sawtimber volume. Net volume in board feet, by the International 1/4-inch rule, of sawlogs in sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Seedlings. Live trees less than 1.0-inch d.b.h. and at least 1 foot in height.

Shrub. Woody-stemmed perennial plant, generally with no well-defined main stem and less than 12 feet in height at maturity; defined by species.

Shrub land. Land with shrub and/or tree cover and an obvious herbaceous understory; average canopy height of less than 25 feet and crown closure of less than 70 percent.

Single-family/custom house. House sheltering one family and immediately adjacent managed land.

Snag. Standing dead tree, with most or all of its bark missing that is at least 5.0 inches in diameter and at least 10 feet tall (does not include salvable dead).

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

Stand. A group of forest trees growing on forest land.

Stand area class. The area, contiguous to the plot, that is of the same overall stand size and

major type group (hardwood, softwood, or uniform mixture of both).

Stand-size class. A classification of forest land based on the size class (that is, seedlings, saplings, poletimber, or sawtimber) of all live trees in the area.

Standard cord. A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Fuelwood cord estimates can be derived from cubic-foot estimates of growing stock by applying an average factor of 80 cubic feet of solid wood per cord. For pulpwood, a conversion of 85 cubic feet of solid wood per cord is used because pulpwood is more uniform.

Standard-lumber log grade. A classification of the quality of sawtimber volume based on standard sawlog grades for hardwoods, white pine, and southern pine. (Note: Red pine was graded using the southern pine guidelines. All specifications are shown under Log-Grade Classification).

State lands. Lands owned by the State or leased to the State for 50 years or more.

Stocking. The degree of occupancy of land by trees, measured by basal area and/or number of trees in a stand compared to the basal area and/or number of trees required to fully use the growth potential of the land (or the stocking standard). In the Eastern United States this standard is 75 square feet of basal area per acre for trees 5.0 inches d.b.h. and larger, or its equivalent in numbers of trees per acre for seedlings and saplings.

Two categories of stocking are used in this report: all live trees and growing-stock trees. The relationships between the classes and the percentage of the stocking standard are: nonstocked = 0 to 9, poorly stocked = 10 to 59, moderately stocked = 60 to 99, fully stocked = 100 to 129, and overstocked = 130 to 160.

Strip mine. Area devoid of vegetation due to current or recent general excavation.

Stump. The main stem of a tree from ground level to 1 foot above ground level, including the wood and bark.

Timberland. Forest land producing or capable of producing crops of industrial wood (more than 20 cubic feet per acre per year) and not withdrawn from timber utilization. Formerly known as commercial forest land.

Timber products. Roundwood (round timber) products and manufacturing plant byproducts harvested from growing-stock trees on timberland; from other sources, such as cull trees, salvageable dead trees, limbs, tops and saplings; and from trees on noncommercial forest and nonforest lands.

Timber removals. The growing-stock or sawtimber volume of trees removed from the inventory for roundwood products, plus logging residues, volume destroyed during land clearing, and volume of standing trees on land that was reclassified from timberland to noncommercial forest land (See Table 46).

Top. The wood and bark of a tree above the merchantable height (or above the point on the stem 4.0 inches in diameter outside bark). It generally includes the uppermost stem, branches, and twigs of the tree, but not the foliage.

Tract/multiple family. Multiple individual residential units or attached units (e.g. apartment buildings, condominiums) and immediately adjacent managed land.

Transportation right-of-way. Land associated with highways and railroads.

Tree class. A classification of the quality or condition of trees for sawlog production. Tree class for sawtimber trees is based on their present condition. Tree class for poletimber trees is a prospective determination--a forecast of their potential quality when they reach sawtimber size (11.0

inches d.b.h. for hardwoods, 9.0 inches d.b.h. for softwoods).

Trees. Woody plants that have well-developed stems and are usually more than 12 feet in height at maturity.

Unproductive forest land. Forest land that is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions, because of adverse site conditions.

Unused manufacturing residues. Plant residues that are dumped or destroyed and not recovered for plant byproducts.

Upper-stem portion. That part of the main stem or fork of a sawtimber tree above the sawlog top to a diameter of 4.0 inches outside bark, or to the point where the main stem or fork breaks into limbs.

Urban forest land. Noncommercial forest land within urban areas that is completely surrounded by urban development (not parks), whether commercial, industrial, or residential.

Utility right-of-way. Land associated with pipeline and electric transmission lines; identified only if vegetative cover differs from adjacent land use.

Veneer log or bolt. A roundwood product from which veneer is sliced or sawn that usually meets certain minimum standards of diameter, length, and defect.

Volume suitable for pulpwood. The sound volume (only rotten cull excluded) of growing-stock and rough trees.

Windbreak/hedgerow. Linear areas, less than 120 feet in width; with predominantly tree and/or shrub vegetation.

References

Ferguson, Roland H.; Mayer, Carl E. 1974. **The timber resources of Delaware.** Resour. Bull. NE-32. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 42 p.

Scott, Charles T. 1979. **Northeastern forest survey board-foot volume equations.** Res. Note NE-271. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 3 p.

Scott, Charles T. 1981. **Northeastern forest survey revised cubic-foot volume equations.** Res. Note NE-304. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 3 p.

Oaks of the Northeast

Species Group	Common Name
Select White Oaks	
<i>Quercus alba</i>	white oak
<i>Q. bicolor</i>	swamp white oak
<i>Q. macrocarpa</i>	bur oak
<i>Q. michauxii</i>	swamp chestnut oak
<i>Q. muehlenbergii</i>	chinkapin oak
Select Red Oaks	
<i>Q. falcata</i> var. <i>pagodaefolia</i>	cherrybark oak
<i>Q. rubra</i>	northern red oak
<i>Q. shumardii</i>	shumard oak
Other White Oaks	
<i>Q. lyrata</i>	overcup oak
<i>Q. prinus</i>	chestnut oak
<i>Q. stellata</i> var. <i>stellata</i>	post oak
Other Red Oaks	
<i>Q. coccinea</i>	scarlet oak
<i>Q. ellipsoidalis</i>	northern pin oak
<i>Q. falcata</i>	southern red oak
<i>Q. ilicifolia</i>	bear oak
<i>Q. imbricaria</i>	shingle oak
<i>Q. laurifolia</i>	laurel oak
<i>Q. marilandica</i>	blackjack oak
<i>Q. nigra</i>	water oak
<i>Q. palustris</i>	pin oak
<i>Q. phellos</i>	willow oak
<i>Q. velutina</i>	black oak

Tree Species of Delaware (as encountered on field plots)

Scientific Name ¹	Common Name(s)	Occurrence ²
Softwoods		
<i>Pinus serotina</i> Michx.	pond pine	r
<i>P. strobus</i> L.	eastern white pine	vr
<i>P. taeda</i> L.	loblolly pine	vc
<i>P. virginiana</i> Mill.	Virginia pine	vc
<i>Tsuga canadensis</i> (L.) Carr.	eastern hemlock	vr
Hardwoods		
<i>Acer negundo</i> L.	boxelder	r
<i>Acer rubrum</i> L.	red maple	vc
<i>Ailanthus altissima</i> (Mill.) Swingle ³	ailanthus	r
<i>Betula lenta</i> L.	sweet birch(black)	vr
<i>B. nigra</i> L.	river birch	vr
<i>Carpinus caroliniana</i> Walt. ³	American hornbeam	r
<i>Carya</i> Nutt.	hickory	c
<i>Cornus</i> spp. L.	dogwood	c
<i>Diospyros virginiana</i> L.	persimmon	r
<i>Fagus grandifolia</i> Ehrh.	American beech	c
<i>Fraxinus americana</i> L.	white ash	c
<i>F. pennsylvanica</i> Marsh.	green ash	c
<i>Ilex opaca</i> L.	American holly	c
<i>Liquidambar styraciflua</i> L.	sweetgum	vc
<i>Liriodendron tulipifera</i> L.	yellow-poplar	c
<i>Morus</i> spp.	mulberry	vr
<i>Nyssa sylvatica</i> Marsh.	blackgum or black tupelo	vc
<i>Platanus occidentalis</i> L.	sycamore	vr
<i>Populus deltoides</i> Bartr. ex Marsh.	eastern cottonwood	c
<i>Prunus serotina</i> Ehrh.	black cherry	c
<i>Quercus alba</i> L.	white oak	vc
<i>Q. bicolor</i> Willd.	swamp white oak	vr
<i>Q. coccinea</i> Muench.	scarlet oak	c
<i>Q. falcata</i> Michx.	southern red oak	c
<i>Q. marilandica</i> Muenchh.	blackjack oak	r
<i>Q. michauxii</i> Nutt.	swamp chestnut oak	vr
<i>Q. nigra</i> L.	water oak	c
<i>Q. palustris</i> Muench.	pin oak	r
<i>Q. phellos</i> L.	willow oak	c
<i>Q. prinus</i> L.	chestnut oak	r
<i>Q. rubra</i> L.	northern red oak	c
<i>Q. stellata</i> Wangenh.	post oak	r
<i>Q. velutina</i> Lam.	black oak	c

Tree Species of Delaware (continued)

Scientific Name ¹	Common Name(s)	Occurrence ²
<i>Robinia pseudoacacia</i> L.	black locust	r
<i>Salix nigra</i> Marsh.	black willow	r
<i>Sassafras albidum</i> (Nutt.) Nees ³	sassafras	c
<i>Ulmus americana</i> L.	American elm	r
<i>U. rubra</i> Muhl.	slippery elm	vr

¹Names according to: Little, Elbert L., Jr. 1979. Checklist of United States Trees (native and naturalized). Agric. Handb. 541. Washington, DC: U.S Department of Agriculture, Forest Service: 375 p.

²Occurrence is based on the proportion of the species among all live trees 5.0 inches d.b.h. or larger encountered on forest survey field plots: vr = very rare (0.05%), r = rare (0.05 to 0.49%), c = common (0.5 to 4.9%), and vc = very common (>5.0%).

³Noncommercial species.

Ecological Importance and Relative Distribution of Lesser Woody-Stemmed Species, Delaware

Species	Relative Density	Relative Frequency	Importance Value	Distribution
Atlantic white cedar	.03	.10	.06	1.00
Eastern redcedar	.04	.28	.16	2.98
Pond pine	.02	.47	.25	4.96
Eastern white pine	.01	.10	.05	1.00
Loblolly pine	2.82	4.73	3.77	50.50
Virginia pine	.92	2.69	1.80	28.72
Eastern hemlock	.02	.10	.06	1.00
Boxelder	.20	.38	.29	3.97
Red maple	6.50	7.97	7.23	85.15
Silver maple	.04	.10	.07	1.00
Sugar maple	.02	.10	.06	1.00
Ailanthus	.01	.10	.05	1.00
Alder species	.05	.10	.07	1.00
Hercules club	.78	1.49	1.14	15.85
Serviceberry	.23	.47	.35	4.96
Chokeberry species	.04	.10	.07	1.00
Azalea species	1.49	1.67	1.58	17.83
Common pawpaw	.52	.10	.31	1.00
Barberry	.05	.10	.08	1.00
Sweet birch	.03	.10	.06	1.00
River birch	.01	.10	.05	1.00
American hornbeam	.04	.28	.16	2.98
Hickory species	.19	1.67	.93	17.83
Bitternut hickory	.01	.19	.10	1.99
Pignut hickory	.03	.19	.11	1.99
Clematis species*	--	--	--	2.98
Sweetfern	.25	.10	.17	1.00
Flowering dogwood	.68	1.49	1.08	15.85
Silky dogwood	.37	.10	.24	1.00
Round-leaved dogwood	.12	.10	.11	1.00
Panicked dogwood	.07	.10	.08	1.00
American hazelnut	.02	.10	.06	1.00
Common persimmon	.19	.56	.38	5.95
American beech	.25	1.39	.82	14.86
White ash	.05	.38	.21	3.97
Green ash	.01	.28	.15	2.98
Teaberry*	--	--	--	1.00
Witch-hazel	.05	.19	.12	1.99
American holly	2.51	4.08	3.30	43.57
Black walnut	.02	.38	.20	3.97
Sheep laurel	.20	.10	.15	1.00
Mountain laurel	.02	.10	.06	1.00
Common spicebush	1.06	.65	.86	6.94

Ecological Importance and Relative Distribution of Lesser Woody-Stemmed Species, Delaware (continued)

Species	Relative Density	Relative Frequency	Importance Value	Distribution
Sweetgum	4.06	6.95	5.50	74.26
Yellow-poplar	.76	2.78	1.77	29.71
Vine honeysuckle*	--	--	--	33.67
Magnolia	.02	.10	.06	1.00
Sweetbay	.83	.93	.88	9.91
Partridgeberry*	--	--	--	23.77
Mulberry species	.01	.19	.10	1.99
Water tupelo	.17	.28	.23	2.98
Black tupelo	1.84	5.56	3.70	59.41
Virginia creeper*	--	--	--	39.61
American sycamore	.01	.10	.05	1.00
Swamp cottonwood	.07	.10	.09	1.00
Pin cherry	.02	.10	.06	1.00
Black cherry	2.23	3.25	2.74	34.66
White oak	.82	5.38	3.10	57.43
Swamp white oak	.02	.28	.15	2.98
Scarlet oak	.22	1.58	.90	16.84
Southern red oak	.62	3.15	1.89	33.67
Blackjack oak	.03	.10	.06	1.00
Swamp chestnut oak	.06	.56	.31	5.95
Water oak	.82	2.41	1.62	25.75
Pin oak	.10	.75	.43	7.93
Willow oak	.20	2.97	1.58	31.69
Chestnut oak	.07	.47	.27	4.96
Northern red oak	.34	1.86	1.10	19.81
Post oak	.02	.28	.15	2.98
Black oak	.20	1.30	.75	13.87
Buckthorn species	.08	.19	.13	1.99
Smooth sumac	.38	.28	.33	2.98
Poison ivy*	--	--	--	40.60
Currant species	.29	.19	.24	1.99
Black locust	.01	.19	.10	1.99
Rose species	.45	.38	.41	3.97
Rubus species	3.76	2.23	2.99	23.77
Willow species	.02	.10	.06	1.00
Black willow	.01	.10	.05	1.00
Sassafras	1.80	3.89	2.85	41.59
Greenbrier*	--	--	--	82.18
American elm	.07	.38	.22	3.97
Slippery elm	.04	.19	.12	1.99
Blueberry	17.92	4.63	11.28	49.51
Viburnum species	.26	.38	.32	3.97
Maple-leaved viburnum	.80	.47	.63	4.96

Ecological Importance and Relative Distribution of Lesser Woody-Stemmed Species, Delaware (continued)

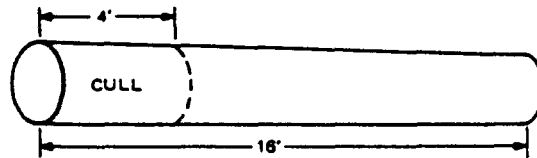
Species	Relative Density	Relative Frequency	Importance Value	Distribution
Arrowwood	2.36	2.60	2.48	27.73
Blackhaw	.05	.10	.07	1.00
Grape*	--	--	--	17.83
Unknown vine*	--	--	--	9.91
Unknown dwarf shrub*	--	--	--	21.79
Unknown deciduous shrub	37.85	6.67	22.26	71.29
Unknown evergreen shrub	.02	.10	.06	1.00
Unknown tree	.77	2.23	1.50	23.77

* Dwarf shrubs and vines not included in Relative Density, Relative Frequency and Importance Value calculations.

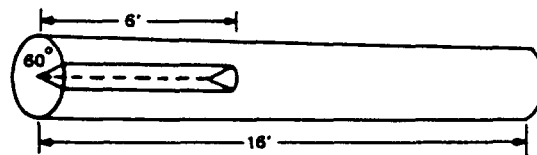
Log-grade Classification

Methods of determining scaling deduction.

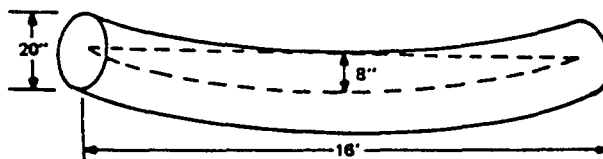
(Examples based on a 16-foot log with 20-inch scaling diameter)



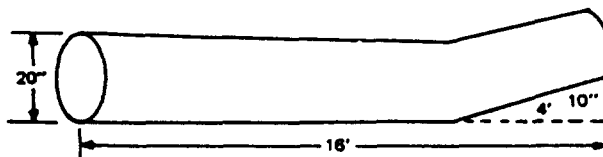
Defect section (rule 1): Percent deduction = $\frac{4}{16} = 25\%$



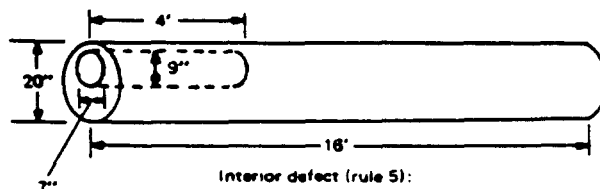
Defect section (rule 2): Percent deduction = $\left(\frac{6}{16}\right) \left(\frac{60}{360}\right) = 6\frac{1}{4}\%$



Sweep (rule 3): Percent deduction = $\frac{8 \cdot 2}{20} = 30\%$



Crook (rule 4): Percent deduction = $\left(\frac{10}{20}\right) \left(\frac{4}{16}\right) = 12\frac{1}{2}\%$



Interior defect (rule 5):

Percent deduction = $\frac{(8)(10)}{(20-1)^2} \times \frac{4}{16} = 5\frac{5}{9}\%$

In practice each ellipse axis can be divided by (20-1)

Thus $\frac{8}{19} = .4, \frac{10}{19} = .5$, and $(.4)(.5) \left(\frac{4}{16}\right) = 5\%$

From: Groenbaugh, L.R. 1952. Shortcuts for cruisers and scalers. U.S. Dep. Agric. For. Serv. South For. Exp. Stn. Occas. Pap. 126.

STANDARD GRADES FOR HARDWOOD FACTORY LUMBER LOGS

Grading Factors		Log grades							
		F1			F2				F3
Position in tree		Butts only	Butts & uppers		Butts & Uppers				Butts & uppers
Scaling diameter, inches		13-15 ^a	16-19	20 +	11 + ^a	12 +			8 +
Length without trim, feet		10 +			10 +	8-9	10-11	12 +	8 +
Required clear cuttings ^c of each of 3 best faces ^d	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than ¼ of end in sound defects	15%			30%				50%
	For logs with more than ¼ of end in sound defects	10%			20%				35%
Maximum scaling	deduction	40% ^e			50% ^f				50%

End defects although not visible in standing trees, are important in grading cut logs. Instructions for dealing with this factor are contained in Forest Prod. Lab. Rpt. D 1737.

^aAsh and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

^bTen-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

^cA clear cutting is the portion of a face, extending the width of the face, that is free of defects.

^dA face is 1/4 of the surface of the log as divided lengthwise.

^eOtherwise #1 logs with 41-60% deductions can be #2.

^fOtherwise #2 logs with 51-60% deductions can be #3.

From: Vaughan, C. L., A. C. Wollin, K. A. McDonald, and E. H. Bulgrin. 1966. Hardwood log grades for standard lumber. USDA For. Serv. Res. Pap. FPL-63.

STANDARD SPECIFICATIONS FOR HARDWOOD CONSTRUCTION LOGS.^a

Position in tree		Butt & upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements.
Sweep allowance, absolute		1/4 diameter small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of 1/3 of log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed 1/3 of log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over 1/3 of log diameter at point of occurrence, and none extends over 3 inches into included timber. ^b
Unsound surface defects		Same requirements as for sound defects if they extend into included timber. ^b No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit 1 shake not to exceed 1/4 the scaling diameter and a longitudinal split not extending over 5 inches into the contained timber.

^aThese specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only non-factory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, then it may be necessary to subdivide the class into grades.

^bIncluded timber is always square, and dimension is judged from small end.

From: Reast, E. D., D. L. Sonderman, and G. L. Gammon. 1973. A guide to hardwood log grading (Revised). USDA For. Serv. Gen. Tech. Rep. NE-1.

EASTERN WHITE PINE SAWLOG GRADE SPECIFICATIONS

GRADING FACTOR	LOG GRADE 1	LOG GRADE 2	LOG GRADE 3	LOG GRADE 4
(1) MINIMUM SCALING DIAMETER (inches)	14 ¹	6	6	6
(2) MINIMUM LOG LENGTH (feet)	10 ²	8	8	8
(3) MAXIMUM WEEVIL INJURY (number)	None	None	2 injuries ³	No limit
(4) MINIMUM FACE REQUIREMENTS	Two full length or four 50', length good faces. ⁴ (In addition, log knots on balance of faces shall not exceed size limitations of grade 2 logs.)	No GOOD FACES REQUIRED. Maximum diameter of log knots on three best faces: SOUND RED KNOTS not to exceed 1/6 scaling diameter and 3 inch maximum. DEAD OR BLACK KNOTS including overgrown knots not to exceed 1-12 scaling diameter and 1 1/2 inch maximum.		Includes all logs not qualifying for No. 3 or better and judged to have at least one-third of their gross volume in sound wood suitable for manufacture into standard lumber.
(5) MAXIMUM SWEEP OR CROOK ALLOWANCE (percent)	20	30	40	66 2/3
(6) MAXIMUM TOTAL SCALING DEDUCTION (percent)	50	50	50	66 2/3
After the tentative log grade is established from face examination, the log will be reduced in grade whenever the following defects are evident: (7) CONKS, PUNK KNOTS, AND PINE BORER DAMAGE ON BARK SURFACE⁵ Degradate one grade if present on one face. Degradate two grades if present on two faces. Degradate three grades if present on three or more faces. (8) LOG END DEFECTS: RED ROT, RING SHAKE, HEAVY STAIN AND PINE BORER DAMAGE OUTSIDE HEART CENTER OF LOG⁵ Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated below: Degradate one grade if present in 2 quarters of log ends. Degradate two grades if present in 3 or 4 quarters of log ends. Degradate three grades if present in 5 or more quarters of log ends.				
¹12 and 13 inch logs with four full length good faces are acceptable. ²8 foot logs with four full length good faces are acceptable. ³8 foot No. 3 logs limited to one weevil injury. ⁴Minimum 50% length good face must be at least 6 feet. ⁵Factors 7 and 8 are not cumulative (total degrade based on more serious of the two). No log to be degraded below grade 4 if net scale is at least one-third gross log scale.				

From: Ostrander, M. D., and R. L. Brisbin, 1971. Sawlog grades for eastern white pine. USDA For. Serv. Res. Pap. NE-205.

SOUTHERN PINE SAWLOGS

Grade 1. Logs with 3 or 4 clear faces.¹ Code 1.

Grade 2. Logs with 1 or 2 clear faces. Code 2.

Grade 3. Logs with no clear faces. Code 3.

After the tentative log grade is established from above, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3.

1. **Sweep.** Degradate any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one third (1/3) the diameter inside bark at small end. This is the final grade if there is no evidence of heart rot.

2. **Heart rot.** Degradate any tentative 1 or 2 log one grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

¹ A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than one-half inch in diameter, overgrown knots of any size, holes more than one-fourth inch in diameter. The faces may be rotated if necessary to obtain the maximum number of clear ones.

From: Schroeder, J. G., R. A. Campbell, and R. C. Rodenbach. 1968. Southern pine sawlogs for yard and structural lumber. USDA For. Serv. Res. Pap. SE-39.

Metric Equivalents

1 acre = 4,046.86 square meters
 1 acre = 0.404686 hectares
 1,000 acres = 404.686 hectares
 1,000,000 acres = 404,686 hectares
 1 board foot = 0.00348 cubic meters
 1 board foot = 3,480 cubic centimeters
 1,000 board feet = 3.48 cubic meters
 1,000,000 board feet = 3,480 cubic meters
 1 cubic foot = 0.028317 cubic meters
 1,000 cubic feet = 28.317 cubic meters
 1,000,000 cubic feet = 28,317 cubic meters
 1 cord (wood, bark, and air space) = 3.6246 cubic meters
 1 cord (solid wood, pulpwood) = 2.4069 cubic meters
 1 cord (solid wood, other than pulpwood) = 2.2654 cubic meters
 1,000 cords (pulpwood) = 2,406.9 cubic meters
 1,000 cords (other products) = 2,265.4 cubic meters
 1 inch = 2.54 centimeters or 0.0254 meters
 1 foot = 30.48 centimeters or 0.3048 meters
 1 mile = 1.609 kilometers
 1 square foot = 929.03 square centimeters
 1 square foot = 0.0929 square meters
 1 square foot per acre basal area = 0.229568 square meters per hectare
 1 ton = 907.1848 kilograms
 1,000 tons = 907.1848 metric tons
 Breast height = 1.4 meters above ground level

Although 1,000 board feet is theoretically equivalent to 2.36 cubic meters, this is true only when a board foot is actually a piece of wood with a volume 1/12 of a cubic foot. The International 1/4-inch log rule is used by the USDA Forest Service in the East to estimate the product potential in board feet. The reliability of the estimate obtained by conversion will vary with the size of the log measure. The conversion given here, 3.48 cubic meters, is based on the cubic volume of a log 16 feet long and 15 inches in diameter inside bark (d.i.b.) at the small end. This conversion could be used for average comparisons when accuracy of 10 percent is acceptable. Because the board foot unit is not a true measure of wood volume and because products other than dimension lumber are becoming important, this unit may eventually be phased out and replaced by the cubic meter.

Index to Tables

The following tables are divided into two major sections: (1) State and (2) County. Recalculated 1972 tables are printed in italic type.

State

Area

1. Land area by land class, Delaware, 1986.
2. *Area of timberland by forest type, forest-type group, and stand-size class, Delaware, 1972.*
3. Area of timberland by forest type, forest-type group, and stand-size class, Delaware, 1986.
4. Area of timberland by forest-type group and ownership class, Delaware, 1986.
5. Area of timberland by stand-size class and ownership class, Delaware, 1986.
6. Area of timberland by net board-foot stand-volume class and ownership class, Delaware, 1986.
7. Area of timberland by stocking class of growing-stock trees and ownership class, Delaware, 1986.
8. Area of timberland by forest-type group and cubic-foot stand-volume class, Delaware, 1986.
9. Area of timberland by forest-type group and board-foot stand-volume class, Delaware, 1986.
10. Area of timberland by forest-type group and green ton stand-volume class, Delaware, 1986.

11. *Area of timberland by forest-type group and stocking class of all live trees, Delaware, 1972.*
12. Area of timberland by forest-type group and stocking class of all live trees, Delaware, 1986.
13. *Area of timberland by forest-type group and stocking class of growing-stock trees, Delaware, 1972.*
14. Area of timberland by forest-type group and stocking class of growing-stock trees, Delaware, 1986.
15. Area of timberland by forest-type group and basal-area class, Delaware, 1986.

Number of Trees

16. Number of live trees on timberland by species and diameter class, Delaware, 1986.
17. Number of live trees on timberland by diameter class, tree class, and soft-woods and hardwoods, Delaware, 1986.
18. Number of trees (5.0+ inches d.b.h.) on timberland by species and tree class, Delaware, 1986.
19. Number of growing-stock trees on timberland by species and diameter class, Delaware, 1986.

Weight

20. Net green weight of all live trees on timberland by species and diameter class, Delaware, 1986.
21. Net dry weight of all live trees on timberland by species and diameter class, Delaware, 1986.
22. Net green weight of all trees on timberland by class of timber and species group, Delaware, 1986.

Volume

23. Net volume of all trees on timberland by class of timber and species group, Delaware, 1986.
24. Net volume of all live, growing-stock, and sawtimber trees on timberland by species group and ownership class, Delaware, 1986.
25. Net volume of growing-stock trees on timberland by forest-type group and stand-size class, Delaware, 1986.
26. Net volume of growing-stock trees on timberland by forest-type group and basal-area class, Delaware, 1986.
27. Net volume of growing-stock trees on timberland by species and forest-type group, Delaware, 1986.
28. *Net volume of growing-stock trees on timberland by species and stand-size class, Delaware, 1972.*
29. Net volume of growing-stock trees on timberland by species and stand-size class, Delaware, 1986.
30. Net volume of growing-stock trees on timberland by species and cubic-foot stand-volume class, Delaware, 1986.
31. *Net volume of growing-stock trees on timberland by species and diameter class, Delaware, 1972.*
32. Net volume of growing-stock trees on timberland by species and diameter class, Delaware, 1986.
33. Net volume of growing stock in the sawlog portion of sawtimber trees on timberland by species and diameter class, Delaware, 1986.
34. *Net volume of sawtimber trees on timberland by species and diameter class, Delaware, 1972.*

35. Net volume of sawtimber trees on timberland by species and diameter class, Delaware, 1986.
36. *Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Delaware, 1972.*
37. Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Delaware, 1986.

Growth

38. Average annual net change of growing-stock volume on timberland by species and component, Delaware, 1972-87.
39. Average annual net growth and average annual removals of growing-stock volume on timberland by species, Delaware, 1972-87.
40. Average annual net growth and average annual removals of growing-stock volume on timberland by ownership class and species group, Delaware, 1972-1987.
41. Average annual mortality of growing-stock and sawtimber volume on timberland by species, Delaware, 1972-87.
42. Average annual net growth and average annual removals of sawtimber volume on timberland by species, Delaware, 1972-87.
43. Average annual net growth and average annual removals of sawtimber volume on timberland by ownership class and species group, Delaware, 1976-87.

Timber Products Output

44. Output of timber products by product, softwoods and hardwoods, and source of material, Delaware, 1985.

45. Output of roundwood products by product, softwoods and hardwoods, and source of material, Delaware, 1985.
46. Timber removals from growing stock and sawtimber on timberland by component and softwoods and hardwoods, Delaware, 1985.
47. Volume of unused residues from primary manufacturing plants by softwoods and hardwoods, type of residue, and industry, Delaware, 1985.

Change

48. Change in area of timberland between inventories by forest-type group and stand-size class, Delaware, 1972-86.
49. Change in volume between inventories, Delaware, 1972-86.

Sampling Errors

50. Sampling errors for estimates in various state-level tables, Delaware, 1972 and 1986.

County

51. Land area by county and land class, Delaware, 1986.
52. Area of timberland by county and ownership class, Delaware, 1986.
53. Area of timberland by county and forest-type group, Delaware, 1986.

54. Area of timberland by county and stand-size class, Delaware, 1986.
55. Area of timberland by county and cubic-foot stand-volume class, Delaware, 1986.
56. Area of timberland by county and green ton stand-volume class, Delaware, 1986.
57. Area of timberland by county and stocking class of growing-stock trees, Delaware, 1986.
58. Area of timberland by county and productivity class, Delaware, 1986.
59. Net volume of growing-stock trees on timberland by county and forest-type group, Delaware, 1986.
60. Net volume of growing-stock trees on timberland by county and stand-size class, Delaware, 1986.
61. Net volume of growing-stock trees on timberland by species and county, Delaware, 1986.
62. Net volume of growing-stock and sawtimber trees on timberland by county and species group, Delaware, 1986.
63. Net volume of sawtimber trees on timberland by county and forest-type group, Delaware, 1986.
64. Net volume of sawtimber trees on timberland by county and stand-size class, Delaware, 1986.
65. Net volume of sawtimber trees on timberland by county and species, Delaware, 1986.

Core Table Cross-Reference

Core table		Statistical table
1	Land area by county and land class, Delaware, 1986	51
2	Area of timberland by county and ownership class, Delaware, 1986	52
3	Area of timberland by county and forest-type group, Delaware, 1986	53
4	Area of timberland by county and stand-size class, Delaware, 1986	54
5	Area of timberland by county and productivity class, Delaware 1986	58
6	Area of timberland by county and stocking class of growing-stock trees, Delaware, 1986	57
7	Area of timberland by forest-type group and ownership class, Delaware, 1986	64
8	Area of timberland by stocking class of growing-stock trees and ownership class, Delaware, 1986	67
9	Area of timberland by forest type, forest-type group, and stand-size class, Delaware, 1986	3
10	Number of live trees on timberland by species and diameter class, Delaware, 1986	16
11	Number of growing-stock trees on timberland by species and diameter class, Delaware, 1986	19
12	Net volume of growing-stock trees on timberland by species and diameter class, Delaware, 1986	32
13	Net volume of growing stock in the sawlog portion of sawtimber trees on timberland by species and diameter class, Delaware, 1986	33
14	Net volume of sawtimber trees on timberland by species and diameter class, Delaware, 1986	35

Core Tables Cross Reference (continued)

15	Net volume of growing-stock and sawtimber trees on timberland by county and species group, Delaware, 1986	62
16	Net volume of all trees on timberland by class of timber and species group, Delaware, 1986	23
17	Net volume of all live, growing-stock, and sawtimber trees on timberland by species group and ownership class, Delaware, 1986	24
18	Average annual net growth of growing-stock and sawtimber volume on timberland by county and species group	Not Available
19	Average annual removals of growing-stock and sawtimber volume on timberland by county and species group	Not Available
20	Average annual net growth and average annual removals of growing-stock volume on timberland by species, Delaware, 1972-86	39
21	Average annual net growth and average annual removals of sawtimber volume on timberland by species, Delaware, 1972-86	42
22	Average annual mortality of growing-stock and sawtimber volume on timberland by species, Delaware, 1972-86	41
23	Average annual net growth and average annual removals of growing-stock volume on timberland by ownership class and species group, Delaware, 1972-86	40
24	Average annual net growth and average annual removals of sawtimber volume on timberland by ownership class and species group, Delaware, 1972-86	43
25	Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Delaware, 1986	37

STATE TABLES

STATE TABLES



Table 1.--Land area by land class, Delaware, 1986^a

Land class	Area	
	Thousand acres	Percent
Timberland	376.4	30
Noncommercial forest land:		
Productive reserved	2.9	W
Unproductive	6.8	W
Urban	3.4	W
Total forest	389.5	31
Nonforest land:		
Cropland ^b	508.7	41
Pasture ^b	24.9	2
Other farmland	66.9	6
Other land	246.7	20
Total nonforest	847.2	69
Total land area ^c	1,236.7	100

^a This and every other table may not add up due to rounding.

^b Source: 1982 Census of Agriculture.

^c Source: 1981 United States Department of Commerce, Bureau of Census.

W-Less than 1.0 percent.

Table 2.--Area of timberland by forest type, forest-type group, and stand-size class, Delaware, 1972

(In thousands of acres)

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Loblolly pine	57.8	8.8	.0	.0	66.6
Virginia pine	.0	4.5	8.3	.0	12.8
Pond pine	.0	.0	4.5	.0	4.5
Loblolly/shortleaf group	57.8	13.3	12.8	.0	83.9
Virginia pine/oak	8.3	4.5	.0	.0	12.8
Loblolly pine/hardwood	25.4	17.7	8.3	.0	51.3
Oak/pine group	33.7	22.2	8.3	.0	64.2
White oak/red oak/hickory	8.9	4.7	.0	.0	13.6
White oak	4.4	.0	4.5	.0	8.9
Y. poplar/wh. oak/no. red oak	4.4	.0	.0	.0	4.4
Black walnut	.0	.0	1.8	.0	1.8
Yellow-poplar	4.7	.0	3.9	.0	8.6
Red maple/central hardwoods	.0	4.1	.0	.0	4.1
Mixed central hardwoods	46.5	8.4	13.7	.0	68.7
Oak/hickory group	68.9	17.2	23.9	.0	110.0
Swamp chstnt oak/cherrybrk oak	.0	8.8	2.5	.0	11.3
Sweetgm/nuttall oak/willow oak	21.3	22.0	25.9	.0	69.3
Sweetbay/swamp tupelo/rd maple	4.4	4.5	.0	.0	8.9
Oak/gum/cypress group	25.7	35.3	28.4	.0	89.5
Black ash/Amer. elm/red maple	8.8	.0	.0	.0	8.8
Red maple(lowland)	17.4	4.4	.0	.0	21.8
Elm/ash/red maple group	26.2	4.4	.0	.0	30.6
Black cherry	.0	.0	4.5	.0	4.5
Northern hardwoods group	.0	.0	4.5	.0	4.5
All forest types	212.3	92.4	77.9	.0	382.6

Table 3.--Area of timberland by forest type, forest-type group, and stand-size class, Delaware, 1986

(In thousands of acres)

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Loblolly pine	40.5	10.1	24.5	.0	75.1
Virginia pine	5.9	.0	.0	.0	5.9
Loblolly/shortleaf group	46.4	10.1	24.5	.0	81.0
Virginia pine/oak	3.9	6.9	5.1	.0	15.9
Loblolly pine/hardwood	38.3	3.9	2.2	.0	44.4
Oak/pine group	42.2	10.8	7.4	.0	60.3
White oak	13.5	9.9	.0	.0	23.4
Northern red oak	2.7	.0	3.9	.0	6.5
Y. poplar/wh. oak/no. red oak	3.0	.0	.0	.0	3.0
Sweetgum/yellow-poplar	5.0	.0	10.2	.0	15.2
Yellow-poplar	5.9	.0	.0	.0	5.9
Scarlet oak	6.9	3.9	3.8	.0	14.6
Red maple/central hardwoods	2.7	3.0	.0	.0	5.6
Mixed central hardwoods	52.6	18.4	11.8	.0	82.8
Oak/hickory group	92.3	35.1	29.6	.0	157.1
Swamp chstnt oak/cherrybark oak	5.0	.0	.0	.0	5.0
Sweetgum/nuttall oak/willow oak	27.2	9.9	.0	.0	37.0
Sweetbay/swamp tupelo/red maple	6.9	3.9	5.0	.0	15.8
Oak/gum/cypress group	39.1	13.8	5.0	.0	57.9
Black ash/Amer. elm/red maple	.0	.0	2.2	.0	2.2
Red maple(lowland)	5.0	.0	.0	.0	5.0
American elm/green ash	3.0	.0	.0	.0	3.0
Elm/ash/red maple group	8.0	.0	2.2	.0	10.3
Black cherry	6.9	.0	.0	.0	6.9
Mixed northern hardwoods	3.0	.0	.0	.0	3.0
Northern hardwoods group	9.8	.0	.0	.0	9.8
All forest types	237.9	69.7	68.8	.0	376.4

Table 4.--Area of timberland by forest-type group and ownership class, Delaware, 1986

(In thousands of acres)

Forest-type group	Ownership class			All classes
	Other public	Forest industry	Other private	
Loblolly/shortleaf	1.3	23.8	55.9	81.0
Oak/pine	2.3	.0	58.0	60.3
Oak/hickory	8.6	7.3	141.2	157.1
Oak/gum/cypress	1.3	.0	56.6	57.9
Elm/ash/red maple	.0	.0	10.3	10.3
Northern hardwoods	.0	.0	9.8	9.8
Total, all groups	13.5	31.1	331.8	376.4

Table 5.--Area of timberland by stand-size class and ownership class, Delaware, 1986

(In thousands of acres)

Stand-size class	Ownership class			All classes
	Other public	Forest industry	Other private	
Sawtimber	9.2	3.2	225.5	237.9
Poletimber	4.3	14.8	50.6	69.7
Sapling and seedling	.0	13.1	55.7	68.8
Total, all classes	13.5	31.1	331.8	376.4

Table 6.--Area of timberland by net board-foot stand-volume class and ownership class, Delaware, 1986

(In thousands of acres)

Stand-volume class (board feet per acre)	Ownership class			All classes
	Other public	Forest industry	Other private	
0 - 1,999	3.1	27.9	81.0	112.0
2,000 - 3,999	1.2	.0	58.4	59.6
4,000 - 5,999	2.9	.0	72.9	75.8
6,000 - 7,999	5.0	3.2	71.8	80.0
8,000 - 9,999	.0	.0	24.8	24.8
10,000+	1.3	.0	22.9	24.2
Total, all classes	13.5	31.1	331.8	376.4

Table 7.--Area of timberland by stocking class of growing-stock trees and ownership class, Delaware, 1986

(In thousands of acres)

Stocking class	Ownership class			All classes
	Other public	Forest industry	Other private	
Poorly stocked	.0	.0	3.9	3.9
Moderately stocked	1.2	.0	20.6	21.7
Fully stocked	.0	11.3	84.1	95.4
Overstocked	12.3	19.8	223.2	255.3
Total, all classes	13.5	31.1	331.8	376.4

Table 8.--Area of timberland by forest-type group and cubic-foot stand-volume class, Delaware, 1986

(In thousands of acres)

Forest-type group	Stand-volume class (cubic feet per acre)						All classes
	0-499	500-999	1000-1499	1500-1999	2000-2499	2500+	
Loblolly/shortleaf	24.5	.0	.0	5.0	23.1	28.3	81.0
Oak/pine	2.2	9.0	5.0	11.9	17.0	15.1	60.3
Oak/hickory	25.4	21.7	30.1	31.7	31.4	16.7	157.1
Oak/gum/cypress	5.0	.0	6.9	14.0	21.8	10.3	57.9
Elm/ash/red maple	2.2	.0	.0	5.0	3.0	.0	10.3
Northern hardwoods	.0	.0	3.9	3.0	.0	3.0	9.8
Total, all groups	59.5	30.7	45.9	70.6	96.2	73.4	376.4

Table 9.--Area of timberland by forest-type group and board-foot stand-volume class, Delaware, 1986

(In thousands of acres)

Forest-type group	Stand-volume class (board feet per acre)						All classes
	0-1999	2000-3999	4000-5999	6000-7999	8000-9999	10000+	
Loblolly/shortleaf	34.6	.0	15.2	26.2	5.0	.0	81.0
Oak/pine	15.1	3.0	14.0	23.1	.0	5.0	60.3
Oak/hickory	51.1	37.8	23.7	21.7	10.9	11.9	157.1
Oak/gum/cypress	8.9	11.9	17.9	8.9	3.0	7.3	57.9
Elm/ash/red maple	2.2	.0	5.0	.0	3.0	.0	10.3
Northern hardwoods	.0	6.9	.0	.0	3.0	.0	9.8
Total, all groups	112.0	59.6	75.8	80.0	24.8	24.2	376.4

Table 10.--Area of timberland by forest-type group and green ton stand-volume class, Delaware, 1986

(In thousands of acres)

Forest-type group	Stand-volume class (green tons per acre)								All classes	
	0-	25-	50-	75-	100-	125-	150-	175-		
	24	49	74	99	124	149	174	199		200+
Loblolly/shortleaf	16.8	7.7	.0	18.1	15.2	8.0	10.2	5.0	.0	81.0
Oak/pine	2.2	5.1	.0	15.8	5.0	22.0	10.1	.0	.0	60.3
Oak/hickory	14.0	15.8	30.0	27.1	28.8	17.7	8.9	5.9	8.9	157.1
Oak/gum/cypress	5.0	.0	.0	10.8	19.0	12.1	11.0	.0	.0	57.9
Elm/ash/red maple	.0	2.2	3.0	5.0	.0	.0	.0	.0	.0	10.3
Northern hardwoods	.0	.0	3.0	.0	3.9	.0	.0	3.0	.0	9.8
Total, all groups	38.1	30.8	35.9	76.8	72.0	59.8	40.1	14.0	8.9	376.4

Table 11.--Area of timberland by forest-type group and stocking class
of all live trees, Delaware, 1972

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked	
Loblolly/shortleaf	.0	.0	4.7	26.4	52.8	83.9
Oak/pine	.0	.0	.0	46.8	17.4	64.2
Oak/hickory	.0	.0	12.6	69.0	28.4	110.0
Oak/gum/cypress	.0	.0	8.2	44.0	37.3	89.5
Elm/ash/red maple	.0	.0	17.4	4.4	8.8	30.6
Northern hardwoods	.0	.0	4.5	.0	.0	4.5
Total, all groups	.0	.0	47.3	190.6	144.7	382.6

Table 12.--Area of timberland by forest-type group and stocking class
of all live trees, Delaware, 1986

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked	
Loblolly/shortleaf	.0	.0	.0	16.4	64.6	81.0
Oak/pine	.0	.0	2.2	3.9	54.1	60.3
Oak/hickory	.0	3.9	2.7	57.4	93.1	157.1
Oak/gum/cypress	.0	.0	.0	6.9	51.0	57.9
Elm/ash/red maple	.0	.0	7.3	.0	3.0	10.3
Northern hardwoods	.0	.0	3.9	.0	5.9	9.8
Total, all groups	.0	3.9	16.1	84.6	271.7	376.4

Table 13.--Area of timberland by forest-type group and stocking class
of growing-stock trees, Delaware, 1972

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked	
Loblolly/shortleaf	.0	.0	13.2	35.3	35.4	83.9
Oak/pine	.0	.0	13.5	37.9	12.7	64.2
Oak/hickory	.0	3.9	25.7	60.3	20.1	110.0
Oak/gum/cypress	.0	.0	25.9	52.3	11.3	89.5
Elm/ash/red maple	.0	.0	17.4	13.2	.0	30.6
Northern hardwoods	.0	.0	4.5	.0	.0	4.5
Total, all groups	.0	3.9	100.3	198.9	79.5	382.6

Table 14.--Area of timberland by forest-type group and stocking class
of growing-stock trees, Delaware, 1986

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked	
Loblolly/shortleaf	.0	.0	.0	16.4	64.6	81.0
Oak/pine	.0	.0	2.2	3.9	54.1	60.3
Oak/hickory	.0	3.9	5.3	64.3	83.5	157.1
Oak/gum/cypress	.0	.0	.0	10.8	47.1	57.9
Elm/ash/red maple	.0	.0	7.3	.0	3.0	10.3
Northern hardwoods	.0	.0	6.9	.0	3.0	9.8
Total, all groups	.0	3.9	21.7	95.4	255.3	376.4

Table 15.--Area of timberland by forest-type group and basal-area class, Delaware, 1986

(In thousands of acres)

Forest-type group	Basal-area class (square feet per acre)							All classes
	0- 49	50- 99	100- 149	150- 199	200- 249	250- 299	300+	
Loblolly/shortleaf	19.5	5.0	33.3	18.2	5.0	.0	.0	81.0
Oak/pine	2.2	5.1	37.8	10.1	5.0	.0	.0	60.3
Oak/hickory	25.9	58.1	65.0	8.1	.0	.0	.0	157.1
Oak/gum/cypress	5.0	6.9	38.0	8.0	.0	.0	.0	57.9
Elm/ash/red maple	.0	7.3	3.0	.0	.0	.0	.0	10.3
Northern hardwoods	.0	.0	6.9	3.0	.0	.0	.0	9.8
Total, all groups	52.7	82.4	183.9	47.3	10.1	.0	.0	376.4

Table 16.--Number of live trees on timberland by species and diameter class, Delaware, 1986

(In thousands of trees)

Species	Diameter class (inches at breast height)												All classes
	1.0-	3.0-	5.0-	7.0-	9.0-	11.0-	13.0-	15.0-	17.0-	19.0-	21.0-	29.0+	
	2.9	4.9	6.9	8.9	10.9	12.9	14.9	16.9	18.9	20.9	28.9		
Loblolly pine	26,537	9,757	3,571	3,765	2,016	1,275	856	520	228	89	67	0	48,682
Virginia pine	6,042	4,057	869	984	903	463	160	35	9	0	9	0	13,531
Other softwoods	1,361	681	0	0	17	0	0	0	0	7	0	0	2,066
Total softwoods	33,940	14,496	4,440	4,749	2,935	1,738	1,016	556	237	96	76	0	64,279
Red maple	38,460	11,462	6,402	2,835	1,952	1,227	585	293	149	58	91	13	63,529
Hickory	767	0	460	153	130	32	58	12	0	0	13	0	1,625
Beech	989	0	393	146	74	46	19	36	7	7	27	9	1,755
Sweetgum	15,561	9,431	2,990	1,839	1,209	776	471	260	149	74	61	0	32,820
Yellow-poplar	2,586	0	172	85	98	18	83	127	133	40	71	19	3,432
Blackgum	6,593	1,671	1,655	829	691	328	203	50	26	17	6	0	12,070
Ash-walnut-cherry	8,086	2,422	886	535	476	330	219	49	102	32	37	0	13,175
Select white oaks	1,877	989	1,684	1,111	817	622	353	242	140	111	138	30	8,116
Select red oaks	0	0	45	66	165	94	86	12	46	0	40	9	564
Other white oaks	681	0	67	0	65	55	0	12	27	16	27	0	952
Other red oaks	9,900	2,722	1,861	1,374	1,049	853	635	271	210	86	71	14	19,048
Other commercial hardwoods	35,903	15,614	1,818	474	307	46	15	21	0	0	9	0	54,207
Non-commercial hardwoods	1,510	679	511	340	254	112	24	8	0	0	0	0	3,439
Total hardwoods	122,915	44,991	18,947	9,786	7,289	4,541	2,751	1,395	989	441	591	95	214,732
Total, all species	156,855	59,487	23,388	14,535	10,224	6,279	3,767	1,951	1,226	537	668	95	279,011

Table 17.--Number of live trees on timberland by diameter class, tree classes, and softwoods and hardwoods, Delaware, 1986

(In thousands of trees)

Diameter class	Growing stock		Cull		All classes
	Softwoods	Hardwoods	Softwoods	Hardwoods	
Seedlings	47,169	973,231	0	164,553	1,184,953
1.0 - 2.9	33,940	121,404	0	1,510	156,855
3.0 - 4.9	14,496	44,312	0	679	59,487
Total seedlings and saplings	95,605	1,138,947	0	166,743	1,401,295
5.0 - 6.9	4,440	17,053	0	1,894	23,388
7.0 - 8.9	4,749	9,012	0	775	14,535
9.0 - 10.9	-	6,715	-	573	7,288
Total pole/timber	9,189	32,780	0	3,242	45,211
9.0 - 10.9	2,935	-	0	-	2,935
11.0 - 12.9	1,697	4,154	41	387	6,279
13.0 - 14.9	1,016	2,520	0	231	3,767
Total small sawtimber	5,648	6,674	41	618	12,981
15.0 - 16.9	556	1,329	0	65	1,951
17.0 - 18.9	237	923	0	66	1,226
19.0 - 20.9	96	406	0	35	537
21.0 - 28.9	76	572	0	19	668
29.0 and larger	0	62	0	33	95
Total large sawtimber	965	3,293	0	219	4,476
All classes	111,408	1,181,694	41	170,822	1,463,964

Table 18.--Number of trees (5.0+ inches d.b.h.) on timberland by species and tree class, Delaware, 1986

(In thousands of trees)

Species	Tree class								All classes
	Preferred	Acceptable	All growing stock	Rough cull	Rotten cull	All live	Salvable dead	Nonsalvable dead	
Loblolly pine	65	12,322	12,387	0	0	12,387	316	466	13,169
Virginia pine	0	3,392	3,392	41	0	3,433	88	953	4,474
Other softwoods	0	24	24	0	0	24	26	0	50
Total softwoods	65	15,738	15,803	41	0	15,843	430	1,419	17,692
Red maple	52	12,584	12,636	672	299	13,607	116	127	13,850
Hickory	12	809	821	37	0	858	0	0	858
Beech	0	725	725	34	7	766	0	0	766
Sweetgum	181	7,264	7,445	158	225	7,828	52	170	8,050
Yellow-poplar	97	742	839	7	0	845	25	0	870
Blackgum	6	3,177	3,184	556	66	3,806	53	36	3,895
Ash-walnut-cherry	8	2,051	2,059	594	13	2,666	145	372	3,183
Select white oaks	17	5,224	5,241	9	0	5,250	303	204	5,757
Select red oaks	4	551	555	0	8	564	246	26	836
Other white oaks	6	264	270	0	0	270	0	112	382
Other red oaks	15	6,288	6,302	92	31	6,425	359	398	7,182
Other commercial hardwoods	0	2,571	2,571	119	0	2,690	131	52	2,873
Non-commercial hardwoods	0	99	99	1,072	78	1,249	426	1,890	3,565
Total hardwoods	399	42,348	42,747	3,350	729	46,826	1,855	3,387	52,068
Total, all species	463	58,086	58,550	3,391	729	62,670	2,285	4,806	69,761

Table 19.--Number of growing-stock trees on timberland by species and diameter class, Delaware, 1986

(In thousands of trees)

Species	Diameter class (inches at breast height)												All classes
	1.0- 2.9	3.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+	
Loblolly pine	26,537	9,757	3,571	3,765	2,016	1,275	856	520	228	89	67	0	48,682
Virginia pine	6,042	4,057	869	984	903	422	160	35	9	0	9	0	13,491
Other softwoods	1,361	681	0	0	17	0	0	0	0	7	0	0	2,066
Total softwoods	33,940	14,496	4,440	4,749	2,935	1,697	1,016	556	237	96	76	0	64,238
Red maple	38,460	11,462	5,800	2,818	1,868	1,076	518	285	131	46	91	3	62,558
Hickory	767	0	460	134	112	32	58	12	0	0	13	0	1,588
Beech	989	0	393	146	50	46	19	36	0	7	27	0	1,714
Sweetgum	15,561	9,431	2,709	1,765	1,209	768	471	260	129	74	61	0	32,437
Yellow-poplar	2,586	0	172	85	98	18	83	127	133	33	71	19	3,425
Blackgum	6,593	1,671	1,397	637	642	277	156	38	26	9	0	0	11,448
Ash-walnut-cherry	8,086	2,422	622	480	334	265	175	33	102	23	23	0	12,567
Select white oaks	1,877	989	1,684	1,111	817	622	353	242	140	111	138	21	8,107
Select red oaks	0	0	45	66	165	94	86	12	38	0	40	9	555
Other white oaks	681	0	67	0	65	55	0	12	27	16	27	0	952
Other red oaks	9,900	2,722	1,842	1,320	1,049	853	601	271	197	86	71	11	18,925
Other hardwoods	35,903	15,614	1,859	449	307	46	0	0	0	0	9	0	54,187
Total hardwoods	121,404	44,312	17,053	9,012	6,715	4,154	2,520	1,329	923	406	572	62	208,463
Total, all species	155,344	58,807	21,493	13,761	9,651	5,851	3,536	1,885	1,160	502	649	62	272,701

Table 20.--Net green weight of all live trees on timberland by species and diameter class, Delaware, 1986

(In thousands of tons)

Species	Diameter class (inches at breast height)										All classes
	1.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0+	
White/red pine	.0	.0	.0	.0	.0	.0	.0	.0	20.7	.0	20.7
Loblolly pine	677.9	528.7	977.8	918.6	873.2	857.0	717.6	403.1	202.3	205.5	6,361.7
Virginia pine	259.5	120.1	272.9	414.9	310.6	154.2	44.5	16.6	.0	25.4	1,618.7
Other softwoods	42.7	.0	.0	6.3	.0	.0	.0	.0	.0	.0	49.0
Total softwoods	980.1	648.8	1,250.6	1,339.8	1,183.9	1,011.2	762.1	419.7	222.9	230.9	8,050.1
Red maple	1,134.9	919.6	822.6	991.1	916.8	635.6	435.9	304.3	132.8	439.8	6,733.4
Hickory	1.8	63.8	48.2	73.7	28.7	77.5	26.1	.0	.0	94.7	414.5
Beech	22.5	76.1	68.3	55.3	52.3	30.7	72.8	17.0	22.5	193.6	611.1
Sweetgum	731.5	439.8	538.3	612.5	576.2	522.6	405.9	286.0	192.0	236.3	4,541.1
Yellow-poplar	21.4	25.3	28.0	50.6	14.7	90.6	184.3	267.7	106.0	509.9	1,298.4
Blackgum	168.4	272.4	273.2	387.8	275.0	237.6	80.7	60.2	47.7	18.0	1,820.9
Ash-walnut-cherry	273.0	141.2	158.5	264.3	267.7	262.0	79.0	208.5	82.9	115.7	1,852.9
Select white oaks	85.0	237.3	320.7	458.0	570.7	474.8	477.9	373.8	411.8	1,161.0	4,571.0
Select red oaks	.0	8.1	24.9	107.0	87.0	132.1	25.3	134.6	.0	460.0	978.9
Other white oaks	2.3	11.5	.0	47.0	54.5	.0	21.6	69.1	56.7	136.5	399.1
Other red oaks	207.7	351.9	477.1	637.6	783.0	885.7	489.0	521.4	284.4	496.1	5,133.9
Black locust	.0	2.7	.0	20.3	30.9	.0	.0	.0	.0	.0	53.9
Other commercial hardwoods	1,260.0	281.7	147.4	165.3	35.5	16.2	30.0	.0	.0	45.0	1,981.0
Non-commercial hardwoods	58.7	68.1	95.0	108.5	47.9	27.9	17.2	.0	.0	.0	423.3
Total hardwoods	3,967.1	2,899.5	3,002.1	3,978.9	3,740.8	3,393.3	2,345.9	2,242.4	1,336.8	3,906.6	30,813.3
Total, all species	4,947.2	3,548.3	4,252.7	5,318.7	4,924.7	4,404.5	3,108.0	2,662.1	1,559.7	4,137.5	38,863.5

Table 21.--Net dry weight of all live trees on timberland by species and diameter class, Delaware, 1986

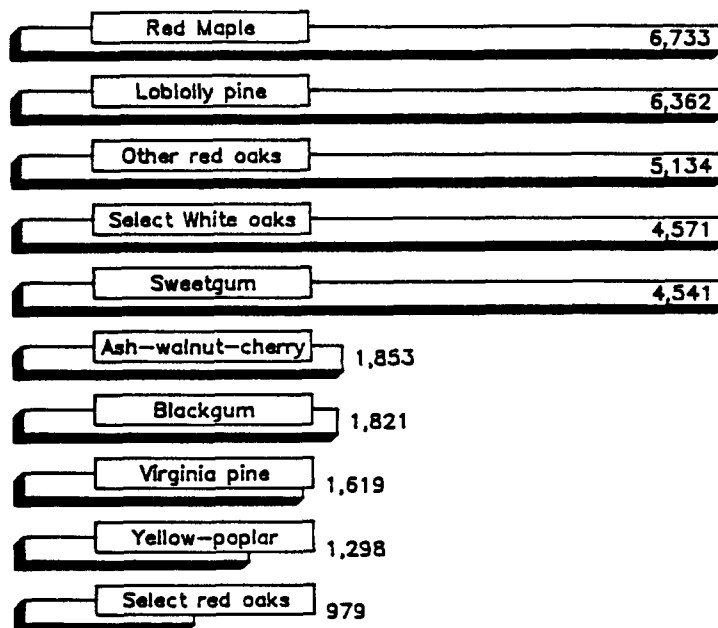
(In thousands of tons)

Species	Diameter class (inches at breast height)										All classes
	1.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0+	
White/red pine	.0	.0	.0	.0	.0	.0	.0	.0	8.4	.0	8.4
Loblolly pine	331.3	238.9	430.3	393.8	367.3	354.2	292.2	162.2	80.5	80.6	2,731.3
Virginia pine	134.6	63.4	145.5	222.6	167.5	83.5	24.2	9.1	.0	14.0	864.5
Other softwoods	21.2	.0	.0	3.1	.0	.0	.0	.0	.0	.0	24.3
Total softwoods	487.2	302.3	575.7	619.6	534.9	437.8	316.4	171.3	88.8	94.5	3,628.5
Red maple	651.2	534.7	480.8	581.9	540.0	375.4	258.1	180.6	78.9	262.8	3,944.4
Hickory	1.2	41.3	31.2	43.9	17.1	50.2	16.9	.0	.0	61.2	263.1
Beech	13.3	44.5	39.7	32.1	30.3	17.8	42.1	9.8	13.0	111.8	354.4
Sweetgum	450.2	280.5	349.4	403.4	383.6	351.6	275.6	195.4	132.2	164.4	2,986.3
Yellow-poplar	8.9	12.2	14.0	26.0	7.7	48.4	100.0	147.8	59.3	300.9	725.2
Blackgum	92.8	155.5	154.3	227.2	162.4	141.5	47.7	36.3	28.7	10.9	1,057.2
Ash-walnut-cherry	151.3	80.3	90.4	154.9	159.3	158.9	48.9	128.3	52.0	73.2	1,097.3
Select white oaks	50.8	137.6	184.5	259.6	320.8	268.3	265.3	206.4	226.2	659.5	2,579.0
Select red oaks	.0	4.6	14.3	61.5	49.9	75.7	14.5	76.9	.0	261.8	559.3
Other white oaks	1.4	6.9	.0	25.4	28.6	.0	12.7	37.7	33.0	79.2	224.9
Other red oaks	131.5	206.0	281.5	363.7	442.1	493.1	271.8	284.6	158.0	305.6	2,937.8
Black locust	.0	1.3	.0	11.5	19.2	.0	.0	.0	.0	.0	32.0
Other commercial hardwoods	666.6	153.8	82.4	92.1	22.0	11.4	18.0	.0	.0	28.0	1,074.3
Non-commercial hardwoods	35.2	35.4	59.5	66.0	30.2	18.9	7.9	.0	.0	.0	253.0
Total hardwoods	2,254.2	1,694.5	1,782.1	2,349.2	2,213.3	2,011.1	1,379.4	1,303.8	781.2	2,319.2	18,088.1
Total, all species	2,741.4	1,996.8	2,357.8	2,968.8	2,748.1	2,448.9	1,695.8	1,475.2	870.1	2,413.8	21,716.6

MAJOR SPECIES BY WEIGHT

(Thousands of tons)

Green Weight



Dry Weight

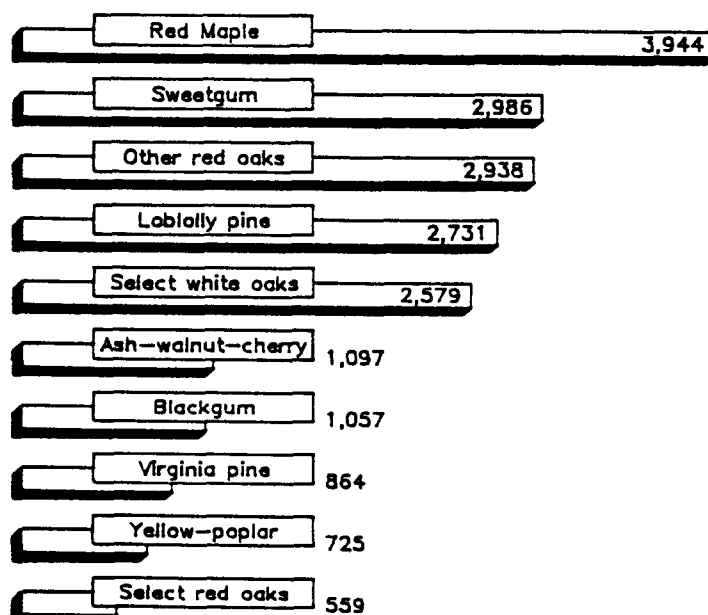


Table 22.--Net green weight of all trees on timberland by class of material and species group, Delaware, 1986

(In thousands of tons)

Class of material	Weight ^a		All groups
	Softwoods	Hardwoods	
Sawtimber trees:			
Sawlog portion	3,437.8	9,815.6	13,253.4
Upper stem	454.0	2,211.5	2,665.5
Total	3,891.8	12,027.1	15,918.9
Poletimber trees	1,279.9	6,402.0	7,681.9
All growing stock	5,171.7	18,429.1	23,600.8
Rough cull trees ^b	19.0	1,215.2	1,234.2
Rotten cull trees ^b	.0	224.0	224.0
Salvable dead trees ^c	108.8	658.7	767.5
Saplings ^d	980.1	3,967.1	4,947.2
Tops - growing stock	1,872.9	6,468.7	8,341.6
Tops - rough and rotten	6.4	509.3	515.7
All nongrowing stock	2,987.2	13,043.0	16,030.2
Total, all classes	8,158.9	31,472.1	39,631.0

^a Includes bark and sound cull; excludes rotten cull.

^b Bole portion of trees 5.0 inches d.b.h. and larger.

^c Volume of bole portion of trees 5.0 inches d.b.h. and larger, and weight of entire tree aboveground.

^d Includes entire tree aboveground.

Table 23.--Net volume of all trees on timberland by class of timber and species group, Delaware, 1986

(In millions of cubic feet)

Class of timber	Volume		All groups
	Softwoods	Hardwoods	
Sawtimber trees:			
Sawlog portion	115.0	239.1	354.1
Upper stem portion	15.3	55.3	70.6
Total	130.3	294.3	424.7
Poletimber trees	45.5	173.7	219.2
Total growing stock	175.9	468.1	643.9
Rough trees:			
Sawtimber size	.4	13.0	13.4
Poletimber size	.0	9.4	9.4
Total	.4	22.4	22.9
Rotten trees:			
Sawtimber size	.0	2.7	2.7
Poletimber size	.0	1.1	1.1
Total	.0	3.8	3.8
Total, all live trees	176.3	494.3	670.5
Salvable dead trees:			
Sawtimber size	1.2	4.5	5.7
Poletimber size	.8	4.3	5.1
Total	2.0	8.8	10.8
Total, all classes	178.3	503.1	681.4

Table 24.--Net volume of all live, growing-stock, and sawtimber trees on timberland by species group and ownership class, Delaware, 1986

Species group	Ownership class				All classes
	National Forest	Other public	Forest industry	Other private	
All live (In millions of cubic feet)					
Softwoods	.0	7.3	17.9	151.1	176.3
Hardwoods	.0	17.1	9.0	468.1	494.3
Total, all groups	.0	24.4	26.9	619.2	670.5
Growing stock (In millions of cubic feet)					
Softwoods	.0	7.1	17.9	150.9	175.9
Hardwoods	.0	16.6	8.0	443.4	468.0
Total, all groups	.0	23.7	25.9	594.3	643.9
Sawtimber (In millions of board feet) ^a					
Softwoods	.0	20.7	14.7	487.7	523.1
Hardwoods	.0	49.2	23.1	1,191.7	1,264.0
Total, all groups	.0	69.9	37.8	1,679.4	1,787.1

^a International 1/4-inch rule.

Table 25.--Net volume of growing-stock trees on timberland by forest-type group and stand-size class, Delaware, 1986

(In millions of cubic feet)

Forest-type group	Stand-size class				All classes
	Sapling and				
	Sawtimber	Poletimber	seedling	Nonstocked	
Loblolly/shortleaf	123.2	17.6	1.1	.0	142.0
Oak/pine	97.8	15.8	2.0	.0	115.6
Oak/hickory	187.5	34.5	9.5	.0	231.4
Oak/gum/cypress	92.8	28.2	.5	.0	121.6
Elm/ash/red maple	15.5	.0	.4	.0	15.9
Northern hardwoods	17.4	.0	.0	.0	17.4
Total, all groups	534.2	96.1	13.6	.0	643.9

Table 26.--Net volume of growing-stock trees on timberland by forest-type group and basal-area class, Delaware, 1986

(In millions of cubic feet)

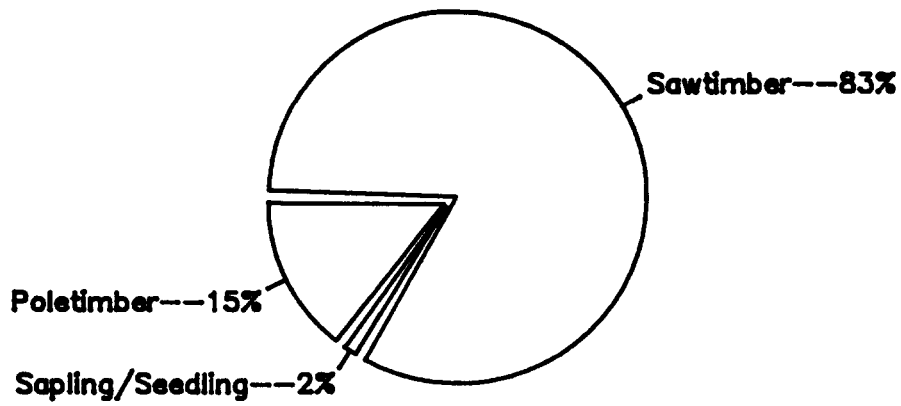
Forest-type group	Basal-area class (square feet per acre)							All classes
	0-	50-	100-	150-	200-	250-	300+	
	49	99	149	199	249	299		
Loblolly/shortleaf	1.1	.1	73.4	52.7	14.7	.0	.0	142.0
Oak/pine	.0	2.0	70.0	30.4	13.2	.0	.0	115.6
Oak/hickory	7.6	67.7	132.8	23.3	.0	.0	.0	231.4
Oak/gum/cypress	.5	10.9	83.2	27.0	.0	.0	.0	121.6
Elm/ash/red maple	.0	8.0	7.9	.0	.0	.0	.0	15.9
Northern hardwoods	.0	.0	6.8	10.6	.0	.0	.0	17.4
Total, all groups	9.2	88.7	374.1	144.0	28.0	.0	.0	643.9

Table 27.--Net volume of growing-stock trees on timberland by species and forest-type group, Delaware, 1986

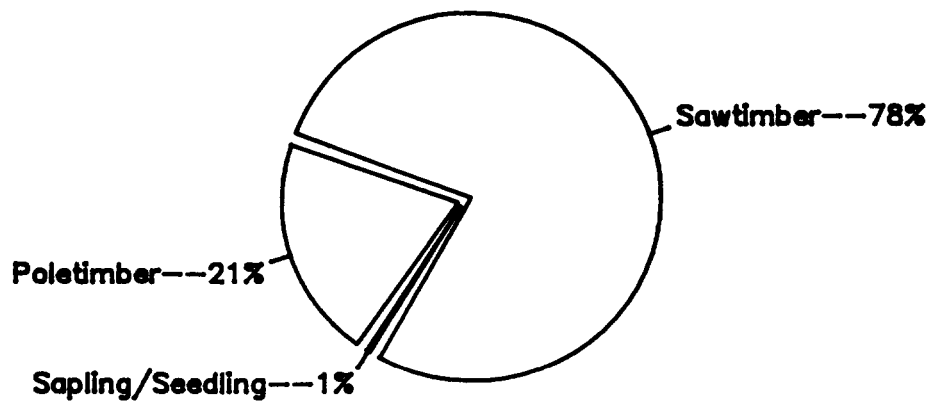
(In millions of cubic feet)

Species	Forest-type group						All groups
	Loblolly/ shortleaf	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	
Loblolly pine	89.3	37.7	11.1	5.1	.0	.0	143.1
Virginia pine	20.6	9.7	2.3	.0	.0	.0	32.6
Other softwoods	.0	.0	.1	.0	.0	.0	.1
Total softwoods	109.9	47.4	13.5	5.1	.0	.0	175.9
Red maple	10.8	17.7	35.9	30.5	10.8	4.1	109.8
Hickory	.6	.1	5.2	.0	.4	.0	6.3
Beech	.0	.0	8.9	.6	.0	.0	9.5
Sweetgum	11.2	13.5	27.8	29.2	1.4	.0	83.1
Yellow-poplar	.5	.5	25.4	4.2	.0	.4	31.1
Blackgum	.2	2.4	6.6	17.1	.2	.3	26.8
Ash-walnut-cherry	.0	.0	6.9	3.1	3.0	11.0	24.0
Select white oaks	.2	9.3	46.1	10.9	.0	.9	67.5
Select red oaks	1.4	.8	11.8	.0	.0	.0	14.0
Other white oaks	1.3	.2	3.4	.3	.0	.0	5.1
Other red oaks	5.6	21.4	37.2	16.6	.0	.0	80.7
Other hardwoods	.3	2.3	2.7	4.0	.1	.7	10.1
Total hardwoods	32.1	68.3	217.9	116.5	15.9	17.4	468.1
Total, all species	142.0	115.6	231.4	121.6	15.9	17.4	643.9

PERCENT VOLUME OF GROWING STOCK BY STAND-SIZE CLASS AND INVENTORY



1986



1972

Table 28.--Net volume of growing-stock trees on timberland by species
and stand-size class, Delaware, 1972

(In millions of cubic feet)

Species	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Loblolly pine	136.8	19.5	5.1	.0	161.4
Virginia pine	13.7	8.4	1.8	.0	23.9
Other yellow pines	.5	.0	.0	.0	.5
Total softwoods	150.9	27.9	7.0	.0	185.8
Red maple	51.4	15.1	2.0	.0	68.4
Hickory	18.9	1.6	.0	.0	20.5
Beech	19.1	.4	.6	.0	20.1
Sweetgum	53.8	22.0	3.4	.0	79.2
Yellow-poplar	35.1	2.5	1.9	.0	39.5
Blackgum	14.3	2.2	.0	.0	16.5
Ash-walnut-cherry	11.4	1.1	1.1	.0	13.6
Select white oaks	47.3	13.7	3.4	.0	64.4
Select red oaks	5.7	.7	.0	.0	6.3
Other white oaks	.5	.0	.0	.0	.5
Other red oaks	48.6	12.9	2.3	.0	63.7
Other hardwoods	4.2	1.1	.1	.0	5.4
Total hardwoods	310.2	73.2	14.8	.0	398.2
Total, all species	461.1	101.1	21.8	.0	583.9

Table 29.--Net volume of growing-stock trees on timberland by species
and stand-size class, Delaware, 1986

(In millions of cubic feet)

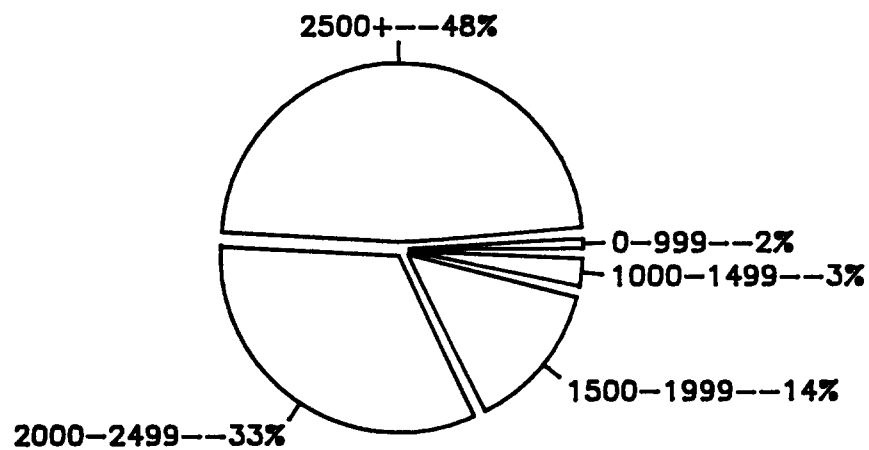
Species	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and		
			seedling	Nonstocked	
Loblolly pine	121.2	21.2	.7	.0	143.1
Virginia pine	24.7	6.8	1.0	.0	32.6
Other softwoods	.1	.0	.0	.0	.1
Total softwoods	146.1	28.1	1.8	.0	175.9
Red maple	94.0	14.9	.9	.0	109.8
Hickory	5.7	.1	.5	.0	6.3
Beech	7.8	1.4	.3	.0	9.5
Sweetgum	64.5	14.8	3.9	.0	83.1
Yellow-poplar	28.7	.8	1.6	.0	31.1
Blackgum	22.4	3.8	.6	.0	26.8
Ash-walnut-cherry	23.2	.8	.0	.0	24.0
Select white oaks	54.2	11.9	1.4	.0	67.5
Select red oaks	13.0	.0	1.0	.0	14.0
Other white oaks	5.1	.0	.0	.0	5.1
Other red oaks	62.9	16.3	1.5	.0	80.7
Other hardwoods	6.5	3.3	.2	.0	10.1
Total hardwoods	388.1	68.1	11.9	.0	468.1
Total, all species	534.2	96.1	13.6	.0	643.9

Table 30.--Net volume of growing-stock trees on timberland by species and cubic-foot stand-volume class, Delaware, 1986

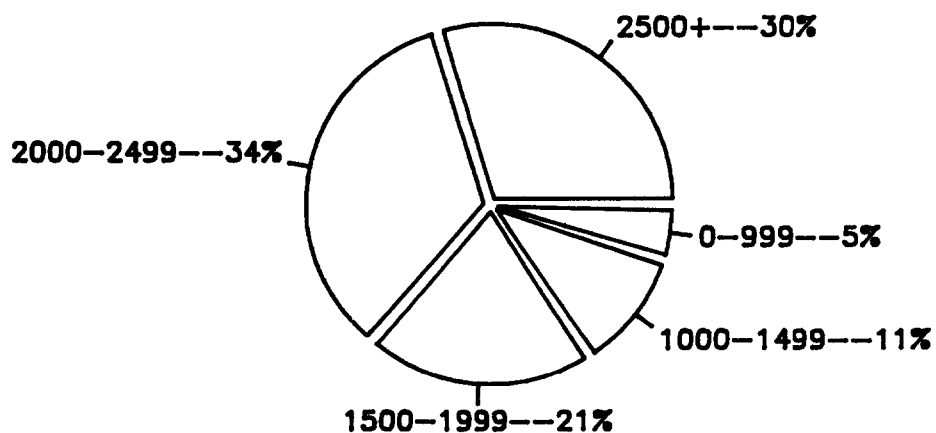
(In millions of cubic feet)

Species	Stand-volume class (cubic feet per acre)						All classes
	0-499	500-999	1000-1499	1500-1999	2000-2499	2500+	
Loblolly pine	1.1	.4	4.7	18.8	46.6	71.5	143.1
Virginia pine	.0	1.6	1.1	6.3	11.3	12.2	32.6
Other softwoods	.0	.0	.0	.0	.0	.1	.1
Total softwoods	1.1	1.9	5.8	25.2	57.9	83.9	175.9
Red maple	.4	2.6	12.4	17.0	32.9	44.4	109.8
Hickory	.4	.2	.1	3.8	.4	1.4	6.3
Beech	.0	.3	.8	.3	1.2	6.9	9.5
Sweetgum	1.3	4.1	4.6	11.5	31.2	30.4	83.1
Yellow-poplar	.0	1.6	.3	3.0	14.1	12.1	31.1
Blackgum	.7	.5	2.0	4.7	6.5	12.4	26.8
Ash-walnut-cherry	.0	.0	3.1	4.6	9.5	6.8	24.0
Select white oaks	.7	3.6	13.9	20.4	22.5	6.3	67.5
Select red oaks	1.0	.0	1.3	4.4	2.3	5.0	14.0
Other white oaks	.0	.0	.0	.5	4.7	.0	5.1
Other red oaks	1.4	3.5	12.5	25.0	29.0	9.4	80.7
Other hardwoods	.2	.6	.5	1.1	3.7	4.1	10.1
Total hardwoods	6.3	16.9	51.4	96.4	157.9	139.2	468.1
Total, all species	7.4	18.8	57.2	121.5	215.8	223.1	643.9

PERCENT GROWING-STOCK VOLUME BY CUBIC-FOOT STAND-VOLUME CLASS AND SPECIES GROUP



Softwood



Hardwood

Table 31.--Net volume of growing-stock trees on timberland by species and diameter class, Delaware, 1972

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+	
Loblolly pine	11.6	24.0	35.0	27.5	30.3	15.8	7.8	4.4	3.6	.0	160.0
Virginia pine	3.9	6.2	5.4	3.0	1.8	1.3	1.2	.4	.4	.0	23.7
Other yellow pines	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.4
Total softwoods	15.5	30.3	40.5	30.9	32.0	17.1	9.0	4.8	4.1	.0	184.1
Red maple	12.8	9.5	9.1	11.6	6.9	7.3	4.7	4.7	3.6	1.4	71.5
Hickory	1.8	3.1	3.3	3.8	3.2	2.4	2.3	.3	.9	.0	21.1
Beech	.7	1.2	1.3	1.3	2.3	.5	2.2	3.6	4.4	.3	17.8
Sweetgum	8.4	16.3	18.1	14.1	5.8	7.3	7.6	2.2	2.3	.0	82.0
Yellow-poplar	.3	3.4	3.7	4.8	4.7	4.2	3.3	3.7	9.8	.5	38.5
Blackgum	1.9	1.1	1.5	2.6	4.0	3.5	.4	1.0	.3	.0	16.4
Ash-walnut-cherry	1.3	3.2	1.2	1.1	1.1	1.9	1.3	.0	.9	.6	12.5
Select white oaks	5.2	9.6	12.3	13.4	9.6	3.2	4.1	2.0	3.6	.3	63.3
Select red oaks	1.4	.7	1.0	.0	.0	.4	.9	.4	.4	1.0	6.3
Other white oaks	.0	.2	.0	.0	.0	.0	.0	.0	.2	.0	.5
Other red oaks	6.1	8.9	7.1	13.6	6.1	7.9	4.2	5.3	4.6	.8	64.6
Other hardwoods	1.4	1.0	.5	.0	.0	1.5	.4	.5	.0	.0	5.3
Total hardwoods	41.3	58.3	59.2	66.3	43.6	40.2	31.2	23.8	31.1	4.8	399.9
Total, all species	56.8	88.5	99.7	97.2	75.7	57.3	40.2	28.5	35.1	4.8	583.9

Table 32.--Net volume of growing-stock trees on timberland by species and diameter class, Delaware, 1986

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+	
Loblolly pine	12.2	24.0	23.8	22.8	22.2	18.3	10.1	5.0	4.7	.0	143.1
Virginia pine	2.7	6.6	10.4	7.0	3.8	1.0	.4	.0	.6	.0	32.6
Other softwoods	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.1
Total softwoods	14.9	30.6	34.3	29.9	26.1	19.3	10.5	5.0	5.3	.0	175.9
Red maple	14.4	17.8	21.9	18.7	12.8	9.3	6.0	1.8	6.8	.4	109.8
Hickory	.9	.8	1.0	.5	1.3	.5	.0	.0	1.4	.0	6.3
Beech	.8	1.2	.6	1.2	.7	1.8	.0	.5	2.6	.0	9.5
Sweetgum	7.5	11.5	14.3	13.3	12.5	9.6	5.6	4.2	4.6	.0	83.1
Yellow-poplar	.5	.6	1.4	.5	2.4	4.9	6.9	2.1	6.3	5.6	31.1
Blackgum	3.5	3.8	7.4	5.1	4.2	1.4	1.0	.5	.0	.0	26.8
Ash-walnut-cherry	1.5	2.5	3.4	4.4	4.2	.9	4.2	1.2	1.5	.0	24.0
Select white oaks	4.5	6.3	8.6	10.5	8.1	7.2	5.3	5.4	9.3	2.3	67.5
Select red oaks	.1	.5	1.8	1.6	2.3	.5	1.8	.0	4.0	1.4	14.0
Other white oaks	.1	.0	.7	.7	.0	.4	1.0	.7	1.6	.0	5.1
Other red oaks	5.7	8.0	11.3	14.4	14.9	8.0	8.1	4.7	3.9	1.6	80.7
Other hardwoods	3.8	2.1	2.9	.6	.0	.0	.0	.0	.7	.0	10.1
Total hardwoods	43.3	55.2	75.2	71.4	63.4	44.5	39.9	21.1	42.6	11.3	468.1
Total, all species	58.2	85.8	109.5	101.3	89.5	63.8	50.4	26.1	47.9	11.3	643.9

Table 33.--Net volume of growing-stock in the sawlog portion^a of sawtimber trees on timberland by species and diameter class, Delaware, 1986

(In millions of cubic feet)

Species	Diameter class (inches at breast height)								All classes
	9.0-	11.0-	13.0-	15.0-	17.0-	19.0-	21.0-		
	10.9	12.9	14.9	16.9	18.9	20.9	28.9	29.0+	
White/red pine	.0	.0	.0	.0	.0	.0	.0	.0	.0
Loblolly pine	20.0	19.9	19.9	16.6	9.3	4.6	4.4	.0	94.7
Virginia pine	8.7	6.1	3.4	.9	.4	.0	.5	.0	20.1
Other softwoods	.1	.0	.0	.0	.0	.0	.0	.0	.1
Total softwoods	28.8	26.0	23.3	17.6	9.7	4.7	5.0	.0	115.0
Red maple	.0	13.8	10.5	7.8	5.4	1.5	5.8	.3	45.0
Hickory	.0	.4	1.0	.4	.0	.0	1.2	.0	3.0
Beech	.0	.9	.6	1.5	.0	.4	2.2	.0	5.6
Sweetgum	.0	9.8	10.1	8.0	4.9	3.5	3.9	.0	40.3
Yellow-poplar	.0	.3	1.9	4.1	5.8	1.8	5.3	4.8	24.1
Blackgum	.0	3.7	3.4	1.1	.9	.4	.0	.0	9.5
Ash-walnut-cherry	.0	3.2	3.4	.8	3.6	1.1	1.3	.0	13.4
Select white oaks	.0	7.7	6.6	6.1	4.5	4.6	7.9	2.0	39.3
Select red oaks	.0	1.2	1.9	.4	1.7	.0	3.4	1.2	9.7
Other white oaks	.0	.5	.0	.3	.8	.6	1.3	.0	3.6
Other red oaks	.0	10.6	12.1	6.7	6.9	4.0	3.3	1.4	45.1
Other hardwoods	.0	.4	.0	.0	.0	.0	.6	.0	1.0
Total hardwoods	.0	52.6	51.5	37.4	34.5	18.0	36.2	9.6	239.8
Total, all species	28.8	78.5	74.8	55.0	44.2	22.6	41.2	9.6	354.8

^a That part of the bole of sawtimber trees between the 1-foot stump and the sawlog top, including the portion of the forks large enough to contain a sawlog.

MAJOR SPECIES BY VOLUME (Millions of board feet)

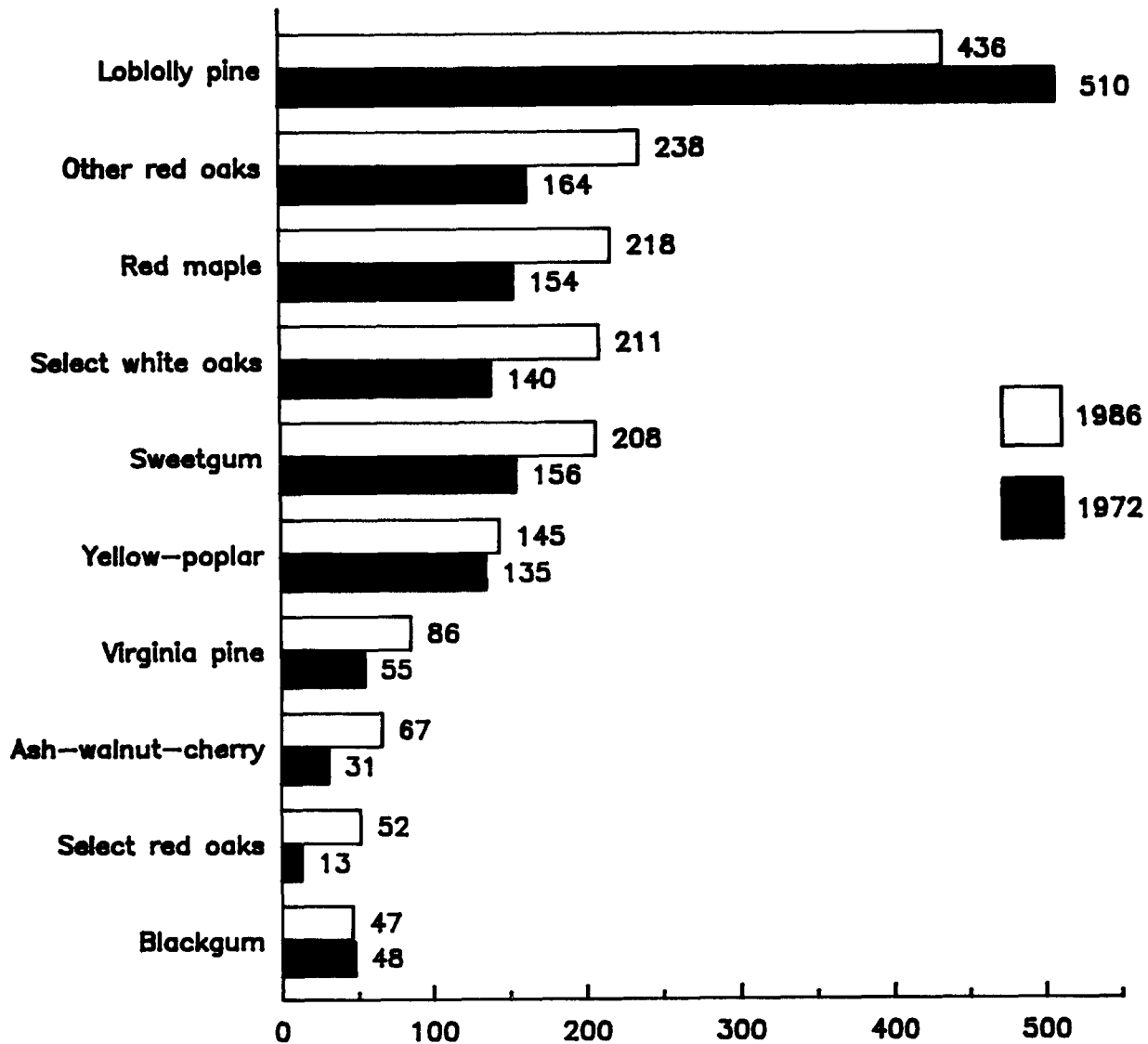


Table 34.--Net volume of sawtimber trees on timberland by species and diameter class, Delaware, 1972

(In millions of board feet)^a

Species	Diameter class (inches at breast height)								All classes
	9.0-	11.0-	13.0-	15.0-	17.0-	19.0-	21.0-		
	10.9	12.9	14.9	16.9	18.9	20.9	28.9	29.0+	
Loblolly pine	127.2	112.6	128.1	70.6	35.2	19.8	16.8	.0	510.2
Virginia pine	20.6	12.5	7.1	5.6	5.4	1.7	1.8	.0	54.9
Other yellow pines	.0	1.5	.0	.0	.0	.0	.0	.0	1.5
Total softwoods	147.8	126.6	135.3	76.2	40.6	21.5	18.7	.0	566.7
Red maple	.0	40.2	26.9	28.6	18.4	19.6	14.4	6.4	154.4
Hickory	.0	12.8	12.5	10.5	9.7	1.4	4.1	.0	51.1
Beech	.0	5.5	8.7	2.2	9.2	15.3	21.6	1.2	63.8
Sweetgum	.0	50.1	23.4	30.6	32.1	8.9	10.5	.0	155.6
Yellow-poplar	.0	16.7	19.0	15.9	13.2	17.8	49.7	2.9	135.4
Blackgum	.0	9.0	15.4	15.2	1.9	4.8	1.7	.0	48.0
Ash-walnut-cherry	.0	3.8	4.6	8.6	6.9	.0	3.9	3.4	31.2
Select white oaks	.0	48.8	38.2	14.2	14.4	8.6	13.8	1.5	139.5
Select red oaks	.0	.0	.0	1.3	4.1	1.5	1.7	4.6	13.2
Other white oaks	.0	.0	.0	.0	.0	.0	1.3	.0	1.3
Other red oaks	.0	47.3	22.5	32.3	16.8	22.3	18.0	4.5	163.7
Other hardwoods	.0	.0	.0	6.4	1.5	1.6	.0	.0	9.5
Total hardwoods	.0	234.2	171.3	165.8	128.4	101.8	140.6	24.4	966.5
Total, all species	147.8	360.8	306.6	242.0	168.9	123.4	159.3	24.4	1,533.2

^a International 1/4-inch rule.

Table 35.--Net volume of sawtimber trees on timberland by species and diameter class, Delaware, 1986

(In millions of board feet)^a

Species	Diameter class (inches at breast height)								All classes
	9.0-	11.0-	13.0-	15.0-	17.0-	19.0-	21.0-		
	10.9	12.9	14.9	16.9	18.9	20.9	28.9	29.0+	
Loblolly pine	78.4	89.0	93.7	81.7	46.3	24.1	22.9	.0	436.1
Virginia pine	34.7	26.8	15.5	4.6	2.0	.0	2.8	.0	86.4
Other softwoods	.4	.0	.0	.0	.0	.3	.0	.0	.7
Total softwoods	113.6	115.8	109.2	86.3	48.3	24.4	25.6	.0	523.2
Red maple	.0	62.8	49.2	36.4	24.7	8.2	34.9	2.3	218.4
Hickory	.0	1.9	5.8	2.2	.0	.0	8.1	.0	18.0
Beech	.0	4.5	2.8	9.3	.0	2.8	15.8	.0	35.4
Sweetgum	.0	47.1	50.3	42.2	24.6	20.4	23.4	.0	208.1
Yellow-poplar	.0	1.8	9.8	22.1	32.8	10.2	34.8	33.3	144.6
Blackgum	.0	18.4	16.5	5.6	4.4	1.9	.0	.0	46.9
Ash-walnut-cherry	.0	15.3	15.8	3.6	18.9	5.9	7.3	.0	66.8
Select white oaks	.0	39.4	32.8	31.6	25.1	25.6	45.7	10.3	210.6
Select red oaks	.0	5.8	9.4	1.4	8.4	.0	19.7	7.8	52.4
Other white oaks	.0	2.3	.0	1.5	4.1	3.4	7.7	.0	19.0
Other red oaks	.0	51.0	60.0	34.5	38.1	23.5	20.0	10.5	237.6
Other hardwoods	.0	2.2	.0	.0	.0	.0	3.8	.0	6.0
Total hardwoods	.0	252.5	252.6	190.4	181.2	102.0	221.2	64.1	1,264.0
Total, all species	113.6	368.2	361.8	276.7	229.5	126.4	246.8	64.1	1,787.1

^a International 1/4-inch rule.

Table 36.--Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Delaware, 1972

(In millions of board feet)^a

Species	All size classes				All grades	>15" Diameter at breast height				All grades
	Grade 1	Grade 2	Grade 3	Grade 4		Grade 1	Grade 2	Grade 3	Grade 4	
Loblolly pine	44.4	53.9	411.9	.0	510.2	17.2	15.5	109.6	.0	142.3
Virginia pine	.0	3.3	51.6	.0	54.9	.0	.9	13.8	.0	14.7
Other yellow pines	.0	.0	1.5	.0	4.2	.0	.0	.0	.0	.0
Total softwoods	44.4	57.2	465.1	.0	566.7	17.2	16.4	123.4	.0	157.0
Red maple	2.0	10.4	79.7	62.2	154.3	1.4	6.3	45.6	34.0	87.3
Hickory	3.0	5.5	20.2	22.4	51.1	3.0	3.9	8.5	10.4	25.8
Beech	.3	1.4	20.4	41.7	63.8	.3	1.4	18.1	29.9	49.7
Sweetgum	9.0	16.6	69.7	60.3	155.6	8.1	11.7	35.4	26.9	82.1
Yellow-poplar	16.6	28.5	43.1	47.2	135.4	13.2	23.7	29.4	33.3	99.6
Blackgum	9.2	9.2	22.3	7.3	48.0	7.6	5.0	9.1	1.9	23.6
Ash-walnut-cherry	7.2	8.5	10.0	5.5	31.2	7.2	5.6	5.8	4.2	22.8
Select white oaks	9.0	25.7	51.6	53.1	139.4	7.8	11.3	19.3	14.0	52.4
Select red oaks	3.1	4.4	3.6	2.1	13.2	3.1	4.4	3.6	2.1	13.2
Other white oaks	.0	.0	.0	1.3	1.3	.0	.0	.0	1.3	1.3
Other red oaks	8.1	20.3	60.0	75.3	163.7	8.1	17.2	34.0	34.6	93.9
Other hardwoods	2.7	1.8	2.3	2.7	9.5	7.3	1.8	2.4	2.6	93.0
Total hardwoods	70.2	132.3	382.9	381.1	966.5	62.4	92.3	211.1	195.2	561.0
Percent of hardwood in each grade	7	14	40	39	100	11	16	38	35	100

^aInternational 1/4-inch rule.

Table 37.--Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Delaware, 1986

(In millions of board feet)^a

Species	All size classes				All grades	>15" Diameter at breast height				All grades
	Grade 1	Grade 2	Grade 3	Grade 4		Grade 1	Grade 2	Grade 3	Grade 4	
Loblolly pine	90.3	51.0	294.7	.0	436.1	53.6	18.5	102.9	.0	175.0
Virginia pine	1.1	4.9	80.4	.0	86.4	.0	1.9	7.4	.0	9.3
Other softwoods	.4	.0	.1	.2	.7	.0	.0	.1	.2	.3
Total softwoods	91.8	55.9	375.2	.2	523.2	53.6	20.4	110.3	.2	184.6
Red maple	.0	24.8	96.4	97.3	218.4	.0	16.1	43.5	46.8	106.4
Hickory	1.5	2.6	9.4	4.4	18.0	1.5	.6	5.9	2.2	10.3
Beech	.2	.0	25.2	9.9	35.4	.2	.0	24.0	3.8	28.0
Sweetgum	15.2	41.4	75.3	76.2	208.1	13.7	23.0	34.1	39.8	110.7
Yellow-poplar	24.7	35.8	40.0	44.3	144.6	24.7	35.4	34.1	39.0	133.1
Blackgum	1.1	15.6	25.6	4.6	46.9	1.1	4.5	5.6	.8	12.0
Ash-walnut-cherry	.6	9.3	39.9	17.0	66.8	.0	5.7	22.6	7.4	35.7
Select white oaks	17.9	41.7	82.5	68.5	210.6	17.3	28.0	45.6	47.3	138.3
Select red oaks	7.8	5.7	23.9	15.1	52.4	7.8	4.8	13.4	11.2	37.3
Other white oaks	1.3	3.4	5.6	8.8	19.0	1.3	3.4	5.6	6.5	16.7
Other red oaks	5.3	38.2	81.4	112.6	237.6	5.3	20.9	41.2	59.2	126.6
Other hardwoods	.0	.5	3.7	1.7	6.0	.0	.0	3.2	.6	3.8
Total hardwoods	75.6	219.0	509.0	460.4	1,264.0	72.9	142.4	278.9	264.6	758.9
Percent of hardwood in each grade	6	17	41	36	100	10	19	36	35	100

^a International 1/4-inch rule.

Table 38.--Average annual net change of growing-stock volume on timberland by species and component, Delaware, 1972-86

(In thousands of cubic feet)

Species	Ingrowth	Accretion	Gross growth	Mortality	Cull increment	Net growth	Removals	Net change
Loblolly pine	902	2,790	3,692	-833	0	2,859	-4,014	-1,155
Other softwoods	257	1,509	1,766	-552	0	1,214	-622	592
Total softwoods	1,159	4,299	5,458	-1,385	0	4,073	-4,636	-563
Red maple	1,070	2,411	3,482	-215	-115	3,151	-527	2,624
Sweetgum	233	1,291	1,525	-563	-424	537	-466	71
Select white oaks	266	1,606	1,872	-209	-8	1,654	-1,370	284
Select red oaks	26	604	629	-90	-9	530	0	530
Other white oaks	81	240	321	0	0	321	0	321
Other red oaks	632	3,031	3,664	-1,251	-50	2,362	-1,259	1,103
Other hardwoods	343	1,130	1,473	-370	-246	856	-1,119	-263
Total hardwoods	2,651	10,313	12,966	-2,698	-852	9,411	-4,741	4,670
Total, all species	3,810	14,612	18,424	-4,083	-852	13,484	-9,377	4,107

Table 39.--Average annual net growth and average annual removals of growing-stock volume on timberland by species, Delaware, 1972-86

(In thousands of cubic feet)

Species	Net growth	Removals
Loblolly pine	2,859	-4,014
Other softwoods	1,214	-622
Total softwoods	4,073	-4,636
Red maple	3,151	-527
Sweetgum	537	-466
Select white oaks	1,654	-1,370
Select red oaks	530	0
Other white oaks	321	0
Other red oaks	2,362	-1,259
Other hardwoods	856	-1,119
Total hardwoods	9,411	-4,741
Total, all species	13,484	-9,377

Table 40.--Average annual net growth and average annual removals of growing-stock volume on timberland by ownership class and species group, Delaware, 1972-87

(In thousands of cubic feet)

Ownership class	Growth			Removals		
	Softwoods	Hardwoods	All groups	Softwoods	Hardwoods	All groups
Public	774	1,600	2,374	-139	-142	-281
Private	3,299	7,811	11,110	-4,497	-4,599	-9,096
Total, all classes	4,073	9,411	13,484	-4,636	-4,741	-9,377

Errata Sheet

Frieswyk, Thomas S.; Digiovanni, Dawn M. 1989.
Forest Statistics for Delaware--1972 and 1986.
 Resour. Bull. NE-109. Broomall, PA: U.S.
 Department of Agriculture, Forest Service,
 Northeastern Forest Experiment Station. 86 p.

**Table 41.--Average annual mortality of growing-stock
 and sawtimber volume on timberland by species,
 Delaware, 1972-86**

Species	Growing stock	Sawtimber
	(In thousands of cubic feet)	(In thousands of board feet) ^a
Loblolly pine	-833	-1,153
Other softwoods	-552	-1,292
Total softwoods	-1,385	-2,445
Red maple	-215	-1,344
Sweetgum	-563	-1,303
Select white oaks	-209	-540
Select red oaks	-90	-259
Other white oaks	0	0
Other red oaks	-1,251	-5,583
Other hardwoods	-370	0
Total hardwoods	-2,698	-9,029
Total, all species	-4,083	-11,474

^aInternational 1/4-inch rule.

Table 42.--Average annual net growth and average annual removals
of sawtimber volume on timberland by species,
Delaware, 1972-86

(In thousands of board feet)^a

Species	Net growth	Removals
Loblolly pine	8,763	-13,843
Other softwoods	3,493	-1,393
Total softwoods	12,256	-15,236
Red maple	5,103	-717
Sweetgum	4,698	-1,101
Select white oaks	8,166	-3,293
Select red oaks	2,688	0
Other white oaks	1,217	0
Other red oaks	8,528	-3,463
Other hardwoods	2,938	-4,392
Total hardwoods	33,338	-12,966
Total, all species	45,594	-28,202

^a International 1/4-inch rule.

Table 43.--Average annual net growth and average annual removals of sawtimber
volume on timberland by ownership class and species group,
Delaware, 1972-86

(In thousands of board feet)^a

Ownership class	Growth			Removals		
	Softwoods	Hardwoods	All groups	Softwoods	Hardwoods	All groups
Public	2,451	5,001	7,452	-152	-908	-1,081
Private	9,805	28,337	38,242	-15,084	-12,058	-27,042
All classes	12,256	33,338	45,594	-15,236	-12,966	-28,123

^a International 1/4-inch rule.

Table 44.--Output^a of timber products by product, softwoods and hardwoods, and source of material, Delaware, 1985

(In standard units and thousands of cubic feet)

Product and species	Standard units ^b	Output from roundwood		Output from plant byproducts		Total output	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs		INDUSTRIAL PRODUCTS					
Softwoods	M board feet	2,525	417	0	0	2,525	417
Hardwoods	M board feet	16,145	2,448	0	0	16,145	2,448
Total	M board feet	18,670	2,865	0	0	18,670	2,865
Veneer							
Softwoods	M board feet	2,000	330	0	0	2,000	330
Hardwoods	M board feet	741	112	0	0	741	112
Total	M board feet	2,741	442	0	0	2,741	442
Pulpwood ^c							
Softwoods	Standard cords	17,261	1,467	271	23	17,532	1,490
Hardwoods	Standard cords	1,171	100	988	84	2,159	184
Total	Standard cords	18,432	1,567	1,259	107	19,691	1,674
Other products ^d							
Softwoods	M board feet	962	203	0	0	962	203
Hardwoods	M board feet	990	182	0	0	990	182
Total	M board feet	1,952	385	0	0	1,952	385
		TOTAL, INDUSTRIAL PRODUCTS					
Softwoods			2,417		23		2,440
Hardwoods			2,842		84		2,926
Total			5,259		107		5,366
Fuelwood ^e		NONINDUSTRIAL PRODUCTS					
Softwoods	Standard cords	1,550	124	3,675	294	5,225	418
Hardwoods	Standard cords	12,988	1,039	4,925	394	17,913	1,433
Total	Standard cords	14,538	1,163	8,600	688	23,138	1,851
		TOTAL, ALL PRODUCTS ^f					
Softwoods			2,541		317		2,858
Hardwoods			3,881		478		4,359
Total			6,422		795		7,217

^aThe volume of wood received at manufacturing plants that used roundwood products.

^bBoard feet is expressed on the International 1/4-inch rule basis and standard cords is expressed on a rough wood basis (includes both roundwood and chips).

^cA standard cord of pulpwood is equivalent to 85 cubic feet of solid wood.

^dIncludes poles and piling.

^eA standard cord of fuelwood is equivalent to 80 cubic feet of solid wood.

^fDoes not include 198,000 cubic feet of softwood and 625,000 cubic feet of hardwood residues used for agricultural bedding.

Table 45.--Output of roundwood products by product, softwoods and hardwoods, and source of material,^a Delaware, 1985

(In thousands of cubic feet)

Product and species	Growing-stock trees			Rough or rotten cull trees	Salvable dead trees	Other sources	All sources
	Poletimber	Sawtimber	Total				
Sawlogs	INDUSTRIAL PRODUCTS						
Softwoods	0	337	337	1	0	79	417
Hardwoods	5	2,201	2,206	130	24	88	2,448
Total	5	2,538	2,543	131	24	167	2,865
Veneer							
Softwoods	0	268	268	0	0	62	330
Hardwoods	0	108	108	0	0	4	112
Total	0	376	376	0	0	66	442
Pulpwood							
Softwoods	20	1,406	1,426	23	15	3	1,467
Hardwoods	42	51	93	3	1	3	100
Total	62	1,457	1,519	26	16	6	1,567
Other products							
Softwoods	0	164	164	1	0	38	203
Hardwoods	0	163	163	10	2	7	182
Total	0	327	327	11	2	45	385
TOTAL, INDUSTRIAL PRODUCTS							
Softwoods	20	2,175	2,195	25	15	182	2,417
Hardwoods	47	2,523	2,570	143	27	102	2,842
Total	67	4,698	4,765	168	42	284	5,259
Fuelwood	NONINDUSTRIAL PRODUCTS						
Softwoods	4	6	10	33	36	45	124
Hardwoods	12	75	87	275	304	373	1,039
Total	16	81	97	308	340	418	1,163
TOTAL, ALL PRODUCTS							
Softwoods	24	2,181	2,205	58	51	227	2,541
Hardwoods	59	2,598	2,657	418	331	475	3,881
Total	83	4,779	4,862	476	382	702	6,422

^aGrowing-stock trees, rough or rotten cull trees, and salvable dead trees are from timberland only. Other sources include trees less than 5.0 inches in diameter at breast height and tree tops and limbs from timberland, as well as any material from nontimberland or nonforest land such as fencerows, pastureland, and urban areas.

Table 46.--Timber removals from growing stock and sawtimber on timberland by component^a and softwoods and hardwoods, Delaware, 1985

Components of timber removals	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species
	----- Thousand cubic feet -----			----- Thousand board feet ^b -----		
Roundwood products						
Sawlogs	337	2,206	2,543	1,497	11,536	13,033
Veneer	268	108	376	1,190	566	1,756
Pulpwood	1,426	93	1,519	4,143	208	4,351
Other products	164	163	327	728	854	1,582
Fuelwood	10	87	97	18	306	324
All products	2,205	2,657	4,862	7,576	13,470	21,046
Logging residue	56	462	518	13	368	381
Total removals	2,271	3,206	5,477	7,607	14,144	21,751

^aLogging residue does not include material from tree tops and limbs.

^bInternational 1/4-inch rule.

Table 47.--Volume of unused residues from primary manufacturing plants by softwoods and hardwoods, type of residue, and industry, Delaware, 1985

(In thousands of cubic feet)

Species and type of residue	Lumber	Veneer	Other industries	All industries
Softwoods				
Coarse ^a	1	0	0	1
Fine ^b	3	0	0	3
Total	4	0	0	4
Hardwoods				
Coarse	0	0	0	0
Fine	3	0	0	3
Total	3	0	0	3
All species				
Coarse	1	0	0	1
Fine	6	0	0	6
Total	7	0	0	7

^aIncludes slabs, edgings, trimmings, veneer cores, and other material suitable for chipping.

^bIncludes sawdust, shavings, and other materials considered unsuitable for chipping.

Table 48.--Change in area of timberland between inventories by forest-type group and stand-size class, Delaware, 1972-86

(In thousands of acres)				
Group or class	1972	1986	Change	Change
				<u>Percent</u>
FOREST-TYPE GROUP				
Loblolly/shortleaf	83.9	81.0	-2.9	-3
Oak/pine	64.2	60.3	-3.9	-61
Oak/hickory	110.0	157.1	47.1	43
Oak/gum/cypress	89.5	57.9	-31.6	-35
Elm/ash/red maple	30.6	10.3	-20.3	-66
Northern hardwoods	4.5	9.8	5.3	123
Total, all groups	382.6	376.4	-6.2	-2
STAND-SIZE CLASS				
Sawtimber	212.3	237.9	25.6	12
Poletimber	92.4	69.7	-22.7	-25
Sapling and seedling	77.9	68.8	-9.1	-12
Nonstocked	.0	.0		0
Total, all classes	382.6	376.4	-6.2	-2

Table 49.--Change in volume between inventories, Delaware, 1972-86

Species	Growing-stock volume				Sawtimber volume			
	1972	1986	Change	Change	1972	1986	Change	Change
	--- Millions of cubic feet ---		Percent		--- Millions of board feet ^a ---		Percent	
Loblolly pine	160.0	143.0	-16.9	-11	510.2	436.1	-74.1	-15
Other softwoods	24.1	32.7	8.6	36	56.4	87.1	30.7	55
Total softwoods	184.1	175.7	-8.4	5	566.6	523.2	-43.4	-8
Red maple	71.5	109.8	38.3	56	154.4	218.4	64.0	42
Sweetgum	82.0	83.1	1.1	1	155.6	208.1	52.6	34
Select white oaks	63.3	67.5	4.2	7	139.5	210.6	71.1	51
Select red oaks	6.3	14.0	7.7	122	13.2	52.4	39.2	297
Other white oaks	.5	5.1	4.6	920	1.3	19.0	17.7	1,362
Other red oaks	64.6	80.7	16.1	25	163.7	237.6	73.9	45
Other hardwoods	111.6	107.8	-3.8	-3	339.0	317.7	-21.3	-6
Total hardwoods	399.9	468.1	68.2	17	966.5	1,264.0	297.5	31
Total, all species	583.9	643.9	60.0	10	1,533.2	1,787.1	253.9	17

^a International 1/4-inch rule.

Table 50.--Sampling errors for estimates in various state level tables,
Delaware, 1972 and 1986

(In percents)

Area by forest-type group (Table 3)	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and		
			seedling	Nonstocked	
Loblolly/shortleaf	29	70	36	0	20
Oak/pine	30	58	76	0	25
Oak/hickory	16	31	37	0	12
Oak/gum/cypress	30	49	100	0	50
Elm/ash/red maple	73	0	100	0	61
Northern hardwoods	58	0	0	0	58
Aspen/birch	8	21	21	0	3
All groups	8.2	20.8	21.1	0	3.0

Species	Number of trees	Growing-stock volume		Sawtimber volume	
	(Table 19) (5"+)	Tables		Tables	
		(31)	(32)	(34)	(35)
White/red pine	100	0	100	0	100
Loblolly pine	22	17	17	18	17
Virginia pine	33	27	36	32	36
Other yellow pines	0	100	0	100	0
Other softwoods	100	0	100	0	100
Total softwoods	20	15	16	17	16
Red maple	14	19	15	26	20
Hickory	38	26	38	30	46
Beech	43	54	60	60	77
Sweetgum	16	21	16	26	20
Yellow-poplar	31	27	29	31	31
Blackgum	23	34	34	39	49
Ash-walnut-cherry	30	51	33	67	37
Select white oaks	16	19	15	24	18
Select red oaks	35	37	30	37	30
Other white oaks	54	70	54	100	61
Other red oaks	16	16	14	20	15
Other hardwoods	27	35	32	65	67
Total hardwoods	8	8	8	11	10
Total, all species	7.3	4.8	6.5	7.0	7.8

COUNTY TABLES

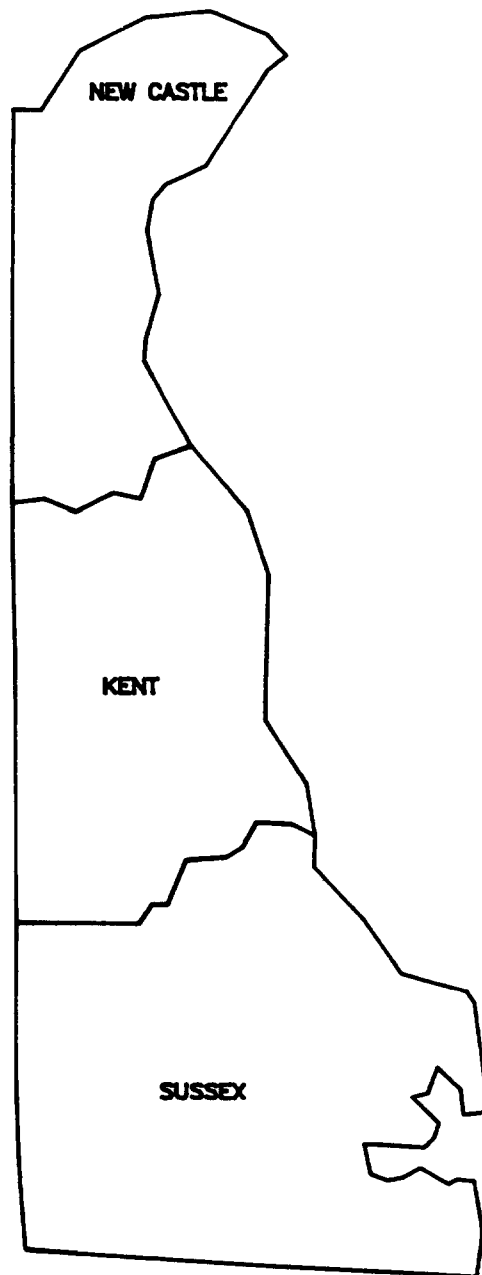


Table 51.--Land area by county and land class, Delaware, 1986

Land class	Sussex	Kent/ New Castle	All counties
Timberland	217.6	158.8	376.4
Noncommercial forest land:			
Productive reserved	.2	2.7	2.9
Unproductive	3.8	3.0	6.8
Urban	.0	3.4	3.4
Total forest	221.6	167.9	389.5
Nonforest land:			
Cropland ^a	258.2	250.5	508.7
Pasture ^a	12.7	12.2	24.9
Other farmland	23.6	43.3	66.9
Other land	86.7	160.0	246.7
Total nonforest	381.2	466.0	847.2
Total land area ^b	602.8	633.9	1,236.7

^a Source: 1982 Census of Agriculture.

^b Source: 1981 United States Department of Commerce, Bureau of Census.

Table 52.--Area of timberland by county and ownership class, Delaware, 1986

(In thousands of acres)

County	Ownership class										All classes
	National Forest	Other federal	State forest	Other state	County and municipal	Forest industry	Miscellaneous private				
							Farmer	individual	corporations	other	
Sussex	.0	.0	4.7	2.6	.0	31.1	36.8	122.2	24.1	10.1	231.6
Kent/New Castle	.0	.0	1.6	4.6	.0	.0	34.9	92.4	8.6	2.7	144.8
State total	.0	.0	6.3	7.2	.0	31.1	71.7	214.6	32.7	12.8	376.4

Table 53.--Area of timberland by county and forest-type group, Delaware, 1986

(In thousands of acres)

County	Forest-type group						All groups
	Loblolly/ shortleaf	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern / hardwoods	
Sussex	72.4	48.2	70.1	31.9	5.0	3.9	231.6
Kent/New Castle	8.6	12.1	87.0	26.0	5.2	5.9	144.8
State Total	81.0	60.3	157.1	57.9	10.3	9.8	376.4

Table 54.--Area of timberland by county and stand-size class , Delaware, 1986

(In thousands of acres)

County	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and		
			seedling	Nonstocked	
Sussex	134.4	42.4	54.8	.0	231.6
Kent/New Castle	103.5	27.4	14.0	.0	144.8
State Total	237.9	69.7	68.8	.0	376.4

Table 55.--Area of timberland by county and cubic-foot stand-volume class, Delaware, 1986

(In thousands of acres)

County	Stand-volume class (cubic feet per acre)						All classes
	0- 499	500- 999	1000- 1499	1500- 1999	2000- 2499	2500+	
Sussex	48.5	21.8	25.7	29.0	56.0	50.6	231.6
Kent/New Castle	11.0	8.9	20.2	41.6	40.3	22.8	144.8
State Total	59.5	30.7	45.9	70.6	96.2	73.4	376.4

Table 56.--Area of timberland by county and green ton stand-volume class, Delaware, 1986

(In thousands of acres)

County	Stand-volume class (green tons per acre)								All classes	
	0-	25-	50-	75-	100-	125-	150-	175-		
	24	49	74	99	124	149	174	199	200+	
Sussex	35.8	19.1	12.7	40.8	45.8	38.1	34.2	5.0	.0	231.6
Kent/New Castle	2.2	11.8	23.2	36.0	26.1	21.7	5.9	8.9	8.9	144.8
State Total	38.1	30.8	35.9	76.8	72.0	59.8	40.1	14.0	8.9	376.4

Table 57.--Area of timberland by county and stocking class of growing-stock trees, Delaware, 1986

(In thousands of acres)

County	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
Sussex	.0	3.9	8.9	41.6	177.1	231.6
Kent/New Castle	.0	.0	12.8	53.8	78.2	144.8
State Total	.0	3.9	21.7	95.4	255.3	376.4

Table 58.--Area of timberland by county and productivity class, Delaware, 1986

(In thousands of acres)

County	Productivity class (cubic feet/acre/year)				All classes
	Very good (120+)	Good (85-119)	Fair (50- 84)	Poor (20- 49)	
Sussex	10.1	38.2	100.3	83.0	231.6
Kent/New Castle	17.5	22.3	62.7	42.2	144.8
State Total	27.6	60.5	163.0	125.2	376.4

Table 59.--Net volume of growing-stock trees on timberland by county and forest-type group, Delaware, 1986

(In millions of cubic feet)

County	Forest-type group						All groups
	Loblolly/ shortleaf	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	
Sussex	123.2	94.2	71.8	58.4	7.6	3.1	358.3
Kent/New Castle	18.8	21.4	159.6	63.2	8.3	14.3	285.6
State Total	142.0	115.6	231.4	121.6	15.9	17.4	643.9

Table 60.--Net volume of growing-stock trees on timberland by county and stand-size class, Delaware, 1986

(In millions of cubic feet)

County	Stand-size class				All classes
	Sapling and				
	Sawtimber	Poletimber	seedling	Nonstocked	
Sussex	297.8	50.5	10.1	.0	358.3
Kent/New Castle	236.4	45.7	3.6	.0	285.6
State Total	534.2	96.1	13.6	.0	643.9

Table 61.--Net volume of growing-stock trees on timberland by species and county, Delaware, 1986

(In millions of cubic feet)

Species	Sussex	Kent/New Castle	All counties
Loblolly pine	128.9	14.2	143.1
Virginia pine	15.0	17.6	32.6
Other softwoods	.0	.1	.1
Total softwoods	143.9	32.0	175.9
Red maple	68.4	41.4	109.8
Hickory	3.2	3.1	6.3
Beech	1.2	8.3	9.5
Sweetgum	41.6	41.5	83.1
Yellow-poplar	5.2	26.0	31.1
Blackgum	16.5	10.3	26.8
Ash-walnut-cherry	6.2	17.8	24.0
Select white oaks	20.2	47.3	67.5
Select red oaks	2.7	11.3	14.0
Other white oaks	1.7	3.4	5.1
Other red oaks	42.7	38.0	80.7
Other hardwoods	4.9	5.2	10.1
Total hardwoods	214.4	253.7	468.1
Total, all species	358.3	285.6	643.9

Table 62.--Net volume of growing-stock and sawtimber trees on timberland by county and species group, Delaware, 1986

County	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All groups	Softwoods	Hardwoods	All groups
	-----Million cubic feet-----			-----Million board feet ^a -----		
Sussex	143.9	214.4	358.3	432.2	466.4	898.6
Kent/New Castle	32.0	253.7	285.6	91.0	797.5	888.5
State Total	175.9	468.1	643.9	523.2	1,264.0	1,787.1

^a International 1/4-inch rule.

Table 63.--Net volume of sawtimber trees on timberland by county and forest-type group, Delaware, 1986

(In millions of board feet)^a

County	Forest-type group						All groups
	Loblolly/ shortleaf	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	
Sussex	280.8	254.6	187.8	144.9	20.7	9.7	898.6
Kent/New Castle	53.0	38.5	538.5	184.9	31.0	42.5	888.5
State Total	333.8	293.1	726.3	329.8	51.8	52.3	1,787.1

^a International 1/4 inch rule.

Table 64.--Net volume of sawtimber trees on timberland by county and stand-size class, Delaware, 1986

(In millions of board feet)^a

County	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and		
			seedling	Nonstocked	
Sussex	809.8	69.5	19.4	.0	898.6
Kent/New Castle	800.8	78.0	9.7	.0	888.5
State Total	1,610.6	147.5	29.1	.0	1,787.1

^a International 1/4-inch rule.

Table 65.--Net volume of sawtimber trees on timberland by county and species, Delaware, 1986

(In millions of board feet)^a

Species	Sussex	Kent/New Castle	All counties
Loblolly pine	392.2	43.9	436.1
Virginia pine	40.0	46.4	86.4
Other softwoods	.0	.7	.7
Total softwoods	432.2	91.0	523.2
Red maple	119.9	98.5	218.4
Hickory	6.9	11.1	18.0
Beech	.0	35.4	35.4
Sweetgum	97.0	111.1	208.1
Yellow-poplar	22.1	122.5	144.6
Blackgum	29.7	17.2	46.9
Ash-walnut-cherry	11.3	55.6	66.8
Select white oaks	47.8	162.8	210.6
Select red oaks	8.5	44.0	52.4
Other white oaks	3.9	15.1	19.0
Other red oaks	118.8	118.8	237.6
Other hardwoods	.5	5.5	6.0
Total hardwoods	466.4	797.5	1,264.0
All species	898.6	888.5	1,787.1

^a International 1/4-inch rule.

Frieswyk, Thomas S.; DiGiovanni, Dawn M. 1989. **Forest statistics for Delaware--1972 and 1986**. Resour. Bull. NE-109. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 86 p.

A statistical report on the third forest survey of Delaware (1986). Findings are displayed in 65 tables containing estimates of forest area, number of trees, timber volume, tree biomass, and timber products output. Data are presented at two levels: state and county.

ODC (751)--905.2

Keywords: Forest survey, inventory, area, volume, biomass.

Headquarters of the Northeastern Forest Experiment Station are in Broomall, Pa. Field laboratories are maintained at:

- Amherst, Massachusetts, in cooperation with the University of Massachusetts.
- Berea, Kentucky, in cooperation with Berea College.
- Burlington, Vermont, in cooperation with the University of Vermont.
- Delaware, Ohio.
- Durham, New Hampshire, in cooperation with the University of New Hampshire.
- Hamden, Connecticut, in cooperation with Yale University.
- Morgantown, West Virginia, in cooperation with West Virginia University, Morgantown.
- Orono, Maine, in cooperation with the University of Maine, Orono.
- Parsons, West Virginia.
- Princeton, West Virginia.
- Syracuse, New York, in cooperation with the State University of New York College of Environmental Sciences and Forestry at Syracuse University, Syracuse.
- University Park, Pennsylvania, in cooperation with the Pennsylvania State University.
- Warren, Pennsylvania.

Persons of any race, color, national origin, sex, age, religion, or with any handicapping condition are welcome to use and enjoy all facilities, programs, and services of the USDA. Discrimination in any form is strictly against agency policy, and should be reported to the Secretary of Agriculture, Washington, DC 20250.