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Forest Statistics for Massachusetts — 1972 and 1985

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Abstract

A statistical report on the third forest survey of Massachusetts conducted in 1984 by the Forest Inventory and Analysis Unit, Northeastern Forest Experiment Station. Statistics for forest area, numbers of trees, timber volume, tree biomass, wildlife habitat, and timber products output are displayed at the state and county levels. The current inventory indicates that the state has approximately 4.7 billion cubic feet of growing-stock volume or 286.2 million tons, net green weight of live trees, on 2.9 million 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 Massachusetts was under the overall direction of John R. Peters, Project Leader of the Forest Inventory and Analysis Unit. Eric H. Wharton 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:

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David R. Dickson and Carol L. McAfee applied FINSYS (Forest INventory SYStem), a generalized data processing system, to the specific needs of the Massachusetts inventory and produced summary tables for the state and counties. Thomas W. Birch and Carol L. McAfee were instrumental in assuring that the area estimates were consistent with the two previous inventories.

Robert L. Nevel, Jr., Richard H. Widmann, and Eric H. Wharton, with the assistance of James M. MacArthur, Massachusetts Department of Environmental Management, collected and compiled the data on timber products output and timber removals.

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

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

Forest Statistics for Massachusetts -- 1972 and 1985

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Contents

Highlights

* The report contains both 1985 tables and updated 1972 tables.

Forest Area

* Massachusetts, with 3,225,200 acres of forest land, is 64 percent forested.

* Ninety-one percent of Massachusetts' forest land, 2,929,400 acres, is classified as timberland (formerly known as commercial forest land).

* Area of timberland has increased 6 percent between inventories (see **Comparison Between Inventories** section).

* The area of sawtimber stands has increased 61 percent since the 1972 inventory; sawtimber stands now total 1,640,900 acres or 56 percent of the timberland. A 64 percent decrease in the area of seedling and sapling stands has reduced these stands to 205,100 acres, or 7 percent of the timberland.

* Seventy-eight percent of the timberland, or 2,286,300 acres, has a growing-stock volume of more than 1,000 cubic feet per acre.

* Eighty-five percent of Massachusetts' timberland is privately owned.

Timber Volume

* Growing-stock volume is 4,681.7 million cubic feet, an average of 1,598 cubic feet per acre. This is a 37 percent increase over the 1972 inventory.

* Sawtimber volume is 11,456.6 million board feet, an average of 3,911 board feet per acre. This is a 57 percent increase over the 1972 survey.

* White pine growing-stock volume increased by 28 percent to 1,107.3 million cubic feet, retaining the species first place rank with 24 percent of the total volume. The board-foot volume increased 43 percent to 4,126.5 million feet.

* These increases in white pine were confined to those trees larger than 12.9 inches diameter at breast height. This group showed a 70 percent increase in cubic-foot volume, while the volume in smaller trees decreased by 12 percent. The board-foot volume followed the same trends with an 8 percent decrease in the smaller group and a 70 percent increase in the larger.

* Red maple retained its second place rank with 19 percent of the growing-stock volume while increasing its volume by 70 percent to 885 million cubic feet. The board-foot volume increased by 178 percent to 1,481 million feet.

* Northern red oak remained in third place with 567 million cubic feet of growing stock, or 12 percent of the total volume. The species' board-foot volume increased by 54 percent to 1,405 million feet.

* Average annual net growth of growing-stock volume in Massachusetts is 3.0 percent of the inventory.

Wildlife Habitat

* Tree mast in Massachusetts is essentially an acorn resource, dominated by red oak species.

* White pine is the most common standing dead tree species; red maple is the second most common. These two species are also the most common standing dead tree species with observed cavities.

* Red maple is the most common live tree species with observed cavities.

* Blueberries (*Vaccinium* spp.) are the most common understory woody-stemmed species in Massachusetts.

* Browse use in Massachusetts is infrequently observed and use is light when found. No major species is favored.

Biomass

* The net green weight of all live trees on timberland is 286.2 million tons or 97.7 tons per acre. Softwoods account for 84.8 million tons or 28.9 tons per acre; hardwoods account for 201.4 million tons or 68.8 tons per acre.

* One hundred seventy-one million tons, or 60 percent of the net green weight of all live trees, is in growing-stock material. Of the remaining 115 million tons of all-live-tree weight, 53 percent is in growing-stock tops, 18 percent is in saplings, and 19 percent is in the bole of cull trees.

* An additional 7.6 million tons of biomass is contained in salvable dead trees.

Introduction

Under the authority of the McSweeny-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 resources of the Nation. The initial inventory of Massachusetts' resources was conducted in 1952. The second inventory was carried out in 1972.

This report presents the forest resource data from the third inventory completed in 1984. This inventory involved a cooperative effort of the Massachusetts Department of Environmental Management, the USDA Soil Conservation Service, and the Northeastern Forest Experiment Station.

The Forest Inventory and Analysis project 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 Massachusetts this required remeasurement of 296 plots from the earlier inventories, classification of 14,299 points on aerial photographs into land-use and cubic-foot volume classes, and establishment of 321 new ground plot locations as a subsample of the photo points. The data collected were summarized using the FINSYS computer system developed at the Northeastern Forest Experiment Station.

The resurvey of Massachusetts' 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. An additional report will also be published containing detailed 1985 biomass statistics.

The forest area, numbers of trees, timber volume, biomass, and wildlife habitat statistics shown in this report are but a summary of the information collected. 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 Massachusetts. 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 Massachusetts. 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 Massachusetts is 2,929,400 acres. Its sampling error is 1.4 percent, or 41,000 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 2,888,400 and 2,970,400 acres (2,929,400 +/- 41,000). Similarly, the odds are 19 to 1 (95 percent probability) that the estimate would be within +/- 82,000 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 Massachusetts for example, the sampling error for the state area tables is 1.4 percent; while the sampling error for Essex County is 11.7 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 1985 estimates with those published by Peters and Bowers (1977) inappropriate, data collected in 1972 have been reprocessed using the 1985 procedures and standards. Seven state-level 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:

The design used in this inventory, sampling with partial replacement, involved the establishment of new plots and the remeasurement of a sample of the previously measured plots. Thus, estimates, particularly those of small segments of a population, may vary from occasion to occasion in part because of the change in the sample. For example, the area of a minor forest type may have been estimated at the previous occasion from only two or three plots; if those plots were not selected for remeasurement, the change from occasion to occasion would differ from the change based on a current sample that by chance did include those plots. The sampling errors presented in Table 57 should be used to determine the reliability of all estimates and particularly that of change in minor components.

A major change was made in the design of the plots established in 1984. 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 nonstocked. In the 1972 inventory only growing-stock trees were considered in determining stand size; the 1985 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 classified as elm/ash/red maple. In 1985, such plots were examined more closely and according to their moisture class and the other species present, were placed in either the red maple/ northern hardwoods, red maple/central hardwoods or elm/ash/red maple type.

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 unit or state 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 proration technique uncertain. One of the prerequisites for developing direct county-level statistics is that a county must have at least 60,000 acres of timberland. Counties that do not meet this criterion have too few plots to allow reliable estimates. Such counties were grouped with neighboring counties to create a sampling base large enough to provide reliable estimates. Plots in Dukes and Nantucket counties were combined with those in Barnstable county to provide such a base.

In 1972, all land in Dukes and Nantucket counties and land in Barnstable county east of the Cape Cod Canal was considered non-forest. That land was excluded from all estimates except total land area. In the current inventory, this land has been included in all estimates, and any sample plot located on this land that met the qualifications for timberland was included in the estimate of timberland. Approximately 40 percent of the increase in timberland can be attributed to this inclusion.

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 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.

Browse-utilization class. Four levels of browse use; none, light (1-10 percent available), moderate (11-40), and heavy (greater than 40 percent).

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.

Cavity. A hollowed out space in a tree, either natural or faunal caused; frequently used as a

nesting site or temporary refuge by many species of wildlife.

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.

Farmer-owned lands. Lands owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from nonfarm 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 Massachusetts were combined into the following major forest-type groups (the descriptions apply to forests in Massachusetts):

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 sugar maple, red maple, red spruce, balsam fir, and paper birch.

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. *Hard pine*--forests in which eastern redcedar or pitch pine, singly or in combination, make up a plurality of the stocking; common associates include oaks, gray birch, 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 white pine contributes 25 to 50 percent of the

stocking; common associates include beech, red spruce, and sugar maple.

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 white pine, paper birch, red spruce, beech, hemlock, sugar maple, and red maple.

f. *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 balsam fir, red maple, aspen, and white ash.

g. *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 balsam fir, red spruce, paper birch, hemlock, white ash, aspen, and basswood.

h. *Aspen/birch*--forests in which aspen, paper birch, or gray birch, singly or in combination, make up a plurality of the stocking; common associates include balsam fir, red maple, red spruce, white ash, and white pine.

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 percent stocking with live trees, (established seedlings or larger trees) regardless of species.

Importance value. Average of relative density and relative frequency of a 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.

Lesser woody stem. Shrub or vine species, or tree species stem that is less than 5.0 inches d.b.h.

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 (roundwood) 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/rivers 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, unproductive 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 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 roundwood 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 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.

Relative density. Number of individuals of a given species as a percentage of the total of all species.

Relative frequency. Frequency of a given species as a percentage of the total of all frequencies (Frequency = total number of plots where a given species occurs / total number of plots).

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 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 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.

Species frequency. Number of plots where a given species occurs expressed as a percentage of the total number of plots.

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: 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, salvable 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 53).

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

Brooks, Robert T.; Sykes, Karen J. 1984. **Sampling land use edge from aerial photographs--line transect vs. circular patterns.** Res. Note NE-321. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 6 p.

Peters, John R.; Bowers, Theresa M. 1977. **Forest Statistics for Massachusetts.** Resour. Bull. NE-48. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 43 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	
Q. alba	white oak
Q. bicolor	swamp white oak
Q. macrocarpa	bur oak
Q. michauxii	swamp chestnut oak
Q. muehlenbergii	chinkapin oak
Select Red Oaks	
Q. falcata var. *pagodaefolia*	cherrybark oak
Q. rubra	northern red oak
Q. shumardii	shumard oak
Other White Oaks	
Q. lyrata	overcup oak
Q. prinus	chestnut oak
Q. stellata var. *stellata*	post oak
Other Red Oaks	
Q. coccinea	scarlet oak
Q. ellipsoidalis	northern pin oak
Q. falcata	southern red oak
Q. ilicifolia	bear oak
Q. imbricaria	shingle oak
Q. laurifolia	laurel oak
Q. marilandica	blackjack oak
Q. nigra	water oak
Q. palustris	pin oak
Q. phellos	willow oak
Q. velutina	black oak

Tree Species of Massachusetts (as encountered on field plots)

Scientific Name ***	Common Name(s)	Occurrence **
	Softwoods	
Abies balsamea (L.) Mill.	balsam fir	r
Chamaecyparis thyoides (L.)B.S.P.	Atlantic white-cedar	vr
Juniperus virginiana L.	eastern redcedar	c
Larix Mill.	larch	vr
Picea glauca (Moench) Voss	white spruce	vr
Picea rubens Sarg.	red spruce	c
Pinus resinosa Ait.	red pine	r
Pinus rigida Mill.	pitch pine	c
Pinus strobus L.	eastern white pine	vc
Pinus sylvestris L.	Scotch pine	r
Tsuga canadensis (L.) Carr.	eastern hemlock	vc
	Hardwoods	
Acer negundo L. *	boxelder	vr
Acer pensylvanicum L. *	striped maple	r
Acer rubrum L.	red maple	vc
Acer saccharinum L.	silver maple	r
Acer saccharum Marsh.	sugar maple	c
Betula alleghaniensis Britton	yellow birch	c
Betula lenta L.	sweet birch	c
Betula papyrifera Marsh.	paper birch	c
Betula populifolia Marsh. •	gray birch	c
Carpinus caroliniana Walt. *	American hornbeam	r
Carya Nutt.	hickory	c
Castanea dentata (Marsh.)Borkh.	American chestnut	vr
Catalpa Scop. *	catalpa	vr
Crataegus L. *	hawthorn	vr
Fagus grandifolia Ehrh.	American beech	c
Fraxinus americana L.	white ash	c
Fraxinus nigra Marsh.	black ash	r
Juglans cinerea L.	butternut	r
Liriodendron tulipfera L.	yellow-poplar	vr
Malus Mill. *	apple	r
Nyssa sylvatica Marsh.	blackgum or black tupelo	r

Tree Species of Massachusetts (continued)

Scientific Name ***	Common Name(s)	Occurrence **
Ostrya virginiana (Mill.) K. Koch *	eastern hophornbeam	r
Populus balsamifera L.	balsam poplar	vr
Populus deltoides Bartr. ex Marsh.	eastern cottonwood	vr
Populus grandidentata Michx.	bigtooth aspen	c
Populus tremuloides Michx.	quaking aspen	c
Prunus pensylvanica L. f. *	pin cherry	r
Prunus serotina Ehrh.	black cherry	c
Quercus alba L.	white oak	c
Quercus bicolor Willd.	swamp white oak	r
Quercus coccinea Muenchh.	scarlet oak	c
Quercus palustris Muenchh.	pin oak	vr
Quercus prinus L.	chestnut oak	r
Quercus rubra L.	northern red oak	vc
Quercus stellata Wangenh.	post oak	vr
Quercus velutina Lam.	black oak	vc
Robinia pseudoacacia L.	black locust	r
Salix L. *	willow	vr
Sassafras albidum (Nutt.) Nees *	sassafras	r
Tilia americana L.	American basswood	r
Ulmus americana L.	American elm	r
Ulmus rubra Muhl.	slippery elm	vr

*** Names 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. 375p.

** Occurrence 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%).

* Noncommercial species.

Relative Density, Relative Frequency, Importance Value, and Species Frequency of Lesser Woody Stems by Species, Massachusetts, 1985

Species	Relative Density	Relative Frequency	Importance Value	Species Frequency
Balsam fir	.22	.17	.20	1.62
Atlantic white cedar	.01	.06	.03	.54
Common juniper	.29	.34	.32	3.23
Eastern redcedar	.06	.23	.14	2.16
Tamarack	.05	.12	.08	1.08
Norway spruce	.01	.06	.04	.54
Red spruce	.33	.68	.51	6.46
Red pine	.04	.46	.25	4.31
Pitch pine	.22	1.14	.68	10.76
Eastern white pine	2.82	6.85	4.84	65.06
Eastern hemlock	.93	2.89	1.91	27.42
Striped maple	1.31	1.02	1.17	9.68
Red maple	4.91	9.06	6.99	86.03
Silver maple	.01	.06	.04	.54
Sugar maple	2.67	3.34	3.01	31.73
Mountain maple	.24	.46	.35	4.31
Alder species	3.22	.91	2.07	8.61
Serviceberry	.25	.63	.44	5.92
Chokeberry species	.10	.06	.08	.54
Azalea species	1.29	.57	.93	5.38
Barberry	1.35	.51	.93	4.84
Yellow birch	.68	2.78	1.73	26.35
Sweet birch	.80	2.27	1.53	21.51
Paper birch	.73	2.66	1.70	25.27
Gray birch	.52	1.65	1.08	15.60
American hornbeam	.39	.46	.42	4.31
Hickory species	.11	.63	.37	5.92
Pignut hickory	.04	.51	.28	4.84
Shagbark hickory	.09	.57	.33	5.38
Mockernut hickory	.02	.17	.10	1.62
American chestnut	.23	.40	.32	3.77
American bittersweet *	-	-	-	.54
Sweetfern	.05	.17	.11	1.62
Flowering dogwood	.28	.23	.26	2.16
Alterate-leaved dogwood	.14	.12	.13	1.08
Silky dogwood	.03	.12	.08	1.08
Round-leaved dogwood	.04	.06	.05	.54
Panicled dogwood	.65	.23	.44	2.16
Red-osier dogwood	.18	.06	.12	.54
Canadian bunchberry *	-	-	-	2.69
Hawthorn species	.09	.29	.19	2.69

Relative Density, Relative Frequency, Importance Value, and Species Frequency of Lesser Woody Stems by Species, Massachusetts, 1985 (continued)

Species	Relative Density	Relative Frequency	Importance Value	Species Frequency
American hazelnut	.51	.57	.54	5.38
Beaked hazelnut	.05	.12	.08	1.08
American beech	1.69	2.38	2.03	22.59
White ash	1.76	3.34	2.55	31.73
Black ash	.26	.57	.42	5.38
Creeping snowberry *	-	-	-	1.08
Teaberry *	-	-	-	25.81
Huckleberry	1.74	.29	1.02	2.69
Witch-hazel	1.68	1.99	1.83	18.82
Winterberry holly	.09	.17	.13	1.62
Butternut	.02	.17	.10	1.62
Sheep laurel	2.71	.80	1.75	7.53
Mountain laurel	4.64	1.53	3.09	14.52
Common spicebush	.65	.46	.56	4.31
Yellow-poplar	.02	.12	.07	1.08
Bush honeysuckle	.33	.40	.37	3.77
Apple species	.06	.51	.29	4.84
Partridgeberry *	-	-	-	22.59
Black tupelo	.31	.57	.44	5.38
Eastern hophornbeam	.25	.74	.49	6.99
Virginia creeper *	-	-	-	2.16
Ninebark	.01	.06	.04	.54
Balsam poplar	.01	.06	.03	.54
Eastern cottonwood	.01	.12	.06	1.08
Bigtooth aspen	.10	.91	.50	8.61
Quaking aspen	.32	1.08	.70	10.22
Cherry species	.06	.12	.09	1.08
Pin cherry	.45	1.19	.82	11.30
Black cherry	1.70	4.48	3.09	42.48
Chokecherry	.56	.68	.62	6.46
White oak	1.20	3.85	2.53	36.56
Swamp white oak	.01	.17	.09	1.62
Scarlet oak	.17	1.19	.68	11.30
Scrub, bear oak	.41	.23	.32	2.16
Chestnut oak	.08	.29	.18	2.69
Northern red oak	2.48	5.95	4.21	56.46
Post oak	.01	.06	.03	.54
Black oak	1.79	3.85	2.82	36.56
Buckthorn species	1.31	.34	.83	3.23
Staghorn sumac	.13	.17	.15	1.62
Poison ivy *	-	-	-	11.30

Relative Density, Relative Frequency, Importance Value, and Species Frequency of Lesser Woody Stems by Species, Massachusetts, 1985 (continued)

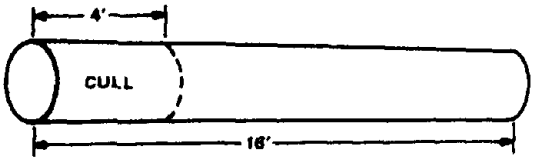
Species	Relative Density	Relative Frequency	Importance Value	Species Frequency
Poison sumac	.04	.12	.08	1.08
Rose species	.53	.17	.35	1.62
Rubus species	3.93	2.21	3.07	20.97
Willow species	.22	.17	.20	1.62
American elderberry	.04	.12	.08	1.08
Sassafras	.48	.85	.67	8.07
Greenbrier *	-	-	-	10.22
American mountain ash	.01	.12	.07	1.08
European mountain ash	.01	.06	.04	.54
Spirea species	1.73	1.25	1.49	11.83
American basswood	.04	.29	.17	2.69
Elm species	.01	.12	.06	1.08
American elm	.18	.51	.35	4.84
Blueberry	25.10	4.87	14.98	46.24
Viburnum species	.15	.12	.13	1.08
Maple-leaved viburnum	1.30	.74	1.02	6.99
Hobblebush viburnun	.58	.17	.38	1.62
Wild raisin	.27	.46	.37	4.31
Arrowwood	1.73	1.59	1.66	15.06
Nannyberry	.77	.85	.81	8.07
Highbush cranberry	.48	.17	.33	1.62
Grape *	-	-	-	2.69
Unknown vine *	-	-	-	2.69
Unknown dwarf shrub *	-	-	-	3.23
Unknown deciduous shrub	9.39	2.04	5.72	19.36
Unknown evergreen shrub	.14	.23	.19	2.16
Unknown tree	.39	.63	.51	5.92

* Not included in calculation of Importance Value.

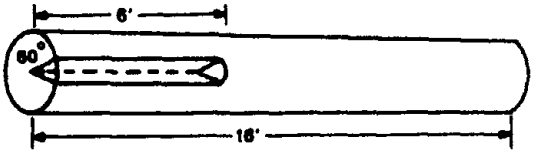
Log-grade Classification

Methods of determining scaling deduction.

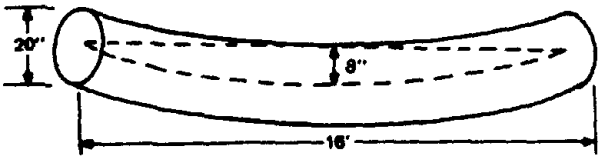
(Examples based on a 16-foot log with 20-inch scaling diameter)



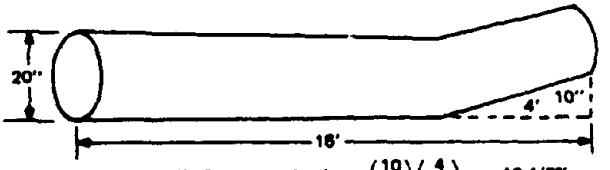
Defect section (rule 1): Percent deduction = $\frac{4}{16}$ = 25%



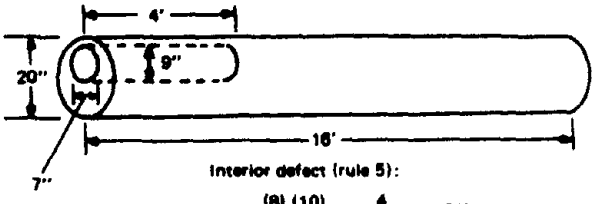
Defect section (rule 2): Percent deduction = $\left(\frac{6}{16}\right)\left(\frac{60}{360}\right)$ = 6-1/4%



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



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



Interior defect (rule 5):

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

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: Grosenbaugh, 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+[b]	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.

[a]Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

[b]Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

[c]A clear cutting is the portion of a face, extending the width of the face, that is free of defects.

[d]A face is ¼ of the surface of the log as divided lengthwise.

[e]Otherwise #1 logs with 41-60% deductions can be #2.

[f]Otherwise #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.

[a]These 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.

[b]Included timber is always square, and dimension is judged from small end.

From: Rast, 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 1½ inch maximum.	SOUND RED KNOTS not to exceed 1/3 scaling diameter and 5 inch maximum. DEAD OR BLACK KNOTS including overgrown knots not to exceed 1/6 scaling diameter and 2½ 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	66⅔
(6) MAXIMUM TOTAL SCALING DEDUCTION (percent)	50	50	50	66⅔

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 SURFACE[5]

Degrade one grade if present on one face.
Degrade two grades if present on two faces.
Degrade 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 LOG[5]

Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated below:
Degrade one grade if present in 2 quarters of log ends.
Degrade two grades if present in 3 or 4 quarters of log ends.
Degrade three grades if present in 5 or more quarters of log ends.

[1] 12 and 13 inch logs with four full length good faces are acceptable.
[2] 8 foot logs with four full length good faces are acceptable.
[3] If one No. 3 logs limited to one weevil injury.
[4] Minimum 50% length good face must be at least 6 feet.
[5] Factors 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.* Degrade 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.* Degrade 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-30.

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.

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Core Table Cross-reference (continued)

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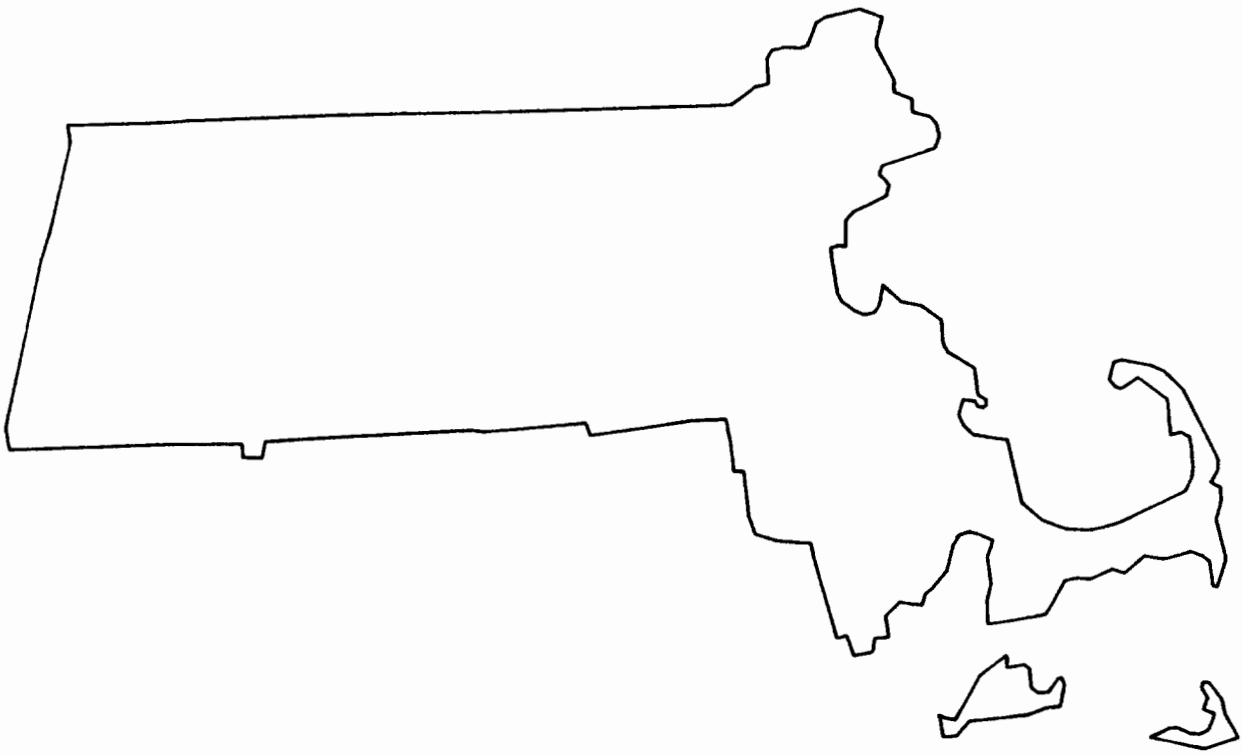
STATE TABLES



Land area by land class, Massachusetts, 1985

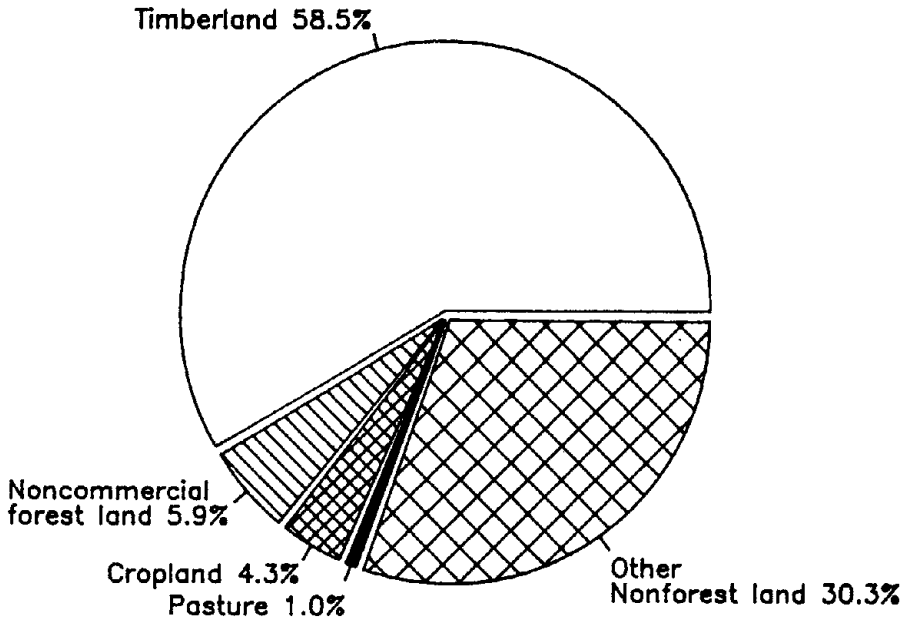


Table 1.--Land area by land class, Massachusetts, 1985[a]

(In thousands of acres)

Land class	Area	
	Thousand acres	Percent
Timberland	2,929.4	58.5
Noncommercial forest land		
Productive reserved	101.4	2.0
Unproductive[b]	142.4	2.9
Urban	52.0	1.0
Total forest	3,225.2	64.4
Nonforest land		
Cropland[c]	214.2	4.3
Pasture[c]	51.7	1.0
Other	1,516.5	30.3
Total nonforest	1,782.4	35.6
Total land area[d]	5,007.6	100.0

[a] Rows and columns in all tables may not sum due to rounding.
[b] Includes 47,369 acres of reserved unproductive land
[c] Source : 1982 Census of Agriculture
[d] Source : 1981 United States Department of Commerce, Bureau of Census

Table 2.--Area of timberland by forest type, forest-type group, and stand-size class, Massachusetts, 1972[a]

(In thousands of acres)[b]

Forest type and Forest-type group	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Red pine	14.5	.0	.0	.0	14.5
White pine	341.1	155.7	68.2	.0	565.1
White pine/hemlock	84.1	14.5	14.9	.0	113.5
Hemlock	42.7	.0	14.0	.0	56.8
White/red pine group	482.5	170.2	97.1	.0	749.8
Tamarack	14.3	.0	.0	.0	14.3
White spruce	.0	.0	14.9	.0	14.9
Norway spruce	13.9	.0	.0	.0	13.9
Spruce/fir group	28.2	.0	14.9	.0	43.0
Pitch pine	28.6	29.2	28.7	.0	86.6
Hard pine group	28.6	29.2	28.7	.0	86.6
White pine/no. red oak/wh. ash	.0	70.3	14.5	.0	84.8
Other oak/pine	42.2	71.5	45.2	.0	158.8
Oak/pine group	42.2	141.8	59.6	.0	243.6
Post,black,or bear oak	55.9	42.1	13.8	.0	111.8
White oak/red oak/hickory	28.2	70.1	.0	.0	98.3
White oak	.0	13.8	28.3	.0	42.1
Northern red oak	97.1	169.3	42.8	.0	309.2
Scarlet oak	.0	42.1	13.8	.0	55.9
Red maple/central hardwoods	28.0	100.3	27.9	.0	156.3
Oak/hickory group	209.2	437.8	126.6	.0	773.6
Black ash/american elm/r.maple	.0	27.7	101.2	.0	128.9
Elm/ash/red maple group	.0	27.7	101.2	.0	128.9
Sugar maple/beech/yellow birch	113.8	69.8	44.2	.0	227.8
Black cherry	14.3	14.1	.0	.0	28.4
Red maple/northern hardwoods	41.8	155.5	87.3	.0	284.7
Mixed northern hardwoods	57.1	98.6	.0	.0	155.7
Northern hardwoods group	226.9	338.0	131.6	.0	696.5
Aspen	.0	.0	14.9	.0	14.9
Paper birch	.0	13.8	.0	.0	13.8
Aspen/birch group	.0	13.8	14.9	.0	28.7
All forest types	1,017.5	1,158.5	574.7	.0	2,750.7

[a] The data in all 1972 tables have been reprocessed so as to be comparable to 1985 data.
[b] In this and other tables, a zero indicates that the data are negligible or the condition was not encountered in the sample. A dash indicates that the condition is not possible under current Forest Service definitions.

Table 3.--Area of timberland by forest type, forest-type group, and stand-size class, Massachusetts, 1985

(In thousands of acres)

Forest type and Forest-type group	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
White pine	465.2	71.6	42.4	.0	579.1
White pine/hemlock	70.7	14.5	.0	.0	85.2
Hemlock	96.5	6.7	.0	.0	103.2
Scotch pine	8.2	.0	.0	.0	8.2
White/red pine group	640.5	92.8	42.4	.0	775.7
Red spruce	6.7	30.3	.0	.0	37.0
Spruce/fir group	6.7	30.3	.0	.0	37.0
Eastern redcedar	.0	8.7	.0	.0	8.7
Pitch pine	40.1	36.9	26.1	.0	103.1
Hard pine group	40.1	45.6	26.1	.0	111.8
White pine/no. red oak/wh. ash	72.1	12.5	.0	.0	84.6
Eastern redcedar/hardwood	.0	9.8	.0	.0	9.8
Other oak/pine	94.8	67.8	.0	.0	162.5
Oak/pine group	166.9	90.1	.0	.0	257.0
Post,black,or bear oak	51.3	145.8	.0	.0	197.1
Chestnut oak	.0	6.7	.0	.0	6.7
White oak/red oak/hickory	15.5	37.7	18.1	.0	71.3
White oak	6.7	25.3	18.7	.0	50.8
Northern red oak	161.8	120.0	8.6	.0	290.3
Black locust	7.7	.0	.0	.0	7.7
Yellow-poplar	.0	13.3	.0	.0	13.3
Scarlet oak	15.8	98.4	33.3	.0	147.5
Red maple/central hardwoods	38.1	59.7	.0	.0	97.8
Mixed central hardwoods	11.3	8.2	15.6	.0	35.1
Oak/hickory group	308.1	515.2	94.2	.0	917.5
Black ash/american elm/r.maple	72.7	20.2	12.4	.0	105.2
Cottonwood	.0	.0	8.9	.0	8.9
Willow	.0	10.6	.0	.0	10.6
Elm/ash/red maple group	72.7	30.8	21.3	.0	124.7
Sugar maple/beech/yellow birch	160.4	85.0	13.3	.0	258.7
Black cherry	15.2	13.3	.0	.0	28.5
Red maple/northern hardwoods	110.0	115.0	.0	.0	225.0
Mixed northern hardwoods	114.0	37.3	7.9	.0	159.1
Northern hardwoods group	399.5	250.6	21.2	.0	671.3
Aspen	4.5	19.5	.0	.0	24.0
Paper birch	2.0	8.6	.0	.0	10.5
Aspen/birch group	6.5	28.0	.0	.0	34.5
All forest types	1,640.9	1,083.3	205.1	.0	2,929.4

Table 4.--Area of timberland by forest-type group and ownership class, Massachusetts, 1985

(In thousands of acres)

Forest-type group	Ownership class				All classes
	National Forest	Other public	Forest industry	Other private	
White/red pine	.0	97.2	22.9	655.6	775.7
Spruce/fir	.0	.0	.0	37.0	37.0
Hard pine	.0	26.7	.0	85.1	111.8
Oak/pine	.0	34.2	17.4	205.3	257.0
Oak/hickory	.0	153.9	9.4	754.2	917.5
Elm/ash/red maple	.0	7.3	.0	117.4	124.7
Northern hardwoods	.0	106.7	16.5	548.0	671.3
Aspen/birch	.0	4.3	.0	30.2	34.5
All groups	.0	430.3	66.3	2,432.8	2,929.4

Table 5.--Area of timberland by stand-size class and ownership class, Massachusetts, 1985

(In thousands of acres)

Stand-size class	Ownership class				All classes
	National Forest	Other public	Forest industry	Other private	
Sawtimber	.0	217.0	33.9	1,390.0	1,640.9
Poletimber	.0	174.2	32.3	876.8	1,083.3
Sapling and seedling	.0	39.1	.0	166.1	205.1
Nonstocked	.0	.0	.0	.0	.0
All classes	.0	430.3	66.3	2,432.8	2,929.4

Table 6.--Area of timberland by board-foot stand-volume class and ownership class, Massachusetts, 1985

(In thousands of acres)

Board-foot stand-volume class	Ownership class				All classes
	National Forest	Other public	Forest Industry	Other private	
0 - 1,999	.0	163.8	16.8	866.8	1,047.4
2,000 - 3,999	.0	97.4	5.8	639.8	742.9
4,000 - 5,999	.0	66.6	15.5	407.5	489.6
6,000 - 7,999	.0	38.6	.0	237.2	275.8
8,000 - 9,999	.0	19.8	28.2	157.1	205.1
10,000+	.0	44.1	.0	124.4	168.6
All classes	.0	430.3	66.3	2,432.8	2,929.4

Table 7.--Area of timberland by stocking class of growing-stock trees and ownership class, Massachusetts, 1985

(In thousands of acres)

Stocking class	Ownership class				All classes
	National Forest	Other public	Forest industry	Other private	
Nonstocked	.0	17.1	.0	1.0	18.1
Poorly stocked	.0	.0	3.6	222.9	226.5
Moderately stocked	.0	98.6	6.8	489.4	594.9
Fully stocked	.0	135.8	11.5	819.7	967.0
Overstocked	.0	178.8	44.3	899.8	1,122.9
All classes	.0	430.3	66.3	2,432.8	2,929.4

Table 8.--Area of timberland by forest-type group and cubic-foot stand-volume class, Massachusetts, 1985

(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+	
White/red pine	29.9	66.2	86.9	134.6	159.6	298.5	775.7
Spruce/fir	.0	12.5	13.3	.0	11.2	.0	37.0
Hard pine	35.3	18.5	40.1	9.2	8.7	.0	111.8
Oak/pine	22.0	16.9	44.6	80.5	38.5	54.5	257.0
Oak/hickory	111.2	177.5	235.7	224.3	107.3	61.5	917.5
Elm/ash/red maple	21.3	15.7	26.9	30.7	24.8	5.1	124.7
Northern hardwoods	33.6	71.1	98.5	174.4	228.8	64.9	671.3
Aspen/birch	11.4	.0	16.6	.0	4.5	2.0	34.5
All groups	264.8	378.3	562.5	653.7	583.5	486.6	2,929.4

Table 9.--Area of timberland by forest-type group and board-foot stand-volume class, Massachusetts, 1985

(In thousands of acres)

Forest-type group	Stand-volume class (board feet per acre)						All classes
	0-1,999	2,000-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10000+	
White/red pine	109.5	136.2	144.5	146.7	94.9	144.0	775.7
Spruce/fir	25.8	4.5	6.7	.0	.0	.0	37.0
Hard pine	71.7	40.1	.0	.0	.0	.0	111.8
Oak/pine	75.3	47.4	59.8	11.5	50.9	12.0	257.0
Oak/hickory	459.4	259.3	123.6	45.2	17.4	12.6	917.5
Elm/ash/red maple	71.5	15.2	13.0	16.8	8.2	.0	124.7
Northern hardwoods	206.2	240.3	141.9	49.0	33.8	.0	671.3
Aspen/birch	28.0	.0	.0	6.5	.0	.0	34.5
All groups	1,047.4	742.9	489.6	275.8	205.1	168.6	2,929.4

Table 10.--Area of timberland by forest-type group and green ton stand-volume class[a], Massachusetts, 1985

(In thousands of acres)

Forest-type group	Stand-volume class (green tons per acre)									All classes
	0-24	25-49	50-74	75- 99	100-124	125-149	150-174	175-199	200+	
White/red pine	12.6	60.7	25.4	160.1	88.0	158.1	184.2	67.1	19.5	775.7
Spruce/fir	.0	37.0	.0	.0	.0	.0	.0	.0	.0	37.0
Hard pine	28.9	42.2	31.8	.0	8.9	.0	.0	.0	.0	111.8
Oak/pine	.0	61.2	28.8	48.4	58.5	28.6	31.4	.0	.0	257.0
Oak/hickory	32.5	159.0	212.3	240.8	223.7	31.0	18.2	.0	.0	917.5
Elm/ash/red maple	9.6	37.0	36.9	17.6	23.5	.0	.0	.0	.0	124.7
Northern hardwoods	14.7	28.3	41.3	196.5	186.9	130.7	58.3	.0	14.7	671.3
Aspen/birch	.0	.0	.0	34.5	.0	.0	.0	.0	.0	34.5
All groups	98.2	425.4	376.5	698.0	589.6	348.4	292.0	67.1	34.2	2,929.4

[a]All biomass estimates are derived from new plots only.

Area of timberland by forest-type group, Massachusetts, 1972 and 1985

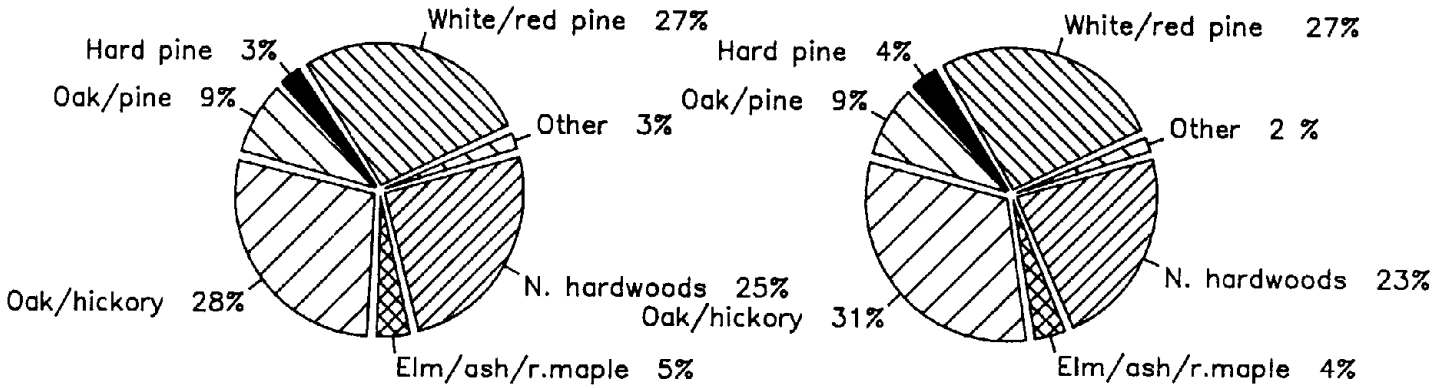


Table 11.--Area of timberland by forest-type group and stocking class of all live trees, Massachusetts, 1972

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
White/red pine	.0	.0	84.6	324.9	340.3	749.8
Spruce/fir	.0	.0	14.3	14.9	13.9	43.0
Hard pine	.0	14.6	14.6	27.9	29.4	86.6
Oak/pine	.0	.0	45.8	113.2	84.6	243.6
Oak/hickory	.0	.0	140.8	462.9	170.0	773.6
Elm/ash/red maple	.0	14.9	29.5	55.1	29.4	128.9
Northern hardwoods	.0	.0	102.3	336.8	257.4	696.5
Aspen/birch	.0	28.7	.0	.0	.0	28.7
All groups	.0	58.2	431.9	1,335.6	925.1	2,750.7

Table 12.--Area of timberland by forest-type group and stocking class of all live trees, Massachusetts, 1985

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
White/red pine	.0	30.5	71.4	158.8	515.1	775.7
Spruce/fir	.0	12.5	.0	6.7	17.8	37.0
Hard pine	.0	.0	18.5	45.0	48.3	111.8
Oak/pine	.0	8.1	61.4	61.9	125.5	257.0
Oak/hickory	.0	40.0	182.8	345.1	349.6	917.5
Elm/ash/red maple	.0	17.6	34.3	35.9	36.9	124.7
Northern hardwoods	.0	.0	90.7	179.7	400.8	671.3
Aspen/birch	.0	11.4	16.6	4.5	2.0	34.5
All groups	.0	120.1	475.7	837.6	1,496.0	2,929.4

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

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
White/red pine	.0	57.5	182.5	368.5	141.3	749.8
Spruce/fir	.0	14.9	14.3	.0	13.9	43.0
Hard pine	.0	14.6	29.5	42.5	.0	86.6
Oak/pine	.0	45.8	71.2	98.5	28.1	243.6
Oak/hickory	.0	29.0	280.4	436.5	27.7	773.6
Elm/ash/red maple	.0	59.3	26.3	43.2	.0	128.9
Northern hardwoods	.0	59.4	243.9	294.1	99.1	696.5
Aspen/birch	.0	28.7	.0	.0	.0	28.7
All groups	.0	309.3	848.0	1,283.3	310.1	2,750.7

Table 14.--Area of timberland by forest-type group and stocking class of growing-stock trees, Massachusetts, 1985

(In thousands of acres)

Forest-type group	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
White/red pine	.0	43.9	101.3	208.3	422.2	775.7
Spruce/fir	.0	12.5	.0	6.7	17.8	37.0
Hard pine	.0	.0	54.2	18.5	39.1	111.8
Oak/pine	.0	8.1	77.3	53.9	117.6	257.0
Oak/hickory	18.1	59.3	218.1	365.4	256.6	917.5
Elm/ash/red maple	.0	34.9	24.9	47.4	17.5	124.7
Northern hardwoods	.0	56.4	102.4	262.3	250.1	671.3
Aspen/birch	.0	11.4	16.6	4.5	2.0	34.5
All groups	18.1	226.5	594.9	967.0	1,122.9	2,929.4

Table 15.--Area of timberland by forest-type group and basal-area class (all live trees), Massachusetts, 1985

(In thousands of acres)

Forest-type group	Basal-area class							All classes
	0-49	50-99	100-149	150-199	200-249	250-299	300+	
White/red pine	30.5	194.2	300.1	234.6	16.3	.0	.0	775.7
Spruce/fir	12.5	13.3	6.7	.0	4.5	.0	.0	37.0
Hard pine	35.3	46.1	21.6	.0	8.7	.0	.0	111.8
Oak/pine	8.1	103.8	111.0	34.0	.0	.0	.0	257.0
Oak/hickory	124.7	467.1	277.5	43.7	4.5	.0	.0	917.5
Elm/ash/red maple	26.5	44.7	48.4	5.1	.0	.0	.0	124.7
Northern hardwoods	33.6	175.5	361.5	83.9	8.2	.0	8.6	671.3
Aspen/birch	11.4	21.1	.0	.0	2.0	.0	.0	34.5
All groups	282.6	1,065.9	1,126.8	401.3	44.2	.0	8.6	2,929.4

Table 16.--Number of live trees on timberland by species and diameter class, Massachusetts, 1985

(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+	
Spruce/fir	12,975	2,732	2,884	3,005	1,074	1,036	398	120	27	27	0	0	24,279
Red pine	0	1,553	300	54	366	356	171	30	0	0	0	0	2,830
Pitch pine	13,784	1,952	5,209	4,693	2,528	1,048	457	196	85	49	0	0	30,001
White pine	97,317	33,674	21,372	15,261	10,668	8,024	5,549	4,421	2,826	1,993	2,345	288	203,739
Hemlock	64,205	27,252	15,960	10,462	6,515	4,546	2,993	1,581	599	191	231	37	134,572
Other softwoods	1,975	1,975	3,264	2,428	746	449	0	0	0	0	0	0	10,837
All softwoods	190,257	69,139	48,989	35,903	21,897	15,460	9,568	6,349	3,536	2,259	2,575	325	406,258
Red maple	172,416	68,052	53,692	38,314	19,165	11,928	4,786	1,701	1,145	284	650	141	372,276
Sugar maple	58,554	14,665	7,452	6,183	2,394	1,669	1,120	632	399	182	298	174	93,723
Yellow birch	35,918	20,739	5,436	4,563	1,803	1,289	553	281	77	63	32	23	70,779
Sweet birch	6,898	6,503	6,608	4,495	2,189	1,271	535	422	69	0	22	0	29,012
Paper birch	9,340	7,660	6,091	4,553	2,327	851	408	87	77	46	28	0	31,468
Hickory	19,254	0	2,065	1,713	1,005	414	231	58	33	13	0	0	24,787
Beech	65,815	8,948	6,725	3,270	1,100	1,429	905	449	242	148	87	0	89,116
White ash	24,595	9,090	5,059	2,965	2,254	1,294	1,141	553	383	61	123	39	47,556
Aspen	7,693	4,262	1,494	2,404	1,558	913	357	62	0	42	24	4	18,813
Black cherry	7,501	9,513	5,003	3,854	3,080	1,528	708	561	112	142	5	0	32,010
White oak	15,444	21,120	10,655	5,774	3,418	1,341	624	334	96	156	92	0	59,055
Northern red oak	22,441	9,771	13,042	12,348	11,271	7,098	3,234	2,296	963	283	416	66	83,229
Other red oaks	21,383	17,249	20,494	15,301	9,083	4,130	2,356	636	301	277	237	15	91,465
Elm	7,386	0	283	320	158	142	0	26	27	0	0	0	8,343
Other commercial hardwoods	14,212	6,399	2,385	2,074	2,447	811	534	415	28	0	80	0	29,386
Noncommercial hardwoods	81,287	29,242	7,712	1,586	543	187	100	27	0	0	43	0	120,727
All hardwoods	570,138	233,213	154,196	109,718	63,795	36,298	17,592	8,541	3,953	1,698	2,139	464	1,201,744
All species	760,395	302,352	203,185	145,622	85,691	51,757	27,160	14,890	7,489	3,957	4,714	789	1,608,002

Table 17.--Number of live trees on timberland by diameter class, tree class, and species group, Massachusetts, 1985

(In thousands of trees)

Diameter class	Growing stock		Cull		Total
	Softwoods	Hardwoods	Softwoods	Hardwoods	
Seedlings	586,961	5,958,797	-	1,963,938	8,509,696
1.0-2.9	190,257	488,851	-	81,287	760,395
3.0-4.9	69,139	203,971	-	29,242	302,352
Total saplings	259,396	692,822	-	110,529	1,062,747
5.0-6.9	39,864	122,240	9,125	31,955	203,185
7.0-8.9	32,360	94,872	3,544	14,846	145,622
9.0-10.9	-	56,783	-	7,012	63,795
Total poletimber	72,223	273,895	12,669	53,813	412,602
9.0-10.9	20,148	-	1,749	-	21,897
11.0-12.9	14,889	32,482	571	3,816	51,757
13.0-14.9	9,202	15,724	365	1,868	27,160
Total small sawtimber	44,239	48,205	2,685	5,684	100,814
15.0-16.9	6,217	7,117	132	1,424	14,890
17.0-18.9	3,464	3,287	72	665	7,489
19.0-20.9	2,207	1,448	52	249	3,957
21.0-28.9	2,414	1,701	161	438	4,714
29.0 and larger	257	197	68	267	789
Total large sawtimber	14,559	13,750	485	3,044	31,839
All classes	977,379	6,987,471	15,840	2,137,008	10,117,698

Table 18.--Number of trees (5.0+ inches d.b.h.) on timberland by species and tree class, Massachusetts, 1985

(In thousands of trees)

Species	Tree class									All classes
	Preferred	Acceptable	All growing stock	Rough cull	Rotten cull	All cull	All live	Salvable dead	Nonsalvable dead	
Spruce/fir	69	8,162	8,230	172	169	341	8,571	1,927	369	10,867
Red pine	0	1,234	1,234	43	0	43	1,277	170	81	1,528
Pitch pine	48	10,714	10,762	3,349	153	3,502	14,265	341	1,154	15,760
White pine	1,635	64,457	66,092	6,109	546	6,655	72,747	9,008	5,569	87,324
Hemlock	176	38,824	39,000	2,942	1,173	4,115	43,116	1,427	1,192	45,735
Other softwoods	0	5,703	5,703	1,183	0	1,183	6,886	300	519	7,705
All softwoods	1,927	129,095	131,022	13,798	2,042	15,840	146,862	13,172	8,884	168,918
Red maple	370	109,428	109,798	16,014	5,996	22,010	131,808	3,515	6,475	141,798
Sugar maple	123	17,539	17,662	1,525	1,317	2,842	20,504	355	1,904	22,763
Yellow birch	148	11,588	11,736	1,615	771	2,386	14,122	769	1,078	15,969
Sweet birch	146	13,209	13,355	1,310	945	2,255	15,611	1,587	384	17,582
Paper birch	351	12,996	13,347	486	635	1,121	14,468	942	1,589	16,999
Hickory	76	5,349	5,425	0	108	108	5,533	0	0	5,533
Beech	43	10,437	10,480	2,693	1,180	3,873	14,353	377	1,047	15,777
White ash	790	11,949	12,739	861	271	1,132	13,871	1,266	488	15,625
Aspen	39	6,343	6,382	244	232	476	6,858	1,135	402	8,395
Black cherry	358	11,403	11,761	2,056	1,178	3,234	14,995	924	1,655	17,574
White oak	105	19,176	19,280	3,003	207	3,210	22,491	2,535	2,108	27,134
Northern red oak	1,519	47,237	48,755	1,205	1,056	2,261	51,016	2,361	1,114	54,491
Other red oaks	179	46,705	46,885	5,444	504	5,948	52,833	1,796	466	55,095
Elm	31	738	770	107	80	187	957	89	627	1,673
Other commercial hardwoods	297	7,179	7,475	975	324	1,299	8,775	111	237	9,123
Noncommercial hardwoods	0	0	0	8,968	1,231	10,198	10,198	1,807	1,591	13,596
All hardwoods	4,575	331,275	335,851	46,506	16,036	62,542	398,393	19,571	21,165	439,129
All species	6,503	460,370	466,873	60,304	18,078	78,382	545,255	32,743	30,049	608,047

Table 19.--Number of growing-stock trees on timberland by species and diameter class, Massachusetts, 1985

(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+	
Spruce/fir	12,975	2,732	2,839	2,781	1,028	1,036	372	120	27	27	0	0	23,938
Red pine	0	1,553	300	54	366	313	171	30	0	0	0	0	2,787
Pitch pine	13,784	1,952	3,092	3,851	2,046	1,048	411	196	70	49	0	0	26,499
White pine	97,317	33,674	16,957	14,244	10,231	7,751	5,448	4,328	2,768	1,941	2,204	220	197,084
Hemlock	64,205	27,252	13,716	9,370	6,045	4,489	2,799	1,542	599	191	211	37	130,457
Other softwoods	1,975	1,975	2,960	2,060	431	252	0	0	0	0	0	0	9,654
All softwoods	190,257	69,139	39,864	32,360	20,148	14,889	9,202	6,217	3,464	2,207	2,414	257	390,418
Red maple	172,416	68,052	43,523	32,554	16,295	10,476	4,060	1,321	863	203	455	47	350,266
Sugar maple	58,554	14,665	6,174	5,566	2,237	1,498	1,021	491	274	142	207	51	90,881
Yellow birch	35,918	20,739	4,642	3,869	1,361	1,087	443	170	50	63	32	18	68,393
Sweet birch	6,898	6,503	5,733	3,723	1,964	1,149	445	276	42	0	22	0	26,757
Paper birch	9,340	7,660	5,810	4,325	2,000	756	328	60	67	0		0	30,347
Hickory	19,254	0	2,065	1,713	897	414	231	58	33	13	0	0	24,679
Beech	65,815	8,948	5,128	2,129	836	1,072	793	249	163	65	45	0	85,243
White ash	24,595	9,090	4,592	2,731	2,121	1,227	1,098	430	356	61	123	0	46,423
Aspen	7,693	4,262	1,295	2,234	1,513	851	357	62	0	42	24	4	18,337
Black cherry	7,501	9,513	3,565	2,952	2,685	1,255	584	528	45	142	5	0	28,776
White oak	15,444	21,120	8,795	4,854	3,277	1,153	522	334	96	156	92	0	55,845
Northern red oak	22,441	9,771	12,120	11,967	10,845	6,873	3,054	2,215	942	283	390	66	80,968
Other red oaks	21,383	17,249	16,654	14,223	8,517	3,816	2,315	548	301	277	224	10	85,517
Elm	7,386	0	197	240	158	122	0	26	27	0	0	0	8,156
Other hardwoods	14,212	6,399	1,945	1,794	2,075	731	472	351	28	0	80	0	28,086
All hardwoods	488,851	203,971	122,240	94,872	56,783	32,482	15,724	7,117	3,287	1,448	1,701	197	1,028,673
All species	679,109	273,110	162,104	127,232	76,930	47,371	24,926	13,334	6,751	3,655	4,115	453	1,419,092

Table 20.--Number of all live nut- and fruit-producing trees on timberland by species and diameter class, Massachusetts, 1985

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes	Sampling error (percent)
	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+		
Eastern redcedar	2,885	1,874	392	84	0	0	0	0	0	0	5,235	81
Hickory	2,065	1,713	1,005	414	231	58	33	13	0	0	5,533	25
American chestnut	60	0	0	0	0	0	0	0	0	0	60	100
Hawthorn	86	0	0	0	0	0	0	0	0	0	86	100
Beech	6,725	3,270	1,100	1,429	905	449	242	148	87	0	14,353	16
Butternut	0	110	77	0	30	31	0	0	27	0	276	52
Apple	721	395	60	39	59	27	0	0	0	0	1,301	38
Blackgum	827	494	423	85	94	54	0	0	0	0	1,977	27
Eastern hophornbeam	925	167	42	31	0	0	0	0	0	0	1,165	38
Pin cherry	786	31	86	39	0	0	0	0	0	0	942	37
Black cherry	5,003	3,854	3,080	1,528	708	561	112	142	5	0	14,995	13
White oak	10,655	5,774	3,418	1,341	624	334	96	156	92	0	22,491	12
Swamp white oak	555	418	263	27	0	0	0	0	0	0	1,263	76
Scarlet oak	8,085	5,683	3,473	1,540	913	186	19	112	0	0	20,011	20
Pin oak	0	68	63	0	0	0	0	0	0	0	131	71
Chestnut oak	307	136	525	182	107	73	0	0	0	0	1,331	63
Northern red oak	13,042	12,348	11,271	7,098	3,234	2,296	963	283	416	66	51,016	11
Post oak	0	0	63	0	0	0	0	0	0	0	63	100
Black oak	12,409	9,551	5,546	2,590	1,443	450	281	166	237	15	32,690	14
Sassafras	389	51	73	35	0	0	0	0	0	0	548	53
Mountain ash	54	0	0	0	0	0	0	0	0	0	54	100
All species	65,580	45,936	30,962	16,463	8,349	4,520	1,747	1,019	865	82	175,523	5.8
Sampling error (percent)	8	8	8	8	9	11	15	22	22	49	5.8	

Table 21.--Number of shrubs and saplings on timberland by stand-size class, type of stem, and mast type, Massachusetts, 1985[a]

(In thousands of stems)

Stand-size class and type of stem	Mast type			Other species	All stems
	Nuts	Other seeds	Berries		
Sawtimber:					
Shrubs	192,578	2,606,697	5,429,983	1,438,898	9,668,157
Saplings	92,883	391,707	35,171	0	519,762
Total sawtimber	285,461	2,998,404	5,465,155	1,438,898	10,187,919
Poletimber:					
Shrubs	3,219	2,487,819	8,486,547	1,896,070	12,873,656
Saplings	96,252	207,335	10,927	0	314,514
Total poletimber	99,471	2,695,154	8,497,475	1,896,070	13,188,170
Sapling/seedling:					
Shrubs	0	305,354	859,410	28,972	1,193,736
Saplings	4,958	35,698	20,531	0	61,187
Total sapling/seedling	4,958	341,052	879,942	28,972	1,254,923
Nonstocked:					
Shrubs	0	0	0	0	0
Saplings	0	0	0	0	0
Total nonstocked	0	0	0	0	0
All classes	389,891	6,034,610	14,842,572	3,363,940	24,631,013

[a] The data in all wildlife habitat tables except Table 20 are derived from new plots only.

Table 22.--Number of standing dead trees on timberland by species, condition class, and diameter class, Massachusetts, 1985

(In thousands of trees)

Species	Intact top				Broken top				All trees	Sampling error (percent)
	Diameter class (inches at breast height)				Diameter class (inches at breast height)					
	5.0-10.9	11.0-14.9	15+	Total	5.0-10.9	11.0-14.9	15+	Total		
Spruce/fir	709	0	57	766	1,217	256	55	1,529	2,295	55
Red pine	113	0	0	113	137	0	0	137	251	59
Pitch pine	160	0	0	160	1,209	125	0	1,334	1,495	55
White pine	7,816	221	84	8,121	5,227	619	263	6,108	14,229	18
Hemlock	494	252	97	843	1,533	139	104	1,775	2,619	32
Other softwoods	338	81	0	419	400	0	0	400	819	59
All softwoods	9,632	554	237	10,423	9,723	1,139	423	11,285	21,707	14
Red maple	2,987	0	0	2,987	5,971	751	281	7,003	9,991	18
Sugar maple	467	0	55	523	1,393	219	125	1,737	2,259	36
Yellow birch	109	0	0	109	1,536	170	31	1,737	1,847	28
Sweet birch	823	63	39	926	993	52	0	1,045	1,971	36
Paper birch	484	203	26	713	1,700	118	0	1,818	2,531	30
Beech	0	131	25	155	797	325	146	1,269	1,424	37
White ash	341	55	0	397	1,243	0	0	1,243	1,640	42
Aspen	592	118	0	711	757	69	0	827	1,537	41
Black cherry	783	137	0	920	1,515	144	0	1,659	2,579	30
White oak	1,655	0	0	1,655	2,931	0	57	2,987	4,643	27
Northern red oak	1,895	119	105	2,120	1,347	0	9	1,356	3,476	31
Other red oaks	1,625	46	0	1,671	591	0	0	591	2,262	31
Elm	96	89	0	185	284	207	40	531	716	60
Other commercial hardwoods	237	0	0	237	111	0	0	111	349	73
Noncommercial hardwoods	1,144	0	0	1,144	1,742	55	60	1,858	3,002	31
All hardwoods	13,242	961	250	14,453	22,911	2,113	750	25,773	40,226	8
All species	22,874	1,515	488	24,876	32,634	3,251	1,172	37,057	61,933	7.5
Sampling error (percent)	12	20	32	11	10	19	21	9	7.5	

Table 23.--Number of trees (5.0+ inches d.b.h.) with observed cavities on timberland by species and condition class, Massachusetts, 1985

(In thousands of trees)

Species	Live				Total live	Dead		Total dead	All trees	Sampling error (percent)
	No cull	Intact live top	Broken top	Dead top		Intact top	Broken top			
Spruce/fir	0	0	0	0	0	0	337	337	337	62
Pitch pine	0	0	0	0	0	0	113	113	113	100
White pine	129	51	55	0	235	561	1,840	2,401	2,636	27
Hemlock	316	209	0	0	525	63	402	465	991	31
Other softwoods	0	0	0	0	0	0	265	265	265	72
All softwoods	445	260	55	0	760	623	2,957	3,581	4,341	18
Red maple	8,267	4,364	545	281	13,458	111	2,686	2,797	16,255	15
Sugar maple	587	1,263	199	0	2,049	354	657	1,011	3,060	31
Yellow birch	433	670	0	0	1,103	0	789	789	1,893	25
Sweet birch	754	234	33	0	1,021	265	227	492	1,514	42
Paper birch	167	727	0	115	1,009	113	1,064	1,177	2,186	30
Hickory	250	0	0	0	250	0	0	0	250	71
Beech	1,249	692	357	0	2,298	77	775	852	3,150	30
White ash	491	52	93	0	636	0	146	146	782	35
Aspen	245	0	0	0	245	118	109	227	473	64
Black cherry	449	151	223	0	823	0	279	279	1,102	34
White oak	228	0	113	0	341	363	202	566	907	49
Northern red oak	1,998	1,087	143	0	3,229	274	123	397	3,626	48
Other red oaks	790	753	57	0	1,600	0	249	249	1,849	29
Elm	0	0	0	0	0	0	299	299	299	74
Other commercial hardwoods	365	152	0	0	517	126	0	126	643	57
Noncommercial hardwoods	358	392	89	0	838	0	488	488	1,326	35
All hardwoods	16,632	10,537	1,853	396	29,419	1,803	8,093	9,896	39,314	9
All species	17,077	10,797	1,909	396	30,179	2,426	11,050	13,477	43,656	8.4
Sampling error (percent)	12	15	24	67	10	29	12	11	8.4	

Table 24.--Number of seedlings, saplings, and shrubs on timberland by species and stand-size class, Massachusetts, 1985

(In millions of stems)

Species	Stand-size class				All classes	Percent saplings
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked		
Eastern redcedar	3	4	0	0	7	57
Spruce species	34	0	0	0	34	18
Pitch pine	11	6	3	0	20	85
Eastern white pine	425	136	27	0	589	23
Eastern hemlock	184	10	0	0	194	28
Other softwoods	42	30	0	0	71	8
All softwoods	699	186	30	0	915	
Red maple	721	601	33	0	1,357	11
Sugar maple	490	345	13	0	848	10
Other maple species	356	174	10	0	540	3
Serviceberry	60	23	3	0	86	0
Yellow birch	129	46	0	0	175	25
Sweet birch	97	53	59	0	209	10
Paper birch	129	34	0	0	162	8
Gray birch	95	52	0	0	147	27
American hornbeam	42	94	0	0	136	7
Hickory species	48	30	0	0	77	9
American chestnut	13	63	3	0	79	0
Flowering dogwood	56	43	0	0	99	0
Hawthorn	20	10	0	0	30	0
American beech	377	138	0	0	515	15
White ash	437	95	23	0	555	5
Other ash species	45	37	0	0	83	0
Yellow-poplar	0	3	0	0	3	0
Apple species	4	0	10	0	14	0
Blackgum	65	42	0	0	107	18
Eastern hophornbeam	23	54	4	0	81	0
Aspen species	45	9	45	0	100	12
Pin cherry	63	14	54	0	130	8
Black cherry	438	66	13	0	517	3
Chokecherry	108	87	0	0	195	0
Other cherries	0	5	15	0	20	75
White oak	107	187	0	0	294	18
Scarlet oak	13	13	13	0	39	33
Bear oak	10	30	101	0	141	2
Chestnut oak	19	7	0	0	26	0
Northern red oak	378	323	27	0	727	4
Black oak	281	266	3	0	550	2
Willow species	59	18	0	0	77	0
Sassafras	22	145	0	0	167	2
American basswood	9	3	0	0	13	0
American elm	28	0	7	0	35	20
Other hardwoods	117	4	0	0	121	0
All hardwoods	4,906	3,115	437	0	8,457	
All trees	5,605	3,301	467	0	9,373	

Table 24.-continued

(In millions of stems)

Species	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Common juniper	91	10	0	0	100
Sheep laurel	108	838	10	0	955
Mountain laurel	1,093	544	0	0	1,637
Other evergreen shrubs	10	38	0	0	48
All evergreen shrubs	1,302	1,429	10	0	2,741
Alder	598	342	195	0	1,136
Azalea	178	276	0	0	454
Barberry	339	135	0	0	474
Sweetfern	4	6	5	0	15
Silky dogwood	0	10	0	0	10
Other dogwood species	189	145	11	0	345
American hazelnut	179	0	0	0	179
Beaked hazelnut	13	3	0	0	16
Huckleberry species	19	330	264	0	614
Witch-hazel	306	284	0	0	590
Winterberry holly	10	21	0	0	31
Common spicebush	131	99	0	0	229
Bush honeysuckle	45	69	0	0	115
Buckthorn	206	254	0	0	460
Sumac species	20	15	23	0	57
Rose species	94	93	0	0	187
Rubus species	801	339	247	0	1,388
American elderberry	4	0	7	0	11
Spirea species	315	198	95	0	609
Blueberry species	2,513	6,064	288	0	8,866
Maple-leaved viburnum	319	140	0	0	459
Hobblebush viburnum	50	153	0	0	203
Wild raisin,witherod	45	51	0	0	95
Arrowwood	248	343	20	0	611
Other viburnum species	274	214	0	0	488
Other deciduous shrubs	1,465	1,858	29	0	3,352
All deciduous shrubs	8,366	11,444	1,184	0	20,995
All species	15,273	16,174	1,661	0	33,109
Sampling error (percent)	9	14	43	0	6.1

Table 25.--Number of seedlings, saplings, and shrubs on timberland by species and forest-type group, Massachusetts, 1985

(In millions of stems)

Species	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Eastern redcedar	0	0	4	0	0	0	0	3	0	7
Spruce species	3	0	0	0	3	0	0	28	0	34
Pitch pine	0	0	17	3	0	0	0	0	0	20
Eastern white pine	295	0	43	33	105	0	5	108	0	589
Eastern hemlock	59	0	0	37	10	0	0	88	0	194
Other softwoods	6	30	0	0	0	0	0	36	0	71
All softwoods	363	30	64	73	118	0	5	263	0	915
Red maple	395	53	0	207	520	0	32	150	0	1,357
Sugar maple	63	0	0	131	71	0	0	583	0	848
Other maple species	10	0	0	10	17	0	32	472	0	540
Serviceberry	33	0	0	0	50	0	0	3	0	86
Yellow birch	55	0	0	0	17	0	22	81	0	175
Sweet birch	46	0	0	7	46	0	0	110	0	209
Paper birch	24	0	0	13	100	0	0	26	0	162
Gray birch	72	3	10	23	33	0	0	6	0	147
American hornbeam	26	0	0	0	104	0	0	7	0	136
Hickory species	0	0	0	7	44	0	0	27	0	77
American chestnut	3	0	0	0	73	0	0	3	0	79
Flowering dogwood	0	0	0	0	53	0	43	3	0	99
Hawthorn	16	0	0	10	0	0	0	3	0	30
American beech	69	3	0	36	75	0	0	331	0	515
White ash	253	0	0	50	64	0	5	183	0	555
Other ash species	0	0	0	0	67	0	0	16	0	83
Yellow-poplar	0	0	0	0	3	0	0	0	0	3
Apple species	0	0	0	0	4	0	0	10	0	14
Blackgum	0	0	0	0	60	0	47	0	0	107
Eastern hophornbeam	0	0	0	10	28	0	0	43	0	81
Aspen species	20	0	0	3	29	0	5	42	0	100
Pin cherry	33	0	0	3	35	0	0	59	0	130

Table 25.-continued

(In millions of stems)

Species	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Black cherry	147	0	0	55	83	0	0	231	0	517
Chokecherry	9	0	3	0	146	0	18	19	0	195
Other cherries	5	0	0	0	15	0	0	0	0	20
White oak	62	0	25	51	150	0	0	5	0	294
Scarlet oak	13	0	13	0	13	0	0	0	0	39
Bear oak	10	0	101	30	0	0	0	0	0	141
Chestnut oak	16	0	0	0	10	0	0	0	0	26
Northern red oak	86	0	25	221	319	0	3	72	0	727
Black oak	38	0	201	15	284	0	0	13	0	550
Willow species	59	0	0	0	0	0	18	0	0	77
Sassafras	0	0	9	44	114	0	0	0	0	167
American basswood	0	0	0	0	0	0	0	13	0	13
American elm	25	0	0	0	7	0	0	3	0	35
Other hardwoods	104	0	0	7	11	0	0	0	0	121
All hardwoods	1,692	59	388	932	2,646	0	226	2,514	0	8,457
All trees	2,055	89	452	1,004	2,764	0	231	2,777	0	9,373
Common juniper	76	0	0	6	0	0	0	18	0	100
Sheep laurel	76	0	225	431	223	0	0	0	0	955
Mountain laurel	524	0	63	6	834	0	29	181	0	1,637
Other evergreen shrubs	0	0	35	0	10	0	0	3	0	48
All evergreen shrubs	675	0	324	444	1,067	0	29	202	0	2,741
Alder	78	0	0	253	711	0	30	63	0	1,136
Azalea	80	0	0	32	331	0	0	12	0	454
Barberry	131	0	0	0	59	0	0	284	0	474
Sweetfern	9	0	6	0	0	0	0	0	0	15
Silky dogwood	0	0	0	0	6	0	0	3	0	10

Table 25.-continued

(In millions of stems)

Species	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Other dogwood species	176	0	0	0	11	0	145	13	0	345
American hazelnut	33	0	0	6	134	0	0	6	0	179
Beaked hazelnut	0	0	0	0	3	0	0	13	0	16
Huckleberry species	19	0	264	107	223	0	0	0	0	614
Witch-hazel	59	0	0	22	335	0	0	175	0	590
Winterberry holly	0	0	0	0	18	0	3	10	0	31
Common spicebush	69	0	0	12	79	0	24	45	0	229
Bush honeysuckle	7	0	0	0	37	0	0	71	0	115
Buckthorn	139	0	0	43	51	0	167	61	0	460
Sumac species	3	0	0	5	0	0	23	26	0	57
Rose species	0	0	0	0	93	0	63	31	0	187
Rubus species	443	0	0	120	305	0	10	510	0	1,388
American elderberry	0	0	0	0	4	0	0	7	0	11
Spirea species	263	63	0	23	25	0	38	197	0	609
Blueberry species	1,199	26	1,062	1,913	4,416	0	0	249	0	8,866
Maple-leaved viburnum	10	0	0	3	435	0	0	11	0	459
Hobblebush viburnum	17	0	0	0	0	0	0	186	0	203
Wild raisin,witherod	0	0	0	59	37	0	0	0	0	95
Arrowwood	124	0	0	73	144	0	119	151	0	611
Other viburnum species	106	0	9	59	306	0	3	3	0	488
Other deciduous shrubs	874	0	333	51	1,713	0	242	139	0	3,352
All deciduous shrubs	3,839	89	1,674	2,781	9,477	0	868	2,267	0	20,995
All species	6,570	178	2,450	4,229	13,307	0	1,127	5,246	0	33,109
Sampling error (percent)	16	100	39	34	14	0	48	15	0	6.1

Number of seedlings, saplings, and shrubs by browse-utilization class, Massachusetts, 1985

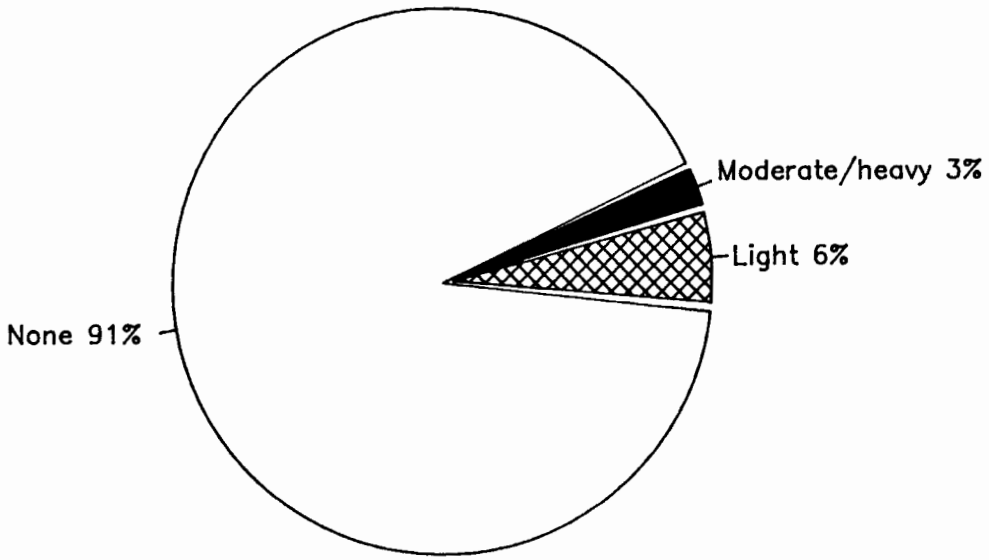


Table 26.--Number of seedlings, saplings, and shrubs on timberland by species and browse-utilization class, Massachusetts, 1985

(In millions of stems)

Species	Browse-utilization class				All classes	Sampling error (percent)
	None	Light	Moderate	Heavy		
Eastern redcedar	7	0	0	0	7	72
Spruce species	34	0	0	0	34	65
Pitch pine	20	0	0	0	20	47
Eastern white pine	585	3	0	0	589	22
Eastern hemlock	194	0	0	0	194	28
Other softwoods	71	0	0	0	71	65
All softwoods	912	3	0	0	915	15
Red maple	1,103	75	66	113	1,357	13
Sugar maple	517	243	89	0	848	20
Other maple species	254	225	62	0	540	29
Serviceberry	86	0	0	0	86	41
Yellow birch	143	19	10	3	175	25
Sweet birch	199	10	0	0	209	30
Paper birch	139	10	0	13	162	38
Gray birch	141	0	3	3	147	30
American hornbeam	64	72	0	0	136	64
Hickory species	77	0	0	0	77	36
American chestnut	79	0	0	0	79	51
Flowering dogwood	46	40	13	0	99	56
Hawthorn	16	13	0	0	30	53
American beech	385	69	57	3	515	19
White ash	367	107	55	26	555	36
Other ash species	66	13	0	4	83	49
Yellow-poplar	3	0	0	0	3	100
Apple species	14	0	0	0	14	76
Blackgum	107	0	0	0	107	45
Eastern hophornbeam	81	0	0	0	81	54
Aspen species	100	0	0	0	100	36
Pin cherry	87	16	7	20	130	34
Black cherry	431	64	22	0	517	24
Chokecherry	172	23	0	0	195	48
Other cherries	15	5	0	0	20	77
White oak	283	11	0	0	294	22
Scarlet oak	39	0	0	0	39	43
Bear oak	141	0	0	0	141	62
Chestnut oak	26	0	0	0	26	68
Northern red oak	666	13	18	29	727	26
Black oak	550	0	0	0	550	35
Willow species	77	0	0	0	77	80
Sassafras	167	0	0	0	167	33
American basswood	3	0	0	9	13	79
American elm	35	0	0	0	35	68
Other hardwoods	118	3	0	0	121	72
All hardwoods	6,800	1,032	402	224	8,457	7
All trees	7,712	1,035	402	224	9,373	6

Table 26.-continued

(In millions of stems)

Species	Browse-utilization class				All classes	Sampling error (percent)
	None	Light	Moderate	Heavy		
Common juniper	100	0	0	0	100	66
Sheep laurel	955	0	0	0	955	48
Mountain laurel	1,618	10	9	0	1,637	24
Other evergreen shrubs	48	0	0	0	48	75
All evergreen shrubs	2,722	10	9	0	2,741	22
Alder	1,098	0	38	0	1,136	37
Azalea	454	0	0	0	454	45
Barberry	474	0	0	0	474	38
Sweetfern	15	0	0	0	15	59
Silky dogwood	10	0	0	0	10	74
Other dogwood species	299	46	0	0	345	49
American hazelnut	157	23	0	0	179	57
Beaked hazelnut	16	0	0	0	16	83
Huckleberry species	614	0	0	0	614	58
Witch-hazel	529	22	16	23	590	22
Winterberry holly	31	0	0	0	31	67
Common spicebush	204	0	26	0	229	42
Bush honeysuckle	92	0	23	0	115	48
Buckthorn	460	0	0	0	460	50
Sumac species	57	0	0	0	57	53
Rose species	187	0	0	0	187	62
Rubus species	1,378	10	0	0	1,388	25
American elderberry	11	0	0	0	11	72
Spirea species	534	12	0	63	609	32
Blueberry species	8,560	287	0	19	8,866	15
Maple-leaved viburnum	262	197	0	0	459	48
Hobblebush viburnum	186	17	0	0	203	78
Wild raisin,witherod	95	0	0	0	95	49
Arrowwood	548	63	0	0	611	25
Other viburnum species	311	160	17	0	488	29
Other deciduous shrubs	3,283	69	0	0	3,352	30
All deciduous shrubs	19,865	905	120	104	20,995	8
All species	30,300	1,950	530	328	33,109	6.1
Sampling error (percent)	6	20	21	36	6.1	

Table 27.--Number of trees (5.0+ inches d.b.h.) with observed cavities on timberland by species and presence of cavities, Massachusetts, 1985

(In thousands of trees)

Species	Live			Total live	Dead			Total dead
	One or more small	One or more large	Multiple, large or small		One or more small	One or more large	Multiple, large or small	
Spruce/fir	0	0	0	0	113	111	112	337
Red pine	0	0	0	0	0	0	0	0
Pitch pine	0	0	0	0	0	0	113	113
White pine	0	113	122	235	1,428	453	520	2,401
Hemlock	322	57	147	525	139	63	264	465
Other softwoods	0	0	0	0	265	0	0	265
All softwoods	322	170	269	760	1,945	627	1,009	3,581
Red maple	5,528	6,307	1,634	13,469	980	839	978	2,797
Sugar maple	355	941	753	2,049	696	111	203	1,011
Yellow birch	217	719	167	1,103	224	126	439	789
Sweet birch	461	211	350	1,021	379	0	113	492
Paper birch	563	185	260	1,009	454	63	660	1,177
Hickory	250	0	0	250	0	0	0	0
Beech	897	1,067	335	2,298	193	311	348	852
White ash	43	537	56	636	146	0	115	261
Aspen	245	0	0	245	63	165	0	227
Black cherry	511	255	56	823	279	0	0	279
White oak	0	341	0	341	188	202	175	566
Northern red oak	1,509	1,065	655	3,229	227	170	0	397
Other red oaks	756	735	109	1,600	105	0	143	249
Elm	0	0	0	0	238	61	0	299
Other commercial hardwoods	0	310	207	517	126	0	0	126
Noncommercial hardwoods	587	151	100	838	573	0	196	769
All hardwoods	11,922	12,826	4,681	29,429	4,872	2,048	3,371	10,292
All species	12,244	12,995	4,950	30,190	6,817	2,675	4,380	13,873

Table 28.--Net green weight of all live trees on timberland by species and diameter class, Massachusetts, 1985

(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+	
Spruce/fir	101	309	750	505	962	285	138	111	118	0	3,279
Red pine	253	86	49	304	461	345	103	0	0	0	1,602
Pitch pine	271	631	670	576	323	315	118	27	78	0	3,008
White pine	2,704	2,731	3,904	4,121	5,628	6,275	8,436	6,150	5,662	11,890	57,502
Hemlock	1,191	1,750	2,691	2,679	2,744	2,587	2,403	979	590	877	18,491
Other softwoods	107	288	310	106	107	0	0	0	0	0	918
All softwoods	4,626	5,796	8,374	8,291	10,226	9,807	11,198	7,267	6,447	12,768	84,800
Red maple	3,143	7,353	11,982	9,974	10,072	5,596	3,025	2,881	669	3,541	58,237
Sugar maple	1,566	1,607	2,735	1,492	1,732	1,280	692	868	361	2,639	14,972
Yellow birch	1,194	722	1,017	685	666	855	341	268	189	1,358	7,296
Sweet birch	914	1,298	1,368	1,516	1,029	708	845	198	0	0	7,877
Paper birch	141	1,003	1,329	1,380	821	767	202	215	179	261	6,299
Hickory	28	377	572	780	183	251	134	141	69	0	2,537
Beech	1,887	1,336	1,149	714	1,299	986	435	694	444	547	9,494
White ash	539	858	970	1,047	1,323	1,677	875	822	151	668	8,931
Aspen	235	96	602	648	559	415	79	0	285	429	3,349
Black cherry	402	758	1,067	1,928	1,701	872	596	295	364	75	8,057
White oak	1,791	1,869	1,779	1,591	983	635	857	251	414	144	10,314
Northern red oak	1,035	2,476	4,414	6,708	6,706	3,993	3,534	1,344	558	2,488	33,256
Other red oaks	683	3,228	4,220	4,705	3,219	2,143	973	1,076	318	1,219	21,785
Elm	107	0	75	114	67	0	72	99	0	0	534
Other commercial hardwoods	403	372	569	995	647	516	513	104	0	279	4,399
Noncommercial hardwoods	2,170	1,267	230	165	121	37	15	0	0	96	4,101
All hardwoods	16,238	24,622	34,080	34,442	31,129	20,732	13,191	9,258	4,001	13,745	201,439
All species	20,864	30,419	42,454	42,733	41,355	30,539	24,389	16,525	10,448	26,513	286,239

Table 29.--Net green weight[a] of all trees on timberland by class of timber and species group, Massachusetts, 1985

(In thousands of tons)

Class of timber	Species group		All groups
	Softwoods	Hardwoods	
Sawtimber trees:			
Sawlog portion	43,521	46,603	90,123
Upper stem	4,753	11,701	16,455
Total	48,274	58,304	106,578
Poletimber trees	8,159	56,275	64,434
All growing stock	56,433	114,579	171,012
Rough cull trees[b]	2,759	14,010	16,768
Rotten cull trees[b]	540	4,265	4,805
Salvable dead trees[c]	2,878	4,734	7,612
Saplings[c]	4,626	16,238	20,864
Stumps[d]	837	3,187	4,024
Tops: growing stock	18,491	42,546	61,037
Tops: rough and rotten	1,157	6,718	7,875
All nongrowing stock	31,287	91,698	122,985
All classes	87,721	206,276	293,997

[a] Includes bark and sound cull; excludes rotten cull.
[b] Bole portion of trees 5.0 inches d.b.h. and larger.
[c] Includes entire tree aboveground.
[d] Of all salvable dead and all live trees 5.0 inches d.b.h. and larger.

Table 30.--Net volume of all trees by class of timber and species group, Massachusetts, 1985

(In millions of cubic feet)

Class of timber	Species group		All groups
	Softwoods	Hardwoods	
Sawtimber trees:			
Sawlog portion	1,230.5	1,162.5	2,393.1
Upper stem portion	142.1	297.7	439.8
Total	1,372.6	1,460.3	2,832.9
Poletimber trees	298.2	1,550.6	1,848.8
Total growing stock	1,670.8	3,010.9	4,681.7
Rough trees:			
Sawtimber size	43.4	101.0	144.4
Poletimber size	29.7	120.8	150.5
Total	73.1	221.8	294.9
Rotten trees:			
Sawtimber size	3.9	36.9	40.7
Poletimber size	3.9	35.0	38.9
Total	7.8	71.8	79.7
All live trees	1,751.7	3,304.5	5,056.3
Salvable dead trees:[a]			
Sawtimber size	21.5	24.5	46.0
Poletimber size	27.8	49.0	76.7
Total	49.3	73.5	122.8
All classes	1,801.0	3,378.0	5,179.1

[a] Includes noncommercial species.

Table 31.--Net volume of all live, growing-stock, and sawtimber trees on timberland by species group and ownership class, Massachusetts, 1985

Species group	Ownership class				
	National Forest	Other public	Forest industry	Other private	All classes
			All live		
			(In millions of cubic feet)		
Softwoods	.0	265.0	54.7	1,432.1	1,751.7
Hardwoods	.0	515.4	79.5	2,709.6	3,304.5
Total, all groups	.0	780.4	134.2	4,141.7	5,056.3
			Growing stock		
			(In millions of cubic feet)		
Softwoods	.0	254.5	53.1	1,363.3	1,670.8
Hardwoods	.0	463.5	77.0	2,470.3	3,010.9
Total, all groups	.0	718.0	130.1	3,833.6	4,681.7
			Sawtimber		
			(In millions of board feet)[a]		
Softwoods	.0	886.4	182.2	4,566.4	5,635.0
Hardwoods	.0	934.9	158.8	4,728.0	5,821.6
Total, all groups	.0	1,821.3	340.9	9,294.4	11,456.6

[a] In this and all other tables presenting board feet volume, the log rule used is the International 1/4-inch rule.

Table 32.--Net volume of growing-stock trees on timberland by forest-type group and stand-size class, Massachusetts, 1985

(In millions of cubic feet)

Forest-type group	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
White/red pine	1,463.9	123.2	23.7	.0	1,610.8
Spruce/fir	12.6	30.0	.0	.0	42.7
Hard pine	47.0	52.8	2.8	.0	102.7
Oak/pine	370.8	88.4	.0	.0	459.2
Oak/hickory	565.1	619.9	23.4	.0	1,208.4
Elm/ash/red maple	121.2	20.5	14.8	.0	156.5
Northern hardwoods	706.5	354.4	3.5	.0	1,064.3
Aspen/birch	16.0	21.1	.0	.0	37.1
All groups	3,303.3	1,310.2	68.2	.0	4,681.7

Table 33.--Net volume of growing-stock trees on timberland by forest-type group and basal-area class (all live trees), Massachusetts, 1985

(In millions of cubic feet)

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+	
White/red pine	5.5	228.4	640.7	648.3	88.0	.0	.0	1,610.8
Spruce/fir	8.3	13.0	12.6	.0	8.8	.0	.0	42.7
Hard pine	6.3	47.3	29.1	.0	20.0	.0	.0	102.7
Oak/pine	1.2	119.1	244.8	94.2	.0	.0	.0	459.2
Oak/hickory	44.6	538.4	495.0	113.4	17.1	.0	.0	1,208.4
Elm/ash/red maple	8.3	46.2	85.6	16.5	.0	.0	.0	156.5
Northern hardwoods	7.6	184.7	623.3	190.1	26.4	.0	32.2	1,064.3
Aspen/birch	1.5	28.2	.0	.0	7.4	.0	.0	37.1
All groups	83.2	1,205.1	2,131.1	1,062.5	167.6	.0	32.2	4,681.7

Net volume of growing-stock trees by species, Massachusetts, 1985

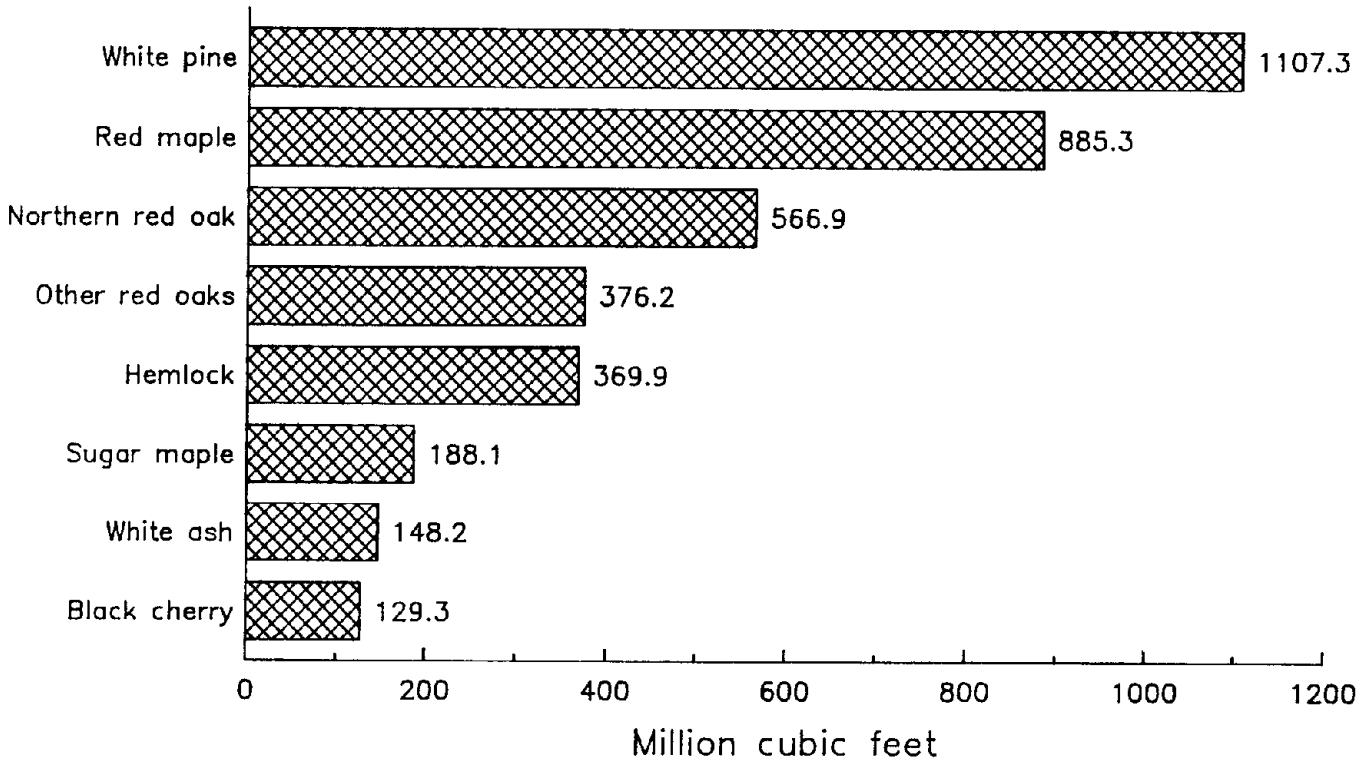


Table 34.--Net volume of growing-stock trees on timberland by species and forest-type group, Massachusetts, 1985

(In millions of cubic feet)

Species	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Spruce/fir	31.5	28.7	.0	.1	.3	.0	.0	13.6	.0	74.2
Red pine	7.2	.0	1.0	.0	2.6	.0	.0	5.3	.5	16.7
Pitch pine	11.5	.0	55.3	8.6	2.8	.0	.0	.0	.0	78.2
White pine	860.6	1.2	8.0	138.2	61.5	.0	.2	35.9	1.7	1,107.3
Hemlock	223.2	.0	.0	9.2	15.5	.0	1.5	119.0	1.5	369.9
Other softwoods	5.7	.0	16.1	1.6	.7	.0	.0	.4	.0	24.4
All softwoods	1,139.6	29.9	80.3	157.7	83.4	.0	1.8	174.3	3.8	1,670.8
Red maple	190.6	3.1	4.1	85.6	194.2	.0	113.1	292.3	2.3	885.3
Sugar maple	10.5	.6	.0	36.5	6.7	.0	.0	131.8	2.1	188.1
Yellow birch	12.8	1.0	.0	1.8	5.1	.0	4.3	65.7	.0	90.8
Sweet birch	25.0	.6	.0	7.8	16.3	.0	.0	55.3	.0	105.1
Paper birch	23.6	1.0	.0	6.2	21.1	.0	.0	37.2	12.3	101.5
Hickory	2.4	.0	.0	10.7	22.0	.0	4.4	6.9	.0	46.4
Beech	19.3	.1	.0	3.6	10.4	.0	.9	59.6	.4	94.3
White ash	23.8	.4	.0	11.3	11.0	.0	20.5	80.4	.7	148.2
Aspen	10.8	.0	.0	4.7	10.3	.0	4.2	24.7	12.6	67.3
Black cherry	29.9	6.1	.0	13.5	5.4	.0	1.8	70.8	1.7	129.3
White oak	17.4	.0	2.8	12.9	93.1	.0	.0	1.6	.0	127.9
Northern red oak	49.0	.0	5.0	69.2	404.4	.0	1.8	36.5	1.1	566.9
Other red oaks	48.7	.0	10.5	30.2	284.3	.0	.0	2.5	.0	376.2
Elm	1.4	.0	.0	.9	1.2	.0	.8	2.6	.0	6.9
Other hardwoods	5.8	.0	.0	6.5	39.5	.0	2.7	22.0	.1	76.6
All hardwoods	471.2	12.8	22.3	301.5	1,125.0	.0	154.7	890.0	33.3	3,010.9
All species	1,610.8	42.7	102.7	459.2	1,208.4	.0	156.5	1,064.3	37.1	4,681.7

Table 35.--Net volume of growing-stock trees on timberland by species and stand-size class, Massachusetts, 1972

(In millions of cubic feet)

Species	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Spruce/fir	74.1	5.9	.0	.0	80.0
Red pine	20.3	.0	1.5	.0	21.8
Pitch pine	30.2	20.2	13.8	.0	64.2
White pine	627.6	200.6	39.7	.0	867.9
Hemlock	138.8	62.9	9.1	.0	210.9
Other softwoods	13.3	.0	.0	.0	13.3
All softwoods	904.4	289.6	64.2	.0	1,258.1
Red maple	186.6	298.8	35.6	.0	521.0
Sugar maple	91.3	68.2	9.6	.0	169.0
Yellow birch	23.8	35.1	1.6	.0	60.5
Sweet birch	26.0	42.2	6.0	.0	74.2
Paper birch	31.1	62.3	5.3	.0	98.8
Hickory	29.6	27.1	2.8	.0	59.5
Beech	39.1	30.8	8.5	.0	78.4
White ash	38.7	48.9	.0	.0	87.6
Aspen	14.0	31.5	2.6	.0	48.0
Black cherry	34.4	47.6	3.6	.0	85.6
White oak	57.9	68.3	14.0	.0	140.2
Northern red oak	169.2	232.0	14.1	.0	415.3
Other red oaks	120.0	142.1	18.4	.0	280.5
Elm	5.1	6.4	2.8	.0	14.3
Other hardwoods	9.4	21.1	1.9	.0	32.4
All hardwoods	876.1	1,162.4	126.8	.0	2,165.3
All species	1,780.5	1,451.9	191.0	.0	3,423.4

Table 36.--Net volume of growing-stock trees on timberland by species and stand-size class, Massachusetts, 1985

(In millions of cubic feet)

Species	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Spruce/fir	42.1	32.1	.0	.0	74.2
Red pine	15.7	.5	.5	.0	16.7
Pitch pine	41.3	34.6	2.3	.0	78.2
White pine	978.2	111.1	18.1	.0	1,107.3
Hemlock	323.2	46.2	.5	.0	369.9
Other softwoods	6.5	17.9	.0	.0	24.4
All softwoods	1,407.0	242.5	21.3	.0	1,670.8
Red maple	599.1	277.1	9.1	.0	885.3
Sugar maple	152.1	32.3	3.6	.0	188.1
Yellow birch	67.2	23.4	.2	.0	90.8
Sweet birch	65.8	38.4	.9	.0	105.1
Paper birch	49.9	51.3	.3	.0	101.5
Hickory	29.3	16.6	.5	.0	46.4
Beech	78.1	16.2	.0	.0	94.3
White ash	105.2	31.8	11.2	.0	148.2
Aspen	39.4	26.0	1.9	.0	67.3
Black cherry	90.7	36.8	1.8	.0	129.3
White oak	63.6	59.0	5.3	.0	127.9
Northern red oak	365.3	195.5	6.0	.0	566.9
Other red oaks	146.9	224.7	4.6	.0	376.2
Elm	5.6	.7	.7	.0	6.9
Other hardwoods	38.1	37.7	.7	.0	76.6
All hardwoods	1,896.2	1,067.7	46.9	.0	3,010.9
All species	3,303.3	1,310.2	68.2	.0	4,681.7

Table 37.--Net volume of growing-stock trees on timberland by species and cubic-foot stand-volume class, Massachusetts, 1985

(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+	
Spruce/fir	.0	5.0	11.3	12.0	16.1	29.7	74.2
Red pine	.5	.0	.0	.5	5.9	9.9	16.7
Pitch pine	7.2	16.2	37.4	11.4	.0	6.0	78.2
White pine	4.5	45.3	96.8	196.3	188.7	575.8	1,107.3
Hemlock	.0	3.4	12.3	66.2	107.5	180.5	369.9
Other softwoods	1.6	.3	.8	.4	20.2	1.2	24.4
All softwoods	13.7	70.2	158.6	286.7	338.5	803.2	1,670.8
Red maple	5.0	65.6	99.7	240.2	221.8	252.9	885.3
Sugar maple	5.3	2.6	16.0	41.9	76.9	45.4	188.1
Yellow birch	.0	4.1	8.8	21.4	37.4	19.0	90.8
Sweet birch	.0	.1	8.4	24.2	35.1	37.3	105.1
Paper birch	.0	.5	18.6	20.9	33.1	28.4	101.5
Hickory	.0	4.9	3.4	19.3	12.5	6.3	46.4
Beech	.0	.7	8.8	25.2	40.4	19.3	94.3
White ash	2.7	2.6	23.2	30.6	63.4	25.5	148.2
Aspen	3.4	3.5	11.1	16.1	28.0	5.3	67.3
Black cherry	.7	4.5	15.2	27.1	51.8	29.9	129.3
White oak	3.3	19.3	29.2	40.5	21.0	14.6	127.9
Northern red oak	5.0	30.4	96.0	143.0	169.6	123.0	566.9
Other red oaks	13.5	61.8	108.8	97.1	45.0	50.1	376.2
Elm	.7	1.4	1.2	.9	1.9	.9	6.9
Other hardwoods	1.1	5.2	16.2	28.4	12.7	13.1	76.6
All hardwoods	40.6	207.1	464.7	776.8	850.7	671.0	3,010.9
All species	54.3	277.3	623.2	1,063.5	1,189.2	1,474.1	4,681.7

Net volume of growing-stock trees by diameter class, Massachusetts, 1972 and 1985

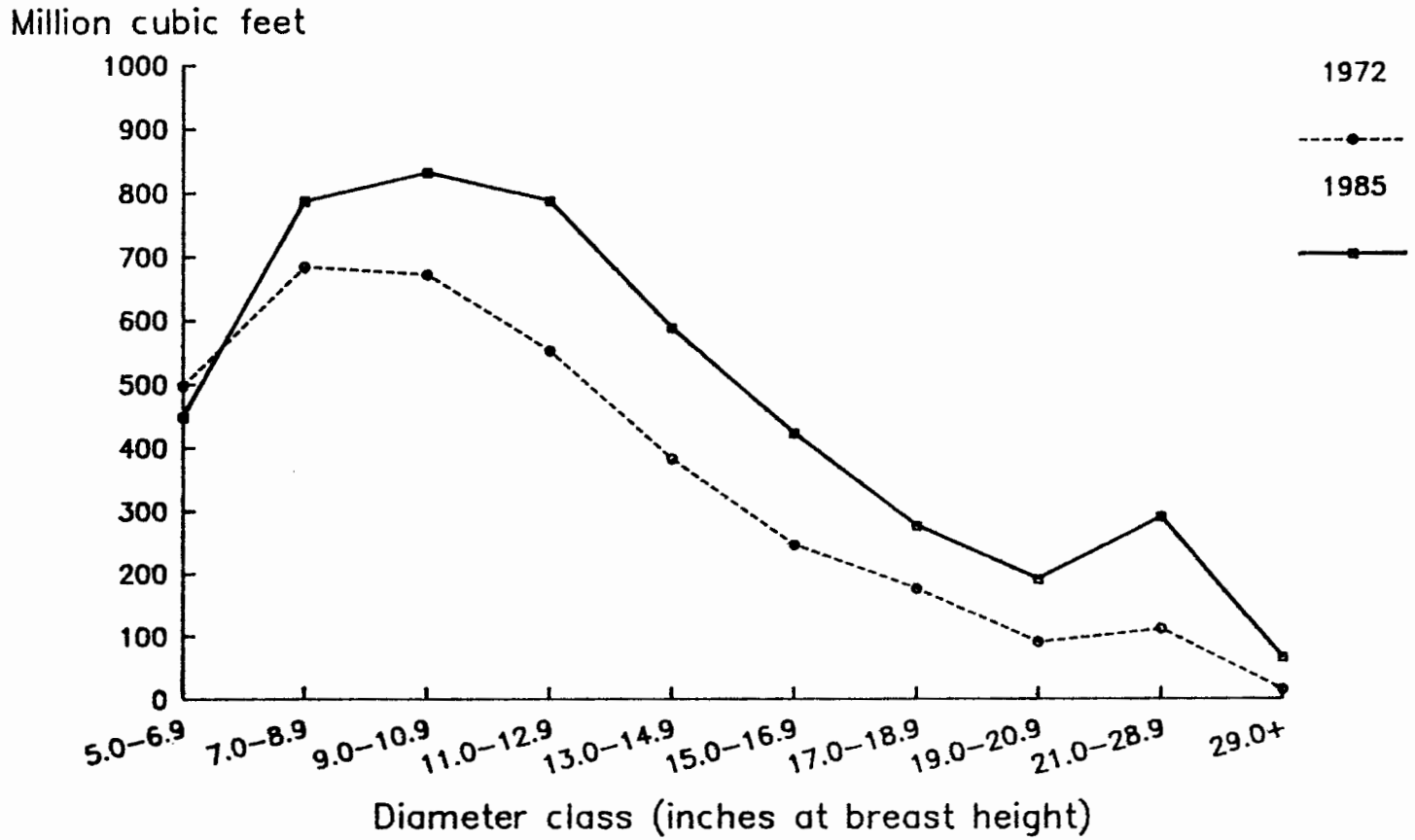


Table 38.--Net volume of growing-stock trees on timberland by species and diameter class, Massachusetts, 1972

(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+	
Spruce/fir	9.5	19.0	21.6	11.2	14.8	2.7	1.4	.0	.0	.0	80.0
Red pine	4.3	3.3	5.0	1.4	5.1	1.4	1.3	.0	.0	.0	21.8
Pitch pine	7.7	13.2	16.6	12.2	8.3	4.5	1.8	.0	.0	.0	64.2
White pine	60.0	106.7	135.5	144.9	120.7	109.3	88.0	45.7	51.0	6.0	867.9
Hemlock	39.6	40.3	42.9	43.0	19.4	8.8	8.4	4.1	4.4	.0	210.9
Other softwoods	1.1	1.2	4.3	3.5	3.2	.0	.0	.0	.0	.0	13.3
All softwoods	122.2	183.8	225.9	216.2	171.5	126.6	100.9	49.7	55.4	6.0	1,258.1
Red maple	122.9	156.2	107.3	68.6	33.4	18.6	2.7	6.6	3.9	.9	521.0
Sugar maple	27.4	38.6	30.1	17.6	21.1	13.6	7.1	4.3	9.2	.0	169.0
Yellow birch	9.9	18.9	12.7	6.2	6.8	.0	3.3	1.1	1.4	.0	60.5
Sweet birch	16.5	19.9	19.0	8.7	5.4	2.8	.8	.0	1.0	.0	74.2
Paper birch	25.0	18.2	30.6	14.4	6.8	2.7	.0	1.0	.0	.0	98.8
Hickory	7.3	10.7	15.8	8.0	9.7	2.4	3.6	.9	1.1	.0	59.5
Beech	8.6	13.8	16.3	18.4	9.2	7.3	2.6	.0	2.2	.0	78.4
White ash	18.2	15.6	12.2	18.3	10.8	1.5	4.1	1.2	5.8	.0	87.6
Aspen	10.8	15.8	5.5	8.4	2.7	4.0	.7	.0	.0	.0	48.0
Black cherry	28.7	19.1	18.7	8.4	8.7	.0	.9	.0	1.1	.0	85.6
White oak	22.3	38.8	23.1	22.0	13.2	4.7	5.5	3.2	6.1	1.4	140.2
Northern red oak	35.5	73.9	88.6	73.4	42.5	38.8	26.4	15.9	14.8	5.5	415.3
Other red oaks	27.5	52.7	59.0	55.7	38.0	17.4	16.1	6.6	6.3	1.4	280.5
Elm	3.3	3.1	2.6	1.3	2.0	.0	.0	.0	1.9	.0	14.3
Other hardwoods	10.7	4.6	4.0	5.6	.0	4.8	1.5	.0	1.2	.0	32.4
All hardwoods	374.7	499.9	445.5	334.9	210.3	118.7	75.2	40.8	56.2	9.2	2,165.3
All species	496.9	683.7	671.4	551.1	381.8	245.3	176.1	90.5	111.6	15.2	3,423.4

Table 39.--Net volume of growing-stock trees on timberland by species and diameter class, Massachusetts, 1985

(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+	
Spruce/fir	7.8	18.5	13.0	18.5	9.8	4.0	1.3	1.3	.0	.0	74.2
Red pine	.9	.5	4.3	5.6	4.5	1.0	.0	.0	.0	.0	16.7
Pitch pine	7.8	19.6	18.8	14.2	8.0	5.4	2.4	2.0	.0	.0	78.2
White pine	48.4	90.1	119.1	135.5	136.2	146.6	121.0	110.2	167.4	32.7	1,107.3
Hemlock	35.3	51.6	59.2	67.7	59.4	46.0	23.1	9.8	13.8	4.1	369.9
Other softwoods	7.5	10.2	3.4	3.4	.0	.0	.0	.0	.0	.0	24.4
All softwoods	107.7	190.5	217.9	244.9	217.9	203.0	147.8	123.3	181.1	36.7	1,670.8
Red maple	119.7	205.9	176.3	174.5	94.6	39.3	32.2	9.0	29.7	4.2	885.3
Sugar maple	16.9	39.3	25.4	27.3	25.7	15.8	10.1	7.2	14.5	5.9	188.1
Yellow birch	11.6	23.2	14.5	17.9	8.5	5.1	1.9	2.5	2.0	3.6	90.8
Sweet birch	17.6	24.2	22.0	19.8	10.5	8.2	1.6	.0	1.2	.0	105.1
Paper birch	20.6	30.5	24.8	13.5	8.1	1.5	2.4	.0	.0	.0	101.5
Hickory	6.2	11.6	10.6	7.9	6.2	1.9	1.3	.6	.0	.0	46.4
Beech	14.2	12.7	9.1	17.9	19.7	8.1	7.0	3.0	2.6	.0	94.3
White ash	14.9	18.0	24.4	22.7	28.5	13.7	14.8	2.6	8.4	.0	148.2
Aspen	4.1	15.6	18.5	14.4	8.3	1.9	.0	2.3	1.8	.6	67.3
Black cherry	10.6	19.4	31.6	24.3	15.3	18.0	2.4	7.2	.5	.0	129.3
White oak	22.6	25.1	30.4	16.1	9.2	9.5	2.9	6.5	5.7	.0	127.9
Northern red oak	34.0	73.8	115.5	113.5	71.9	67.3	38.2	14.0	25.1	13.4	566.9
Other red oaks	41.8	85.3	86.1	57.1	52.0	16.6	10.7	12.1	13.4	1.0	376.2
Elm	.3	1.4	1.5	1.8	.0	.8	1.0	.0	.0	.0	6.9
Other hardwoods	5.2	10.6	22.8	13.2	10.1	10.5	.8	.0	3.4	.0	76.6
All hardwoods	340.4	596.6	613.6	541.9	368.6	218.3	127.3	67.2	108.3	28.7	3,010.9
All species	448.1	787.1	831.4	786.7	586.5	421.2	275.2	190.5	289.4	65.4	4,681.7

Table 40.--Net volume of growing stock in the sawlog portion[a] of sawtimber trees on timberland by species and diameter class, Massachusetts, 1985

(In millions of cubic feet)

Species	Diameter class (inches at breast height)								All classes
	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+	
Spruce/fir	10.9	16.1	8.8	3.6	1.2	1.2	.0	.0	41.7
Red pine	3.7	4.8	4.0	.9	.0	.0	.0	.0	13.4
Pitch pine	15.8	12.4	7.2	4.9	2.2	1.9	.0	.0	44.3
White pine	100.2	117.9	121.8	133.4	111.7	102.5	156.5	30.5	874.6
Hemlock	49.8	58.9	53.1	41.9	21.3	9.1	12.9	3.8	250.8
Other softwoods	2.8	2.9	.0	.0	.0	.0	.0	.0	5.8
All softwoods	183.2	213.0	194.8	184.7	136.4	114.7	169.4	34.3	1,230.5
Red maple	-	128.5	76.6	33.0	27.4	7.6	25.2	3.5	301.8
Sugar maple	-	20.1	20.8	13.2	8.6	6.2	12.3	5.0	86.2
Yellow birch	-	13.1	6.9	4.3	1.6	2.2	1.7	3.1	32.8
Sweet birch	-	14.6	8.5	6.9	1.4	.0	1.0	.0	32.3
Paper birch	-	10.0	6.5	1.3	2.0	.0	.0	.0	19.8
Hickory	-	5.8	5.0	1.6	1.1	.5	.0	.0	14.1
Beech	-	13.2	16.0	6.8	5.9	2.6	2.2	.0	46.6
White ash	-	16.7	23.1	11.5	12.6	2.2	7.1	.0	73.3
Aspen	-	10.6	6.7	1.6	.0	2.0	1.5	.5	22.8
Black cherry	-	17.9	12.4	15.1	2.0	6.1	.5	.0	54.0
White oak	-	11.8	7.4	8.0	2.6	5.5	4.8	.0	40.0
Northern red oak	-	83.6	58.2	56.6	32.5	11.9	21.4	11.3	275.5
Other red oaks	-	42.0	42.2	13.9	9.1	10.3	11.4	.9	129.8
Elm	-	1.3	.0	.7	.9	.0	.0	.0	2.9
Other hardwoods	-	9.7	8.2	8.9	.7	.0	2.9	.0	30.4
All hardwoods	-	398.8	298.6	193.3	108.2	57.1	92.9	24.3	1,162.8
All species	183.2	611.9	493.4	378.0	244.6	171.9	262.4	58.7	2,393.3

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

Net volume of sawtimber trees by diameter class, Massachusetts, 1972 and 1985

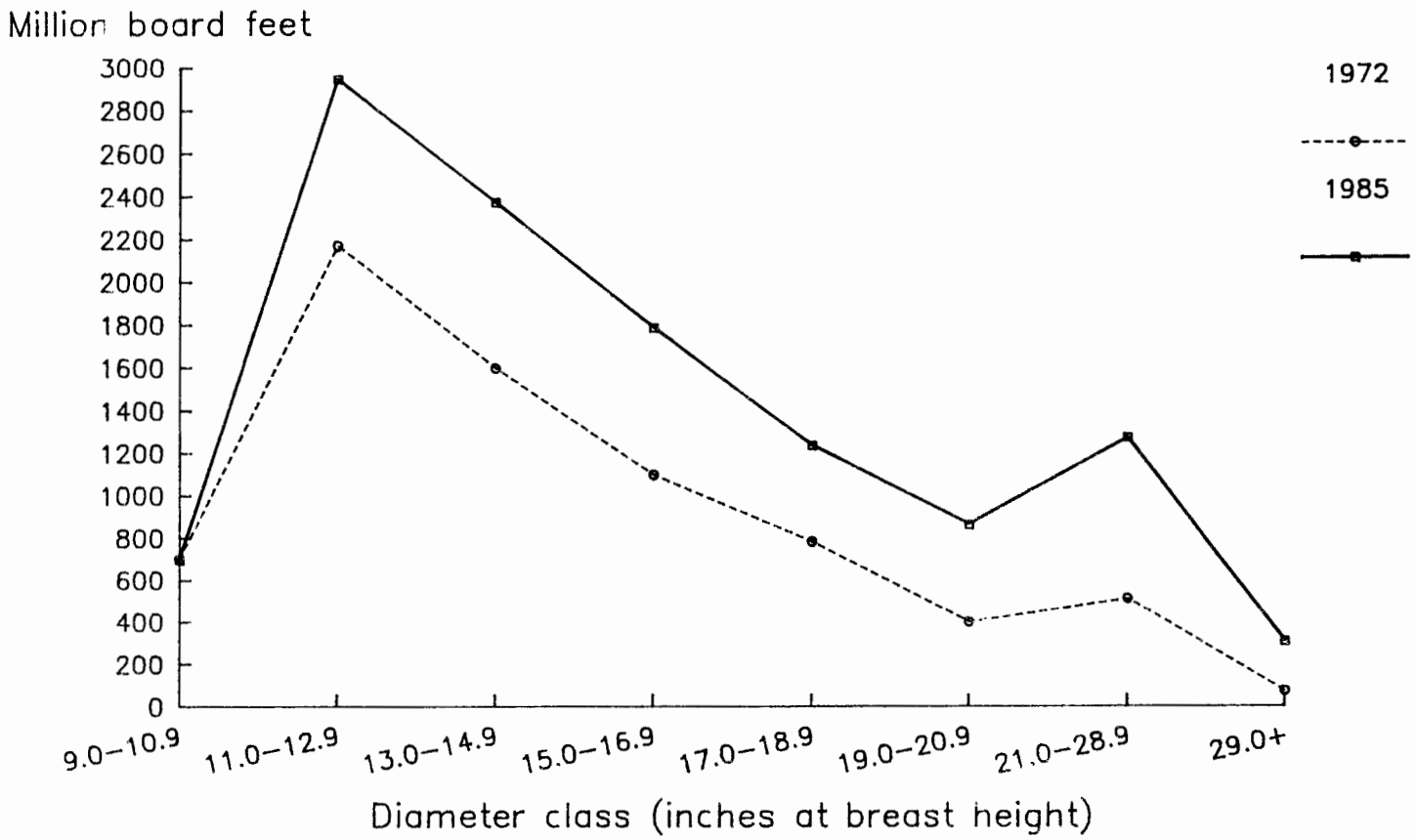


Table 41.--Net volume of sawtimber trees on timberland by species and diameter class, Massachusetts, 1972

(In millions of board feet)

Species	Diameter class (inches at breast height)								All classes
	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+	
Spruce/fir	76.2	45.0	65.7	12.9	6.0	.0	.0	.0	205.8
Red pine	14.9	5.4	22.2	6.7	5.8	.0	.0	.0	54.8
Pitch pine	51.1	44.7	36.9	20.1	7.0	.0	.0	.0	159.6
White pine	413.5	580.0	519.4	494.7	392.2	204.4	242.2	32.3	2,878.7
Hemlock	127.7	156.9	80.2	37.3	34.6	14.8	19.7	.0	471.3
Other softwoods	14.2	12.4	13.0	.0	.0	.0	.0	.0	39.6
All softwoods	697.6	844.4	737.3	571.6	445.5	219.2	261.9	32.3	3,809.8
Red maple	-	264.6	125.2	79.7	10.0	30.4	17.9	4.2	532.1
Sugar maple	-	68.4	90.1	63.3	32.8	18.3	36.5	.0	309.4
Yellow birch	-	26.7	29.1	.0	7.5	5.3	6.1	.0	74.7
Sweet birch	-	30.0	22.9	12.6	4.8	.0	4.2	.0	74.5
Paper birch	-	60.3	31.2	13.1	.0	2.4	.0	.0	107.0
Hickory	-	30.8	39.7	11.6	15.6	3.5	5.0	.0	106.3
Beech	-	77.5	38.0	31.7	14.7	.0	12.5	.0	174.4
White ash	-	77.4	45.4	5.7	19.5	4.5	25.2	.0	177.6
Aspen	-	37.6	12.1	17.7	3.1	.0	.0	.0	70.5
Black cherry	-	33.2	41.0	.0	4.2	.0	4.0	.0	82.4
White oak	-	84.1	54.1	19.8	26.5	13.3	23.2	6.2	227.3
Northern red oak	-	287.3	173.0	172.7	119.5	73.7	64.1	22.5	912.7
Other red oaks	-	219.2	149.4	76.6	71.2	27.7	30.8	6.9	581.8
Elm	-	4.6	7.1	.0	.0	.0	13.0	.0	24.8
Other hardwoods	-	22.7	.0	18.9	4.8	.0	5.2	.0	51.6
All hardwoods	-	1,324.4	858.5	523.4	334.3	179.1	247.7	39.7	3,507.1
All species	697.6	2,168.8	1,595.8	1,095.0	779.8	398.3	509.7	72.0	7,316.9

Table 42.--Net volume of sawtimber trees on timberland by species and diameter class, Massachusetts, 1985

(In millions of board feet)

Species	Diameter class (inches at breast height)								All classes
	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+	
Spruce/fir	43.1	72.5	42.8	18.6	6.5	5.5	.0	.0	189.0
Red pine	15.2	21.4	20.0	4.4	.0	.0	.0	.0	61.1
Pitch pine	55.4	47.4	29.5	19.9	9.9	9.0	.0	.0	171.2
White pine	392.7	525.3	579.4	645.4	562.7	508.4	756.4	156.2	4,126.5
Hemlock	181.2	241.9	236.9	186.3	103.2	40.0	59.5	18.4	1,067.4
Other softwoods	8.5	11.3	.0	.0	.0	.0	.0	.0	19.8
All softwoods	696.0	919.9	908.7	874.6	682.2	563.0	815.9	174.6	5,635.0
Red maple	-	646.6	368.2	163.6	139.1	38.3	108.4	17.1	1,481.3
Sugar maple	-	101.0	98.8	60.0	38.8	25.9	60.8	26.6	412.0
Yellow birch	-	66.3	32.7	17.6	9.3	9.7	9.0	14.3	159.0
Sweet birch	-	73.9	41.4	31.9	7.1	.0	4.5	.0	158.9
Paper birch	-	54.5	30.7	7.7	10.5	.0	.0	.0	103.4
Hickory	-	32.0	25.8	8.8	6.3	3.1	.0	.0	76.1
Beech	-	66.6	79.3	34.7	32.3	15.7	13.5	.0	242.1
White ash	-	88.3	117.1	57.6	61.9	10.6	35.4	.0	370.9
Aspen	-	58.2	32.8	7.2	.0	11.8	9.3	3.0	122.3
Black cherry	-	89.0	58.5	78.2	11.3	30.8	3.2	.0	271.0
White oak	-	61.4	37.8	42.2	14.2	29.6	22.5	.0	207.7
Northern red oak	-	423.1	292.5	287.1	164.1	63.6	110.6	64.3	1,405.2
Other red oaks	-	206.5	208.0	67.0	46.7	57.8	63.0	5.2	654.2
Elm	-	5.9	.0	4.1	4.9	.0	.0	.0	14.9
Other hardwoods	-	49.2	37.1	40.7	3.2	.0	12.4	.0	142.6
All hardwoods	-	2,022.5	1,460.8	908.5	549.6	296.9	452.7	130.5	5,821.6
All species	696.0	2,942.4	2,369.5	1,783.0	1,231.9	859.9	1,268.6	305.1	11,456.6

Table 43.--Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Massachusetts, 1972

(In millions of board feet)

Species	All size classes					>15" Diameter at breast height				
	Grade 1	Grade 2	Grade 3	Grade 4[a]	All grades	Grade 1	Grade 2	Grade 3	Grade 4[a]	All grades
Spruce/fir[b]	205.8	-	-	-	205.8	18.9	-	-	-	18.9
Red pine	25.3	3.3	26.2	-	54.8	6.6	.9	5.0	-	12.5
Pitch pine	14.8	14.2	130.6	-	159.6	.0	2.6	24.4	-	27.0
White pine	83.8	422.0	1,431.4	941.5	2,878.7	50.3	172.2	606.1	537.1	1,365.7
Hemlock[b]	471.3	-	-	-	471.3	106.4	-	-	-	106.4
Other softwoods	39.6	.0	.0	-	39.6	.0	.0	.0	-	.0
All softwoods	840.5	439.5	1,588.2	941.5	3,809.8	182.2	175.7	635.5	537.1	1,530.5
Red maple	2.6	29.6	378.3	121.5	532.1	.0	12.9	99.6	29.8	142.3
Sugar maple	9.1	34.7	203.1	62.5	309.4	7.9	15.9	91.1	36.1	151.0
Yellow birch	2.1	13.0	32.3	27.3	74.7	1.7	.5	9.8	6.9	18.9
Sweet birch	5.3	4.9	35.2	29.1	74.5	4.8	1.1	10.5	5.1	21.5
Paper birch	7.1	36.1	53.0	10.8	107.0	.0	5.4	8.7	1.5	15.6
Hickory	.0	19.2	63.0	24.1	106.3	.0	9.7	20.2	5.9	35.8
Beech	1.7	.0	147.9	24.8	174.4	.6	.0	51.2	7.1	58.9
White ash	21.5	47.4	84.3	24.4	177.6	13.0	14.3	21.5	6.1	54.9
Aspen	8.1	14.0	40.4	8.0	70.5	4.3	8.7	6.5	1.4	20.9
Black cherry	.0	12.9	57.3	12.3	82.4	.0	.0	6.9	1.3	8.2
White oak	16.3	28.0	123.6	59.4	227.3	13.7	8.4	48.2	18.8	89.1
Northern red oak	92.9	201.1	502.0	116.6	912.7	79.6	119.3	206.5	47.0	452.4
Other red oaks	22.4	70.9	304.4	184.1	581.8	18.9	36.1	95.7	62.6	213.3
Elm	.0	8.7	13.4	2.7	24.8	.0	8.7	3.5	.8	13.0
Other hardwoods	4.5	8.6	28.9	9.6	51.6	4.5	4.9	15.4	4.0	28.8
All hardwoods	193.7	529.0	2,067.1	717.3	3,507.1	148.9	246.1	695.1	234.2	1,324.3
Percent of hardwood in each grade	6	15	59	20	100	11	19	52	18	100

[a]Grade 4 applies only to white pine. For hardwoods, the volumes in this column are for construction logs.
[b]These species are not divided into standard-lumber grades.

Table 44.--Net volume of sawtimber trees on timberland by species, size class, and standard-lumber log grade, Massachusetts, 1985

(In millions of board feet)

Species	All size classes					>15" Diameter at breast height				
	Grade 1	Grade 2	Grade 3	Grade 4[a]	All grades	Grade 1	Grade 2	Grade 3	Grade 4[a]	All grades
Spruce/fir[b]	189.0	-	-	-	189.0	35.7	-	-	-	35.7
Red pine	.0	3.7	57.4	-	61.1	.0	.0	5.3	-	5.3
Pitch pine	.0	30.5	140.7	-	171.2	.0	9.4	25.9	-	35.3
White pine	70.2	631.4	2,125.1	1,299.8	4,126.5	66.0	412.7	1,386.5	924.3	2,789.5
Hemlock[b]	1,067.4	-	-	-	1,067.4	439.8	-	-	-	439.8
Other softwoods	19.8	.0	.0	-	19.8	.0	.0	.0	-	.0
All softwoods	1,346.4	665.6	2,323.2	1,299.8	5,635.0	541.5	422.1	1,417.7	924.3	3,305.6
Red maple	4.4	93.3	811.8	571.8	1,481.3	4.4	45.9	293.3	205.9	549.5
Sugar maple	36.7	23.1	183.3	168.9	412.0	36.3	9.5	60.6	96.8	203.2
Yellow birch	1.9	15.4	100.5	41.2	159.0	1.1	8.9	63.1	22.1	95.2
Sweet birch	2.0	9.7	94.1	53.1	158.9	.5	.5	18.6	28.0	47.6
Paper birch	.0	27.1	56.9	19.4	103.4	.0	.0	11.9	1.6	13.5
Hickory	.0	9.0	43.7	23.4	76.1	.0	4.6	22.9	6.5	34.0
Beech	22.8	9.7	123.2	86.4	242.1	21.8	6.1	47.0	37.8	112.7
White ash	12.3	105.3	177.3	76.0	370.9	9.6	48.6	65.3	27.4	150.9
Aspen	8.4	37.1	58.0	18.8	122.3	8.4	22.4	21.0	2.3	54.1
Black cherry	25.2	46.3	128.5	71.0	271.0	25.2	28.2	43.9	11.4	108.7
White oak	23.7	35.1	90.3	58.6	207.7	23.7	27.8	46.9	21.0	119.4
Northern red oak	91.3	344.3	730.7	238.9	1,405.2	77.3	192.5	234.7	89.9	594.4
Other red oaks	26.2	111.9	274.7	241.4	654.2	26.2	72.6	72.6	96.8	268.2
Elm	.0	3.4	8.3	3.2	14.9	.0	3.4	6.8	1.3	11.5
Other hardwoods	4.1	34.1	68.9	35.5	142.6	4.1	18.3	24.4	18.0	64.8
All hardwoods	259.0	904.8	2,950.2	1,707.6	5,821.6	238.6	489.3	1,033.0	666.8	2,427.7
Percent of hardwood in each grade	4	16	51	29	100	10	20	43	27	100

[a]Grade 4 applies only to white pine. For hardwoods, the volumes in this column are for construction logs.
[b]These species are not divided into standard-lumber grades.

Table 45.--Average annual net change of growing-stock volume on timberland by species and component, Massachusetts, 1971-84

(In thousands of cubic feet)

Species	Ingrowth	Accretion	Gross growth	Mortality	Cull increment	Net growth	Removals	Net change
Spruce/fir	499	1,340	1,839	-802	-155	882	-1,348	-466
White pine	4,535	36,363	40,898	-3,355	-931	36,612	-17,642	18,970
Hemlock	3,708	13,983	17,691	-799	-216	16,676	-4,074	12,602
Other softwoods	1,980	982	2,962	-301	-286	2,375	-789	1,586
Total softwoods	10,722	52,668	63,390	-5,257	-1,588	56,545	-23,854	32,692
Red maple	14,315	22,996	37,311	-1,684	-1,534	34,093	-5,232	28,861
Sugar maple	301	2,226	2,527	-491	-413	1,623	-111	1,512
Yellow birch	1,024	2,238	3,262	-448	-294	2,520	-124	2,395
Sweet birch	1,502	1,988	3,490	-137	-183	3,170	-724	2,446
Hickory	11	59	70	-974	0	-904	-130	-1,034
Beech	697	1,846	2,543	-457	-534	1,552	-295	1,257
White ash	1,464	4,462	5,926	-286	-41	5,599	-802	4,797
Aspen	807	1,549	2,356	-646	0	1,710	-176	1,533
White oak	622	2,390	3,012	-1,580	-407	1,025	-2,001	-976
Northern red oak	2,718	15,470	18,188	-1,392	-131	16,665	-4,652	12,013
Other red oaks	2,021	10,028	12,049	-621	-252	11,176	-3,592	7,584
Other hardwoods	3,512	6,995	10,507	-2,238	-394	7,875	-1,277	6,598
Total hardwoods	28,994	72,247	101,241	-10,954	-4,182	86,105	-19,118	66,986
All species	39,716	124,915	164,631	-16,211	-5,770	142,650	-42,972	99,678

Table 46.--Average annual net growth and average annual removals of growing-stock volume on timberland by species, Massachusetts, 1971-84

(In thousands of cubic feet)

Species	Net growth	Removals
Spruce/fir	882	-1,348
White pine	36,612	-17,642
Hemlock	16,676	-4,074
Other softwoods	2,375	-789
Total softwoods	56,545	-23,854
Red maple	34,093	-5,232
Sugar maple	1,623	-111
Yellow birch	2,520	-124
Sweet birch	3,170	-724
Hickory	-904	-130
Beech	1,552	-295
White ash	5,599	-802
Aspen	1,710	-176
White oak	1,025	-2,001
Northern red oak	16,665	-4,652
Other red oaks	11,176	-3,592
Other hardwoods	7,875	-1,277
Total hardwoods	86,105	-19,118
All species	142,650	-42,972

Table 47.--Average annual net growth and average annual removals of sawtimber volume on timberland by species, Massachusetts, 1971-84

(In thousands of board feet)

Species	Net growth	Removals
Spruce/fir	4,210	-5,538
White pine	170,653	-71,800
Hemlock	64,331	-17,107
Other softwoods	1,030	-1,188
Total softwoods	240,224	-95,633
Red maple	86,179	-10,977
Sugar maple	8,124	0
Yellow birch	6,972	-293
Sweet birch	7,646	-958
Beech	6,316	-950
White ash	16,105	-788
Aspen	4,347	-250
White oak	988	-2,541
Northern red oak	56,059	-17,045
Other red oaks	10,715	-4,976
Other hardwoods	23,291	-4,609
Total hardwoods	226,742	-43,387
All species	466,966	-139,020

Table 48.--Average annual mortality of growing-stock and sawtimber volume on timberland by species, Massachusetts, 1971-84

Species	Growing stock	Sawtimber
	Thousand cubic feet	Thousand board feet
Spruce/fir	-802	-1,204
White pine	-3,355	-8,463
Hemlock	-799	-2,151
Other softwoods	-301	-1,099
Total softwoods	-5,257	-12,917
Red maple	-1,684	-390
Sugar maple	-491	-607
Yellow birch	-448	-138
Sweet birch	-137	0
Hickory	-974	[a]
Beech	-457	-289
White ash	-286	-327
Aspen	-646	-1,103
White oak	-1,580	-3,766
Northern red oak	-1,392	-1,760
Other red oaks	-621	-680
Other hardwoods	-2,238	-3,706
Total hardwoods	-10,954	-12,766
All species	-16,211	-25,683

[a] Included in other hardwoods.

Table 49.--Average annual net growth and average annual removals of growing-stock volume on timberland by ownership class and species group, Massachusetts, 1971-84

(In thousands of cubic feet)

Ownership class	Growth			Removals		
	Softwood	Hardwood	All groups	Softwood	Hardwood	All groups
Public	8,865	11,436	20,301	-621	-3,105	-3,727
Private	47,680	74,669	122,349	-23,233	-16,013	-39,245
All classes	56,545	86,105	142,650	-23,854	-19,118	-42,972

Table 50.--Average annual net growth and average annual removals of sawtimber volume on timberland by ownership class and species group, Massachusetts, 1971-84

(In thousands of board feet)

Ownership class	Growth			Removals		
	Softwood	Hardwood	All groups	Softwood	Hardwood	All groups
Public	44,081	42,106	86,187	-1,681	-7,162	-8,843
Private	196,143	184,636	380,779	-93,952	-36,225	-130,177
All classes	240,224	226,742	466,966	-95,633	-43,387	-139,020

Table 51.--Output[a] of timber products by product, softwoods and hardwoods, and source of material, Massachusetts, 1984

(In standard units and thousands of cubic feet)

Product and species group	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
				INDUSTRIAL PRODUCTS			
Sawlogs							
Softwoods	M board feet	75,389	11,542	0	0	75,389	11,542
Hardwoods	M board feet	59,095	9,355	0	0	59,095	9,355
Total	M board feet	134,484	20,897	0	0	134,484	20,897
Veneer							
Softwoods	M board feet	939	155	0	0	939	155
Hardwoods	M board feet	1,497	237	0	0	1,497	237
Total	M board feet	2,436	392	0	0	2,436	392
Pulpwood[c]							
Softwoods	Standard cords	7,033	598	13,976	1,188	21,009	1,786
Hardwoods	Standard cords	3,834	326	10,518	894	14,352	1,220
Total	Standard cords	10,867	924	24,494	2,082	35,361	3,006
Other products[d]							
Softwoods	M board feet	1,038	166	619	99	1,657	265
Hardwoods	M board feet	775	124	256	41	1,031	165
Total	M board feet	1,813	290	875	140	2,688	430
				TOTAL INDUSTRIAL PRODUCTS			
Softwoods	M cubic feet		12,461		1,287		13,748
Hardwoods	M cubic feet		10,042		935		10,977
Total	M cubic feet		22,503		2,222		24,725
				NONINDUSTRIAL PRODUCTS			
Fuelwood[e]							
Softwoods	Standard cords	446,139	35,691	27,038	2,163	473,177	37,854
Hardwoods	Standard cords	755,172	60,414	24,050	1,924	779,222	62,338
Total	Standard cords	1,201,311	96,105	51,088	4,087	1,252,399	100,192
				TOTAL ALL PRODUCTS[f]			
Softwoods	M cubic feet		48,152		3,450		51,602
Hardwoods	M cubic feet		70,456		2,859		73,315
Total	M cubic feet		118,608		6,309		124,917

[a] The volume of wood received at manufacturing plants that used roundwood products.
[b] Board 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).
[c] A standard cord of pulpwood is equivalent to 85 cubic feet of solid wood.
[d] Includes cabin logs, roller stock, shingle stock, handle stock, and miscellaneous dimension and specialty products
[e] A standard cord of fuelwood is equivalent to 80 cubic feet of solid wood.
[f] Does not include 3,583,000 cubic feet of softwood and 2,952,000 cubic feet of hardwood residues used for agricultural bedding.

Table 52.--Output of roundwood products by product, softwoods and hardwoods, and source of material,[a] Massachusetts, 1984

(In thousands of cubic feet)

Product and species group	Growing-stock trees			Rough or rotten cull trees	Salvable dead trees	Other sources	All sources
	Poletimber	Sawtimber	Total				
				INDUSTRIAL PRODUCTS			
Sawlogs							
Softwoods	12	9,138	9,150	1,300	68	1,024	11,542
Hardwoods	21	7,775	7,796	734	93	732	9,355
Total	33	16,913	16,946	2,034	161	1,756	20,897
Veneer							
Softwoods	0	126	126	0	0	29	155
Hardwoods	1	216	217	0	0	20	237
Total	1	342	343	0	0	49	392
Pulpwood							
Softwoods	8	574	582	0	15	1	598
Hardwoods	138	165	303	0	14	9	326
Total	146	739	885	0	29	10	924
Other products							
Softwoods	0	135	135	0	0	31	166
Hardwoods	0	115	115	7	0	2	124
Total	0	250	250	7	0	33	290
				TOTAL INDUSTRIAL PRODUCTS			
Softwoods	20	9,973	9,993	1,300	83	1,085	12,461
Hardwoods	160	8,271	8,431	741	107	763	10,042
Total	180	18,244	18,424	2,041	190	1,848	22,503
				NONINDUSTRIAL PRODUCTS			
Fuelwood[b]							
Softwoods	0	0	0	0	0	35,691	35,691
Hardwoods	1,788	1,039	2,827	701	7,002	49,884	60,414
Total	1,788	1,039	2,827	701	7,002	85,575	96,105
				TOTAL ALL PRODUCTS			
Softwoods	20	9,973	9,993	1,300	83	36,776	48,152
Hardwoods	1,948	9,310	11,258	1,442	7,109	50,647	70,456
Total	1,968	19,283	21,251	2,742	7,192	87,423	118,608

[a] Growing-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.

[b] Softwood and hardwood totals are estimates from a study conducted by the University of Massachusetts. Output by source of material was estimated from a telephone survey of a sample of forest land owners.

Table 53.--Timber removals from growing stock and sawtimber on timberland by component[a] and softwoods and hardwoods, Massachusetts, 1984

Components of timber removals	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species
	Thousand cubic feet			Thousand board feet		
Roundwood products						
Sawlogs	9,150	7,796	16,946	59,695	49,120	108,815
Veneer	126	217	343	823	1,365	2,188
Pulpwood	582	303	885	2,716	885	3,601
Other products	135	115	250	844	719	1,563
Fuelwood	0	2,827	2,827	0	4,430	4,430
All products	9,993	11,258	21,251	64,078	56,519	120,597
Logging residue	750	813	1,563	4,688	5,071	9,759
Land use change	30	69	99	117	123	240
Total removals	10,773	12,140	22,913	68,883	61,713	130,596

[a]Logging residue does not include material from tree tops and limbs. Land use change includes land sufficiently productive to be classified as timberland, but withdrawn from production through administrative designation, such as for wilderness or parks.

Table 54.--Volume of unused residues from primary manufacturing plants by softwoods and hardwoods, type of residue, and industry, Massachusetts, 1984

(In thousands of cubic feet)

Species group and type of residue	Lumber	Veneer	Other industries	All industries
Softwoods				
Coarse[a]	156	0	1	157
Fine[b]	86	0	0	86
Total	242	0	1	243
Hardwoods				
Coarse	19	0	0	19
Fine	91	0	0	91
Total	110	0	0	110
All species				
Coarse	175	0	1	176
Fine	177	0	0	177
Total	352	0	1	353

[a]Includes slabs, edgings, trimmings, veneer cores, and other material suitable for chipping.
[b]Includes sawdust, shavings, and other materials considered unsuitable for chipping.

Table 55.--Change in area of timberland between inventories by stand-size class, Massachusetts, 1972-85

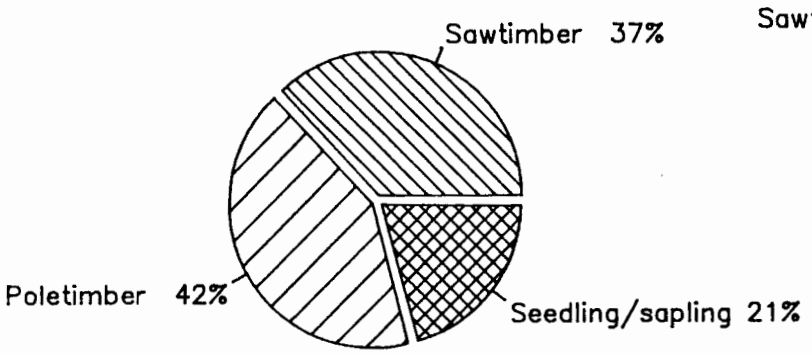
(In thousands of acres)

Stand-size class	1972	1985	Change	Change
				Percent
Sawtimber	1,017.5	1,640.9	623.4	61
Poletimber	1,158.5	1,083.3	-75.2	-6
Sapling and seedling	574.7	205.1	-369.6	-64
All classes	2,750.7	2,929.4	178.7	6

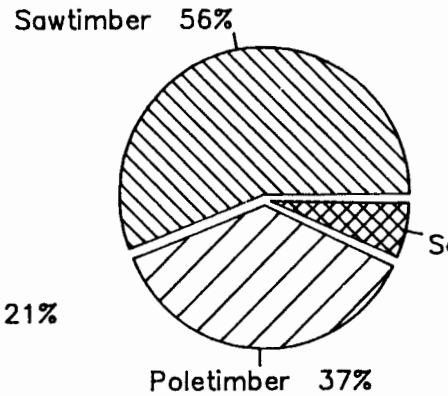
Table 56.--Change in volume between inventories, Massachusetts, 1972-85

Species group	1972	1985	Change	Change
	Growing stock			
	---Millions of cubic feet---			Percent
Softwoods	1,258.1	1,670.8	412.7	33
Hardwoods	2,165.3	3,010.9	845.6	39
All groups	3,423.4	4,681.7	1,258.3	37
	Sawtimber			
	---Millions of board feet---			Percent
Softwoods	3,809.8	5,635.0	1,825.2	48
Hardwoods	3,507.1	5,821.6	2,314.5	66
All groups	7,316.9	11,456.6	4,139.7	57

Area of timberland by stand-size class, Massachusetts, 1972 and 1985



1972



1985

Table 57.--Sampling errors for estimates in various state-level tables, Massachusetts, 1972 and 1985

(In percent)

Area by forest-type group (Table 3)	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
White/red pine	10	29	37	0	9
Spruce/fir	100	62	0	0	54
Hard pine	49	41	55	0	24
Oak/pine	23	31	0	0	18
Oak/hickory	15	12	31	0	8
Elm/ash/red maple	33	59	71	0	27
Northern hardwoods	13	18	73	0	9
Aspen/birch	76	52	0	0	45
All groups	5.0	7.5	20.3	0	1.4

Species and diameter class	Number of trees (Table 19)		Growing-stock volume		Sawtimber volume	
	(1"+)	(5"+)	(Table 38)	(Table 39)	(Table 41)	(Table 42)
Spruce/fir	37	31	55	31	62	33
Red pine	59	45	66	48	81	51
Pitch pine	32	19	34	21	43	24
White pine	14	9	11	10	10	11
Hemlock	18	14	22	14	25	15
Other softwoods	84	73	81	68	91	47
All softwoods	9	7	8	7	8	9
Red maple	11	7	11	8	18	10
Sugar maple	17	18	19	18	25	22
Yellow birch	21	18	25	18	37	25
Sweet birch	21	19	24	20	31	22
Paper birch	21	19	19	17	35	26
Hickory	30	25	28	25	39	31
Beech	26	17	24	15	33	17
White ash	23	16	22	16	33	21
Aspen	35	22	28	22	43	27
Black cherry	22	14	27	15	35	23
White oak	18	13	16	12	20	20
Northern red oak	13	11	13	11	16	13
Other red oaks	14	11	17	10	20	12
Elm	62	33	34	36	60	49
Other hardwoods	30	22	28	25	44	31
All hardwoods	6	3	6	4	9	6
All species	5.0	2.7	3.4	3.0	5.0	4.9
D.b.h. class (inches)						
1.0 to 2.9	8		-	-	-	-
3.0 to 4.9	10		-	-	-	-
5.0 to 6.9	5		7	5	-	-
7.0 to 8.9	4		6	4	-	-
9.0 to 10.9	4		6	5	13	12
11.0 to 12.9	5		6	5	7	5
13.0 to 14.9	5		9	5	9	5
15.0 to 16.9	7		9	7	9	7
17.0 to 18.9	10		11	10	10	10
19.0 to 20.9	12		13	12	12	13
21.0 to 28.9	12		14	13	14	14
29 +	29		35	32	36	32

COUNTY TABLES

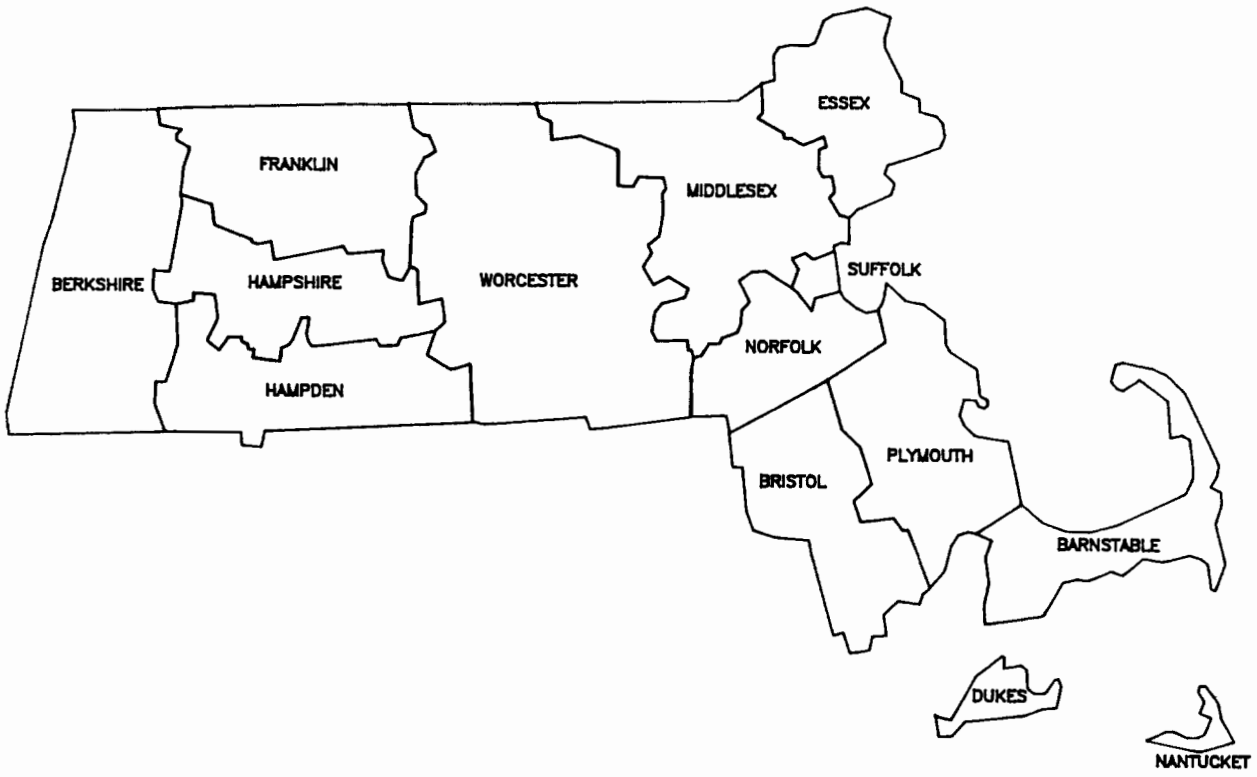


Table 58.--Land area by county and land class, Massachusetts, 1985

(In thousands of acres)

County	Forest land area						Total land area
	Timberland	Productive reserved	Urban forest	Unproductive	Total forest	Non-forest	
Berkshire	447.4	14.0	.0	7.3	468.7	125.8	594.5
Bristol	189.9	5.4	.0	2.6	197.8	158.4	356.3
Essex	115.2	1.8	6.9	5.7	129.8	187.0	316.7
Franklin	351.8	8.1	.0	1.7	361.6	87.5	449.1
Hampden	249.1	17.9	7.9	4.8	279.6	116.0	395.6
Hampshire	233.0	7.6	.0	3.0	243.6	94.5	338.0
Middlesex	238.6	3.7	27.5	6.8	276.6	249.2	525.8
Norfolk	110.6	16.4	.0	12.3	139.3	116.5	255.8
Plymouth	225.7	6.3	.0	8.3	240.3	179.0	419.3
Suffolk	.0	.0	.0	.0	.0	36.3	36.3
Worcester	638.7	16.4	.0	27.1	682.3	286.3	968.6
Barnstable/Dukes/ Nantucket	129.3	3.7	9.6	63.0	205.6	146.1	351.6
Total	2,929.4	101.4	52.0	142.4	3,225.2	1,782.4	5,007.6

Table 59.--Area of timberland by ownership class and county, Massachusetts, 1985

(In thousands of acres)

Ownership class	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
National forest	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Other federal	.0	.0	.0	.0	2.2	2.1	2.4	.1	.4	10.2	.1	17.5
State	86.8	7.0	9.9	70.3	11.1	21.5	10.2	2.7	8.1	64.1	5.3	297.0
County and municipal	30.9	7.6	1.6	4.5	25.9	17.8	5.7	3.0	8.0	8.7	2.1	115.8
Total public	117.7	14.6	11.5	74.8	39.2	41.4	18.3	5.8	16.5	83.0	7.5	430.3
Forest industry	.0	.0	.0	11.5	16.1	12.8	14.7	.0	.0	11.1	.0	66.3
Farmer	58.2	17.5	8.6	80.8	48.4	25.5	29.4	8.7	44.8	100.0	40.6	462.7
Miscellaneous private:												
Individual	213.3	122.7	60.5	161.6	113.0	153.3	132.2	78.6	119.6	366.8	81.2	1,602.8
Corporate	48.5	35.1	.0	.0	16.1	.0	14.7	8.7	.0	33.3	.0	156.5
Other	9.7	.0	34.6	23.1	16.1	.0	29.4	8.7	44.8	44.5	.0	210.9
Total private	329.7	175.3	103.7	277.0	209.8	191.6	220.3	104.9	209.3	555.8	121.7	2,499.1
All ownerships	447.4	189.9	115.2	351.8	249.1	233.0	238.6	110.6	225.8	638.8	129.3	2,929.4

Table 60.--Area of timberland by county and forest-type group, Massachusetts, 1985

(In thousands of acres)

County	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Berkshire	102.4	17.8	.0	16.1	68.7	.0	8.0	221.8	12.5	447.4
Bristol	51.4	.0	.0	18.6	104.5	.0	15.4	.0	.0	189.9
Essex	13.5	.0	.0	23.1	73.1	.0	.0	.0	5.5	115.2
Franklin	110.3	12.5	.0	56.3	48.4	.0	20.3	104.0	.0	351.8
Hampden	63.5	.0	.0	16.3	56.7	.0	17.0	87.5	7.9	249.1
Hampshire	52.4	6.7	.0	6.7	13.4	.0	18.4	135.4	.0	233.0
Middlesex	52.6	.0	12.4	23.0	117.0	.0	23.0	10.6	.0	238.6
Norfolk	24.6	.0	.0	5.0	56.5	.0	12.3	12.3	.0	110.6
Plymouth	76.7	.0	16.9	39.6	69.2	.0	10.3	13.1	.0	225.8
Worcester	228.2	.0	.0	33.2	282.2	.0	.0	86.5	8.6	638.8
Barnstable/Dukes/Nantucket	.0	.0	82.5	19.1	27.7	.0	.0	.0	.0	129.3
All counties	775.7	37.0	111.8	257.0	917.5	.0	124.7	671.3	34.5	2,929.4

Table 61.--Area of timberland by county and stand-size class, Massachusetts, 1985

(In thousands of acres)

County	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Berkshire	300.5	133.5	13.3	.0	447.4
Bristol	48.6	112.2	29.1	.0	189.9
Essex	46.2	69.0	.0	.0	115.2
Franklin	253.6	90.3	7.9	.0	351.8
Hampden	164.5	75.7	8.9	.0	249.1
Hampshire	151.0	75.3	6.7	.0	233.0
Middlesex	98.6	88.3	51.7	.0	238.6
Norfolk	61.5	36.9	12.3	.0	110.6
Plymouth	117.0	79.4	29.4	.0	225.8
Worcester	371.7	239.0	28.0	.0	638.8
Barnstable/Dukes/Nantucket	27.7	83.7	17.9	.0	129.3
All counties	1,640.9	1,083.3	205.1	.0	2,929.4

Table 62.--Area of timberland by county and cubic-foot stand-volume class, Massachusetts, 1985

(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+	
Berkshire	13.3	4.5	84.6	151.4	140.9	52.7	447.4
Bristol	45.2	38.5	43.8	55.5	6.9	.0	189.9
Essex	15.1	13.7	19.2	32.7	9.6	25.1	115.2
Franklin	32.8	12.5	45.2	109.2	65.4	86.8	351.8
Hampden	16.8	40.1	48.3	32.4	55.8	55.6	249.1
Hampshire	.0	35.0	45.2	52.4	75.3	25.1	233.0
Middlesex	39.3	23.0	58.4	21.2	44.2	52.6	238.6
Norfolk	7.3	27.0	19.6	12.3	19.8	24.6	110.6
Plymouth	29.4	50.9	34.0	51.5	8.7	51.1	225.8
Worcester	19.4	96.2	127.4	125.9	156.8	113.1	638.8
Barnstable/Dukes/Nantucket	46.2	36.9	36.9	9.2	.0	.0	129.3
All counties	264.8	378.3	562.5	653.7	583.5	486.6	2,929.4

Table 63.--Area of timberland by county and stocking class of growing-stock trees, Massachusetts, 1985

(In thousands of acres)

County	Stocking class					All classes
	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	
Berkshire	.0	16.1	73.8	195.0	162.5	447.4
Bristol	.0	23.1	4[illegible]	91.7	33.4	189.9
Essex	.0	11.1	[illegible].3	21.1	34.6	115.2
Franklin	.0	41.9	40.6	94.7	174.6	351.8
Hampden	.0	24.0	73.3	48.5	103.2	249.1
Hampshire	.0	41.7	25.1	95.9	70.3	233.0
Middlesex	18.1	23.0	.0	42.4	155.2	238.6
Norfolk	.0	.0	22.0	46.8	41.8	110.6
Plymouth	.0	13.3	43.3	78.8	90.5	225.8
Worcester	.0	23.0	153.5	215.3	247.0	638.8
Barnstable/Dukes/Nantucket	.0	9.2	73.3	36.9	9.8	129.3
All counties	18.1	226.5	594.9	967.0	1,122.9	2,929.4

Table 64.--Area of timberland by county and productivity class, Massachusetts, 1985

(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)	
Berkshire	69.3	47.2	164.1	166.8	447.4
Bristol	6.9	37.7	81.2	64.0	189.9
Essex	13.5	19.2	32.9	49.7	115.2
Franklin	71.9	32.6	132.3	115.1	351.8
Hampden	15.8	43.5	108.7	81.0	249.1
Hampshire	43.5	6.7	127.7	55.1	233.0
Middlesex	46.0	58.1	102.8	31.8	238.6
Norfolk	12.3	9.9	29.6	58.9	110.6
Plymouth	21.3	46.2	88.5	69.8	225.8
Worcester	64.1	100.2	295.8	178.6	638.8
Barnstable/Dukes/Nantucket	.0	9.8	8.1	111.3	129.3
All counties	364.5	411.2	1,171.5	982.1	2,929.4

Table 65.--Net volume of growing-stock trees on timberland by county and forest-type group, Massachusetts, 1985

(In millions of cubic feet)

County	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Berkshire	204.6	21.7	.0	42.8	127.6	.0	14.3	342.6	18.6	772.3
Bristol	34.6	.0	.0	24.4	118.2	.0	24.3	.0	.0	201.5
Essex	42.4	.0	.0	57.1	94.8	.0	.0	.0	7.9	202.2
Franklin	248.4	8.3	.0	89.3	85.8	.0	12.7	173.2	.0	617.7
Hampden	149.0	.0	.0	23.2	58.1	.0	19.9	154.1	1.1	405.4
Hampshire	87.0	12.6	.0	13.6	19.5	.0	28.1	194.3	.0	355.2
Middlesex	104.3	.0	14.0	75.0	133.3	.0	16.3	21.2	.0	364.1
Norfolk	60.4	.0	.0	11.8	61.5	.0	22.7	21.9	.0	178.3
Plymouth	172.2	.0	22.3	54.3	70.8	.0	18.3	13.5	.0	351.4
Worcester	507.9	.0	.0	58.6	421.0	.0	.0	143.4	9.6	1,140.5
Barnstable/Dukes/Nantucket	.0	.0	66.4	9.0	17.8	.0	.0	.0	.0	93.2
All counties	1,610.8	42.7	102.7	459.2	1,208.4	.0	156.5	1,064.3	37.1	4,681.7

Table 66.--Net volume of growing-stock trees on timberland by county and stand-size class, Massachusetts, 1985

(In millions of cubic feet)

County	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Berkshire	574.5	194.3	3.5	.0	772.3
Bristol	67.0	132.2	2.3	.0	201.5
Essex	123.3	78.9	.0	.0	202.2
Franklin	518.4	99.3	.0	.0	617.7
Hampden	332.4	70.9	2.1	.0	405.4
Hampshire	243.0	105.0	7.2	.0	355.2
Middlesex	241.6	103.9	18.5	.0	364.1
Norfolk	127.9	44.7	5.7	.0	178.3
Plymouth	248.8	86.9	15.6	.0	351.4
Worcester	793.3	334.4	12.7	.0	1,140.5
Barnstable/Dukes/Nantucket	33.0	59.7	.5	.0	93.2
All counties	3,303.3	1,310.2	68.2	.0	4,681.7

Table 67.--Net volume of growing-stock trees on timberland by species and county, Massachusetts, 1985

(In millions of cubic feet)

Species	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
Spruce/fir	36.7	.0	.0	14.7	9.2	6.9	.0	.0	.0	6.7	.0	74.2
Red pine	.5	.0	.0	10.7	.6	.0	.0	.0	.4	3.6	1.0	16.7
Pitch pine	.0	6.3	.0	2.0	.0	1.1	7.7	2.8	6.5	.9	50.9	78.2
White pine	87.3	32.1	45.3	130.6	90.0	43.8	110.1	51.1	146.3	365.5	5.3	1,107.3
Hemlock	92.9	.0	1.5	121.2	54.5	29.7	7.9	.0	1.7	60.6	.0	369.9
Other softwoods	.4	.4	.0	.4	5.3	.0	.0	.0	16.4	.0	1.6	24.4
All softwoods	217.8	38.8	46.8	279.6	159.6	81.5	125.7	53.9	171.3	437.2	58.7	1,670.8
Red maple	107.9	70.0	46.4	111.9	89.8	74.6	52.0	51.1	79.7	200.3	1.6	885.3
Sugar maple	86.9	.0	2.9	14.0	12.0	44.4	19.0	.0	.5	8.3	.0	188.1
Yellow birch	24.6	1.4	1.4	20.4	6.1	22.3	.0	2.6	1.9	10.0	.0	90.8
Sweet birch	6.6	3.6	.0	49.5	8.7	17.0	2.7	.0	1.9	15.0	.0	105.1
Paper birch	20.3	.0	4.3	17.4	9.9	13.6	9.0	.0	.0	27.0	.0	101.5
Hickory	2.1	2.1	12.6	7.0	2.4	5.7	2.0	.0	1.9	10.6	.0	46.4
Beech	41.8	.0	.0	14.2	12.7	9.6	.0	3.9	6.5	4.8	.8	94.3
White ash	57.5	.6	4.4	11.7	12.9	27.1	13.5	2.4	.3	17.7	.0	148.2
Aspen	27.2	.0	4.6	5.6	13.6	7.5	2.7	.0	.0	6.1	.0	67.3
Black cherry	59.0	1.0	.0	9.6	13.0	14.0	2.6	.0	2.8	27.3	.0	129.3
White oak	3.0	11.4	7.7	8.0	3.1	6.5	8.8	11.4	20.2	42.1	5.5	127.9
Northern red oak	88.8	25.9	25.8	58.3	29.6	20.9	71.3	11.4	11.2	218.8	5.0	566.9
Other red oaks	.0	35.7	41.2	7.9	23.6	5.5	47.6	38.5	47.4	107.7	21.2	376.2
Elm	.5	.0	.2	.0	1.4	1.9	3.0	.0	.0	.0	.0	6.9
Other hardwoods	28.3	10.9	3.8	2.5	7.1	3.1	4.1	3.2	5.8	7.6	.3	76.6
All hardwoods	554.5	162.7	155.4	338.2	245.8	273.7	238.4	124.4	180.1	703.3	34.4	3,010.9
All species	772.3	201.5	202.2	617.7	405.4	355.2	364.1	178.3	351.4	1,140.5	93.2	4,681.7

Table 68.--Net volume of growing-stock and sawtimber trees on timberland by county and species group, Massachusetts, 1985

County	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All groups	Softwoods	Hardwoods	All groups
	----Million cubic feet----			----Million board feet----		
Berkshire	217.8	554.5	772.3	691.1	1,264.9	1,956.0
Bristol	38.8	162.7	201.5	110.2	190.4	300.6
Essex	46.8	155.4	202.2	191.7	267.0	458.6
Franklin	279.6	338.2	617.7	857.3	750.0	1,607.2
Hampden	159.6	245.8	405.4	535.5	541.5	1,077.0
Hampshire	81.5	273.7	355.2	265.1	561.1	826.3
Middlesex	125.7	238.4	364.1	465.5	388.5	854.1
Norfolk	53.9	124.4	178.3	209.7	221.3	431.0
Plymouth	171.3	180.1	351.4	553.9	325.9	879.8
Worcester	437.2	703.3	1,140.5	1,625.6	1,298.6	2,924.2
Barnstable/Dukes/Nantucket	58.7	34.4	93.2	129.4	12.3	141.7
All counties	1,670.8	3,010.9	4,681.7	5,635.0	5,821.6	11,456.6

Table 69.--Net volume of sawtimber trees on timberland by county and forest-type group, Massachusetts, 1985

(In millions of board feet)

County	Forest-type group									All groups
	White/ red pine	Spruce/ fir	Hard pine	Oak/ pine	Oak/ hickory	Oak/gum/ cypress	Elm/ash/ red maple	Northern hardwoods	Aspen/ birch	
Berkshire	668.3	29.9	.0	159.9	278.0	.0	34.1	749.5	36.4	1,956.0
Bristol	79.7	.0	.0	27.3	176.6	.0	17.0	.0	.0	300.6
Essex	155.3	.0	.0	151.6	137.3	.0	.0	.0	14.4	458.6
Franklin	716.5	19.3	.0	194.5	258.5	.0	33.0	385.5	.0	1,607.2
Hampden	461.7	.0	.0	63.0	99.5	.0	80.5	372.2	.0	1,077.0
Hampshire	260.5	36.4	.0	35.0	66.1	.0	79.4	348.9	.0	826.3
Middlesex	326.2	.0	31.6	203.0	223.9	.0	16.3	53.1	.0	854.1
Norfolk	195.8	.0	.0	28.0	114.2	.0	46.5	46.4	.0	431.0
Plymouth	531.2	.0	11.3	135.2	134.6	.0	46.6	21.0	.0	879.8
Worcester	1,655.1	.0	.0	195.2	807.3	.0	.0	264.0	2.5	2,924.2
Barnstable/Dukes/Nantucket	.0	.0	122.1	9.2	10.3	.0	.0	.0	.0	141.7
All counties	5,050.3	85.6	165.0	1,202.0	2,306.4	.0	353.4	2,240.6	53.4	11,456.6

Table 70.--Net volume of sawtimber trees on timberland by county and stand-size class, Massachusetts, 1985

(In millions of board feet)

County	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling and seedling	Nonstocked	
Berkshire	1,727.4	228.6	.0	.0	1,956.0
Bristol	171.0	129.6	.0	.0	300.6
Essex	379.6	79.0	.0	.0	458.6
Franklin	1,464.5	142.8	.0	.0	1,607.2
Hampden	994.4	80.2	2.4	.0	1,077.0
Hampshire	674.5	130.4	21.3	.0	826.3
Middlesex	695.0	138.9	20.2	.0	854.1
Norfolk	354.9	60.0	16.1	.0	431.0
Plymouth	768.7	93.1	18.1	.0	879.8
Worcester	2,450.6	443.8	29.7	.0	2,924.2
Barnstable/Dukes/Nantucket	84.3	57.5	.0	.0	141.7
All counties	9,764.8	1,584.0	107.8	.0	11,456.6

Table 71.--Net volume of sawtimber trees on timberland by species and county, Massachusetts, 1985

(In millions of board feet)

Species	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
Spruce/fir	85.8	.0	.0	43.4	27.1	21.9	.0	.0	.0	10.7	.0	189.0
Red pine	1.9	.0	.0	40.0	1.3	.0	.0	.0	1.1	15.5	1.2	61.1
Pitch pine	.0	13.7	.0	7.0	.0	4.7	13.9	10.3	12.3	3.0	106.2	171.2
White pine	338.8	96.5	188.2	422.0	354.1	153.5	427.1	199.3	526.2	1,401.0	19.9	4,126.5
Hemlock	262.9	.0	3.5	344.0	146.0	85.0	24.5	.0	6.1	195.4	.0	1,067.4
Other softwoods	1.7	.0	.0	.8	6.9	.0	.0	.0	8.2	.0	2.2	19.8
All softwoods	691.1	110.2	191.7	857.3	535.5	265.1	465.5	209.7	553.9	1,625.6	129.4	5,635.0
Red maple	218.2	49.2	87.8	210.1	186.6	118.9	58.6	93.9	149.7	305.1	3.2	1,481.3
Sugar maple	222.3	.0	.4	37.1	25.2	88.4	25.5	.0	1.7	11.3	.0	412.0
Yellow birch	33.6	.0	5.7	44.8	7.8	47.8	.0	.0	1.6	17.8	.0	159.0
Sweet birch	8.8	4.0	.0	79.1	16.0	27.9	9.6	.0	.0	13.6	.0	158.9
Paper birch	26.8	.0	9.2	18.9	24.9	14.3	.0	.0	.0	9.2	.0	103.4
Hickory	.0	2.8	11.6	27.3	.0	10.3	.0	.0	4.2	19.9	.0	76.1
Beech	99.4	.0	.0	48.3	41.0	17.8	.0	11.8	17.0	3.2	3.6	242.1
White ash	165.1	.0	14.1	40.2	31.1	75.9	17.0	2.1	.0	25.4	.0	370.9
Aspen	41.8	.0	2.7	12.5	41.4	17.2	3.3	.0	.0	3.3	.0	122.3
Black cherry	152.9	.0	.0	10.0	24.0	27.6	.0	.0	4.1	52.3	.0	271.0
White oak	1.8	8.0	8.0	22.1	4.4	14.6	3.5	6.1	50.5	88.8	.0	207.7
Northern red oak	230.7	37.4	69.4	167.6	69.3	74.9	172.6	18.5	28.0	536.8	.0	1,405.2
Other red oaks	.0	69.2	49.5	30.0	47.6	13.1	91.1	88.8	63.3	197.3	4.1	654.2
Elm	.0	.0	.0	.0	5.9	4.9	4.1	.0	.0	.0	.0	14.9
Other hardwoods	63.3	19.9	8.6	1.9	16.4	7.6	3.2	.0	5.9	14.5	1.3	142.6
All hardwoods	1,264.9	190.4	267.0	750.0	541.5	561.1	388.5	221.3	325.9	1,298.6	12.3	5,821.6
All species	1,956.0	300.6	458.6	1,607.2	1,077.0	826.3	854.1	431.0	879.8	2,924.2	141.7	11,456.6

Table 72.--Number of all live nut- and fruit-producing trees on timberland by species and county, Massachusetts, 1985

(In thousands of trees)

Species	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
Eastern redcedar	0	0	0	0	0	0	0	0	4,278	0	876	5,154
Hickory	484	129	1,572	429	101	912	326	0	449	2,039	0	6,441
American chestnut	0	0	0	0	0	0	0	0	0	113	0	113
Hawthorn	0	0	0	105	0	0	0	0	0	0	0	105
Beech	8,662	0	0	2,803	1,735	527	0	0	163	829	52	14,771
Butternut	0	0	71	0	63	0	53	0	0	0	0	187
Apple	113	0	0	209	48	584	0	0	41	340	0	1,335
Blackgum	0	0	0	0	0	0	225	0	939	170	47	1,381
Eastern hophornbeam	0	115	433	227	0	671	0	0	0	0	0	1,446
Pin cherry	537	0	0	561	52	0	0	0	0	0	0	1,150
Black cherry	6,945	0	109	1,607	1,643	780	0	0	1,112	4,703	143	17,043
White oak	612	3,355	1,037	1,046	1,733	617	3,010	2,041	1,354	6,509	2,221	23,536
Swamp white oak	0	0	0	0	332	0	1,620	0	223	0	0	2,175
Scarlet oak	0	224	0	0	0	56	3,369	2,944	5,179	998	1,306	14,076
Chestnut oak	292	225	0	0	0	0	0	0	0	0	0	517
Northern red oak	5,517	7,710	3,702	6,121	2,937	429	6,108	0	1,105	24,625	746	59,001
Post oak	0	0	0	0	0	0	0	0	0	0	111	111
Black oak	0	4,003	5,040	0	45	921	3,647	1,513	1,356	15,623	5,734	37,883
Sassafras	0	0	0	0	81	0	0	0	652	0	326	1,059
Mountain ash	0	0	0	113	0	0	0	0	0	0	0	113
All species	23,162	15,763	11,964	13,223	8,770	5,498	18,359	6,498	16,851	55,950	11,562	187,599

Table 73.--Number of seedlings, saplings, and shrubs with observed browse and percent of total on timberland by species and county, Massachusetts, 1985

(In thousands of stems)

Species	County							
	Berkshire		Bristol		Essex		Franklin	
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total
Eastern white pine	0	0	0	0	0	0	0	0
All softwoods	0	0	0	0	0	0	0	0
Red maple	91,647	40	0	0	0	0	56,201	49
Sugar maple	233,019	65	0	0	0	0	40,798	16
Other maple species	237,752	62	0	0	0	0	16,631	15
Yellow birch	29,334	34	0	0	0	0	0	0
Sweet birch	0	0	0	0	0	0	9,918	14
Paper birch	13,171	29	0	0	0	0	0	0
Gray birch	6,586	50	0	0	0	0	0	0
American hornbeam	3,293	25	0	0	0	0	0	0
Flowering dogwood	0	0	0	0	0	0	52,935	54
Hawthorn	3,250	33	0	0	0	0	0	0
American beech	71,969	32	0	0	0	0	34,668	22
White ash	47,260	61	0	0	0	0	22,469	24
Other ash species	12,999	20	0	0	0	0	0	0
Pin cherry	29,593	53	0	0	0	0	13,224	33
Black cherry	41,128	24	0	0	0	0	24,940	29
Chokecherry	13,450	71	0	0	0	0	6,109	67
Other cherries	0	0	0	0	0	0	0	0
White oak	0	0	0	0	0	0	0	0
Northern red oak	16,249	31	0	0	0	0	3,055	3
American basswood	0	0	0	0	0	0	0	0
Other hardwoods	3,250	100	0	0	0	0	0	0
All hardwoods	853,950	0	0	0	0	0	280,949	0
All trees	853,950	0	0	0	0	0	280,949	0

Table 73.-continued

(In thousands of stems)

Species	County							
	Berkshire		Bristol		Essex		Franklin	
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total
Mountain laurel	9,879	4	0	0	0	0	9,164	6
All evergreen shrubs	9,879	0	0	0	0	0	9,164	0
Alder	0	0	0	0	0	0	0	0
Other dogwood species	43,039	70	0	0	0	0	0	0
American hazelnut	22,749	19	0	0	0	0	0	0
Witch-hazel	16,464	35	0	0	0	0	6,109	100
Common spicebush	0	0	0	0	0	0	0	0
Bush honeysuckle	22,749	33	0	0	0	0	0	0
Rubus species	0	0	0	0	0	0	0	0
Spirea species	69,064	37	0	0	0	0	0	0
Blueberry species	0	0	0	0	0	0	0	0
Maple-leaved viburnum	0	0	0	0	0	0	186,340	94
Hobblebush viburnum	0	0	0	0	0	0	16,631	50
Arrowwood	16,464	45	0	0	0	0	39,712	59
Other viburnum species	140,431	100	0	0	0	0	26,447	90
Other deciduous shrubs	29,248	31	0	0	0	0	0	0
All deciduous shrubs	360,208	0	0	0	0	0	275,240	0
All species	1,224,037	0	0	0	0	0	565,353	0

Table 73.-continued

(In thousands of stems)

Species	County							
	Hampden		Hampshire		Middlesex		Norfolk	
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total
Eastern white pine	0	0	0	0	0	0	0	0
All softwoods	0	0	0	0	0	0	0	0
Red maple	48,432	30	41,211	46	0	0	0	0
Sugar maple	8,386	31	39,090	48	0	0	0	0
Other maple species	0	0	31,871	83	0	0	0	0
Yellow birch	2,795	33	0	0	0	0	0	0
Sweet birch	0	0	0	0	0	0	0	0
Paper birch	0	0	0	0	0	0	0	0
Gray birch	0	0	0	0	0	0	0	0
American hornbeam	62,260	74	6,585	33	0	0	0	0
Flowering dogwood	0	0	0	0	0	0	0	0
Hawthorn	0	0	0	0	0	0	0	0
American beech	10,347	18	0	0	0	0	0	0
White ash	0	0	35,375	67	0	0	0	0
Other ash species	3,662	33	0	0	0	0	0	0
Pin cherry	0	0	0	0	0	0	0	0
Black cherry	0	0	16,463	24	0	0	0	0
Chokecherry	0	0	0	0	0	0	0	0
Other cherries	5,591	100	0	0	0	0	0	0
White oak	10,987	42	0	0	0	0	0	0
Northern red oak	8,386	18	9,878	47	0	0	0	0
American basswood	0	0	9,561	100	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0
All hardwoods	160,848	0	190,035	0	0	0	0	0
All trees	160,848	0	190,035	0	0	0	0	0

Table 73.-continued

(In thousands of stems)

Species	County							
	Hampden		Hampshire		Middlesex		Norfolk	
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total
Mountain laurel	0	0	0	0	0	0	0	0
All evergreen shrubs	0	0	0	0	0	0	0	0
Alder	0	0	38,245	92	0	0	0	0
Other dogwood species	2,795	100	0	0	0	0	0	0
American hazelnut	0	0	0	0	0	0	0	0
Witch-hazel	21,974	30	16,463	12	0	0	0	0
Common spicebush	25,636	37	0	0	0	0	0	0
Bush honeysuckle	0	0	0	0	0	0	0	0
Rubus species	0	0	0	0	0	0	0	0
Spirea species	5,591	5	0	0	0	0	0	0
Blueberry species	130,978	45	16,463	20	0	0	0	0
Maple-leaved viburnum	10,987	100	0	0	0	0	0	0
Hobblebush viburnum	0	0	0	0	0	0	0	0
Arrowwood	0	0	0	0	0	0	0	0
Other viburnum species	0	0	0	0	0	0	0	0
Other deciduous shrubs	0	0	16,463	78	0	0	0	0
All deciduous shrubs	197,962	0	87,635	0	0	0	0	0
All species	358,810	0	277,670	0	0	0	0	0

Table 73.-continued

(In thousands of stems)

Species	County						
	Plymouth		Worcester		Barnstable/Dukes/ Nantucket		
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	All counties
Eastern white pine	0	0	3,304	4	0	0	3,304
All softwoods	0	0	3,304	0	0	0	3,304
Red maple	0	0	16,551	5	0	0	254,042
Sugar maple	0	0	9,913	8	0	0	331,206
Other maple species	0	0	0	0	0	0	286,255
Yellow birch	0	0	0	0	0	0	32,130
Sweet birch	0	0	0	0	0	0	9,918
Paper birch	0	0	9,956	10	0	0	23,128
Gray birch	0	0	0	0	0	0	6,586
American hornbeam	0	0	0	0	0	0	72,138
Flowering dogwood	0	0	0	0	0	0	52,935
Hawthorn	0	0	9,956	50	0	0	13,206
American beech	12,876	100	0	0	0	0	129,861
White ash	0	0	82,611	36	0	0	187,715
Other ash species	0	0	0	0	0	0	16,661
Pin cherry	0	0	0	0	0	0	42,816
Black cherry	0	0	3,304	4	0	0	85,836
Chokecherry	0	0	3,304	100	0	0	22,864
Other cherries	0	0	0	0	0	0	5,591
White oak	0	0	0	0	0	0	10,987
Northern red oak	0	0	23,232	7	0	0	60,800
American basswood	0	0	0	0	0	0	9,561
Other hardwoods	0	0	0	0	0	0	3,250
All hardwoods	12,876	0	158,829	0	0	0	1,657,487
All trees	12,876	0	162,134	0	0	0	1,660,791

Table 73.-continued

(In thousands of stems)

Species	County						
	Plymouth		Worcester		Barnstable/Dukes/ Nantucket		
	Number browsed	Percent of total	Number browsed	Percent of total	Number browsed	Percent of total	All counties
Mountain laurel	0	0	0	0	0	0	19,043
All evergreen shrubs	0	0	0	0	0	0	19,043
Alder	0	0	0	0	0	0	38,245
Other dogwood species	0	0	0	0	0	0	45,835
American hazelnut	0	0	0	0	0	0	22,749
Witch-hazel	0	0	0	0	0	0	61,011
Common spicebush	0	0	0	0	0	0	25,636
Bush honeysuckle	0	0	0	0	0	0	22,749
Rubus species	0	0	9,956	2	0	0	9,956
Spirea species	0	0	0	0	0	0	74,655
Blueberry species	6,438	t	152,005	9	0	0	305,884
Maple-leaved viburnum	0	0	0	0	0	0	197,327
Hobblebush viburnum	0	0	0	0	0	0	16,631
Arrowwood	6,438	3	0	0	0	0	62,614
Other viburnum species	0	0	9,913	7	0	0	176,791
Other deciduous shrubs	0	0	23,232	2	0	0	68,943
All deciduous shrubs	12,876	0	195,106	0	0	0	1,129,028
All species	25,753	0	357,240	0	0	0	2,808,862

t Indicates <.5%

Table 74.--Number of standing dead trees (5.0+ inches d.b.h.) on timberland by species and county, Massachusetts, 1985

(In thousands of trees)

Species	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
Spruce/fir	1,324	0	0	623	143	0	0	0	0	205	0	2,295
Red pine	0	0	0	0	0	0	0	0	81	170	0	251
Pitch pine	0	0	71	363	0	0	0	105	0	0	954	1,495
White pine	2,852	231	455	1,861	536	715	844	155	1,281	5,590	0	14,521
Hemlock	967	0	115	177	679	56	0	0	0	624	0	2,619
Other softwoods	347	0	0	0	269	0	0	0	203	0	0	819
All softwoods	5,490	231	641	3,025	1,628	771	844	260	1,565	6,589	954	21,999
Red maple	1,415	523	321	959	528	881	853	1,695	885	1,931	0	9,991
Sugar maple	2,006	0	0	0	69	0	184	0	0	0	0	2,259
Yellow birch	907	0	0	144	240	441	0	0	0	114	0	1,847
Sweet birch	0	0	0	1,247	63	234	0	0	0	426	0	1,971
Paper birch	731	0	0	264	439	109	507	0	0	480	0	2,531
Beech	831	0	0	334	259	0	0	0	0	0	0	1,424
White ash	404	146	0	0	185	109	0	0	0	796	0	1,640
Aspen	778	0	109	0	63	109	408	0	0	69	0	1,537
Black cherry	815	0	0	354	631	166	0	0	385	229	0	2,579
White oak	0	726	707	0	126	589	408	702	415	969	0	4,643
Northern red oak	918	115	0	471	188	0	1,008	0	68	707	0	3,476
Other red oaks	0	0	381	0	0	0	763	105	46	640	326	2,262
Elm	299	0	0	0	377	0	0	0	40	0	0	716
Other comm. hardwoods	223	0	0	0	126	0	0	0	0	0	0	349
Noncomm. hardwoods	961	0	0	0	937	649	0	0	0	455	0	3,002
All hardwoods	10,289	1,511	1,518	3,774	4,230	3,287	4,131	2,503	1,839	6,817	326	40,226
All species	15,779	1,742	2,160	6,800	5,858	4,059	4,975	2,763	3,403	13,406	1,281	62,225

Table 75.--Index to land-use edge by type of land use and county, Massachusetts, 1985

(Edge hits[a] per thousand acres)

Land-use edge type	County											All counties
	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Barns./Dukes/ Nantucket	
Forest -												
forest	14.6	5.0	6.0	12.1	4.5	12.3	5.0	13.9	5.7	14.9	3.3	9.6
shrub	3.1	2.8	3.2	6.4	2.6	5.0	2.3	6.3	1.7	7.9	4.0	4.4
agricultural/ herbaceous	5.2	8.9	7.8	13.3	10.7	10.4	12.2	12.3	7.5	8.5	2.0	8.8
cultural	4.4	11.7	11.6	2.6	11.3	10.2	32.2	29.1	15.3	8.3	8.7	12.3
Shrub -												
agricultural/ herbaceous	.6	.3	.3	2.0	.5	.8	1.1	1.2	.3	1.4	.3	.9
cultural	.7	.5	.7	.2	.1	.5	1.3	.8	.6	.8	1.4	.7
Agricultural/herbaceous -												
cultural	1.1	2.0	1.7	1.8	2.4	1.6	2.7	1.8	2.0	.5	.1	1.5
Hedgerow	1.6	4.8	2.4	4.9	.9	4.7	.9	.5	1.2	2.9	.1	2.3
Transportation												
right of way	6.9	15.9	14.7	17.6	13.9	21.5	16.2	19.5	14.0	14.8	19.3	15.3
Utility												
right of way	1.6	5.3	2.2	.7	3.8	2.8	3.3	4.9	7.3	3.4	2.8	3.3
Aquatic	4.5	6.1	6.0	5.9	6.5	3.8	6.8	5.7	6.3	6.5	9.3	6.1
All types	44.2	63.3	56.7	67.6	57.2	73.6	84.0	96.0	61.9	70.0	51.2	65.2
Number of edge plots	38	21	21	29	26	22	32	17	28	60	25	319
Number of edge hits	941	744	667	1,098	833	907	1,504	914	970	2,351	716	11,645

[a]Edge condition on an aerial photograph sampled by a line transect (Brooks and Sykes 1984).

Table 76.--Sampling errors for various county-level estimates, Massachusetts, 1985

(In percent)

County	Timberland area	Growing-stock volume	Sawtimber volume
Berkshire	1.9	6.4	10.7
Bristol	5.1	10.6	16.9
Essex	11.7	16.7	32.2
Franklin	1.3	7.3	9.6
Hampden	2.6	9.7	14.2
Hampshire	5.0	10.9	15.0
Middlesex	2.8	14.2	19.7
Norfolk	10.8	15.2	22.2
Plymouth	5.8	11.1	19.3
Worcester	3.3	6.8	12.0
Barnstable/Dukes/Nantucket	14.3	18.5	29.9
Total	1.4	3.0	4.9

Dickson, David R.; McAfee, Carol L. 1988. **Forest Statistics for Massachusetts--1972 and 1985**. Resour. Bull. NE-106. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 112 p.

A statistical report on the third forest survey of Massachusetts (1984). Findings are displayed in 76 tables containing estimates of forest area, numbers of trees, timber volume, tree biomass, and timber products output. Data are presented at two levels: state and county.

ODC (745)--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:

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- Berea, Kentucky, in cooperation with Berea College.
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