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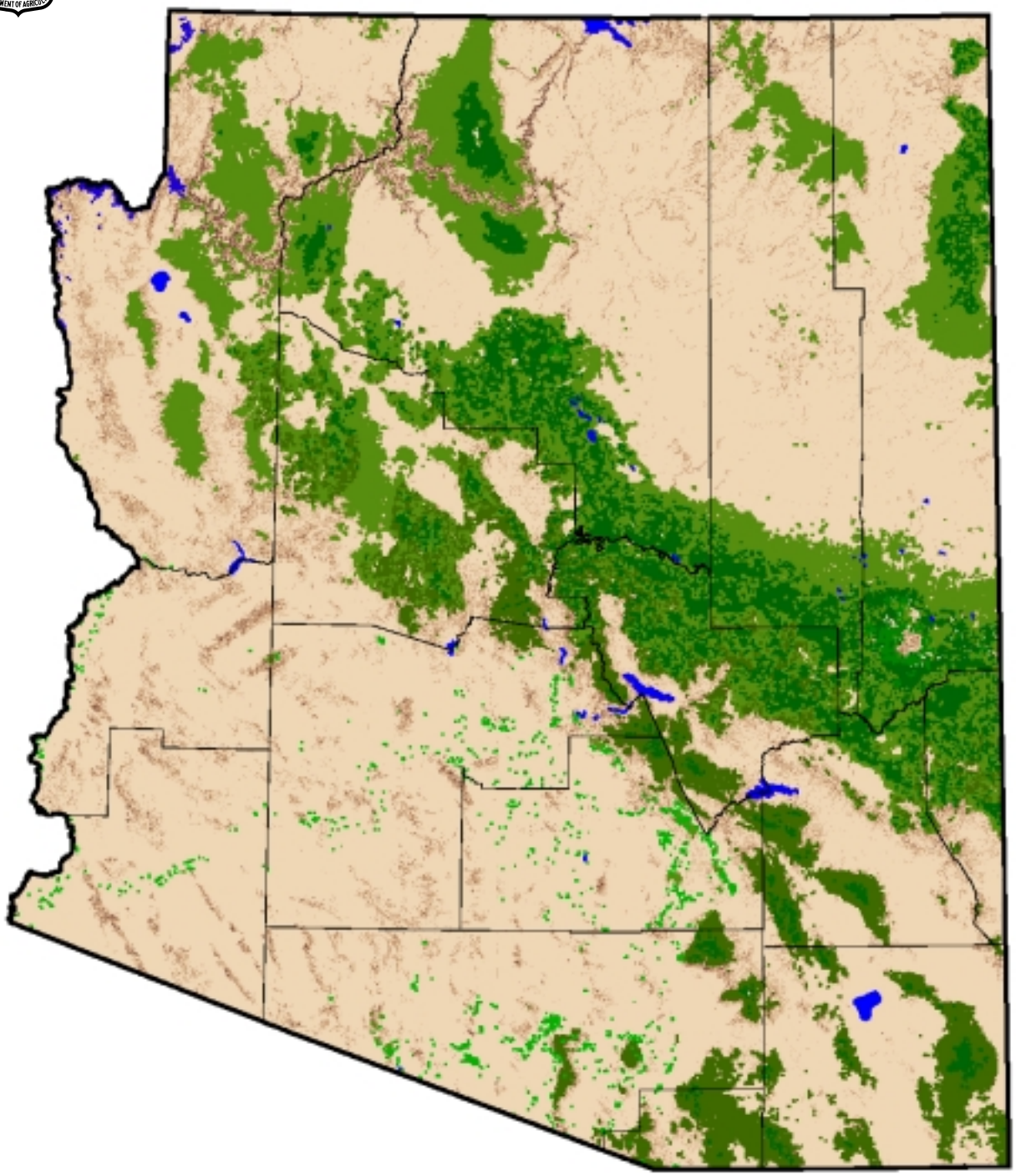
Arizona's Forest Resources, 1999

Renee A. O'Brien



Abstract

O'Brien, Renee A. 2002. **Arizona's Forest Resources, 1999**. Resour. Bull. RMRS-RB-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 116 p.

This report presents a summary of the most recent inventory information for Arizona's forest lands. Much of the data are from the inventory completed in 1999 that included National Forest System lands and reserved lands. This report includes tables and highlights of area, number of trees, biomass, volume, growth, mortality, successional stage, understory vegetation, removals, and net change. Most of the tables are organized by forest type, species, diameter class, or owner group. The report also explains inventory design and inventory terminology, and discusses data reliability.

Results show that roughly 27 percent of the area of Arizona is forest land, and that about 59 percent of the forest land is administered by government agencies. About 9 percent of the forest land in Arizona is reserved from being utilized for wood products. The most common forest type is pinyon-juniper, comprising 40 percent of the total forest land. The tree species estimated to have the highest percent of the total number of trees is twoneedle pinyon, with 17 percent. Ponderosa pine is estimated to make up 38 percent of the total biomass, and 35 percent of the total cubic foot volume. The total volume of wood in live trees in Arizona is estimated to be over 15.5 billion cubic feet. The net volume of growing stock on nonreserved timberland (species traditionally harvested for lumber) is over 6.2 billion cubic feet, with almost 68 percent of that occurring on lands administered by the National Forest System.

Keywords: forest land area, forest inventory, number of trees, biomass, volume, growth, mortality, forest type, double sampling

The Author

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The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture or any product or service.

Cover: Landsat TM image of Utah from Edwards and others (1995) and Homer and others (1997) with field plot and county overlay.

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Highlights

Area

- The total land area of Arizona is almost 73 million acres. Roughly 27 percent or 19.4 million acres is forest land.
- Pinyon-juniper and pure juniper forest types combined occupy almost 10.9 million acres or 56 percent of the forest land.
- Forty-two percent of the forest land is administered by the USDA Forest Service, and 41 percent is private, which includes Indian Trust land. Seven percent is administered by the USDI Bureau of Land Management, 6 percent is State owned, and the remaining 4 percent is other public.
- About 9 percent of the forest land in Arizona is in reserved status.

Biomass and Volume

- The total biomass in live trees in Arizona forests is estimated to be over 287 million tons.
- Total volume of wood in live trees in Arizona is estimated to be in excess of 15.5 billion cubic feet.
- Ponderosa pine makes up 38 percent of the total biomass and 35 percent of the total volume.

Growth and Mortality

- Gross annual growth of all trees on forest land in Arizona totaled about 253 million cubic feet.
- Mortality reduced gross growth by almost 19 percent to about 206 million cubic feet of net annual growth.
- Ponderosa pine alone accounted for 54 percent of the net growth.

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Arizona's Forest Resources, 1999

Renee A. O'Brien

Introduction

This report presents a summary of the most recent inventory data available for Arizona's forest lands. Much of the data in this report are from the inventory started in 1995 and completed in 1999 (referred to as the 1999 inventory) by the USDA Forest Service, Interior West Resource Inventory, Monitoring, and Evaluation (IWRIME) Program, as part of their Forest Inventory and Analysis (FIA) activities. The 1999 inventory employed a new sampling design called the mapped plot design.

Land classification categories are individually defined in the terminology section of this report. However, an overview of the classification relationships may provide a better understanding of how these groups are subdivided. Land area is divided into forest and nonforest (fig.1). Nonforest includes rangelands, agriculture, urban lands, and water, and may have a small amount of tree cover. Within both classifications, the land may be reserved or nonreserved, which means that, in the case of forest land, nonreserved forest land is available for tree utilization, reserved forest land is not. Forest found in wilderness areas or National Parks typifies reserved forest land.

Forest land is subdivided into timberland and woodland. Timberland includes forests of tree species traditionally used in the forest products industry, such as ponderosa pine and Douglas-fir. Woodland includes tree species that typically have a multistem growth form and are not traditionally used for industrial wood products, such as pinyon, juniper, and oak. A location was classified as timberland or woodland depending on which category of species made up the majority of the stocking.

The 1999 inventory included National Forest System lands, some Indian reservations, areas in reserved status, and all timberland regardless of owner. New data were not collected for nonreserved woodlands outside the National Forest System. Instead, data from the previous Arizona inventory

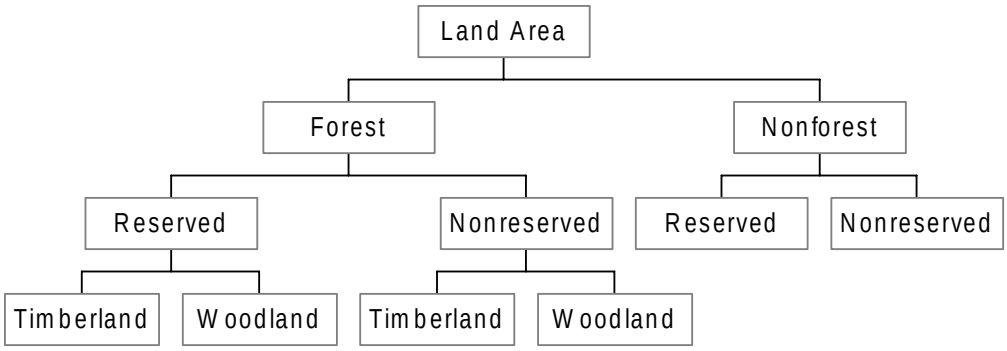

Figure 1—Land classification for FIA reporting, Arizona, 1999.

(Conner and others 1990) and from a 1990 to 1991 Navajo Indian Reservation inventory were recompiled to be comparable to the design and definitions of the 1999 inventory and combined with the mapped plot design results to produce this report (fig. 2).

Emphasis in this report is placed on the total forest land resource, including species diversity, forest health, and land use issues, as well as the more traditional estimates such as volume, growth, mortality, and removals. Other types of information included in this report are the occurrence and cover of understory species, estimates of biomass, and occurrence of habitat types. Scientific and common names for all plant species included in this paper are listed in appendix A.

The 1999 inventory was made possible through a major cooperative effort between many Federal and State agencies. The field work, data compilation, and analysis were conducted and partially funded by the IWRIME program. Significant funding was also provided by the USDA Forest Service Southwestern Region through a cooperative agreement between the Rocky Mountain Research Station (RMRS) and the National Forest System that resulted in an expanded inventory that included National Forest System lands. Substantial cooperation in terms of logistical assistance was received from the Arizona State Land Department, Forestry Division, and all other public and private landowners including the American Indian Tribes. Data are also being reported separately for the six National Forests in Arizona.

Comparison with forest statistics previously reported for Arizona (Conner and others 1990) should be restricted to area estimates. Methods for obtaining area data are fairly consistent over time, but even the definition of forest land has fluctuated. Estimation of other attributes such as volume or growth will vary due to procedural and definition changes.

Methods

The data in this report represent all forest land, including all owners and land status. IWRIME uses a two-phase or double sampling procedure (Cochran 1963) for State inventories. The first, or remotely sensed, phase was based on a grid of sample points systematically located across all lands in the State. A forest cover type map of the United States (Powell and others 1993), which is based on Advanced Very High Resolution Radiometer (AVHRR) satellite imagery (fig. 3), was used to obtain timberland, woodland, or nonforest cover information on 295,153 points in Arizona. This designation, along with other geopolitical information, was then used to stratify field plots.

Field crews conducted the second, or field, phase of the inventory on a subsample of the phase one points that occurred on forest land (USDA Forest Service 1995). This is land that had at least 5 percent cover of species classified as trees (timber or woodland species), had at least 40 tally tree species seedlings or saplings per acre, or is currently without cover but formerly had at least 5 percent cover with tally tree species, and human activity on the site does not preclude natural succession. The sampling intensity used in the 1999 inventory for the National Forest System, National Park Service, some Indian reservations, and all reserved land was roughly one field plot every 3 miles. A grid of one-half that intensity was used to sample all other land.

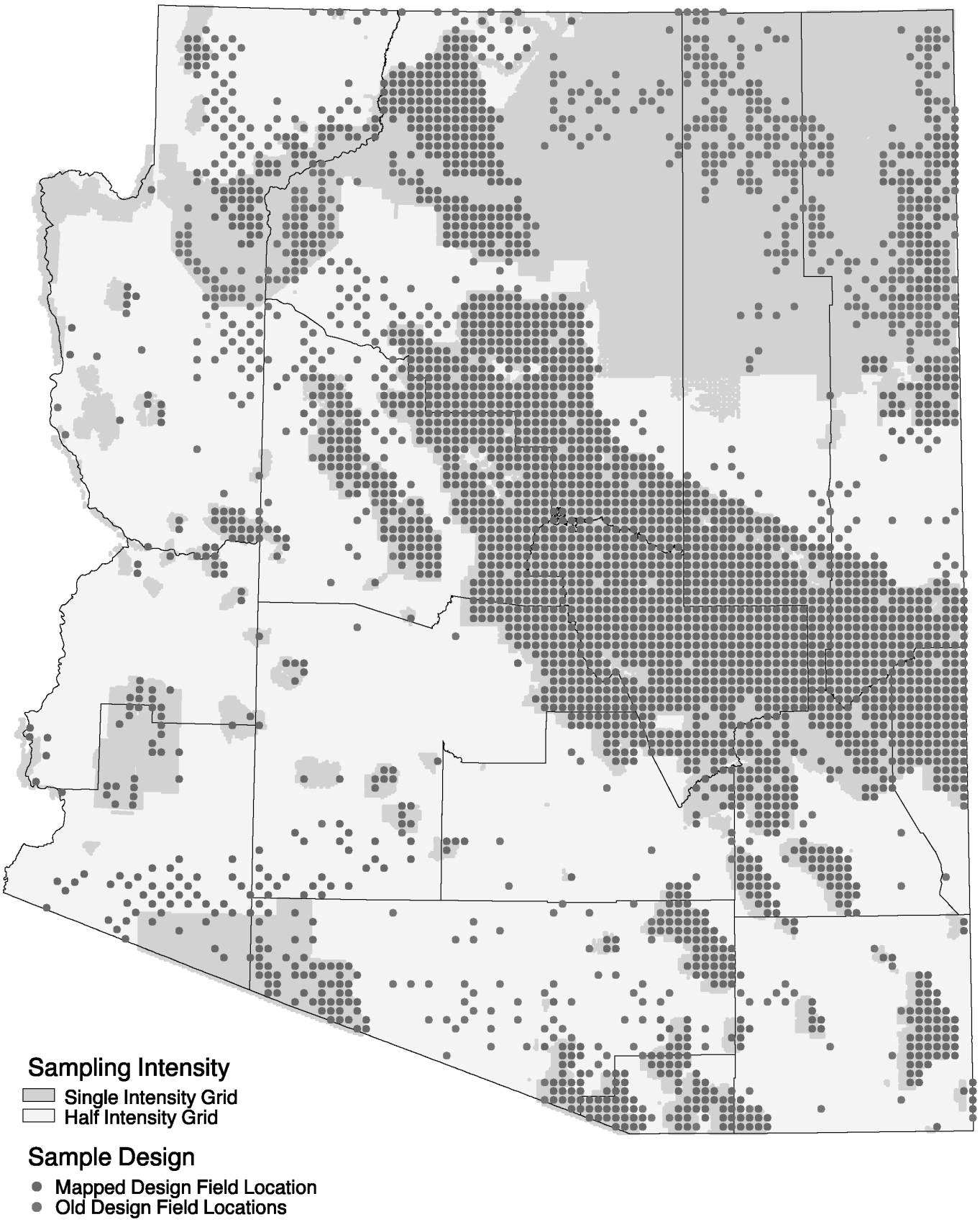

Figure 2—Distribution of inventory plots by intensity and design, Arizona, 1999.

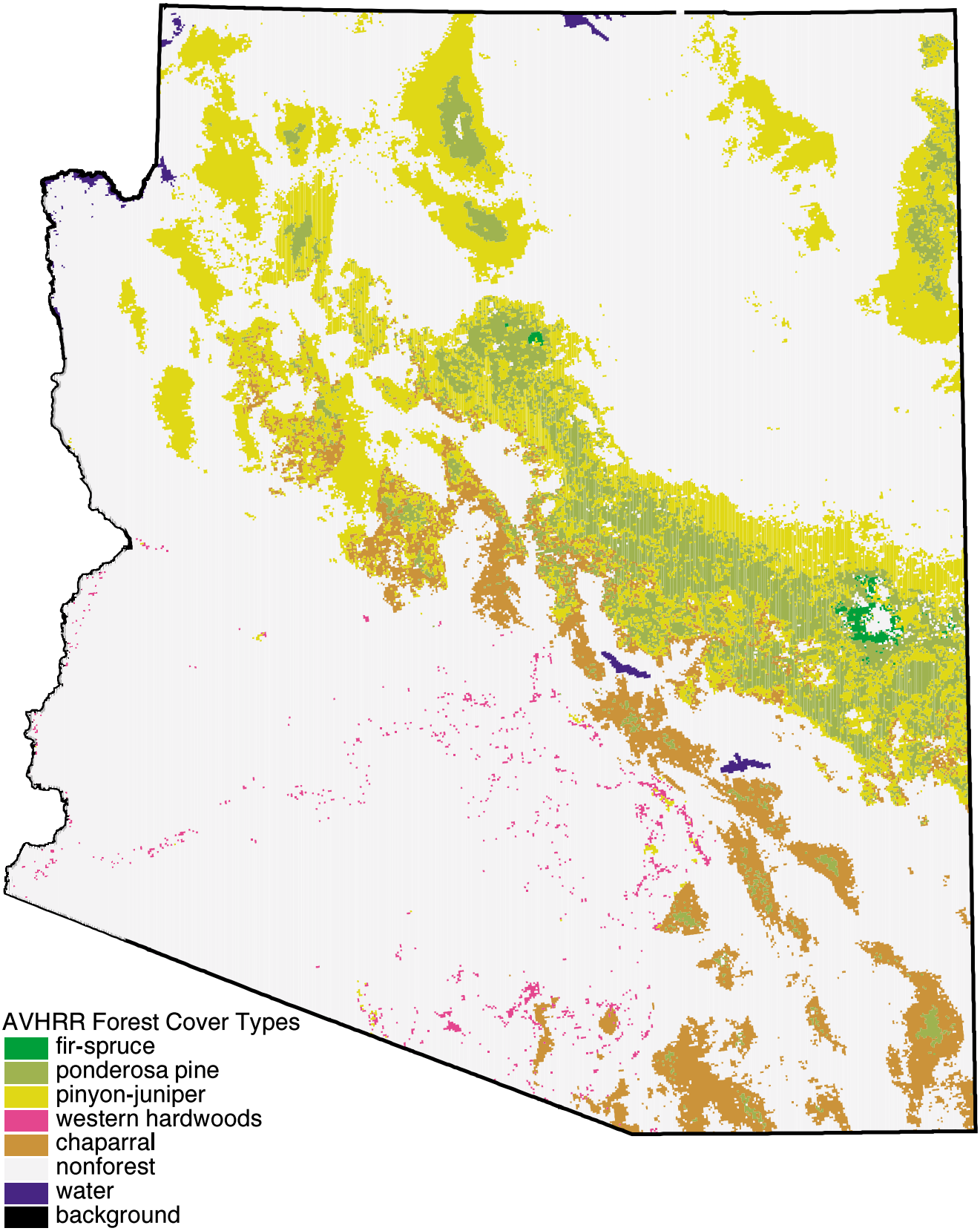

Figure 3—Advanced very high resolution radiometer (AVHRR) forest cover types for Arizona (Powell and others 1993).

The mapped plot design is a cluster of four points spaced 120 feet apart. Each point serves as the center of a 1/24-acre circular subplot used to sample trees 5.0 inches in diameter at breast height (d.b.h.) or root collar (d.r.c.), and larger. A 1/300-acre circular microplot, located at the center of the subplot, was used to sample seedlings and saplings (trees up to 4.9 inches d.b.h or d.r.c.). Forest and adjacent nonforest conditions were delineated (mapped) and recorded. Condition classes were defined by five attributes: forest/nonforest, forest type, stand-size class, stand origin, and stand density. All attributes measured on each location were assigned to their respective condition class. A total of 8,588 field plots were evaluated, of which 2,763 were at least partially forested. This number includes 798 woodland plots from older surveys, the design for which is described in Conner and others (1990).

IWRIME inventories provide a probability-based sample of forest resources across all ownerships that can be used for planning and analyses at local, State, regional, and national levels. The sample was designed to meet national standards for precision in State and regional estimates of forest attributes.

A measure of the variability of inventory statistics is provided by standard errors, listed in table 2 for estimates of area, volume, growth, and mortality, on forest land for the entire State. A 95 percent confidence interval can be computed for any estimate by multiplying the estimate's percent standard error (SE) by 1.96, multiplying that product times the estimate, and then adding and subtracting that product from the estimate to get the bounds. The 95 percent confidence interval for total forest land area in Arizona is between 18.9 and 19.9 million acres. Similarly, the estimate of total forest land volume ranges between 14.9 and 16.2 billion cubic feet.

Users may compute statistical confidence for subdivisions of the reported data using the formula below. Because sampling error increases as the area or volume considered decreases, users should aggregate data cells as much as possible. Sampling errors obtained from this method are only approximations of reliability because this process assumes constant variance across all subdivisions of totals. The formula is:

$$\tilde{SE}_g = \frac{SE_t \sqrt{\hat{Y}_t}}{\sqrt{\hat{Y}_g}}$$

where:

$\tilde{SE}_g$ = approximate percent standard error of $\hat{Y}_g$

SE_t = percent standard error of $\hat{Y}_t$

$\hat{Y}$ = table variable of interest

g = table cell or group of cells of interest

t = totals from tables 2 or 3.

Overview of Tables

Area of forest land, number of trees, wood volume and biomass, growth, mortality, and removals are the primary categories for which statistics are tabulated and presented in the tables. There are five groups of summary

tables. Tables 1 through 27 are for all forest land, both reserved and nonreserved. Tables 28 through 43 are for nonreserved forest land—forest land not withdrawn from tree utilization through statute or administrative designation. Tables 44 through 81 are for nonreserved timberland, that is nonreserved forest land where timber species—those species traditionally used for industrial wood products—make up at least 10 percent stocking, and compose at least 51 percent of the total stocking on the site. Tables 82 through 89 are for nonreserved woodland, meaning forest land where timber species make up less than 51 percent of the total stocking. The last group of tables, 90 through 111, is a core set comparable to similar sets presented by other FIA groups across the nation and used in the Resources Planning Act Assessment to represent lands traditionally referred to as "commercial timberland." These core tables are for nonreserved timberland that has a minimum productivity of 20 cubic feet per acre per year. Highlights presented in this report are for total forest land and for nonreserved timberland.

Highlights of Inventory Results for Total Forest Land

Area

The State of Arizona encompasses almost 73 million acres (table 1). Roughly 27 percent of the area or 19.4 million acres is forest land (fig. 4). A total of 42 percent of the forest land is administered by the USDA Forest Service, and 41 percent is private, which includes Indian Trust land (fig. 5). Also, 7 percent is administered by the USDI Bureau of Land Management (BLM), 6 percent is State owned, and the remaining 4 percent is other public. About 9 percent of the forest land in Arizona is in reserved status. Unless otherwise indicated, lands of both reserved and nonreserved status are included in the statistics in this report.

The area variables discussed below describe the structure and composition of Arizona forests. Some of the variables were originally developed to describe forests in terms of growing stock and timber production, and consequently had to be adapted for use in describing all trees on all forest land.

Forest type—Forest type refers to the predominant tree species in a stand, based on tree stocking, and is one indicator of forest diversity. Table 3 shows

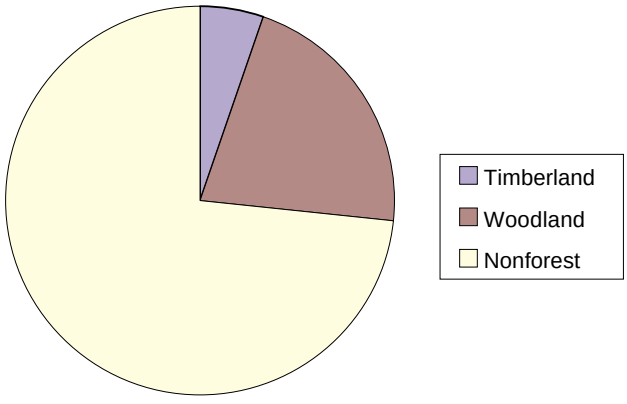

Figure 4—Distribution of land area by land class, Arizona, 1999.

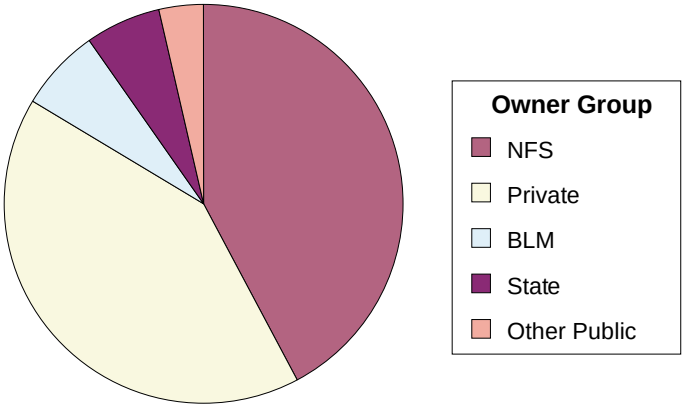

Figure 5—Distribution of forest land area by owner group, Arizona, 1993.

that the pinyon-juniper type is by far the most abundant forest type in the State, covering over 7.7 million acres, or 40 percent of the forest land. Another 3.1 million acres—almost 16 percent—of Arizona forest land is classified as pure juniper. Together, the pinyon-juniper and juniper types compose 56 percent of Arizona's forest land. Figure 6 displays area by land status for all forest types. Ponderosa pine is the third most abundant forest type with 3.0 million acres, or about 16 percent. Evergreen oak makes up 8 percent of the area; mesquite, 7 percent; deciduous oak, 2 percent; and Douglas-fir, aspen, and Engelmann spruce, about 1 percent each. Other miscellaneous types combined, including nonstocked woodland, make up the remaining 8 percent of the forest land.

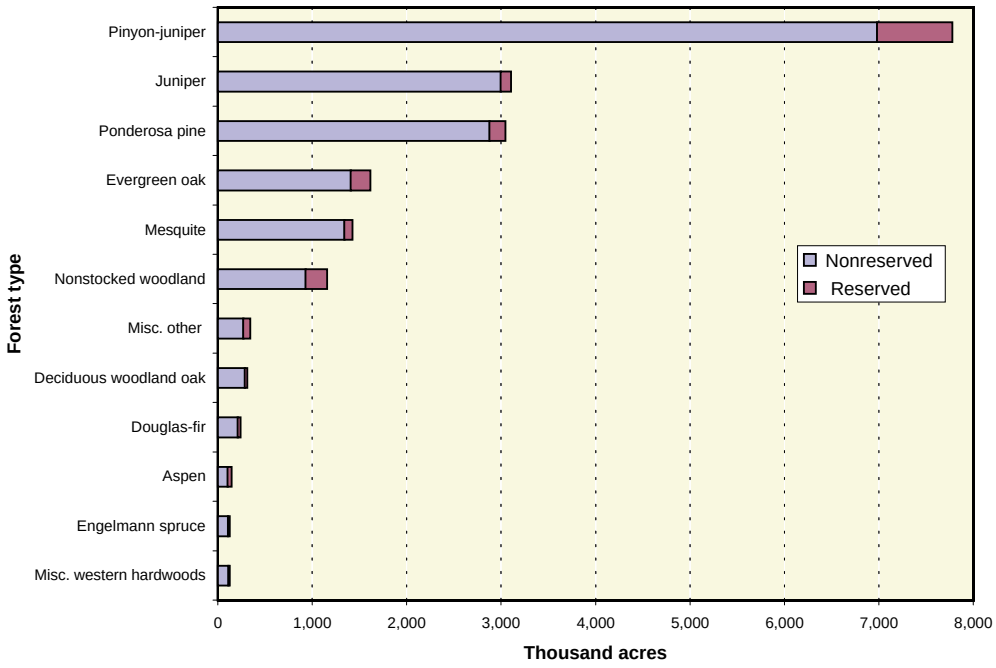

Figure 6—Area of forest land by forest type and land status, Arizona, 1993.

Stand-size class—Another variable, stand-size class, classifies forest land based on the predominant stocking by size of all live trees present (tables 4 through 7) and gives an idea of the overall structure of Arizona forests. Figure 7 shows area of forest land by stand-size class and owner group. This figure illustrates that relatively few stands are composed mostly of small trees (sapling/seeding), such as stands that have been harvested or burned. Figure 7 also shows a relatively large amount of nonstocked forest land. Many sparsely stocked stands in Arizona fall into this category.

Stand age—Figure 8 shows area of forest land by stand age class. Stand age is an important forest attribute but is difficult to quantify and should be used with caution. Stand age is computed here using only the ages of trees within the stand-size class, weighted by trees per acre. If a stand is nonstocked, the age is set to zero. Based on these criteria, 30 percent of all forest stands in Arizona are estimated to be 51 to 100 years old, and another 30 percent are estimated to be 101 to 150 years old (table 11). Because trees of all ages can occur together, this method of computing stand age will not necessarily portray old-growth situations.

Stand density index—Stand density index (SDI), as developed by Reineke (1933), is a relative measure of stand density that quantifies the relationship between trees per acre, stand basal area, average stand diameter, and stocking of a forested stand. The concept was developed for even-aged stands but can also be applied to uneven-aged stands (Long and Daniel 1990). SDI is usually presented as a percentage of the maximum SDI for each forest type (USDA Forest Service 1993). SDI was computed for each location using those maximums, and the results were grouped into six classes (fig. 9). A site is considered to be fully occupied at 35 percent of SDI maximum, which marks the onset of competition-related stresses and slowed growth rates. IWRIME

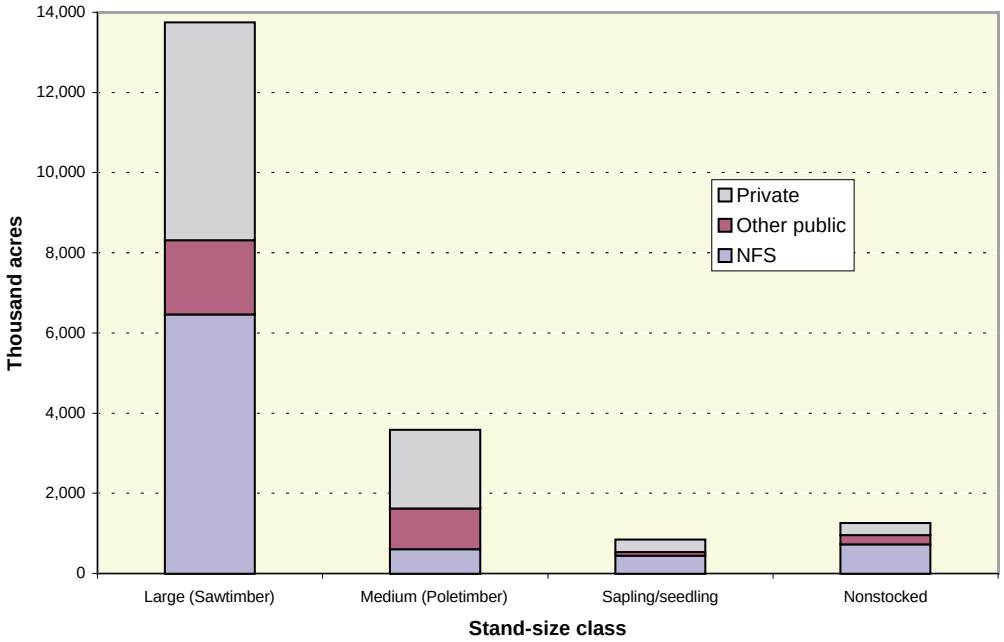

Figure 7—Area of forest land by stand-size class and owner group, Arizona, 1999.

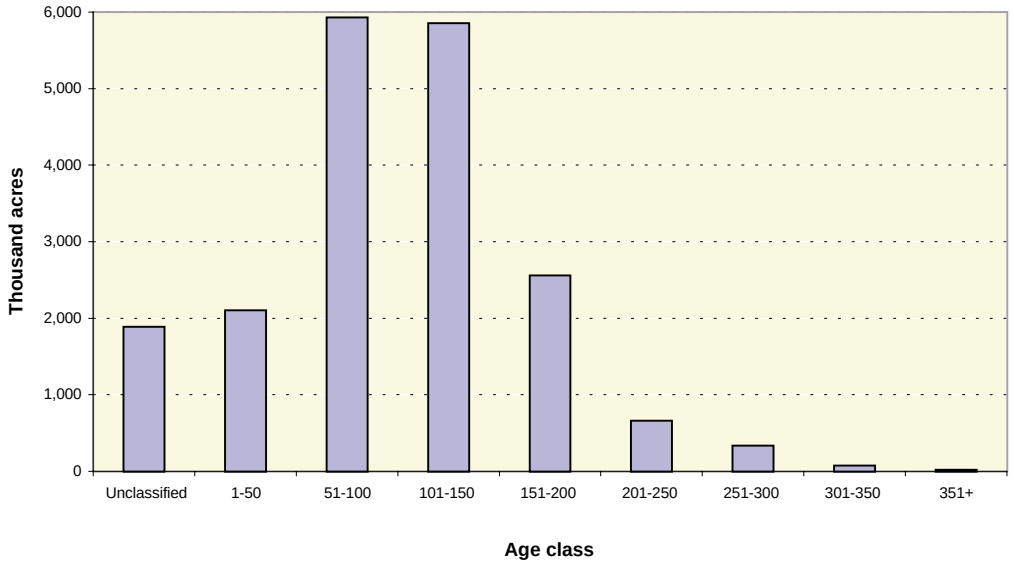

Figure 8—Area of forest land by stand age class, Arizona, 1999.

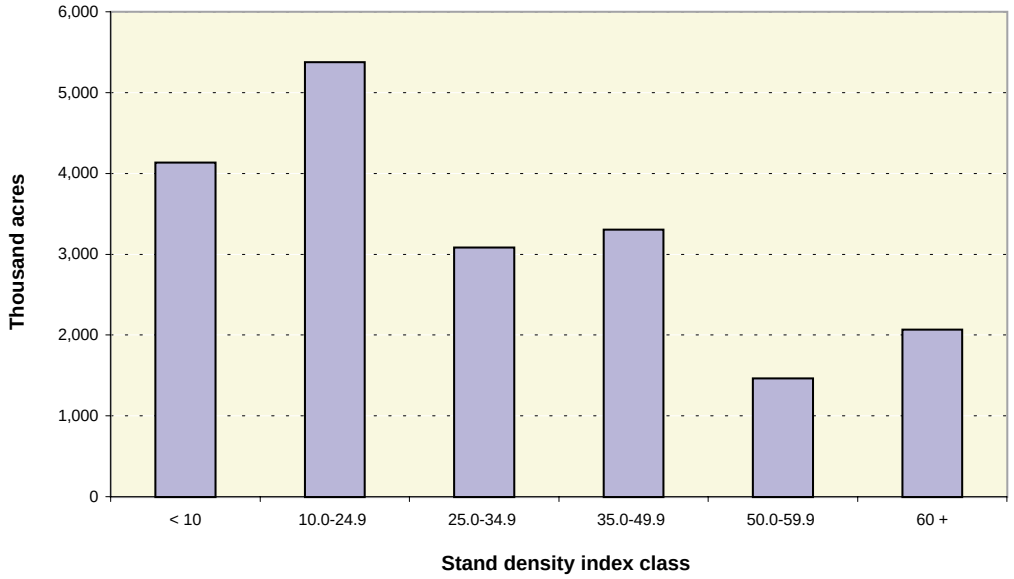

Figure 9—Area of forest land by stand density index (SDI), Arizona, 1999.

estimates that 35 percent of all forest stands in Arizona are at or above 35 percent of SDI maximum.

Basal area class—Basal area (BA) is the cross-sectional area of a tree stem, expressed in square feet. The sum of the BA of all trees in a stand is an indicator of the degree to which the site is being utilized for growth. High levels of BA indicate dense stands that may have a high potential for catastrophic fire and are also vulnerable to attack by insects or disease. Table 10 presents area of forest land by forest type and basal area class. Focusing on one forest type, figure 10 illustrates area of ponderosa pine forest type by

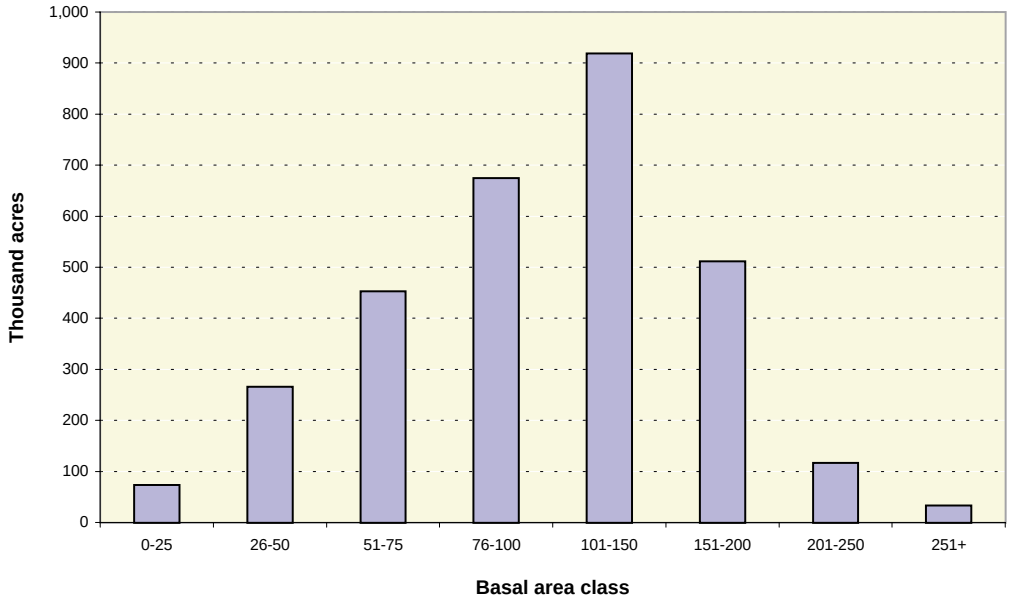

Figure 10—Area of ponderosa pine forest type by basal area class, Arizona, 1999.

BA class and shows that a high proportion (74 percent) of the ponderosa pine forest type in Arizona has greater than 75 square feet of BA.

Habitat type—Habitat types describe lands in terms of their potential to produce similar plant communities at successional climax. The climax plant community, which is the theoretical end result of plant succession, reflects the integration of environmental factors that affect vegetation such as soils, climate, and landform. Habitat type classifications are named for the predominant overstory and understory plant species at the time of successional climax. In the 1999 inventory, Arizona forests, including woodlands, were classified using Stuever and Hayden (1996). Table 13 presents area of forest land by habitat type series and forest type, to give a general indication of forest successional status for the State. The 798 woodland locations from older surveys were not classified by habitat type, and therefore will show up in the unclassified column. Although presented for the entire State, this concept is more meaningful, and more widely used at the site level.

Number of Trees

The composition of the forest by individual tree species is another indicator of forest diversity. Figure 11 displays the distribution of number of live trees on Arizona forest land for the most abundant species. Twoneedle pinyon is estimated to make up the highest percentage of number of trees in Arizona with 17 percent; ponderosa pine, 16 percent; Gambel oak, 14 percent; Utah juniper, 11 percent; Arizona white oak and alligator juniper, each 6 percent; oneseed juniper, 5 percent; Douglas-fir, mesquite, and Emory oak, each 3 percent; and aspen and silverleaf oak, each 2 percent. Other species tallied in the inventory, each of which composed less than 2 percent of the total

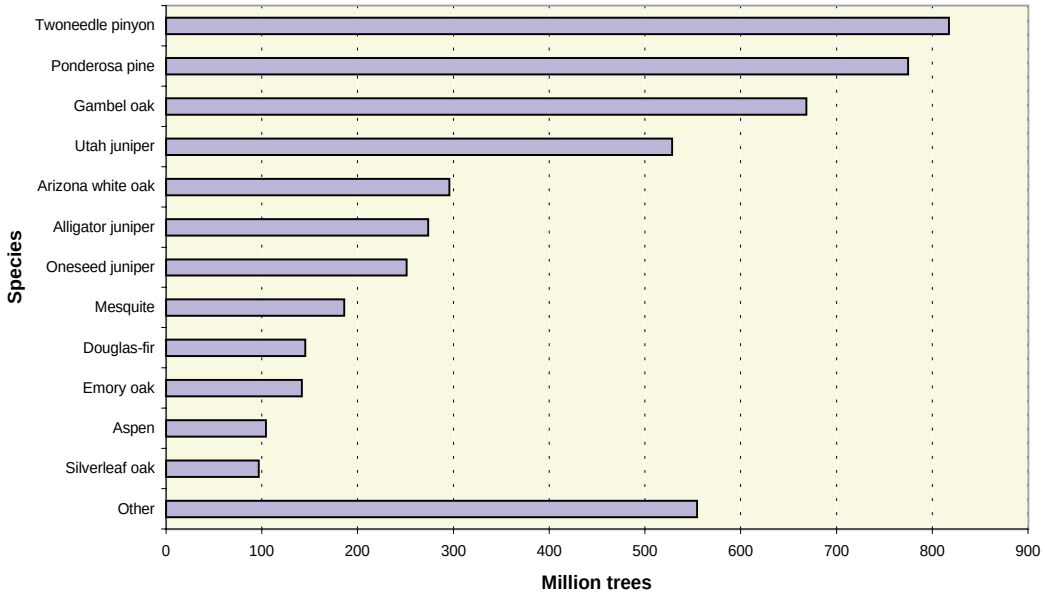

Figure 11—Number of live trees on forest land by species, Arizona, 1999.

number of trees, are New Mexico locust, white fir, border pinyon, Arizona pinyon pine, Rocky Mountain juniper, Engelmann spruce, singleleaf pinyon, evergreen oak, Arizona cypress, bigtooth maple, southwestern white pine, corkbark fir, desert ironwood, Mexican blue oak, Mexican pinyon pine, Chihuahua pine, subalpine fir, redberry juniper, California juniper, blue spruce, cottonwood, Apache pine, boxelder, and Rocky Mountain maple (table 14).

Size distribution of individual trees indicates structural diversity. Figure 12 displays number of trees on forest land by diameter class (both d.b.h. and d.r.c.), showing many more small than large trees. In terms of sheer numbers, 59 percent of all live trees are less than 5 inches in diameter (table 14).

Dead trees are an important component of forest ecosystems, providing habitat for many species of wildlife and functioning as nutrient sinks. There are roughly 131 million standing dead trees greater than 5.0 inches diameter (snags) in Arizona (table 15). The number includes snags of all species and degree of decay. Many wildlife species are dependent on snags, but the species, size, and density of snags required vary according to the species of wildlife. Larger snags are relatively scarce in relation to smaller snags. Considering snags 11 inches in diameter or larger, Arizona forests average 2.5 snags per acre. Of the very large snags (19 inches in diameter or larger), Arizona has about 0.6 per acre. The most abundant species of snag overall, and the most abundant species of snag in the 19 inch and larger category, is ponderosa pine.

These numbers represent averages over the total forest land area. Standing dead trees were only actually tallied on 38 percent of the forest land area and 59 percent of the timberland area. Snags are difficult to sample adequately (Bull and others 1990). They are fewer in number and may be less randomly distributed than live trees—occurring in patches because of fire, disease, insect outbreaks, and so forth.

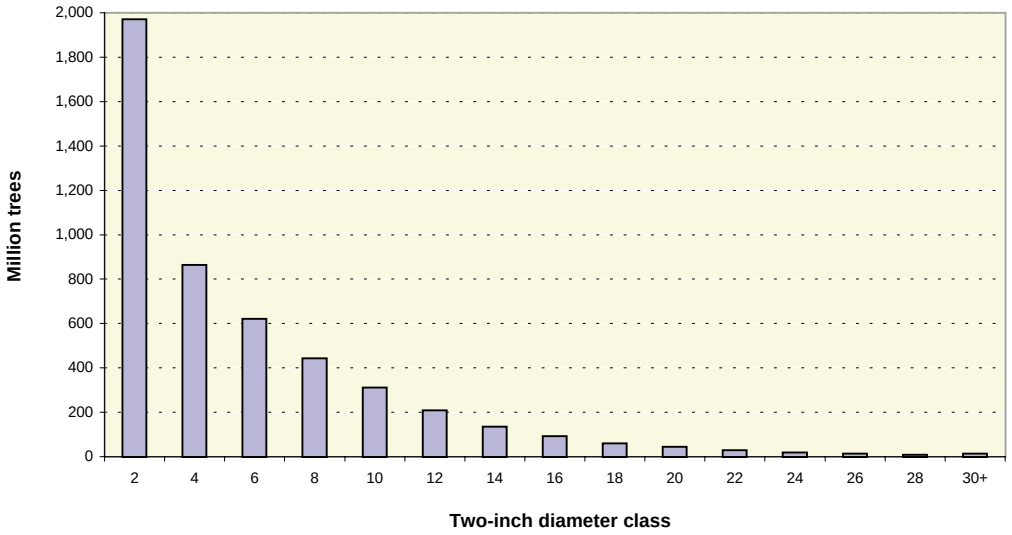

Figure 12—Number of live trees on forest land by 2-inch diameter class, Arizona, 1999.

Biomass and Volume

The total biomass in live trees in Arizona forests is estimated to be 287.3 million tons. Biomass includes boles, bark, and branches of all live trees including saplings. Biomass is presented by species in figure 13 and by species and diameter class in table 16. The species estimated to have the greatest total biomass is ponderosa pine, with 38 percent of the total biomass in the State.

Total volume of wood in live trees in Arizona is estimated to be in excess of 15.5 billion cubic feet. This includes trees 5.0 inches in diameter and larger. Figure 14 shows cubic-foot volume by species, table 18 shows cubic-foot volume by species and owner, and table 19 shows volume by species and diameter class. The species estimated to have the most cubic-foot volume in Arizona is ponderosa pine, with 35 percent of the total.

Growth and Mortality

Growth, as reported here, is the average annual growth over a 10-year period based on increment core measurements. It is reported for the year prior to the year of inventory. Gross annual growth of all trees on forest land in Arizona totaled about 253 million cubic feet. Net annual growth is the difference between gross growth and losses due to mortality. Mortality is the average annual net volume of trees that have died in the 5 years prior to the year of inventory. Mortality reduced gross growth by almost 19 percent to about 206 million cubic feet of net annual growth. About 58 percent of the net annual growth in Arizona occurred on lands under National Forest System management. Ponderosa pine alone accounted for 54 percent of the net growth.

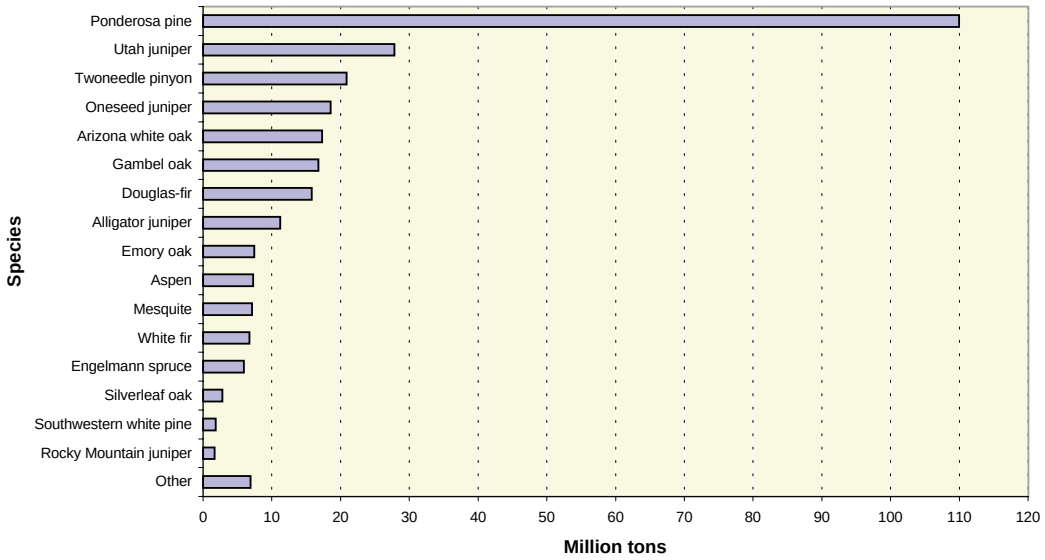

Figure 13—Oven-dry weight of biomass of all live trees by species on forest land, Arizona, 1999.

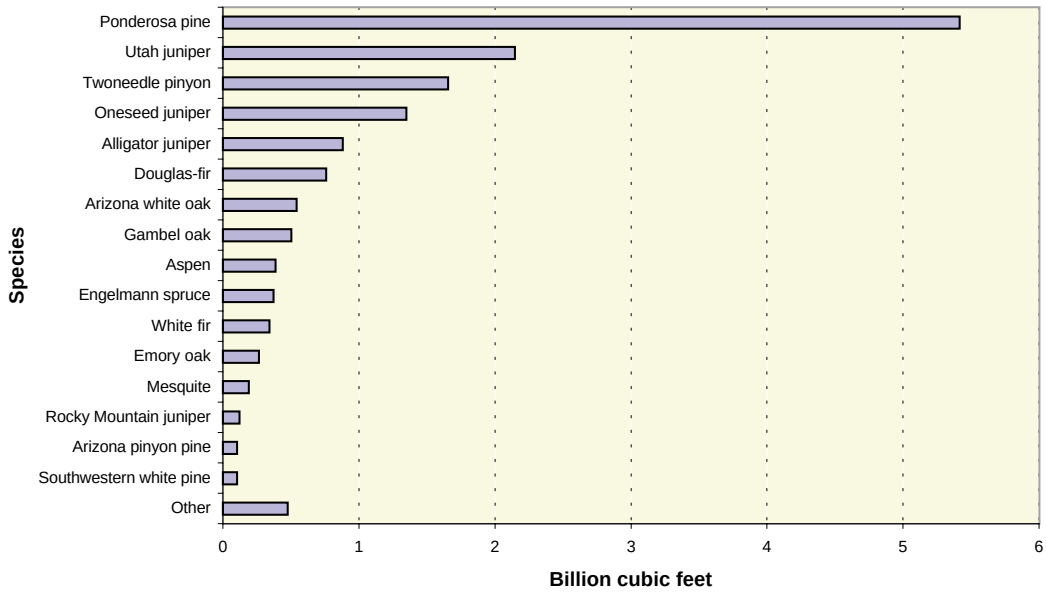

Figure 14—Net cubic foot volume by species on all forest land, Arizona, 1999.

Tree mortality in Arizona was high for some species and size classes (table 24). Mortality exceeded growth for the year prior to the inventory year (1998) for subalpine fir, meaning that the overall net annual growth of subalpine fir as a species is negative (table 22). Many species have negative growth in some diameter classes. Disease was estimated to be the primary cause of death, followed by insects and fire. It should be noted that exact cause of death is sometimes unknown, or is the result of a combination of factors.

Aspen—Aspen-dominated stands are currently a minor component of Arizona forests. Only about 147,000 acres currently have the aspen stocking required to be considered aspen forest type by FIA definitions. Information from various sources (Bartos 1995; Bartos and Campbell 1998; Johnson 1994) indicates that this important forest type is declining in much of its western range. Aspen forests are unusual because they reproduce primarily by suckering from the parent root system. Often a disturbance or dieback is necessary to stimulate regeneration of the stands. Evidence suggests that aspen root systems have existed for thousands of years; and because of this, even minor amounts of aspen in a stand probably indicate that the site was at one time dominated by aspen. In an attempt to shed more light on this issue, each location in the inventory data base was examined for any presence of aspen. An estimated 633,000 acres in Arizona have at least one live or dead aspen tree present. This number indicates that under certain conditions, more Arizona forest land could be dominated by aspen. It does not imply that all 633,000 acres were ever simultaneously dominated by aspen.

Understory Vegetation and Ground Cover

In addition to information about the forest overstory, the average crown canopy cover of shrubs, forbs, and graminoids (grasslike plants) by layer, as well as percent bare ground, were collected at each field location. Where forest was sampled, crews also recorded the name, percent crown canopy cover, and height layer of up to four individual species in each lifeform that had 5 percent or more cover. Table 26 summarizes lifeform cover percent, percent bare ground, total number of species recorded, most common understory species encountered with 5 percent cover or greater, and number of locations by forest type.

The highest average percent bare ground (24 percent) is found in the miscellaneous western hardwood forest type (primarily made up of New Mexico locust and ironwood). The highest percent average cover of shrubs (24 percent) also occurred in the miscellaneous western hardwood type, compared to the lowest average shrub cover (1 percent) in the blue spruce type. The highest amount of average forb cover (15 percent) and the highest amount of average grass cover (24 percent) was found in the mesquite type.

Figure 15 shows the 10 most common species encountered with 5 percent cover or greater on Arizona forest land by the number of field locations on which they were found. The species to be encountered most often with 5 percent or greater cover on all forest land is shrub live oak, found on 18 percent (498) of all locations. Blue grama was the second most common, and sideoats grama was third, found on 16 percent (443) and 10 percent (286) of all locations, respectively.

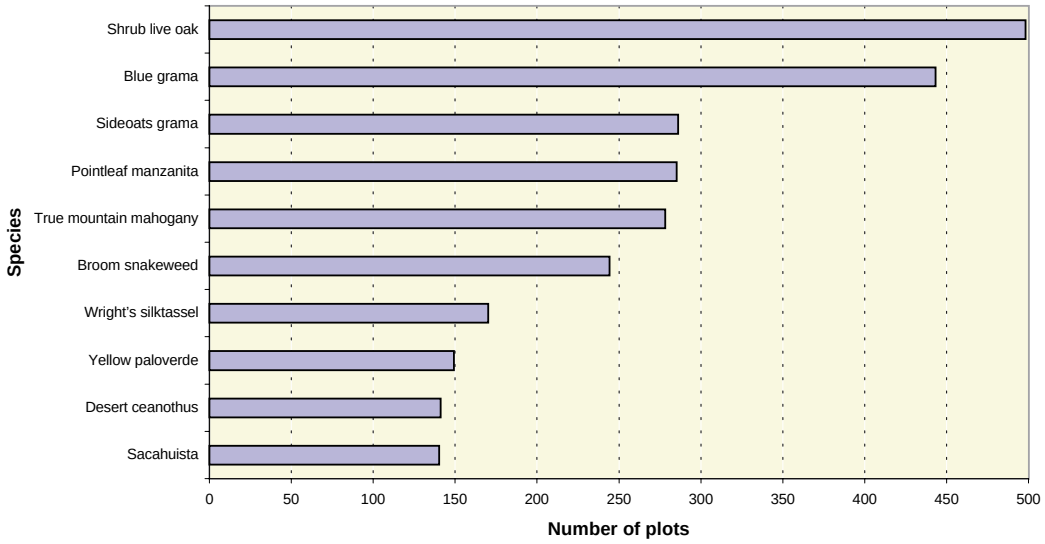

Figure 15—Occurrence of the 10 most common understory species on forest land, Arizona, 1999.

Highlights of Inventory Results for Nonreserved Timberland

Area, Volume, and Net Growth

Because of the importance of wood products, some additional summaries for nonreserved timberland are useful. Just over 18 percent (3.6 million acres) of the forest land in Arizona is nonreserved timberland. The area of nonreserved timberland by owner group and productivity class is presented in figure 16 and tables 44 through 47. About 54 percent of the lands capable of producing more than 50 cubic feet per acre per year are on National Forests—the remainder is in private ownership. The distribution of nonreserved timberland by owner group and stand volume class is presented in figure 17 and table 48.

The total net volume of growing stock on nonreserved timberland is over 6.2 billion cubic feet, with almost 68 percent of that occurring on lands administered by the National Forest System. The species composing by far the greatest percentage of growing-stock volume is ponderosa pine, with 74 percent.

The volume of sawtimber trees on nonreserved timberland in Arizona is estimated to be over 24.9 billion board feet (Scribner rule) (table 56). Ponderosa pine accounts for 76 percent of the total sawtimber volume. Douglas-fir and Engelmann spruce combined account for another 15 percent. Figure 18 shows sawtimber volume by species for nonreserved timberland.

Net annual growth of growing-stock trees on nonreserved timberland totaled over 124 million cubic feet (table 67). Figure 19 shows gross growth, mortality, and removals of growing-stock volume for grouped species on nonreserved timberland.

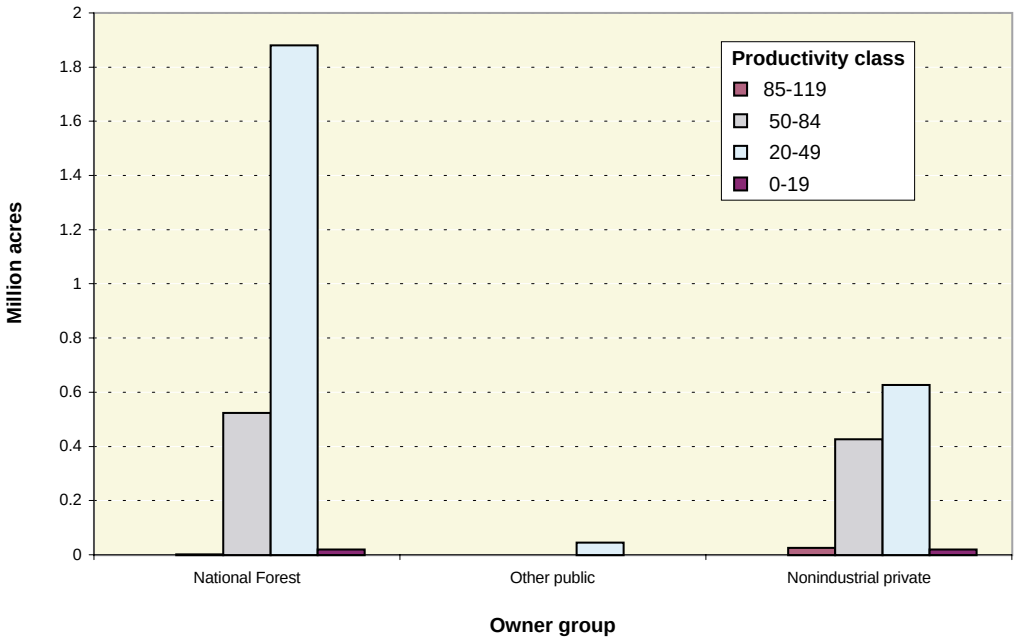

Figure 16—Area of nonreserved timberland by owner group and productivity class, Arizona, 1999.

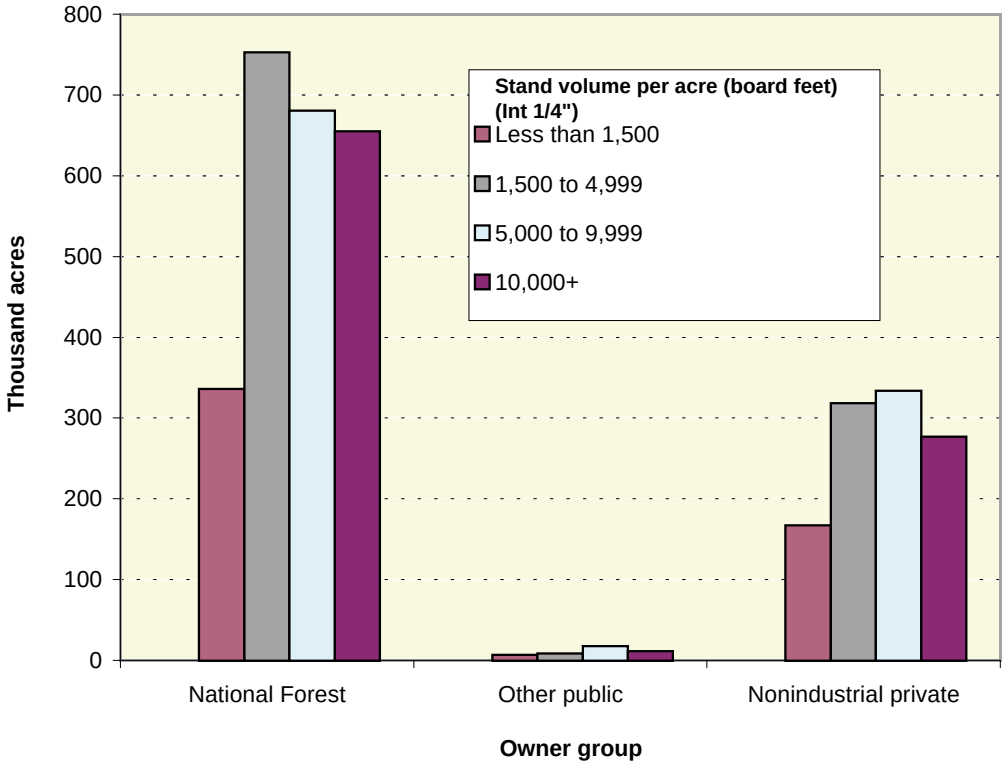

Figure 17—Area of nonreserved timberland by owner group and stand volume class, Arizona, 1999.

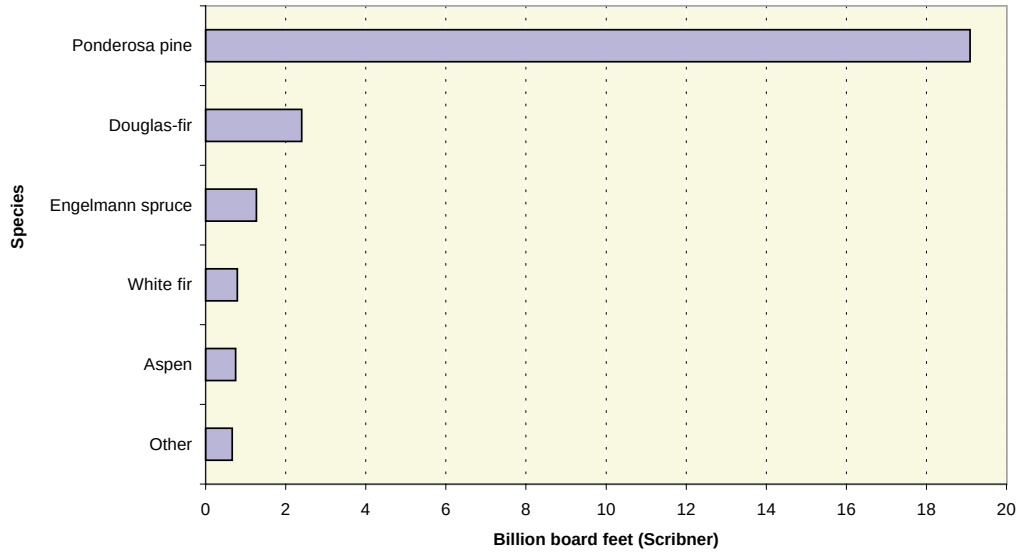

Figure 18—Sawtimber volume by species for nonreserved timberland, Arizona, 1999.

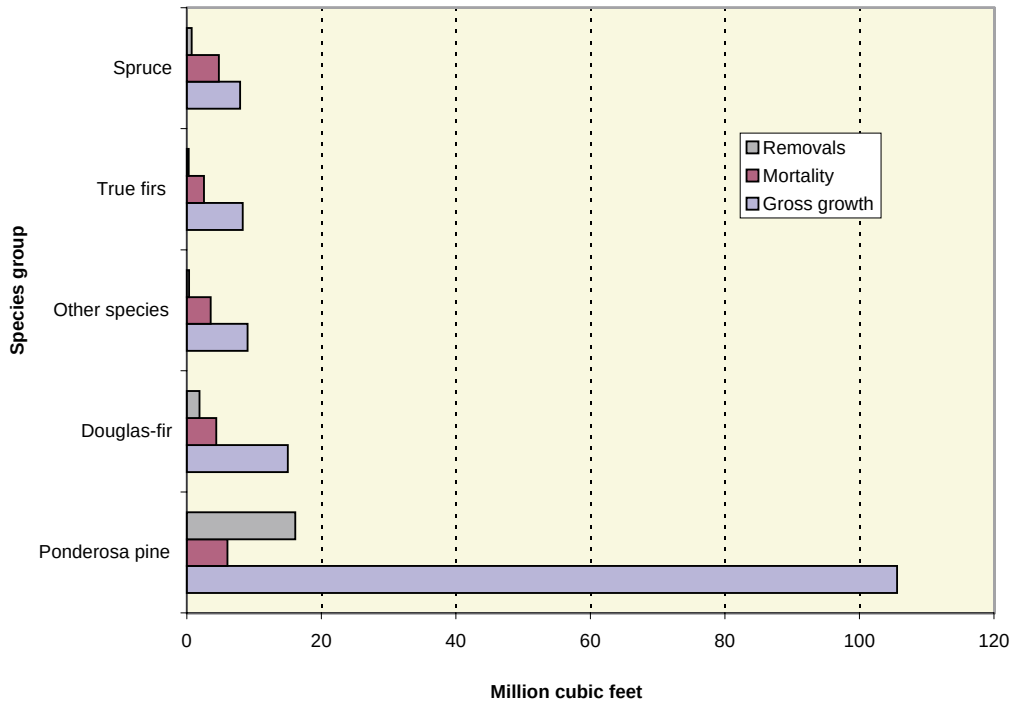

Figure 19—Gross growth, mortality, and removals of growing stock for grouped species on nonreserved timberland, Arizona, 1998.

Removals

The net volume of growing-stock trees removed from the inventory by harvesting, cultural operations, land clearing, and changes in land use, is known as removals. Removals include both the volume processed and the volume harvested or killed but not utilized. Removals, as reported here, are based on data from 1 year—1998. Figure 20 shows volume removed from growing stock inventory by product and owner group. Tables 79 through 81 show harvest and removals by product, species, and owner group in cubic feet for growing-stock removals, as well as board feet Scribner and International for sawtimber removals (Keegan and others 2001).

Almost 19 million cubic feet of wood, exclusive of land clearing volume, were removed from growing stock on Arizona's nonreserved timberland in 1998. A total of 92 percent of the removals from growing stock were for timber products, 4 percent were for fuelwood, and 4 percent were not utilized and left in the woods as logging residues. Sawlogs were the largest component of removals from growing-stock volume followed by pulpwood, at 69 and 22 percent, respectively. Other products, primarily house logs, made up less than 1 percent. National Forests supplied 41 percent of the volume removed from growing stock; other lands—primarily Indian Tribal Trust—supplied 59 percent.

These removals included 79.8 million board feet Scribner log rule or 90.9 million board feet expressed in International ¼-inch log rule. Sawlogs were the dominant product harvested, accounting for 77 percent of removals. Pulpwood was 18 percent of sawtimber removals, fuelwood 3 percent, and other products 1 percent. Two percent of sawtimber removals was timber not utilized and left in the woods as logging residues.

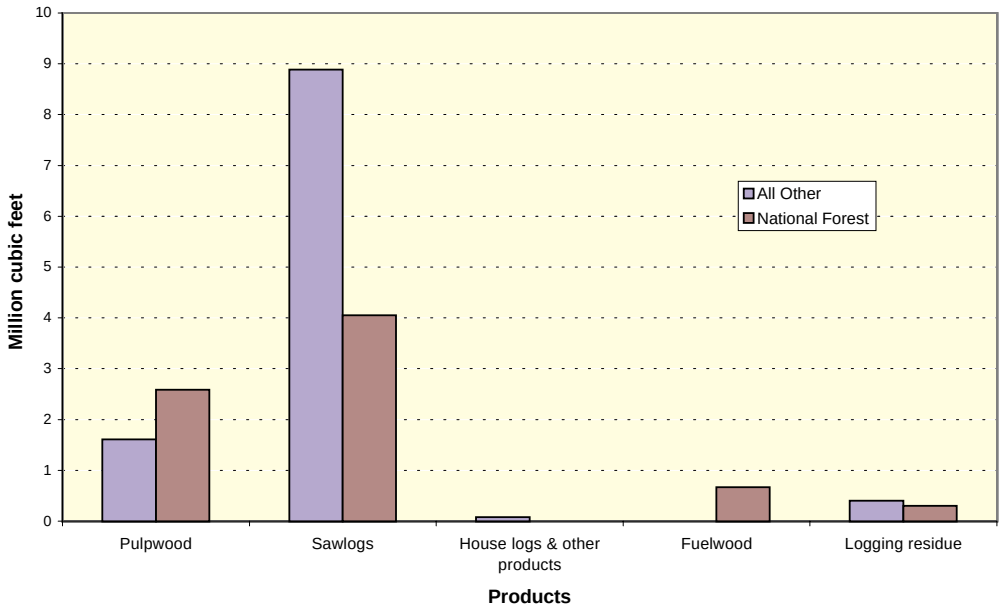

Figure 20—Volume removed from growing-stock inventory on nonreserved timberland by product and owner group, Arizona, 1998.

Over 84 percent of the growing-stock and sawtimber volume removed was ponderosa pine (table 79). Douglas-fir accounted for about 10 percent, with the remainder primarily spruce and true firs**.** Altogether, removals reduced the available standing inventory by only about 0.3 percent of growing stock and sawtimber (Scribner rule). The harvest attributed to each individual species was roughly proportional to its share of the total inventory.

Components of Change

Removals and mortality are both components of change that reduce the amount of growing stock on Arizona's nonreserved timberlands. Figure 21 shows net annual growth compared to removals. Because growth is annual, based on an average over 10 years, and removals data are collected for 1 year, this graph does not necessarily imply a trend. What it does illustrate is that no species had more wood volume removed in 1 year (1998) than the average annual net growth. Total growing-stock volume removed was only 15 percent of total net annual growth of all species of growing-stock trees on nonreserved timberland in Arizona.

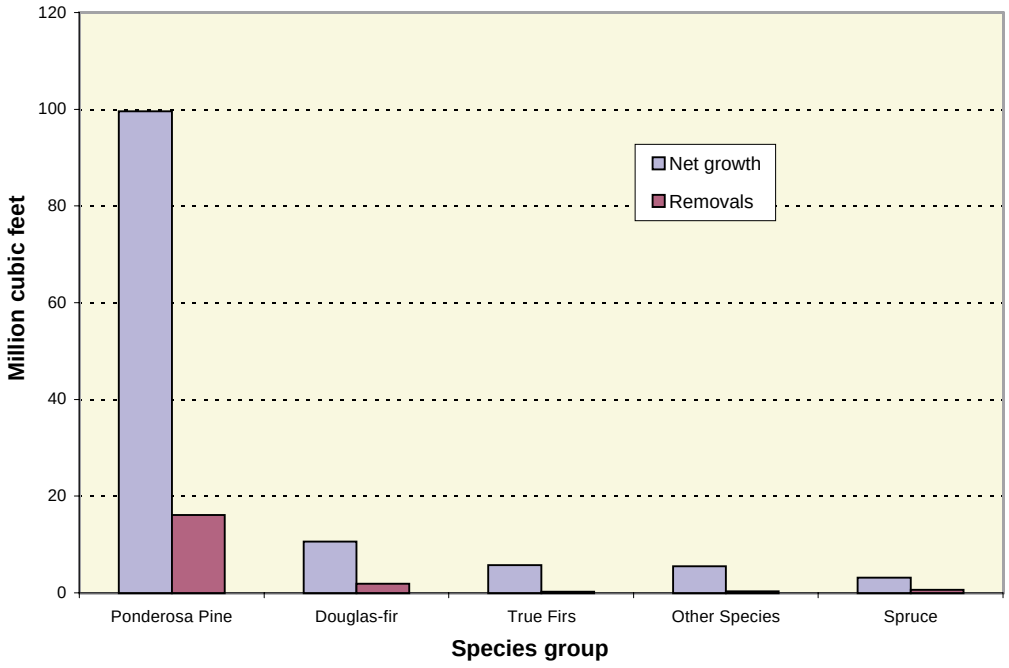

Figure 21—Net annual growth compared to removals by species on nonreserved timberland, Arizona, 1998.

Basal area (BA)—The cross-sectional area of a tree stem/bole (trunk) at the point where diameter is measured, inclusive of bark; BA is expressed in square feet. For timber species the calculation is based on diameter at breast height (d.b.h.); for woodland species it is based on diameter at root collar (d.r.c.).

Biomass—The quantity of wood fiber, for trees 1.0 inch in diameter and larger, expressed in terms of oven-dry weight. Includes aboveground portions of trees: bole/stem (trunk), bark, and branches. Biomass estimates can be computed for live and/or dead trees.

Bole—A trunk or main stem of a tree; seedlings and saplings are specified as having stems rather than boles. Woodland trees are also referenced as having stems.

Condition—Generally defined as an area of relatively uniform ground cover, such as homogeneous vegetative cover, meeting minimum size requirements. A **condition class** is a categorization of the condition based on several defining variables: Ground Cover Class, Land Use. See "Condition criteria," "Ground cover class," and "Land use."

Cubic-foot volume (merchantable)—See "Volume."

Diameter at breast height (d.b.h.)—For timber species: the diameter of a tree bole/stem (trunk) measured at breast height (4.5 feet above ground); measured outside the bark. The point of diameter measurement may vary for abnormally formed trees.

Diameter at root collar (d.r.c.)—For woodland trees: the diameter of a tree stem(s) measured at root collar or at the point nearest the ground line (whichever is higher) that represents the basal area of the tree; measured outside the bark. For multistemmed woodland trees, d.r.c. is calculated from an equation that incorporates the individual stem diameter measurements. The point of diameter measurement may vary for woodland trees with stems that are abnormally formed. With the exception of seedlings, woodland stems qualifying for measurement must be at least 1.0 inch in diameter or larger and at least 1.0 foot in length.

Diameter class—A grouping of tree diameters (d.b.h. or d.r.c.) into classes of a specified range. For some diameter classes, the number referenced (for example, 4, 6, 8 inches) is designated as the midpoint of an individual class range. For example, if 2-inch classes are specified (the range for an individual class) and even numbers are referenced, the 6-inch class would include trees 5.0 to 6.9 inches in diameter.

Field location—A reference to the sample site or plot; an area containing the field location center (LC) and all sample points, distributed over area approximately 2.5 acres in size. A field location consists of four subplots and four microplots.

- **Subplot**—A 1/24-acre fixed-radius area (24-foot horizontal radius) used to sample trees 5.0 inches d.b.h./d.r.c. and larger and understory vegetation.
- **Microplot**—A 1/300-acre fixed-radius plot (6.8-foot radius), located at the center of each subplot, used to inventory seedlings and saplings.

Fixed-radius plot—A circular sample plot of a specified horizontal radius: 1/300 acre = 6.8-foot radius (microplot); 1/24 acre = 24.0-foot radius (subplot).

Forest industry lands—See "Private lands."

Forest land—Land that is at least 10 percent stocked with live tally tree species (timber or woodland species), including land that formerly had such stocking and that will be regenerated naturally or artificially. The minimum area for classification of forest land is 1 acre and 120-feet wide. Unimproved roads, trails, streams, and openings in forest areas are classified as forest land if they are less than 120-feet wide or 1 acre in size. For field use, sufficient tree crown cover (5 percent cover of tally tree species) or the presence of sufficient reproduction (40 tally tree species seedlings/saplings per acre) is used to represent forest land stocking. See "Tally tree," "Timber species," and "Woodland species."

- **Timberland**—A subset of forest land, where the designated forest type is derived from timber species.
- **Woodland**—A subset of forest land, where the designated forest type is derived from woodland species.
- **Nonstocked forest land**—Formerly stocked forest land that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked. For example, recently harvested, burned, or windthrow-damaged areas.

Forest type (traditional Rocky Mountain FIA method)—A classification of forest land based on and named for the tree species presently forming a plurality of live-tree stocking. Stocking is an expression of the extent to which growing space is effectively utilized by live trees. Exceptions to the single predominant species concept used for classifying forest type apply to sites where (1) hardwoods and softwoods occur together in a stand, or (2) when Engelmann spruce and subalpine fir occur together in a stand, and in combination they compose the predominant live-tree stocking. When hardwoods (for example, maple/oak or aspen trees) and softwoods (for example, Douglas-fir or ponderosa pine trees) occur together within a stand, forest type is determined as follows: First, the stocking percents of all softwoods are summed as a group, and then again for hardwoods, in order to determine which of the two overall groups has the most live-tree stocking. Next, the individual tree species from the group with the majority of stocking is selected as the forest type. When Engelmann spruce and subalpine fir (or corkbark fir) occur together in a stand, and in combination they constitute the predominant live-tree stocking, forest type is computed using the following criteria: First, all stocking percents are adjusted from an absolute base to a relative base, where the sum of all percents are equal to 100 percent. Next, a stand is classified as an Engelmann spruce type if Engelmann spruce individually is greater than or equal to 20 percent relative stocking, and subalpine fir is less than 20 percent relative stocking. For all other stands where subalpine fir and Engelmann spruce together have plurality, the stand is classified as the spruce-fir type.

Gross annual growth—See "Growth."

Growing-stock tree—See "Tree class—Sound tree."

Growth (tree level)—

- **Gross annual growth**—The average annual increase in the volume of live trees (less deductions for cull volume).
- **Net annual growth**—Gross annual growth minus average annual mortality volume.

Hardwood trees—Trees that are usually broad leaved and deciduous (leaves that fall off or shed at specific seasons).

Indian Trust lands—See "Private lands."

Industrial wood—See "Logging residue/products."

Large trees (Sawtimber trees)—See "Tree-size class."

Logging residue/products—

- **Industrial wood**—All commercial roundwood products, excluding fuelwood.
- **Logging residue**—The unused portions within the merchantable sections of sound (growing-stock) trees cut or killed during logging operations.
- **Primary wood-processing plants**—An industrial plant that processes roundwood products, such as sawlogs, pulpwood bolts, or veneer logs.
- **Pulpwood**—Roundwood, whole-tree chips, or wood residues that are used for the production of wood pulp.
- **Roundwood**—Logs, bolts, or other round sections cut from trees.

Mapped design—A sampling technique that identifies (maps) and separately classifies distinct "conditions" on the field location sample area. Each condition must meet minimum size requirements. At the most basic level, condition types include forest land, nonforest land, and water. Forest land conditions can be further subdivided into separate condition classes if there are distinct variations in forest type, stand size, stand origin, and stand density, given that each distinct area meets minimum size requirements. See "Condition," "Condition criteria," "Field location," "Forest land," "Nonforest land," and "Water."

Medium trees (Poletimber trees)—See "Tree-size class."

Microplot—See "Field location."

Mortality tree—A standing or downed tree, 1.0-inch d.b.h./d.r.c. and larger, that was live within the past 5 years or at the last inventory. See "Tree lean angle."

Mortality volume (annual)—See "Volume."

National Forest System lands—See "Public lands."

National Park System lands—See "Public lands."

Net annual growth—See "Growth."

Nonforest land—For the FIA mapped design baseline inventory, nonforest land includes three main categories: (1) nontree land, (2) nonsampled tree land, and (3) other tree land.

- **Nontree land**—This is land that (1) has never supported tree cover/stocking sufficient for classification as forest land (for example, barren, alpine tundra), or (2) was formerly tree land, but has been converted to a nontree land status (for example, cropland, improved pasture). Other examples of nontree land are improved roads of any width, graded or otherwise regularly maintained for long-term use, and rights-of-way of all powerlines, pipelines, other transmission lines, and operating railroads. If intermingled in forest areas, unimproved roads and nonforest strips must be at least 120-feet wide and 1 acre in size to qualify as nontree land. This category also includes formerly stocked woodland areas if they are currently nonstocked due to a treatment (for example, chaining, other land clearing). These areas are treated to eliminate woodland trees for the purpose of enhancing or providing for nonwood commodities or uses (for example, increasing herbage production).
- **Nonsampled tree land**—This is land that currently meets the requirements for forest land, but human activity on the site will preclude the natural succession of the stand (areas that might be included in this category are golf courses, cemeteries, picnic grounds, orchards, Christmas tree plantations, and home yards with mowed lawns).
- **Other tree land**—Land that is 10 percent stocked with trees defined as "other tree species" (nontally tree species) but has less than 10 percent stocking in tally tree species. Examples would include land stocked with tree species such as palo verde, tamerisk, or Russian olive. See "Other tree species."

Nonindustrial private lands—See "Private lands."

Nonreserved forest land—Forest land not withdrawn from management for production of wood products through statute or administrative designation.

Nonstocked forest land—See "Forest land."

Other private lands—See "Private lands."

Other public lands—See "Public lands."

Other tree species (nontally species)—All species classified as trees (Little, Elbert L., Jr. 1979; Checklist of United States Trees; U.S. Department of Agriculture, Agriculture Handbook 541) that have not been designated as tally tree species. For the purposes of classifying forest land, only tally tree species are used to determine if minimal stocking requirements have been met. Other tree species include turbinella oak, Russian olive, acacia, and so forth. See "Nonforest land—Other tree land."

Poletimber-size trees (Medium trees)—See "Tree-size class."

Poletimber stands (Medium tree stands)—See "Stand-size class."

Primary wood-processing plants—See "Logging residue/products."

Private lands—

- **Forest industry**—Land owned by a company or an individual(s) operating a primary wood-processing plant.
- **Indian Trust**—American Indian lands held in fee, or trust, by the Federal Government, but administered for tribal groups or as individual trust allotments.
- **Nonindustrial private**—All private ownerships except forest industry.
- **Other private**—Privately owned lands other than forest industry or Indian Trust.

Productivity—The potential yield capability of a stand calculated as a function of site index (expressed in terms of cubic feet per acre per year). Productivity values for forest land provide an indication of biological potential. Timberland stands are classified by the potential net annual growth attainable in fully stocked natural stands. Woodland stands are given a default value of 10 cubic feet per acre per year. For FIA reporting, **Productivity Class** is a variable that groups stand productivity values into categories of a specified range. Productivity is sometimes referred to as "Yield" or "Mean annual increment (MAI)."

Public lands—

- **Miscellaneous Federal**—Public lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or the Bureau of Land Management, U.S. Department of the Interior.
- **National Forest System**—Public lands administered by the Forest Service, U.S. Department of Agriculture, such as National Forests, National Grasslands, and some National Recreation Areas.
- **National Park**—Public lands administered by the Park Service, U.S. Department of the Interior, such as National Parks, National Monuments, National Historic Sites (such as National Memorials and National Battlefields), and some National Recreation Areas.

Other public—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture. Includes lands administered by other Federal, State, county, and local government agencies, including lands leased by these agencies for more than 50 years.

Pulpwood—See "Logging residue/products."

Removals—The net volume of sound (growing-stock) trees removed from the inventory by harvesting or other cultural operations (such as timberstand improvement), by land clearing, or by changes in land use (such as a shift to wilderness).

Reserved land—Land withdrawn from management for production of wood products through statute or administrative designation. Examples include Wilderness areas and National Parks and Monuments.

Sapling and seedling stands—See "Stand-size class."

Saplings—See "Tree-size class."

Sawlog portion (timber species)—That part of the bole of sawtimber-size trees between a 1-foot stump and the sawlog top.

Sawtimber-size trees (Large trees)—See "Tree-size class."

Sawtimber stands (Large tree stands)—See "Stand-size class."

Seedlings—See "Tree-size class."

Site index—A measure of forest productivity for a timberland tree/stand. Expressed in terms of the expected height (in feet) of site trees at an index age of 50 (or 80 for aspen and cottonwood). Calculated from height-to-age equations.

Site productivity—See "Productivity."

Site tree—A timber species tree used to provide an index of site quality. Timber species selected for site index calculations must meet specified criteria with regards to age, diameter, crown class, and damage (for example, no broken or dead top damage).

Snag—A standing dead tree. See "Tree class—Hard dead tree and Soft dead tree."

Softwood trees—Coniferous trees that are usually evergreen (retain leaves year-round), and having needle- or scalelike leaves.

Stand—A community of trees that can be distinguished from adjacent communities due to similarities and uniformity in tree and site characteristics, such as age-class distribution, species composition, spatial arrangement, structure, and so forth. See "Condition criteria."

Stand density—A relative measure of stand density that quantifies the relationship between trees per acre, stand basal area, average stand diameter, and stocking of a forested stand. **Stand density index (SDI)**, a widely used measure developed by Reineke (1933), is an index that expresses relative stand density based on a comparison of measured stand values with some standard condition. For FIA reporting, the SDI for a site is usually presented as a percentage of the maximum SDI for the forest type. Site SDI values are sometimes grouped into SDI classes of a specified percentage range. Maximum SDI values vary by region.

Standard error—An expression that denotes the precision of an estimate, obtained by statistical sampling methods.

Stand-size class—A classification of forest land based on the predominant diameter size of live trees presently forming the majority of live-tree stocking. Classes are defined as:

- **Sawtimber stand (Large tree stand)**—A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees 5.0 inches or larger in diameter, and with sawtimber (large tree) stocking equal to or greater than poletimber (medium tree) stocking.
- **Poletimber stand (Medium tree stand)**—A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees 5.0 inches or larger in diameter, and with poletimber (medium tree) stocking exceeding sawtimber (large tree) stocking.
- **Sapling/seedling stand**—A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees less than 5.0 inches in diameter.

- **Nonstocked stand**—A formerly stocked stand that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked (for example, recently harvested, burned, or windthrow-damaged areas).

Stocking—An expression of the extent to which growing space is effectively utilized by live trees.

Stocking condition (class)—A classification of forest land to provide an indication of the extent to which a site is being utilized by live trees (including live cull trees).

- **Overstocked**—Sites at least 100 percent stocked.
- **Fully stocked**—Sites that are 60 to100 percent stocked.
- **Medium to fully stocked**—Sites that are 35 to 60 percent stocked.
- **Poorly stocked**—Sites that are less than 35 percent stocked.

Subplot—See "Field location."

Tally trees—Tree species that have been selected to be included in the field inventory/sample. Tally tree species are categorized as "timber" or "woodland" trees. Tally trees are evaluated for a variety of items (for example, crown class, crown ratio, damage, rotten/missing material, form defect), and measurements (for example, diameter, height) are taken on each tally tree. This information is used to obtain estimates of volume, growth, and mortality for the sample location. Tally tree data can also be used to obtain estimates for other site variables, such as site quality and health. See "Field location," "Timber species," "Woodland species," and "Tree-form criteria."

Timber species—Tree species traditionally used for industrial wood products. These include all species of conifers, except pinyon, juniper, and yew. Hardwoods included are aspen, box elder, cottonwood (*Populus* spp.), and paper birch. Timber species are measured for diameter at breast height. See "Diameter at breast height (d.b.h.)."

Timberland—See "Forest land."

Tree class—A classification system based on a tree's physical characteristics.

- **Live trees** are classified for Tree Class as follows; timber species are classified as either a sound tree (also referred to as growing-stock tree), rough tree, or rotten tree:
  - **Sound tree (Growing-stock tree)**—A live timber species, 5.0-inches d.b.h. or larger, with less than two-thirds (67 percent) of the merchantable volume cull, and containing at least one solid 8-foot section, reasonably free of form defect, on the merchantable portion of the tree. A live timber species sapling (1.0- to 4.9-inches d.b.h.) is also included in this category if it is expected to become a sound live tree, 5.0-inches d.b.h. or larger, with good form and vigor.
  - **Rough tree**—A live timber species, 5.0-inches d.b.h. and larger, with two-thirds (67 percent) or more of the merchantable volume cull, and more than half of this cull is due to sound dead wood volume loss, or severe form-defect volume loss (for example, severe sweep, crook, forks). Also, a live timber species sapling (1.0- to 4.9-inches d.b.h.) that is not expected to become a sound (growing-stock) tree due to

defect, or a timber species (5.0-inches d.b.h. and larger) that does not now, or prospectively, have at least one solid 8-foot section, reasonably free of form defect, on the merchantable portion.

- **Rotten tree –** A live timber species, 5.0-inches d.b.h. and larger, with two-thirds (67 percent) or more of the merchantable volume cull, and more than half of this cull is due to rotten and/or missing material.
- **Live woodland tree**

• **Dead trees** (timber or woodland species) are classified for Tree Class as follows:

- **Hard dead tree (Salvable dead tree)**—A standing dead tally tree, 1.0-inch d.b.h./d.r.c. or larger, that has a minimum of one-third of the original merchantable volume sound (less than two-thirds rotten and/or missing material). Also, a down-dead tally tree, 1.0-inch d.b.h./d.r.c. or larger, with a minimum of one-third of the original merchantable volume sound and intact. See "Downed tree" and "Standing tree."
- **Soft dead tree (Nonsalvable dead tree)**—A standing dead tree, 1.0-inch d.b.h./d.r.c. or larger, that has less than one-third of the original merchantable volume sound (more than two-thirds rotten/missing material). Also, a down-dead tree, 1.0-inch d.b.h./d.r.c. or larger, with less than one-third of the original merchantable bole sound and intact. See "Downed tree" and "Standing tree."

Tree-size class—A classification of trees based on d.b.h. for timber species and d.r.c. for woodland species. For woodland trees, with the exception of seedlings, stems qualifying for measurement must be at least 1.0 inch in diameter or larger and at least 1.0 foot in length:

• **Seedling**—An established tree smaller than 1.0-inch d.b.h. for timber species or 1.0-inch d.r.c. for woodland trees. See "Established seedling."

• **Sapling**—A timber species 1.0- to 4.9-inches d.b.h.; also, a single-stemmed woodland tree 1.0- to 4.9-inches d.r.c., or a multistemmed woodland tree with a cumulative d.r.c. of 1.0 to 4.9 inches.

• **Poletimber-size tree or medium tree**—A timber species at least 5.0-inches d.b.h., but smaller than 9.0-inches d.b.h. for a softwood, and smaller than 11.0-inches d.b.h. for a hardwood. A woodland tree 5.0- to 8.9-inches d.r.c. (single-stem measurement or computed multistem measurement) is also included in this category.

• **Sawtimber-size tree or large tree**—A timber species that is at least 9.0-inches d.b.h. for a softwood, and at least 11.0-inches d.b.h. for a hardwood. A woodland tree 9.0-inches d.r.c. and larger (single-stem measurement or computed multistem measurement) is also included in this category.

Volume for timber species—

• **Annual mortality volume**—The net volume contained in timber species (standing or down) that have died over a 1-year period of time. This estimate is based on a 5-year average. Mortality volume for timber species can be calculated in terms of cubic feet or board feet. See "Mortality tree."

- **Board-foot volume**— A board foot is a unit of measure indicating the amount of wood contained in an unfinished board 1-foot wide, 1-foot long, and 1-inch thick**.** Board-foot volume is computed for the sawlog portion of a sawtimber-size tree; the sawlog portion includes the part of the bole on sawtimber-size tree from a 1-foot stump to a minimum sawlog top of 7 inches diameter outside bark (d.o.b.) for softwoods, or 9 inches d.o.b. for hardwoods. ***Net board-foot volume*** is calculated as the gross board-foot volume in the sawlog portion of a sawtimber-size tree, less deductions for cull (limited to rotten/missing material and form defect cull deductions—referred to as the **board-foot merchantability factor**). Board-foot volume estimates are computed in both Scribner and International ¼-inch rule, and can be calculated for live and/or dead (standing or down) trees. See "Cull deductions."
- **Cubic-foot volume (merchantable)**—A cubic-foot is a unit of measure indicating the amount of wood contained in a cube 1 x 1 x 1 foot. Cubic-foot volume is computed for the merchantable portion of a timber species tree; the merchantable portion includes that part of a bole from a 1-foot stump to a minimum 4-inch top d.o.b. **Net cubic-foot volume** is calculated as the gross cubic-foot volume in the merchantable portion of a tree, less deductions for cull (limited to rotten/missing cull deductions—referred to as the **cubic-foot merchantability factor**). Merchantable cubic-foot volume estimates can be calculated for live and/or dead (standing or down) trees. See "Cull deductions."

Volume for woodland trees—

- **Annual mortality volume**—The net volume contained in woodland trees (standing or down) that have died over a 1-year period of time. This estimate is based on a 5-year average. Mortality volume for woodland trees is calculated in cubic feet. See "Mortality tree."
- **Cubic-foot volume**—A cubic-foot is a unit of measure indicating the amount of wood contained in a cube 1 x 1 x 1 foot. Woodland cubic-foot volume is computed for trees 5.0 inches and larger in diameter.
  - **Dead volume**—For dead woodland trees, this volume is equal to gross cubic-foot volume. For live woodland trees, dead volume is calculated as gross cubic-foot volume times the field crew estimate of percent sound dead volume loss. Cull deductions are limited to the merchantable portion of a tree. See "Cull deductions" and "Merchantable portion."
  - **Net volume**—The gross cubic-foot volume of live woodland trees, less deductions for rotten and missing material. This estimate includes volume for dead material on live trees. Cull deductions are limited to the merchantable portion of a tree. See "Cull deductions" and "Merchantable portion."

Water—In terms of Ground Cover Classification, water includes streams, sloughs, estuaries, and canals more than 30 feet in width; and, lakes, reservoirs, and ponds more than 1 acre in size. Ephemeral and intermittent streams are classified as land. Water is further classified as "census water" or "noncensus" water as follows:

- **Census water**—Rivers, streams, sloughs, estuaries, and canals, more than 200-feet wide and 4.5 acres and larger in size; only portions of rivers

and streams meeting the definition criteria are considered census water. Other census water includes lakes, reservoirs, and ponds more than 4.5 acres and larger in size. Portions of braided streams meeting the census water definition criteria and more than 50 percent water at normal high-water level are also considered census water.

- **Noncensus water**—Portions of rivers, streams, sloughs, estuaries, and canals that are 30- to 200-feet wide and at least 1 acre in size; and lakes, reservoirs, and ponds 1- to 4.5-acres in size. Portions of rivers and streams not meeting the criteria for census water, but at least 30-feet wide and 1 acre in size, are considered noncensus water. Portions of braided streams not meeting the criteria for census water, but at least 30 feet in width and 1 acre in size, and more than 50 percent water at normal high-water level are also considered noncensus water.

Wilderness—An area of undeveloped land currently included in the Wilderness System, managed to preserve its natural conditions and retain its primeval character and influence.

Woodland—See "Forest land."

Woodland species—Tree species that are not usually converted into industrial wood products. Common uses of woodland trees are fuelwood, fenceposts, and Christmas trees. These species include pinyon, juniper (except Western juniper), oak, mesquite, locust, yew, mountain-mahogany (*Cercocarpus* spp.), Rocky Mountain maple, bigtooth maple, and desert ironwood. Because woodland trees are extremely variable in form, diameter is measured at the root collar. See "Diameter at root collar (d.r.c.)."

References

Bartos, Dale L. 1995. Aspen problem definition. Unpublished paper on file at: U.S. Department of Agriculture, Forest Service, Intermountain (now Rocky Mountain) Research Station, Forestry Sciences Laboratory, Logan, UT.

Bartos, Dale L.; Campbell, Robert B. 1998. Decline of quaking aspen in the Interior West—examples from Utah. Rangelands. 20(1): 15–22.

Bull, Evelyn L.; Holthausen, Richard S.; Marx, David, B. 1990. How to determine snag density. Western Journal of Applied Forestry. 5: 56–58.

Chojnacky, David C. 1985. Pinyon-juniper volume equations for the central Rocky Mountain States. Res. Pap. INT-339. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 27 p.

Chojnacky, David C. 1988a. Juniper, pinyon, oak, and mesquite volume equations for Arizona. Res. Pap. INT-391. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 11 p.

Chojnacky, David C. 1988b. Woodland volume equations for Arizona Fort Apache and San Carlos Indian Reservations. Res. Note INT-379. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 p.

Chojnacky, David C. 1992. Estimating volume and biomass for dryland oak species. In: Ecology and management of oak and associated woodlands: perspectives in the Southwestern United States and Northern Mexico; 1992 April 27–30; Sierra Vista, AZ. GTR-RM-218. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 155–161.

Chojnacky, David C.; Moisen, Gretchen G. 1993. Converting wood volume to biomass for pinyon and juniper. Res. Note INT-411. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain (now Rocky Mountain) Research Station. 5 p.

Cochran, William G. 1963. Sampling techniques. 2nd ed. New York: John Wiley and Sons. 413 p.

Conner, Roger C.; Born, J. David; Green, Alan W.; O'Brien, Renee A. 1990. Forest resources of Arizona. Res. Bull. INT-69. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain (now Rocky Mountain) Research Station. 92 p.

Hann, David W.; Bare, Bruce B. 1978. Comprehensive tree volume equations for major species of New Mexico and Arizona: II. Tables for unforked trees. Res. Pap. INT-210. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 127 p.

Johnson, Marlin A. 1994. Changes in Southwestern forests: stewardship implications. Journal of Forestry. 92(12): 16–19.

Keegan, Charles E.; Chase, Alfred L.; Morgan, Todd A.; Bodmer, Steven E.; Van Hooser, Dwane D.; Mortimer, Michael. 2001. Arizona's forest products industry: a descriptive analysis 1998. The University of Montana, Bureau of Business and Economic Research, Missoula. 20 p.

Kemp, Paul D. 1958. Volume tables. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Intermountain (now Rocky Mountain) Research Station, Interior West Resource, Inventory, Monitoring, and Evaluation Program, Ogden, UT.

Little, Elbert L., Jr. 1979. Checklist of United States trees. Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture.

Long, James N.; Daniel, Theodore W. 1990. Assessment of growing-stock in uneven-aged stands. Western Journal of Applied Forestry. 5(3): 93–96.

Powell, Douglas S.; Faulkner, Joanne L.; Darr, David R.; Zhu, Zhiliang; MacCleery, Douglas W. 1993. Forest resources of the United States, 1992. Gen. Tech. Rep. RM-234. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 32 p. With separate map.

Reineke, L. H. 1933. Perfecting a stand density index for even-aged forests. Journal of Agricultural Research. 46: 627–638.
Stuever, Mary C.; Hayden, John S. 1996. Plant associations (habitat types) of the forests and woodlands of Arizona and New Mexico. Final report submitted to: U.S. Department of Agriculture, Forest Service, Southwestern Region. Contract R3-95-27. Placitas, NM: Seldom Seen Expeditions, Inc. 520 p.
U.S. Department of Agriculture, Forest Service. 1993. RMSTAND user's guide, Chapter 60. Unpublished user's guide on file at: U.S. Department of Agriculture, Forest Service, Southwestern Region, Albuquerque, NM.
U.S. Department of Agriculture, Forest Service. 1995. Arizona/New Mexico, Region 3, Forest Survey field procedures. Unpublished field guide on file at: U.S. Department of Agriculture, Forest Service, Intermountain (now Rocky Mountain) Research Station, Forestry Sciences Laboratory, Interior West Resource Inventory, Monitoring, and Evaluation Program, Ogden, UT.
Van Hooser, Dwane D.; Chojnacky, David C. 1983. Whole tree volume estimates for the Rocky Mountain States. Res. Bull. INT-29. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 69 p.

Appendix A: Common name, scientific name, and timberland (T) or woodland (W) designation for trees

Tree Species

Alligator juniper (*Juniperus deppeana*) W
Apache pine (*Pinus engelmannii*) T
Arizona cypress (*Cypressus arizonica*) T
Arizona pinyon pine (*Pinus edulis* var. *fallax*) W
Arizona white oak (*Quercus Arizonica*) W
Aspen (*Populus tremuloides*) T
Bigtooth maple (*Acer grandidentatum*) W
Blue spruce (*Picea pungens*) T
Border pinyon (*Pinus discolor*) W
Boxelder (*Acer negundo*) T
California juniper (*Juniperus californica*) W
Chihuahua pine (*Pinus leiophylla*) T
Corkbark fir (*Abies lasiocarpa* var. *arizonica*) T
Cottonwood (*Populus* sp.) T
Desert ironwood (*Olneya tesota*) W
Douglas-fir (*Pseudotsuga menziesii*) T
Emory oak (*Quercus emoryi*) W
Engelmann spruce (*Picea engelmannii*) T
Gambel oak (*Quercus gambelii*) W
Mesquite (*Prosopis* spp.)
Mexican blue oak (*Quercus oblongifolia*) W
Mexican pinyon pine (*Pinus cembroides*) W
New Mexico locust (*Robinia neomexicana* var. *neomexicana*) W
Oneseed juniper (*Juniperus monosperma*) W
Ponderosa pine (*Pinus ponderosa*) T
Rocky Mountain juniper (*Juniperus scopulorum*) W
Rocky Mountain maple (*Acer glabrum*) W
Redberry juniper (*Juniperous erythrocarpa*) W
Silverleaf oak (*Quercus hypoleucoides*) W
Singleleaf pinyon (*Pinus monophylla*) W
Southwestern white pine (*Pinus strobiformis*) T
Subalpine fir (*Abies lasiocarpa*) T
Twoneedle pinyon (*Pinus edulis*) W
Utah juniper (*Juniperus osteosperma*) W
Velvet mesquite (*Prosopis velutina*) W
Western honey mesquite (*Prosopis glandulosa* v. *torreyana*) W
White fir (*Abies concolor*) T

Shrub Species

Broom snakeweed (*Gutierrezia sarothrae*)
Common juniper (*Juniperus communis*)
Creosotebush (*Larrea tridentata*)
Desert ceanothus (*Ceanothus greggii*)
Sacahuista (*Nolina microcarpa*)
Pointleaf manzanita (*Arctostaphylos pungens*)
Shrub live oak (*Quercus turbinella*)
Skunkbush sumac (*Rhus trilobata*)

True mountain mahogany (*Cercocarpus montanus*)
Yellow paloverde (*Parkinsonia microphylla*)

Forb Species

Clubmoss (*Lycopodium* spp.)
Fendler meadowrue (*Thalictrum fendleri*)
Wright's silktassel (*Garrya wrightii*)

Grass Species

Arizona fescue (*Festuca arizonica*)
Blue grama (*Bouteloua gracilis*)
Bullgrass (*Muhlenbergia emersleyi*)
Mountain muhly (*Muhlenbergia montana*)
Screwleaf muhly (*Muhlenbergia virescens*)
Sedge (*Carex* spp.)
Sideoats grama (*Bouteloua curtipendula*)

Appendix B: Volume and Biomass Equation Sources

Volume

Chojnacky (1985) was used for Rocky Mountain maple, bigtooth maple, and ironwood volume estimation.

Chojnacky (1988a) was used for juniper, pinyon, Gambel oak, Arizona white oak, and mesquite volume estimation.

Chojnacky (1988b) was used for silverleaf oak, evergreen oak, Mexican blue oak, and Emory oak volume estimation.

Equation from North Central Station was used for New Mexico locust volume estimation.

Hann and Bare (1978) was used for all timber species volume estimation except cottonwood and boxelder.

Kemp (1958) was used for cottonwood and boxelder volume estimation.

Biomass

Chojnacky (1992) was used for all woodland hardwood biomass estimation.

Chojnacky and Moisen (1993) was used for pinyon and juniper biomass estimation.

Van Hooser and Chojnacky (1983) was used for all timber species biomass estimation.

Table 1--Total area by ownership class and land class, Arizona, 1999

Ownership class	Land class: Nonreserved Forest	Nonreserved Nonforest	Nonreserved Water	Nonreserved Total	Reserved Forest	Reserved Nonforest	Reserved Water	Reserved Total	Total Forest	Total Nonforest	Total Water	Total area
	Acres											
Land												
Public												
National Forest	7,220,517	2,520,622	7,947	9,749,087	1,002,159	502,979	--	1,505,138	8,222,676	3,023,601	7,947	11,254,225
Bureau of Land Management	1,160,959	11,097,262	--	12,258,221	142,836	1,273,241	--	1,416,077	1,303,794	12,370,503	--	13,674,298
National Park	--	--	--	--	490,534	1,991,610	41,635	2,523,779	490,534	1,991,610	41,635	2,523,779
Miscellaneous federal	58,947	1,001,253	--	1,060,200	116,061	1,567,492	--	1,683,553	175,008	2,568,745	--	2,743,753
State	1,184,720	8,467,418	--	9,652,137	--	25,402	--	25,402	1,184,720	8,492,819	--	9,677,539
County and municipal	39,898	300,703	--	340,601	--	--	--	--	39,898	300,703	--	340,601
Total public	9,665,041	23,387,258	7,947	33,060,246	1,751,590	5,360,723	41,635	7,153,948	11,416,630	28,747,981	49,582	40,214,194
Private												
Indian Trust	5,982,721	14,117,172	9,466	20,109,358	66,691	17,149	--	83,840	6,049,412	14,134,321	9,466	20,193,198
Other private	1,960,930	10,394,603	--	12,355,533	--	--	--	--	1,960,930	10,394,603	--	12,355,533
Total private	7,943,651	24,511,775	9,466	32,464,891	66,691	17,149	--	83,840	8,010,342	24,528,924	9,466	32,548,731
Total land area	17,608,691	47,899,033	12,413	65,525,137	1,818,281	5,377,872	41,635	7,237,788	19,426,972	53,276,905	59,048	72,762,925
Water	--	--	201,081	201,081	--	--	--	--	--	--	201,081	201,081
Total land and water[a]	17,608,691	47,899,033	218,494	65,726,218	1,818,281	5,377,872	41,635	7,237,788	19,426,972	53,276,905	260,129	72,964,006

[a]Source: U.S. Department of Commerce. 1990 Decennial Census.

Table 2--Percent standard error for area, volume, growth, and mortality on forest land, Arizona

Land class	Attribute	Area (acres)	Volume (thousand)	Percent standard error
Forest land[a]	Area, 1999	19,426,970		±1.39
	Net volume, All live trees (cubic feet), 1999		15,562,510	±2.13
	Net annual growth, all tree classes (cubic feet), 1998		206,214	±3.77
	Annual mortality, all tree classes (cubic feet), 1998		46,579	±12.51
Nonreserved forest land:				
Timberland	Area, 1999	3,564,960		±2.87
	Net volume, 1999:			
	Growing stock (cubic feet)		6,202,590	±4.01
	Sawtimber - International ¼-inch rule (board feet)		28,582,990	±4.45
	Sawtimber - Scribner rule (board feet)		24,901,810	±4.54
	Net annual growth, 1998:			
	Growing stock (cubic feet)		124,616	±5.04
	Sawtimber - International ¼-inch rule (board feet)		661,129	±5.73
	Sawtimber - Scribner rule (board feet)		573,224	±5.76
	Annual mortality, 1998:			
	Growing stock (cubic feet)		21,021	±20.27
	Sawtimber - International ¼-inch rule (board feet)		90,841	±27.38
	Sawtimber - Scribner rule (board feet)		77,919	±28.66
Woodland	Area, 1999	14,043,730		±1.93
	Net volume, all live trees (cubic feet), 1999		7,120,110	±2.76
	Net annual growth, all tree classes (cubic feet), 1998		68,361	±3.94
	Annual mortality, all tree classes (cubic feet), 1998		6,137	±19.19
Reserved forest land:				
Timberland	Area, 1999	331,600		±12.27
	Net volume, Growing stock (cubic feet), 1999		792,990	±17.83
	Net annual growth, Growing stock (cubic feet), 1998		2,654	±106.13
	Annual mortality, Growing stock (cubic feet), 1998		11,524	±23.11
Woodland	Area, 1999	1,486,680		±5.14
	Net volume, all live trees (cubic feet), 1999		779,430	±8.64
	Net annual growth, all tree classes (cubic feet), 1998		4,484	±56.66
	Annual mortality, all tree classes (cubic feet), 1998		4,678	±53.68

[a]Includes cull volume on timberland and woodland that is not reported in growing stock numbers.

Table 3--Area of forest land by forest type, owner group, and land class, Arizona, 1999

	Owner group											
	National Forest			Other public			Nonindustrial private			All owners		
Forest type	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total
	Acres											
Aspen	56,645	17,634	74,279	--	26,145	26,145	46,668	--	46,668	103,313	43,779	147,093
Blue spruce	4,890	--	4,890	--	--	--	12,115	--	12,115	17,006	--	17,006
Cottonwood	9,196	--	9,196	--	--	--	4,530	--	4,530	13,726	--	13,726
Deciduous woodland oak	107,344	28,689	136,034	24,264	--	24,264	151,234	--	151,234	282,842	28,689	311,532
Douglas-fir	134,979	32,122	167,101	--	--	--	72,507	--	72,507	207,487	32,122	239,608
Engelmann spruce	65,006	4,093	69,099	--	16,226	16,226	42,004	--	42,004	107,010	20,319	127,329
Evergreen oak	851,275	182,451	1,033,726	64,895	28,913	93,808	488,601	--	488,601	1,404,771	211,364	1,616,135
Juniper	891,547	61,835	953,382	695,470	51,255	746,724	1,405,962	--	1,405,962	2,992,979	113,089	3,106,068
Maple woodland	--	8,875	8,875	--	--	--	--	--	--	--	8,875	8,875
Mesquite	211,887	11,559	223,447	485,020	76,734	561,754	641,343	--	641,343	1,338,250	88,293	1,426,544
Misc. western hardwoods	19,436	--	19,436	63,769	14,224	77,993	29,229	--	29,229	112,434	14,224	126,657
Other western softwoods	37,257	28,717	65,973	--	4,433	4,433	23,614	--	23,614	60,870	33,149	94,019
Pinyon-juniper	2,160,293	421,479	2,581,771	971,193	306,967	1,278,160	3,851,204	66,691	3,917,895	6,982,690	795,137	7,777,827
Ponderosa pine	1,981,847	92,040	2,073,887	44,349	77,974	122,323	850,950	--	850,950	2,877,145	170,014	3,047,159
Spruce-fir	4,890	--	4,890	--	6,536	6,536	7,027	--	7,027	11,918	6,536	18,454
White fir	60,700	11,164	71,864	--	6,536	6,536	12,519	--	12,519	73,219	17,700	90,919
Nonstocked timberland	68,943	7,977	76,919	--	--	--	24,325	--	24,325	93,268	7,977	101,244
Nonstocked woodland	554,383	93,524	647,907	95,563	133,488	229,051	279,819	--	279,819	929,764	227,012	1,156,776
All types[a]	7,220,517	1,002,159	8,222,676	2,444,523	749,431	3,193,954	7,943,651	66,691	8,010,342	17,608,691	1,818,281	19,426,972

[a]On this and all subsequent tables, totals may vary due to rounding.

Table 4--Area of forest land by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
			Acres		
Aspen					
Sawtimber	--	68,929	27,275	--	96,203
Poletimber	--	17,348	7,845	--	25,193
Sapling/seedling	--	--	25,696	--	25,696
Nonstocked	--	--	--	--	--
Total	--	86,277	60,816	--	147,093
Blue spruce					
Sawtimber	1,580	12,277	--	--	13,858
Poletimber	--	--	--	--	--
Sapling/seedling	--	3,148	--	--	3,148
Nonstocked	--	--	--	--	--
Total	1,580	15,425	--	--	17,006
Cottonwood					
Sawtimber	--	--	10,753	--	10,753
Poletimber	--	--	2,973	--	2,973
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	13,726	--	13,726
Deciduous woodland oak					
Sawtimber	--	--	--	100,916	100,916
Poletimber	--	--	--	110,486	110,486
Sapling/seedling	--	--	--	100,130	100,130
Nonstocked	--	--	--	--	--
Total	--	--	--	311,532	311,532
Douglas-fir					
Sawtimber	12,446	106,213	98,028	--	216,687
Poletimber	--	--	13,290	--	13,290
Sapling/seedling	4,741	--	4,890	--	9,631
Nonstocked	--	--	--	--	--
Total	17,186	106,213	116,208	--	239,608
Engelmann spruce					
Sawtimber	9,532	86,529	21,638	--	117,699
Poletimber	--	--	6,276	--	6,276
Sapling/seedling	--	--	3,354	--	3,354
Nonstocked	--	--	--	--	--
Total	9,532	86,529	31,268	--	127,329
Evergreen oak					
Sawtimber	--	--	--	1,372,950	1,372,950
Poletimber	--	--	--	199,796	199,796
Sapling/seedling	--	--	--	43,389	43,389
Nonstocked	--	--	--	--	--
Total	--	--	--	1,616,135	1,616,135
Juniper					
Sawtimber	--	--	--	2,549,374	2,549,374
Poletimber	--	--	--	499,098	499,098
Sapling/seedling	--	--	--	57,597	57,597
Nonstocked	--	--	--	--	--
Total	--	--	--	3,106,068	3,106,068
Maple woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	8,875	8,875
Nonstocked	--	--	--	--	--
Total	--	--	--	8,875	8,875
Mesquite					
Sawtimber	--	--	--	449,025	449,025
Poletimber	--	--	--	801,512	801,512
Sapling/seedling	--	--	--	176,006	176,006
Nonstocked	--	--	--	--	--
Total	--	--	--	1,426,544	1,426,544

(con.)

Table 4 (Con.)

Forest type and stand-size class	Productivity class 85-119	50-84	20-49	0-19	Total
			Acres		
Misc. western hardwoods					
Sawtimber	--	--	--	43,729	43,729
Poletimber	--	--	--	58,751	58,751
Sapling/seedling	--	--	--	24,177	24,177
Nonstocked	--	--	--	--	--
Total	--	--	--	126,657	126,657
Other western softwoods					
Sawtimber	--	9,844	22,559	37,773	70,176
Poletimber	--	--	--	12,806	12,806
Sapling/seedling	--	6,321	4,716	--	11,037
Nonstocked	--	--	--	--	--
Total	--	16,165	27,275	50,579	94,019
Pinyon-juniper					
Sawtimber	--	--	--	5,775,289	5,775,289
Poletimber	--	--	--	1,712,800	1,712,800
Sapling/seedling	--	--	--	289,739	289,739
Nonstocked	--	--	--	--	--
Total	--	--	--	7,777,827	7,777,827
Ponderosa pine					
Sawtimber	17,395	658,571	2,137,716	6,288	2,819,970
Poletimber	--	--	137,414	--	137,414
Sapling/seedling	--	18,412	71,364	--	89,776
Nonstocked	--	--	--	--	--
Total	17,395	676,983	2,346,493	6,288	3,047,159
Spruce-fir					
Sawtimber	--	11,427	7,027	--	18,454
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	11,427	7,027	--	18,454
White fir					
Sawtimber	4,716	59,457	26,746	--	90,919
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	4,716	59,457	26,746	--	90,919
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	18,934	82,310	--	101,244
Total	--	18,934	82,310	--	101,244
Nonstocked woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	1,156,776	1,156,776
Total	--	--	--	1,156,776	1,156,776
All types					
Sawtimber	45,669	1,013,247	2,351,742	10,335,344	13,746,003
Poletimber	--	17,348	167,797	3,395,249	3,580,394
Sapling/seedling	4,741	27,881	110,020	699,912	842,555
Nonstocked	--	18,934	82,310	1,156,776	1,258,020
Total	50,410	1,077,411	2,711,869	15,587,281	19,426,972

Table 5--Area of National Forest System forest land by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				
	85-119	50-84	20-49	0-19	Total
	Acres				
Aspen					
Sawtimber	--	21,645	14,202	--	35,848
Poletimber	--	4,890	7,845	--	12,736
Sapling/seedling	--	--	25,696	--	25,696
Nonstocked	--	--	--	--	--
Total	--	26,536	47,743	--	74,279
Blue spruce					
Sawtimber	--	1,742	--	--	1,742
Poletimber	--	--	--	--	--
Sapling/seedling	--	3,148	--	--	3,148
Nonstocked	--	--	--	--	--
Total	--	4,890	--	--	4,890
Cottonwood					
Sawtimber	--	--	6,223	--	6,223
Poletimber	--	--	2,973	--	2,973
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	9,196	--	9,196
Deciduous woodland oak					
Sawtimber	--	--	--	41,179	41,179
Poletimber	--	--	--	70,152	70,152
Sapling/seedling	--	--	--	24,702	24,702
Nonstocked	--	--	--	--	--
Total	--	--	--	136,034	136,034
Douglas-fir					
Sawtimber	12,446	75,998	64,023	--	152,466
Poletimber	--	--	9,745	--	9,745
Sapling/seedling	--	--	4,890	--	4,890
Nonstocked	--	--	--	--	--
Total	12,446	75,998	78,658	--	167,101
Engelmann spruce					
Sawtimber	1,631	43,228	17,965	--	62,823
Poletimber	--	--	6,276	--	6,276
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	1,631	43,228	24,241	--	69,099
Evergreen oak					
Sawtimber	--	--	--	876,945	876,945
Poletimber	--	--	--	117,620	117,620
Sapling/seedling	--	--	--	39,160	39,160
Nonstocked	--	--	--	--	--
Total	--	--	--	1,033,726	1,033,726
Juniper					
Sawtimber	--	--	--	884,379	884,379
Poletimber	--	--	--	37,056	37,056
Sapling/seedling	--	--	--	31,947	31,947
Nonstocked	--	--	--	--	--
Total	--	--	--	953,382	953,382
Maple woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	8,875	8,875
Nonstocked	--	--	--	--	--
Total	--	--	--	8,875	8,875
Mesquite					
Sawtimber	--	--	--	101,808	101,808
Poletimber	--	--	--	32,951	32,951
Sapling/seedling	--	--	--	88,687	88,687
Nonstocked	--	--	--	--	--
Total	--	--	--	223,447	223,447

(con.)

Table 5 (Con.)

Forest type and stand-size class	Productivity class				
	85-119	50-84	20-49	0-19	Total
	Acres				
Misc. western hardwoods					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	19,436	19,436
Nonstocked	--	--	--	--	--
Total	--	--	--	19,436	19,436
Other western softwoods					
Sawtimber	--	9,844	22,559	27,052	59,455
Poletimber	--	--	--	6,518	6,518
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	9,844	22,559	33,570	65,973
Pinyon-juniper					
Sawtimber	--	--	--	2,219,529	2,219,529
Poletimber	--	--	--	218,016	218,016
Sapling/seedling	--	--	--	144,226	144,226
Nonstocked	--	--	--	--	--
Total	--	--	--	2,581,771	2,581,771
Ponderosa pine					
Sawtimber	11,107	344,286	1,582,603	--	1,937,996
Poletimber	--	--	86,680	--	86,680
Sapling/seedling	--	6,603	42,608	--	49,211
Nonstocked	--	--	--	--	--
Total	11,107	350,889	1,711,891	--	2,073,887
Spruce-fir					
Sawtimber	--	4,890	--	--	4,890
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	4,890	--	--	4,890
White fir					
Sawtimber	--	51,654	20,209	--	71,864
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	51,654	20,209	--	71,864
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	12,859	64,060	--	76,919
Total	--	12,859	64,060	--	76,919
Nonstocked woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	647,907	647,907
Total	--	--	--	647,907	647,907
All types					
Sawtimber	25,183	553,288	1,727,784	4,150,892	6,457,147
Poletimber	--	4,890	113,518	482,315	600,724
Sapling/seedling	--	9,751	73,194	357,034	439,979
Nonstocked	--	12,859	64,060	647,907	724,826
Total	25,183	580,789	1,978,557	5,638,148	8,222,676

Table 6--Area of other publicly owned forest land by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Aspen					
Sawtimber	--	13,073	13,073	--	26,145
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	13,073	13,073	--	26,145
Blue spruce					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Cottonwood					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Deciduous woodland oak					
Sawtimber	--	--	--	12,280	12,280
Poletimber	--	--	--	11,984	11,984
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	24,264	24,264
Douglas-fir					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Engelmann spruce					
Sawtimber	--	16,226	--	--	16,226
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	16,226	--	--	16,226
Evergreen oak					
Sawtimber	--	--	--	66,560	66,560
Poletimber	--	--	--	27,248	27,248
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	93,808	93,808
Juniper					
Sawtimber	--	--	--	544,346	544,346
Poletimber	--	--	--	185,566	185,566
Sapling/seedling	--	--	--	16,812	16,812
Nonstocked	--	--	--	--	--
Total	--	--	--	746,724	746,724
Maple woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Mesquite					
Sawtimber	--	--	--	217,076	217,076
Poletimber	--	--	--	299,179	299,179
Sapling/seedling	--	--	--	45,499	45,499
Nonstocked	--	--	--	--	--
Total	--	--	--	561,754	561,754

(con.)

Table 6 (Con.)

Forest type and stand-size class	Productivity class 85-119	50-84	20-49	0-19	Total
			Acres		
Misc. western hardwoods					
Sawtimber	--	--	--	43,729	43,729
Poletimber	--	--	--	34,263	34,263
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	77,993	77,993
Other western softwoods					
Sawtimber	--	--	--	4,433	4,433
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	4,433	4,433
Pinyon-juniper					
Sawtimber	--	--	--	799,229	799,229
Poletimber	--	--	--	457,323	457,323
Sapling/seedling	--	--	--	21,609	21,609
Nonstocked	--	--	--	--	--
Total	--	--	--	1,278,160	1,278,160
Ponderosa pine					
Sawtimber	--	34,771	80,854	--	115,625
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	6,698	--	6,698
Nonstocked	--	--	--	--	--
Total	--	34,771	87,552	--	122,323
Spruce-fir					
Sawtimber	--	6,536	--	--	6,536
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	6,536	--	--	6,536
White fir					
Sawtimber	--	--	6,536	--	6,536
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	6,536	--	6,536
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Nonstocked woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	229,051	229,051
Total	--	--	--	229,051	229,051
All types					
Sawtimber	--	70,606	100,463	1,687,654	1,858,722
Poletimber	--	--	--	1,015,564	1,015,564
Sapling/seedling	--	--	6,698	83,920	90,618
Nonstocked	--	--	--	229,051	229,051
Total	--	70,606	107,161	3,016,187	3,193,954

Table 7--Area of nonindustrial private forest land by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Aspen					
Sawtimber	--	34,211	--	--	34,211
Poletimber	--	12,458	--	--	12,458
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	46,668	--	--	46,668
Blue spruce					
Sawtimber	1,580	10,535	--	--	12,115
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	1,580	10,535	--	--	12,115
Cottonwood					
Sawtimber	--	--	4,530	--	4,530
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	4,530	--	4,530
Deciduous woodland oak					
Sawtimber	--	--	--	47,457	47,457
Poletimber	--	--	--	28,349	28,349
Sapling/seedling	--	--	--	75,428	75,428
Nonstocked	--	--	--	--	--
Total	--	--	--	151,234	151,234
Douglas-fir					
Sawtimber	--	30,216	34,006	--	64,221
Poletimber	--	--	3,545	--	3,545
Sapling/seedling	4,741	--	--	--	4,741
Nonstocked	--	--	--	--	--
Total	4,741	30,216	37,551	--	72,507
Engelmann spruce					
Sawtimber	7,901	27,075	3,673	--	38,650
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	3,354	--	3,354
Nonstocked	--	--	--	--	--
Total	7,901	27,075	7,027	--	42,004
Evergreen oak					
Sawtimber	--	--	--	429,444	429,444
Poletimber	--	--	--	54,928	54,928
Sapling/seedling	--	--	--	4,229	4,229
Nonstocked	--	--	--	--	--
Total	--	--	--	488,601	488,601
Juniper					
Sawtimber	--	--	--	1,120,649	1,120,649
Poletimber	--	--	--	276,475	276,475
Sapling/seedling	--	--	--	8,838	8,838
Nonstocked	--	--	--	--	--
Total	--	--	--	1,405,962	1,405,962
Maple woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Mesquite					
Sawtimber	--	--	--	130,141	130,141
Poletimber	--	--	--	469,382	469,382
Sapling/seedling	--	--	--	41,819	41,819
Nonstocked	--	--	--	--	--
Total	--	--	--	641,343	641,343

(con.)

Table 7 (Con.)

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Misc. western hardwoods					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	24,488	24,488
Sapling/seedling	--	--	--	4,741	4,741
Nonstocked	--	--	--	--	--
Total	--	--	--	29,229	29,229
Other western softwoods					
Sawtimber	--	--	--	6,288	6,288
Poletimber	--	--	--	6,288	6,288
Sapling/seedling	--	6,321	4,716	--	11,037
Nonstocked	--	--	--	--	--
Total	--	6,321	4,716	12,576	23,614
Pinyon-juniper					
Sawtimber	--	--	--	2,756,531	2,756,531
Poletimber	--	--	--	1,037,460	1,037,460
Sapling/seedling	--	--	--	123,904	123,904
Nonstocked	--	--	--	--	--
Total	--	--	--	3,917,895	3,917,895
Ponderosa pine					
Sawtimber	6,288	279,514	474,259	6,288	766,349
Poletimber	--	--	50,734	--	50,734
Sapling/seedling	--	11,809	22,058	--	33,867
Nonstocked	--	--	--	--	--
Total	6,288	291,323	547,050	6,288	850,950
Spruce-fir					
Sawtimber	--	--	7,027	--	7,027
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	7,027	--	7,027
White fir					
Sawtimber	4,716	7,803	--	--	12,519
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	4,716	7,803	--	--	12,519
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	6,075	18,250	--	24,325
Total	--	6,075	18,250	--	24,325
Nonstocked woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	279,819	279,819
Total	--	--	--	279,819	279,819
All types					
Sawtimber	20,486	389,354	523,495	4,496,799	5,430,133
Poletimber	--	12,458	54,279	1,897,370	1,964,107
Sapling/seedling	4,741	18,130	30,128	258,959	311,958
Nonstocked	--	6,075	18,250	279,819	304,144
Total	25,227	426,017	626,152	6,932,946	8,010,342

Table 8--Area of forest land by stand volume and owner group, Arizona, 1999

Stand volume per acre[a]	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Acres			
Less than 1,500 board feet	5,723,440	3,010,902	6,902,383	15,636,725
1,500 to 4,999 board feet	1,017,785	58,585	450,814	1,527,185
5,000 to 9,999 board feet	746,249	45,429	373,742	1,165,420
10,000 board feet or more	735,202	79,037	283,403	1,097,643
Total	8,222,676	3,193,954	8,010,342	19,426,972

[a]International ¼-inch rule.

Table 9--Area of forest land by forest type and stocking condition, Arizona, 1999

Forest type	Stocking condition						Total
	Overstocked timberland	Fully stocked timberland	Medium to fully stocked timberland	Poorly stocked timberland	Nonstocked timberland	Woodland	
	Acres						
Aspen	19,538	69,315	47,156	11,083	--	--	147,093
Blue spruce	--	7,375	7,889	1,742	--	--	17,006
Cottonwood	--	6,223	4,530	2,973	--	--	13,726
Deciduous woodland oak	--	--	--	--	--	311,532	311,532
Douglas-fir	26,827	80,208	97,514	35,059	--	--	239,608
Engelmann spruce	1,580	64,406	27,860	33,483	--	--	127,329
Evergreen oak	--	--	--	--	--	1,616,135	1,616,135
Juniper	--	--	--	--	--	3,106,068	3,106,068
Maple woodland	--	--	--	--	--	8,875	8,875
Mesquite	--	--	--	--	--	1,426,544	1,426,544
Misc. western hardwoods	--	--	--	--	--	126,657	126,657
Other western softwoods	2,555	25,089	32,910	33,466	--	--	94,019
Pinyon-juniper	--	--	--	--	--	7,777,827	7,777,827
Ponderosa pine	32,287	710,209	1,316,091	988,573	--	--	3,047,159
Spruce-fir	--	11,918	6,536	--	--	--	18,454
White fir	7,759	38,590	31,579	12,990	--	--	90,919
Nonstocked timberland	--	--	--	--	101,244	--	101,244
Nonstocked woodland	--	--	--	--	--	1,156,776	1,156,776
All types	90,546	1,013,333	1,572,066	1,119,369	101,244	15,530,414	19,426,972

Table 10--Area of forest land by forest type and basal area class, Arizona, 1999

Forest type	Basal area class											Total
	0	1-25	26-50	51-75	76-100	101-150	151-200	201-250	251-300	301-350	351-400	
	Acres											
Aspen	--	11,233	--	33,490	27,933	12,405	30,601	14,080	17,350	--	--	147,093
Blue spruce	--	3,148	--	1,742	--	10,535	1,580	--	--	--	--	17,006
Cottonwood	--	2,973	--	4,530	--	6,223	--	--	--	--	--	13,726
Deciduous woodland oak	24,337	20,614	40,671	36,663	45,980	70,135	58,524	12,764	--	--	1,844	311,532
Douglas-fir	187	--	4,741	27,889	27,462	62,728	55,836	25,834	16,961	17,141	828	239,608
Engelmann spruce	1,319	3,732	3,662	26,089	16,033	24,379	39,414	11,120	1,580	--	--	127,329
Evergreen oak	17,011	219,268	361,643	300,939	196,842	320,671	143,273	51,844	1,589	3,053	--	1,616,135
Juniper	54,216	744,812	802,498	605,163	355,835	370,178	120,242	47,035	6,089	--	--	3,106,068
Maple woodland	--	--	--	8,875	--	--	--	--	--	--	--	8,875
Mesquite	53,622	986,537	255,928	91,553	8,455	18,351	12,098	--	--	--	--	1,426,544
Misc. western hardwoods	--	99,804	20,478	6,375	--	--	--	--	--	--	--	126,657
Other western softwoods	--	4,716	23,654	11,417	15,307	24,134	12,237	--	--	2,555	--	94,019
Pinyon-juniper	28,508	1,051,029	1,455,658	1,463,321	1,205,535	1,543,923	718,845	260,002	51,007	--	--	7,777,827
Ponderosa pine	5,211	68,256	265,882	452,654	674,617	918,873	511,345	117,057	31,793	--	1,471	3,047,159
Spruce-fir	--	--	--	--	6,536	4,890	--	7,027	--	--	--	18,454
White fir	--	--	--	--	24,523	21,083	14,919	24,456	4,716	1,223	--	90,919
Nonstocked timberland	23,973	77,272	--	--	--	--	--	--	--	--	--	101,244
Nonstocked woodland	229,723	927,054	--	--	--	--	--	--	--	--	--	1,156,776
All types	438,105	4,220,448	3,234,815	3,070,702	2,605,058	3,408,509	1,718,917	571,218	131,086	23,972	4,142	19,426,972

Table 11--Area of forest land by forest type and stand-age class, Arizona, 1999

Forest type	Stand-age class										All classes
	Nonstocked/ Unclassified	1-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	
	Acres										
Aspen	--	35,143	71,442	40,508	--	--	--	--	--	--	147,093
Blue spruce	--	3,148	13,858	--	--	--	--	--	--	--	17,006
Cottonwood	--	2,973	4,530	6,223	--	--	--	--	--	--	13,726
Deciduous woodland oak	12,057	106,205	94,160	99,109	--	--	--	--	--	--	311,532
Douglas-fir	--	16,234	107,405	73,158	36,453	6,358	--	--	--	--	239,608
Engelmann spruce	--	3,354	68,426	44,429	11,120	--	--	--	--	--	127,329
Evergreen oak	111,833	102,930	234,946	691,750	295,997	122,234	52,541	3,904	--	--	1,616,135
Juniper	64,266	220,858	1,348,127	964,765	383,099	36,252	76,558	10,572	--	1,572	3,106,068
Maple woodland	--	8,875	--	--	--	--	--	--	--	--	8,875
Mesquite	215,286	779,805	220,772	119,202	62,871	25,554	3,053	--	--	--	1,426,544
Misc. western hardwoods	58,751	30,635	23,615	--	13,656	--	--	--	--	--	126,657
Other western softwoods	--	11,037	12,617	29,211	41,155	--	--	--	--	--	94,019
Pinyon-juniper	166,025	637,092	2,012,573	2,770,508	1,466,012	455,160	197,688	53,757	11,829	7,182	7,777,827
Ponderosa pine	--	143,422	1,684,405	953,541	236,936	16,427	6,354	6,075	--	--	3,047,159
Spruce-fir	--	--	4,890	6,536	7,027	--	--	--	--	--	18,454
White fir	--	--	28,363	56,280	6,276	--	--	--	--	--	90,919
Nonstocked timberland	101,244	--	--	--	--	--	--	--	--	--	101,244
Nonstocked woodland	1,156,776	--	--	--	--	--	--	--	--	--	1,156,776
All types	1,886,239	2,101,711	5,930,128	5,855,220	2,560,604	661,985	336,194	74,308	11,829	8,754	19,426,972

Table 12--Area of forest land by land category, forest type group and percent stand density index, Arizona, 1999

Hardwood/softwood type	Percent of maximum stand density index (SDI)						
	< 10	10.0-24.9	25.0-34.9	35.0-49.9	50.0-59.9	60 +	Total area
	Acres						
Timberland							
Softwoods							
Pine	75,019	526,685	554,149	868,349	372,021	650,936	3,047,159
Mixed conifer	8,076	62,739	49,881	133,423	45,886	47,528	347,533
Spruce-fir	8,713	39,228	27,533	49,001	12,701	8,608	145,783
Other	--	28,370	11,417	15,307	10,892	28,034	94,019
Nonstocked	101,244	--	--	--	--	--	101,244
Hardwoods	14,206	20,748	41,157	29,813	28,482	26,412	160,818
Woodland							
Softwoods	2,345,617	3,626,334	1,989,966	1,898,241	794,771	956,729	11,611,658
Hardwoods	1,583,247	1,070,839	407,472	308,940	197,010	351,248	3,918,756
Total forest land	4,136,123	5,374,942	3,081,576	3,303,073	1,461,762	2,069,496	19,426,972

Table 13--Area of forest land by habitat type series and forest type, Arizona, 1999

	Forest type																	
Habitat type series	Aspen	Blue spruce	Cottonwood	Deciduous woodland oak	Douglas-fir	Engelmann spruce	Evergreen oak	Juniper	Maple woodland	Mesquite	Misc. western hardwoods	Other western softwoods	Pinyon-juniper	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	Nonstocked woodland	All types
	Acres																		
White fir	14,211	--	--	--	58,163	--	--	--	--	--	4,741	11,853	--	124,983	--	78,107	1,822	--	293,879
Unclassified	8,649	--	--	57,401	--	--	258,009	1,736,040	--	1,330,175	108,774	--	4,008,512	54,159	--	--	15,582	435,732	8,013,031
Subalpine fir	36,423	--	--	--	31,198	54,816	--	--	--	--	--	--	--	--	11,918	--	--	--	134,355
Engelmann spruce	40,285	--	--	--	--	67,532	--	--	--	--	--	6,328	--	30,408	--	12,813	--	--	157,365
Blue spruce	4,890	13,858	--	--	--	1,319	--	--	--	--	--	--	--	6,276	6,536	--	--	--	32,880
Ponderosa pine	18,119	3,148	6,223	218,007	18,218	--	160,613	186,631	--	--	5,007	--	343,406	2,632,002	--	--	83,840	26,385	3,701,599
Douglas-fir	24,516	--	--	11,312	132,030	3,662	23,929	18,283	8,875	--	4,832	15,595	29,577	130,252	--	--	--	--	402,863
Arizona cypress	--	--	2,973	--	--	--	6,623	--	--	--	--	38,518	5,772	--	--	--	--	--	53,886
Apache pine	--	--	--	--	--	--	19,503	--	--	--	--	4,433	--	--	--	--	--	--	23,936
Chihuahua pine	--	--	--	--	--	--	12,862	--	--	--	--	17,292	--	31,441	--	--	--	--	61,596
Fremont poplar	--	--	4,530	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,530
Thinleaf alder	--	--	--	--	--	--	--	--	--	--	--	--	4,959	--	--	--	--	--	4,959
Arizona sycamore	--	--	--	--	--	--	--	--	--	--	--	--	6,225	--	--	--	--	1,870	8,095
Juniper woodland	--	--	--	--	--	--	24,039	972,796	--	66,183	3,303	--	368,229	13,703	--	--	--	332,783	1,781,036
Pinyon pine	--	--	--	--	--	--	144,620	112,523	--	--	--	--	2,597,094	10,917	--	--	--	208,999	3,074,153
Scarp	--	--	--	24,812	--	--	50,440	28,326	--	6,623	--	--	200,341	--	--	--	--	47,783	358,324
Madrean oak	--	--	--	--	--	--	915,497	51,469	--	23,564	--	--	213,714	13,020	--	--	--	103,225	1,320,487
All types	147,093	17,006	13,726	311,532	239,608	127,329	1,616,135	3,106,068	8,875	1,426,544	126,657	94,019	7,777,827	3,047,159	18,454	90,919	101,244	1,156,776	19,426,972

Table 14--Number of live trees on forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches)															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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Alligator juniper[a]	101,176	55,465	34,264	24,058	17,690	11,945	8,532	6,053	3,933	2,823	1,621	1,136	1,294	991	2,320	273,302
Apache pine	486	486	39	79	117	39	40	--	40	39	40	40	--	--	--	1,447
Arizona cypress	10,380	4,656	1,420	1,448	820	436	578	96	87	131	--	--	--	--	--	20,051
Arizona pinyon pine[a]	26,114	7,261	8,395	5,082	3,102	1,702	1,083	368	112	80	32	--	--	--	--	53,332
Blue spruce	474	553	433	245	327	330	188	84	77	38	--	--	--	--	--	2,749
Border pinyon[a]	22,724	11,672	9,388	6,068	2,615	1,077	840	235	80	78	--	--	--	--	--	54,778
California juniper[a]	898	898	349	267	289	239	--	--	--	--	--	--	--	--	--	2,941
Chihuahua pine	1,886	943	1,149	670	468	229	78	81	--	--	--	--	--	--	--	5,504
Corkbark fir	5,968	2,823	1,440	830	635	360	283	282	85	--	29	--	--	--	--	12,734
Douglas-fir	61,667	31,498	16,842	11,157	8,470	4,954	3,258	2,358	1,595	844	527	406	506	119	803	145,004
Engelmann spruce	15,059	14,725	5,251	4,917	3,830	2,893	1,657	1,016	771	614	361	67	--	--	62	51,224
Mexican pinyon pine[a]	2,232	1,430	1,092	588	178	60	39	38	39	--	--	--	--	--	--	5,695
Oneseed juniper[a]	47,815	26,204	28,901	25,199	24,193	22,582	17,023	16,645	11,268	9,637	7,465	4,365	3,274	1,963	4,095	250,628
Ponderosa pine	219,871	160,243	111,596	89,316	66,811	44,648	28,793	17,869	11,587	8,242	5,712	4,285	2,185	1,575	1,720	774,453
Redberry juniper[a]	465	--	392	521	191	583	397	334	226	--	36	37	30	75	37	3,324
Rocky Mountain juniper[a]	23,022	13,983	4,664	3,262	1,886	1,790	1,042	789	712	304	196	185	175	--	310	52,320
Singleleaf pinyon[a]	15,731	5,106	4,593	3,468	2,010	1,309	519	258	73	--	41	--	--	--	--	33,106
Southwestern white pine	5,458	969	2,623	2,175	1,334	636	807	379	44	104	97	67	44	37	44	14,818
Subalpine fir	2,817	--	528	511	303	319	197	67	39	--	--	--	--	--	--	4,780
Twoneedle pinyon[a]	323,031	169,142	120,517	84,193	53,755	33,067	17,192	7,941	3,830	2,485	1,070	354	474	--	60	817,111
Utah juniper[a]	136,408	70,897	72,088	58,049	47,788	35,287	26,481	22,602	16,858	14,193	9,615	5,683	4,440	3,076	4,356	527,823
White fir	37,273	16,379	6,612	5,412	4,195	3,012	1,854	1,003	1,140	425	474	178	100	237	52	78,345
Softwood total	1,060,954	595,333	432,575	327,519	241,005	167,495	110,880	78,498	52,597	40,039	27,317	16,803	12,522	8,072	13,860	3,185,470
Arizona white oak[a]	94,847	54,281	48,050	36,615	25,265	14,877	9,098	5,219	2,832	2,010	1,081	559	347	--	316	295,398
Aspen	62,592	13,534	6,359	6,054	5,525	4,663	2,552	1,978	400	213	38	--	--	--	--	103,908
Bigtooth maple[a]	10,351	2,870	1,019	305	78	35	194	--	--	--	--	--	--	--	--	14,852
Boxelder	614	--	--	--	--	--	--	--	--	--	--	--	--	--	--	614
Cottonwood	--	933	112	150	112	37	37	37	37	--	--	--	--	--	--	1,458
Desert ironwood[a]	859	3,109	946	623	690	151	184	160	184	37	--	--	37	57	--	7,036
Emory oak[a]	49,232	22,289	22,363	19,687	12,444	6,525	4,257	1,946	1,559	451	308	106	64	33	--	141,264
Gambel oak[a]	453,159	99,240	68,988	26,041	9,279	4,816	2,274	1,294	835	820	340	436	264	119	261	668,168
Mesquite[a]	59,918	18,783	14,552	10,009	6,310	3,278	1,723	998	491	115	--	--	--	--	--	116,177
Mexican blue oak[a]	--	819	944	1,246	778	1,288	992	226	109	182	109	72	74	35	--	6,876
New Mexico locust[a]	82,172	9,687	1,076	232	38	71	--	--	--	--	--	--	--	--	--	93,277
Oak--evergreen[a]	15,666	7,302	4,285	1,750	1,853	784	375	--	280	--	--	--	--	--	--	32,295
Rocky Mountain maple[a]	--	--	177	35	109	35	--	--	--	--	--	--	--	--	--	357
Silverleaf oak[a]	52,549	21,412	8,752	5,865	3,846	1,918	764	651	203	200	155	--	76	--	--	96,392
Velvet mesquite[a]	17,339	5,541	7,438	4,821	2,881	1,347	813	522	368	316	74	36	39	73	--	41,609
W. honey mesquite[a]	10,410	9,299	3,405	1,925	1,599	660	225	74	74	--	--	--	--	--	74	27,744
Hardwood total	909,709	269,100	188,467	115,358	70,810	40,486	23,488	13,107	7,372	4,344	2,106	1,210	901	318	650	1,647,425
All species	1,970,663	864,433	621,041	442,876	311,815	207,981	134,368	91,605	59,969	44,383	29,423	18,013	13,423	8,390	14,510	4,832,895

[a]Diameter taken at root collar rather than at breast height.

Table 15--Number of standing dead trees on forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand trees															
Alligator juniper[a]	1,868	1,412	1,097	744	723	657	379	608	275	186	383	233	159	78	476	9,277
Apache pine	--	--	40	40	--	--	40	--	--	--	39	--	--	--	--	160
Arizona cypress	--	--	87	77	40	37	75	53	--	--	--	--	--	--	--	370
Arizona pinyon pine[a]	899	--	71	194	185	148	77	--	39	--	--	--	--	--	--	1,613
Blue spruce	--	--	133	44	--	--	--	--	--	--	39	--	--	--	--	217
Border pinyon[a]	--	--	486	790	251	--	258	--	--	--	--	--	--	--	--	1,785
California juniper[a]	--	--	60	--	38	--	--	--	--	--	33	--	--	--	--	131
Chihuahua pine	--	--	38	105	--	--	--	--	--	--	--	--	--	--	--	143
Corkbark fir	--	--	216	293	161	118	29	39	39	--	--	--	42	--	--	939
Douglas-fir	5,556	1,798	1,246	687	605	501	328	363	38	147	306	37	111	--	168	11,890
Engelmann spruce	1,314	1,330	847	661	742	424	184	166	204	163	39	39	--	--	--	6,113
Mexican pinyon pine[a]	--	--	--	39	39	--	--	--	--	--	--	--	--	--	--	78
Oneseed juniper[a]	--	397	827	840	1,799	1,534	1,698	1,154	857	857	371	232	231	97	163	11,058
Ponderosa pine	9,472	8,714	6,411	4,358	2,679	1,553	1,047	567	787	910	430	627	116	342	274	38,286
Redberry juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	467	938	79	197	152	73	38	151	72	72	72	--	--	72	--	2,382
Singleleaf pinyon[a]	--	--	--	36	--	80	--	127	--	--	--	--	--	--	--	244
Southwestern white pine	333	--	176	191	181	76	82	--	38	76	--	75	--	--	--	1,228
Subalpine fir	--	490	571	228	234	156	39	--	--	--	--	--	--	--	--	1,719
Twoneedle pinyon[a]	5,798	2,778	3,379	3,717	2,218	1,629	810	610	655	65	39	--	--	--	60	21,758
Utah juniper[a]	1,491	1,653	2,941	2,994	3,700	3,319	3,827	2,318	1,269	1,039	719	407	--	184	276	26,137
White fir	3,444	1,844	1,085	503	538	373	244	186	79	76	--	--	--	44	38	8,453
Softwood total	30,643	21,354	19,791	16,739	14,286	10,679	9,155	6,342	4,352	3,592	2,469	1,650	659	817	1,454	143,982
Arizona white oak[a]	2,263	4,101	3,097	1,538	1,024	736	725	491	159	383	37	72	109	37	41	14,814
Aspen	9,212	837	3,361	2,291	1,197	845	432	483	117	--	--	29	--	--	--	18,805
Bigtooth maple[a]	1,427	--	38	--	--	--	--	--	--	--	--	--	--	--	--	1,465
Boxelder	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	150	--	--	--	--	--	--	--	--	--	--	150
Desert ironwood[a]	--	--	47	47	77	--	--	--	--	--	--	--	--	38	--	209
Emory oak[a]	--	1,333	897	633	713	288	144	149	74	75	--	--	--	--	--	4,307
Gambel oak[a]	61,999	15,007	8,673	2,192	978	669	341	191	270	76	114	76	37	--	--	90,624
Mesquite[a]	--	--	492	368	--	123	--	--	--	--	--	--	--	--	--	982
Mexican blue oak[a]	--	916	37	37	--	74	37	37	--	72	--	35	--	--	--	1,244
New Mexico locust[a]	8,287	865	69	33	--	--	--	--	--	--	--	--	--	--	--	9,255
Oak--evergreen[a]	--	1,021	255	--	136	--	136	--	--	--	--	--	--	--	--	1,549
Rocky Mountain maple[a]	--	--	40	--	--	--	--	--	--	--	--	--	--	--	--	40
Silverleaf oak[a]	3,272	477	1,277	844	348	193	--	--	--	--	--	--	--	--	--	6,411
Velvet mesquite[a]	--	--	232	77	141	--	39	--	--	--	--	--	--	--	--	490
W. honey mesquite[a]	--	--	37	113	--	--	--	--	--	--	--	--	--	--	--	150
Hardwood total	86,460	24,556	18,553	8,173	4,763	2,928	1,855	1,351	620	606	151	213	147	76	41	150,493
All species	117,103	45,910	38,344	24,912	19,049	13,606	11,010	7,693	4,972	4,198	2,621	1,863	805	893	1,496	294,475

[a]Diameter taken at root collar rather than at breast height.

Table 16--Total oven-dry weight of biomass of all live trees on forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches)															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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand tons															
Alligator juniper[a]	59	204	294	477	700	775	893	897	821	814	605	554	698	630	2,726	11,147
Apache pine	2	10	2	6	16	8	15	--	35	36	73	80	--	--	--	284
Arizona cypress	52	100	61	111	96	85	168	33	40	96	--	--	--	--	--	842
Arizona pinyon pine[a]	17	29	145	204	236	233	195	98	38	36	12	--	--	--	--	1,242
Blue spruce	2	12	20	26	56	94	70	47	57	38	--	--	--	--	--	422
Border pinyon[a]	10	44	127	174	158	121	116	50	21	24	--	--	--	--	--	844
California juniper[a]	1	3	2	5	6	7	--	--	--	--	--	--	--	--	--	23
Chihuahua pine	9	20	46	39	52	39	30	41	--	--	--	--	--	--	--	277
Corkbark fir	30	61	60	69	107	96	118	184	55	--	39	--	--	--	--	819
Douglas-fir	339	772	835	1,124	1,478	1,352	1,343	1,328	1,206	808	632	618	861	235	2,839	15,768
Engelmann spruce	90	317	204	464	672	796	718	569	624	652	506	126	--	--	152	5,889
Mexican pinyon pine[a]	1	3	18	19	10	7	5	7	13	--	--	--	--	--	--	81
Oneseed juniper[a]	24	90	201	402	755	1,119	1,358	1,985	1,854	2,027	2,124	1,417	1,213	888	3,025	18,481
Ponderosa pine	1,099	3,205	5,321	7,457	9,987	11,021	10,954	9,963	9,117	8,706	8,651	8,064	5,113	4,240	7,015	109,912
Redberry juniper[a]	([b])	--	3	8	7	32	36	53	35	--	7	17	13	41	29	281
Rocky Mountain juniper[a]	16	72	63	90	108	157	134	139	172	105	82	83	140	--	241	1,604
Singleleaf pinyon[a]	7	20	76	144	152	165	87	66	25	--	27	--	--	--	--	769
Southwestern white pine	27	21	124	167	194	145	281	191	23	90	114	92	90	82	120	1,759
Subalpine fir	15	--	22	46	56	95	87	35	29	--	--	--	--	--	--	386
Twoneedle pinyon[a]	159	641	1,830	2,948	3,620	3,725	2,896	1,877	1,149	928	471	190	305	--	72	20,812
Utah juniper[a]	80	240	527	1,001	1,586	2,001	2,241	2,837	2,980	3,202	2,824	1,892	1,908	1,468	2,967	27,754
White fir	186	352	285	469	639	724	693	513	802	387	553	275	168	519	107	6,672
Softwood total	2,229	6,216	10,265	15,448	20,689	22,795	22,438	20,913	19,097	17,947	16,718	13,408	10,509	8,103	19,292	226,068
Arizona white oak[a]	158	417	1,347	2,105	2,527	2,361	2,179	1,792	1,187	1,076	762	469	332	--	542	17,254
Aspen	125	129	281	660	1,180	1,608	1,252	1,392	355	204	43	--	--	--	--	7,229
Bigtooth maple[a]	22	32	44	30	20	7	73	--	--	--	--	--	--	--	--	228
Boxelder	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Cottonwood	--	9	3	9	14	8	11	14	20	--	--	--	--	--	--	87
Desert ironwood[a]	1	31	18	24	40	18	27	36	64	12	--	--	24	45	--	342
Emory oak[a]	78	167	602	1,063	1,285	1,058	1,046	691	740	238	214	94	78	54	--	7,408
Gambel oak[a]	951	1,196	3,391	2,731	1,800	1,484	978	753	623	714	370	493	384	221	652	16,739
Mesquite[a]	132	166	460	649	693	652	456	315	261	68	--	--	--	--	--	3,853
Mexican blue oak[a]	--	8	29	74	80	184	220	70	48	102	60	66	72	32	--	1,043
New Mexico locust[a]	153	128	70	26	7	19	--	--	--	--	--	--	--	--	--	402
Oak--evergreen[a]	23	46	104	73	151	91	58	--	107	--	--	--	--	--	--	653
Rocky Mountain maple[a]	--	--	7	3	17	7	--	--	--	--	--	--	--	--	--	33
Silverleaf oak[a]	89	212	297	399	448	394	222	250	91	146	111	--	78	--	--	2,737
Velvet mesquite[a]	28	44	225	282	335	260	261	220	179	182	53	22	39	67	--	2,196
W. honey mesquite[a]	24	65	112	126	236	137	67	26	42	--	--	--	--	--	178	1,013
Hardwood total	1,786	2,649	6,989	8,256	8,831	8,287	6,849	5,559	3,717	2,742	1,612	1,144	1,007	418	1,372	61,218
All species	4,014	8,866	17,254	23,704	29,520	31,083	29,287	26,472	22,814	20,689	18,331	14,552	11,516	8,521	20,664	287,286

[a]Diameter taken at root collar rather than at breast height.
[b]Less than 500 tons.

Table 17--Net volume of all live trees on forest land by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Aspen	288,932	78,986	2,428	--	370,347
Blue spruce	36,676	--	243	--	36,919
Cottonwood	15,345	317	--	--	15,662
Deciduous woodland oak	158,418	128,826	25,084	--	312,327
Douglas-fir	700,113	16,157	4,760	--	721,029
Engelmann spruce	387,532	8,045	397	--	395,974
Evergreen oak	917,936	53,772	5,245	--	976,954
Juniper	1,205,810	95,479	4,027	--	1,305,317
Maple woodland	--	--	8,534	--	8,534
Mesquite	98,745	70,195	7,361	--	176,301
Misc. western hardwoods	5,215	561	3,644	--	9,419
Other western softwoods	114,238	2,796	6,408	--	123,441
Pinyon-juniper	4,326,811	712,713	26,070	--	5,065,594
Ponderosa pine	5,526,265	98,567	26,677	--	5,651,510
Spruce-fir	67,378	--	--	--	67,378
White fir	270,087	--	--	--	270,087
Nonstocked timberland	--	--	--	10,620	10,620
Nonstocked woodland	--	--	--	45,100	45,100
All types	14,119,501	1,266,414	120,878	55,719	15,562,512

Table 18--Net volume of all live trees on forest land by species and owner group, Arizona, 1999

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Alligator juniper[a]	514,208	12,118	351,030	877,357
Apache pine	12,527	--	--	12,527
Arizona cypress	30,056	573	--	30,629
Arizona pinyon pine[a]	92,216	--	7,786	100,002
Blue spruce	1,390	4,036	21,546	26,972
Border pinyon[a]	57,968	5,918	2,428	66,314
California juniper[a]	--	1,162	647	1,809
Chihuahua pine	5,017	636	5,197	10,850
Corkbark fir	22,172	--	26,159	48,331
Douglas-fir	533,913	11,485	211,629	757,026
Engelmann spruce	162,535	49,239	158,643	370,417
Mexican pinyon pine[a]	4,582	1,895	--	6,477
Oneseed juniper[a]	367,422	100,419	879,249	1,347,089
Ponderosa pine	3,604,410	289,731	1,518,406	5,412,548
Redberry juniper[a]	16,292	2,562	4,341	23,195
Rocky Mountain juniper[a]	34,784	320	83,440	118,544
Singleleaf pinyon[a]	34,619	5,619	21,336	61,575
Southwestern white pine	79,723	4,243	15,789	99,754
Subalpine fir	10,084	13,518	--	23,603
Twoneedle pinyon[a]	567,496	158,681	926,838	1,653,016
Utah juniper[a]	591,752	654,168	897,276	2,143,197
White fir	253,688	38,459	48,170	340,317
Softwood total	6,996,854	1,354,783	5,179,910	13,531,547
Arizona white oak[a]	320,383	8,702	209,394	538,479
Aspen	179,455	48,810	154,947	383,212
Bigtooth maple[a]	611	--	7,552	8,164
Boxelder	--	--	--	--
Cottonwood	3,055	--	1,775	4,830
Desert ironwood[a]	148	7,491	1,769	9,407
Emory oak[a]	161,756	5,317	94,144	261,216
Gambel oak[a]	301,753	10,901	186,233	498,888
Mesquite[a]	63	42,356	54,526	96,944
Mexican blue oak[a]	33,713	--	490	34,203
New Mexico locust[a]	1,952	281	1,613	3,846
Oak--evergreen[a]	833	5,322	11,435	17,590
Rocky Mountain maple[a]	1,385	--	133	1,517
Silverleaf oak[a]	66,659	5,874	8,465	80,997
Velvet mesquite[a]	26,972	24,527	12,005	63,504
W. honey mesquite[a]	25,979	1,962	226	28,167
Hardwood total	1,124,716	161,542	744,707	2,030,965
All species	8,121,570	1,516,325	5,924,617	15,562,512

[a]Diameter taken at root collar rather than at breast height.

Table 19--Net volume of all live trees on forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches)													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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Alligator juniper[a]	29,699	45,392	63,350	68,753	76,737	75,482	68,150	65,400	46,765	42,279	54,096	47,712	193,543	877,357
Apache pine	53	265	805	408	781	--	1,785	1,806	2,404	4,221	--	--	--	12,527
Arizona cypress	1,882	5,328	4,641	3,950	7,676	1,269	1,551	4,331	--	--	--	--	--	30,629
Arizona pinyon pine[a]	12,533	17,422	19,714	19,330	16,087	7,952	3,115	2,889	960	--	--	--	--	100,002
Blue spruce	968	1,568	3,495	6,295	4,676	3,197	4,071	2,703	--	--	--	--	--	26,972
Border pinyon[a]	11,059	14,964	13,239	9,884	9,521	4,056	1,698	1,894	--	--	--	--	--	66,314
California juniper[a]	181	477	527	623	--	--	--	--	--	--	--	--	--	1,809
Chihuahua pine	1,309	1,654	2,429	1,860	1,477	2,121	--	--	--	--	--	--	--	10,850
Corkbark fir	2,873	3,919	6,881	6,434	8,239	13,174	3,925	--	2,886	--	--	--	--	48,331
Douglas-fir	33,853	50,816	71,183	67,700	69,831	69,490	64,557	43,692	34,547	34,142	46,628	12,910	157,678	757,026
Engelmann spruce	9,302	26,946	42,737	52,502	49,486	39,856	44,791	47,528	36,724	9,450	--	--	11,093	370,417
Mexican pinyon pine[a]	1,523	1,591	804	559	390	593	1,017	--	--	--	--	--	--	6,477
Oneseed juniper[a]	19,140	36,062	63,166	92,175	106,775	150,920	140,427	146,531	152,343	101,442	84,845	60,014	193,249	1,347,089
Ponderosa pine	188,649	375,499	532,097	584,501	573,258	515,078	469,407	444,477	459,415	424,649	266,588	219,637	359,294	5,412,548
Redberry juniper[a]	289	761	630	2,945	3,140	4,379	2,946	--	605	1,337	1,058	3,200	1,905	23,195
Rocky Mountain juniper[a]	5,675	7,831	9,028	12,905	10,673	10,925	12,924	7,723	6,233	6,221	10,901	--	17,506	118,544
Singleleaf pinyon[a]	6,667	12,253	12,767	13,663	7,153	5,249	1,703	--	2,119	--	--	--	--	61,575
Southwestern white pine	4,711	8,984	11,164	8,086	16,049	11,828	1,317	5,020	7,396	6,036	5,792	5,528	7,842	99,754
Subalpine fir	1,068	2,712	3,309	6,527	5,538	2,290	2,159	--	--	--	--	--	--	23,603
Twoneedle pinyon[a]	158,977	250,623	303,102	308,002	236,383	149,320	91,155	73,689	36,861	15,149	24,028	--	5,726	1,653,016
Utah juniper[a]	49,493	91,461	137,256	167,777	184,670	225,842	233,344	241,892	212,786	142,345	140,013	107,275	209,045	2,143,197
White fir	11,740	22,474	32,633	39,040	39,282	29,805	47,594	22,911	32,595	13,850	10,456	31,377	6,560	340,317
Softwood total	551,645	979,002	1,334,956	1,473,919	1,427,820	1,322,826	1,197,635	1,112,487	1,034,639	801,121	644,405	487,652	1,163,441	13,531,547
Arizona white oak[a]	37,232	62,935	79,821	77,684	73,051	61,860	39,684	36,892	27,737	15,743	10,653	--	15,185	538,479
Aspen	16,218	37,075	67,064	90,673	64,087	75,903	19,300	10,177	2,713	--	--	--	--	383,212
Bigtooth maple[a]	1,816	1,376	1,013	312	3,648	--	--	--	--	--	--	--	--	8,164
Boxelder	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	163	565	857	471	668	878	1,230	--	--	--	--	--	--	4,830
Desert ironwood[a]	464	702	1,010	607	903	1,248	1,975	412	--	--	788	1,298	--	9,407
Emory oak[a]	18,532	35,600	45,682	38,701	40,238	27,131	29,226	8,887	7,707	4,101	3,524	1,885	--	261,216
Gambel oak[a]	105,117	91,561	64,646	52,828	36,056	28,272	23,161	26,013	12,795	16,511	14,317	9,139	18,472	498,888
Mesquite[a]	11,222	17,054	18,549	18,152	13,503	8,747	7,534	2,183	--	--	--	--	--	96,944
Mexican blue oak[a]	793	2,146	2,540	5,822	7,255	2,464	1,634	3,540	2,006	2,178	2,794	1,030	--	34,203
New Mexico locust[a]	2,236	800	240	570	--	--	--	--	--	--	--	--	--	3,846
Oak--evergreen[a]	2,691	2,091	4,348	2,782	1,822	--	3,857	--	--	--	--	--	--	17,590
Rocky Mountain maple[a]	286	125	777	330	--	--	--	--	--	--	--	--	--	1,517
Silverleaf oak[a]	8,433	12,402	14,550	13,711	7,717	8,750	2,843	5,657	3,946	--	2,988	--	--	80,997
Velvet mesquite[a]	5,719	7,651	9,634	7,851	8,270	7,103	5,570	5,925	1,713	670	1,384	2,012	--	63,504
W. honey mesquite[a]	2,903	3,536	7,003	4,077	2,091	831	1,407	--	--	--	--	--	6,319	28,167
Hardwood total	213,826	275,618	317,734	314,570	259,311	223,188	137,422	99,687	58,617	39,204	36,447	15,364	39,976	2,030,965
All species	765,471	1,254,620	1,652,690	1,788,489	1,687,131	1,546,014	1,335,057	1,212,175	1,093,256	840,324	680,853	503,016	1,203,417	15,562,512

[a]Diameter taken at root collar rather than at breast height.

Table 20--Net volume of all live trees on forest land by species and forest type, Arizona, 1999

Species	Forest type																		
	Aspen	Blue spruce	Cottonwood	Deciduous woodland oak	Douglas-fir	Engelmann spruce	Evergreen oak	Juniper	Maple woodland	Mesquite	Misc. western hardwoods	Other western softwoods	Pinyon-juniper	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	Nonstocked woodland	All types
	Thousand cubic feet																		
Alligator juniper[a]	--	--	96	15,746	5,384	--	125,762	225,894	--	--	41	379	367,146	134,325	--	--	231	2,354	877,357
Apache pine	--	--	--	--	7,564	--	3,178	--	--	--	--	1,785	--	--	--	--	--	--	12,527
Arizona cypress	--	--	--	--	--	--	5,371	--	--	--	--	24,229	206	822	--	--	--	--	30,629
Arizona pinyon pine[a]	--	--	--	--	--	--	10,039	--	--	--	--	3,473	85,261	--	--	--	--	1,228	100,002
Blue spruce	69	22,867	--	--	--	--	--	--	--	--	--	--	--	--	4,036	--	--	--	26,972
Border pinyon[a]	--	--	--	--	1,567	--	12,959	--	--	--	--	99	50,820	75	--	--	--	794	66,314
California juniper[a]	--	--	--	--	--	--	--	1,678	--	--	--	--	131	--	--	--	--	--	1,809
Chihuahua pine	--	--	--	66	--	--	4,947	347	--	--	--	3,313	--	2,176	--	--	--	--	10,850
Corkbark fir	3,198	--	--	--	10,616	8,624	--	--	--	--	--	4,316	--	778	20,800	--	--	--	48,331
Douglas-fir	27,727	2,189	--	12,906	424,406	52,446	5,338	4,744	7,519	--	465	10,108	16,533	147,631	2,228	42,787	--	--	757,026
Engelmann spruce	18,439	--	--	--	20,812	258,939	--	--	--	--	--	1,151	--	40,607	20,924	9,545	--	--	370,417
Mexican pinyon pine[a]	--	--	--	--	--	--	2,040	--	--	--	--	506	3,149	--	--	--	--	782	6,477
Oneseed juniper[a]	--	--	--	38	933	--	3,868	388,794	--	1,566	--	--	941,424	2,429	--	--	130	7,907	1,347,089
Ponderosa pine	58,969	3,660	4,763	110,866	92,346	28,368	73,186	69,488	95	--	103	23,294	147,529	4,770,055	--	21,018	8,505	304	5,412,548
Redberry juniper[a]	--	--	195	--	--	--	1,064	16,192	--	849	149	--	3,011	--	--	--	--	1,735	23,195
Rocky Mountain juniper[a]	341	--	--	4,321	3,214	--	2,723	5,435	--	--	--	--	79,874	22,345	--	--	291	--	118,544
Singleleaf pinyon[a]	--	--	--	--	--	--	4,963	--	--	42	--	2,012	50,049	867	--	--	--	3,641	61,575
Southwestern white pine	4,924	1,078	--	1,289	16,852	1,482	557	--	--	--	--	38,383	--	29,354	131	5,702	--	--	99,754
Subalpine fir	842	--	--	--	--	7,597	--	--	--	--	--	--	--	2,224	12,939	--	--	--	23,603
Twoneedle pinyon[a]	--	--	--	1,884	3,419	--	23,315	--	--	--	--	1,599	1,592,772	26,992	--	--	839	2,195	1,653,016
Utah juniper[a]	--	--	883	1,110	31	--	9,405	530,108	--	--	--	--	1,580,385	15,023	--	--	--	6,252	2,143,197
White fir	19,763	821	--	--	70,261	1,610	--	--	--	--	793	270	--	80,918	1,395	164,487	--	--	340,317
Softwood total	134,273	30,615	5,937	148,226	657,404	359,066	288,717	1,242,680	7,614	2,458	1,551	114,918	4,918,289	5,276,623	62,452	243,539	9,996	27,192	13,531,547
Arizona white oak[a]	--	--	2,817	1,627	419	--	335,069	28,699	--	394	1,033	391	100,201	65,894	--	--	--	1,937	538,479
Aspen	234,319	6,304	--	292	29,171	36,908	--	--	--	--	512	6,142	--	44,905	4,926	19,734	--	--	383,212
Bigtooth maple[a]	--	--	--	3,896	636	--	--	312	300	--	--	--	578	373	--	2,069	--	--	8,164
Boxelder	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	4,559	--	--	--	271	--	--	--	--	--	--	--	--	--	--	--	4,830
Desert ironwood[a]	--	--	--	--	--	--	--	--	--	2,590	5,923	--	--	--	--	--	--	895	9,407
Emory oak[a]	--	--	1,677	1,853	1,382	--	220,978	7,357	--	--	--	270	15,995	7,163	--	--	--	4,540	261,216
Gambel oak[a]	218	--	672	154,875	30,095	--	9,417	18,449	621	--	401	367	25,078	253,733	--	4,338	624	--	498,888
Mesquite[a]	--	--	--	--	--	--	--	1,552	--	95,170	--	--	63	--	--	--	--	160	96,944
Mexican blue oak[a]	--	--	--	--	--	--	29,749	2,157	--	1,146	--	--	47	--	--	--	--	1,104	34,203
New Mexico locust[a]	1,537	--	--	281	424	--	208	128	--	--	--	--	--	861	--	408	--	--	3,846
Oak--evergreen[a]	--	--	--	1,125	--	--	13,378	159	--	--	--	674	2,185	70	--	--	--	--	17,590
Rocky Mountain maple[a]	--	--	--	153	1,364	--	--	--	--	--	--	--	--	--	--	--	--	--	1,517
Silverleaf oak[a]	--	--	--	--	135	--	74,570	--	--	--	--	679	2,956	1,888	--	--	--	768	80,997
Velvet mesquite[a]	--	--	--	--	--	--	4,165	672	--	51,697	--	--	129	--	--	--	--	6,841	63,504
W. honey mesquite[a]	--	--	--	--	--	--	431	3,153	--	22,846	--	--	73	--	--	--	--	1,664	28,167
Hardwood total	236,074	6,304	9,725	164,102	63,626	36,908	688,237	62,637	920	173,843	7,868	8,523	147,305	374,886	4,926	26,549	624	17,908	2,030,965
All species	370,347	36,919	15,662	312,327	721,029	395,974	976,954	1,305,317	8,534	176,301	9,419	123,441	5,065,594	5,651,510	67,378	270,087	10,620	45,100	15,562,512

[a]Diameter taken at root collar rather than at breast height.

Table 21--Net annual growth of all live trees on forest land by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Alligator juniper [a]	2,206	101	2,568	4,874
Apache pine	7	--	--	7
Arizona cypress	517	4	--	521
Arizona pinyon pine [a]	1,593	--	-54	1,539
Blue spruce	59	-677	682	64
Border pinyon [a]	581	145	52	777
California juniper [a]	--	14	14	27
Chihuahua pine	106	20	135	261
Corkbark fir	719	--	256	975
Douglas-fir	5,654	274	5,839	11,768
Engelmann spruce	1,110	443	1,669	3,222
Mexican pinyon pine [a]	92	17	--	109
Oneseed juniper [a]	2,778	607	5,315	8,700
Ponderosa pine	74,465	4,280	32,987	111,732
Redberry juniper [a]	127	15	42	185
Rocky Mountain juniper [a]	239	6	616	860
Singleleaf pinyon [a]	572	91	134	796
Southwestern white pine	1,945	35	495	2,475
Subalpine fir	201	-1,027	--	-826
Twoneedle pinyon [a]	6,108	2,269	9,524	17,900
Utah juniper [a]	4,228	5,451	5,782	15,461
White fir	3,482	-647	1,351	4,186
Softwood total	106,788	11,421	67,406	185,614
Arizona white oak [a]	2,507	78	2,098	4,682
Aspen	1,315	-1,724	1,223	814
Bigtooth maple [a]	7	--	323	330
Boxelder	--	--	--	--
Cottonwood	101	--	124	226
Desert ironwood [a]	-14	4	34	23
Emory oak [a]	1,573	47	1,016	2,636
Gambel oak [a]	5,338	334	3,058	8,730
Mesquite [a]	(b)	287	421	708
Mexican blue oak [a]	231	--	6	236
New Mexico locust [a]	61	141	9	211
Oak--evergreen [a]	7	47	70	125
Rocky Mountain maple [a]	14	--	2	17
Silverleaf oak [a]	582	54	78	714
Velvet mesquite [a]	361	173	153	687
W. honey mesquite [a]	384	75	2	461
Hardwood total	12,467	-485	8,618	20,599
All species	119,255	10,936	76,023	206,214

[a] Diameter taken at root collar rather than at breast height.
[b] Less than 500 cubic feet.

Table 22--Net annual growth of all live trees on forest land by species and diameter class, Arizona, 1998

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	1,288	618	732	625	636	363	487	330	52	154	200	161	-772	4,874
Apache pine	-13	12	18	9	-163	--	19	22	22	81	--	--	--	7
Arizona cypress	173	123	41	58	87	8	12	19	--	--	--	--	--	521
Arizona pinyon pine[a]	791	291	148	75	137	59	14	21	2	--	--	--	--	1,539
Blue spruce	54	34	169	228	92	61	59	67	-700	--	--	--	--	64
Border pinyon[a]	445	64	83	124	9	28	17	8	--	--	--	--	--	777
California juniper[a]	4	7	9	7	--	--	--	--	--	--	--	--	--	27
Chihuahua pine	77	37	42	42	24	39	--	--	--	--	--	--	--	261
Corkbark fir	445	116	36	104	-54	240	25	--	62	--	--	--	--	975
Douglas-fir	3,012	1,914	2,611	1,541	1,433	837	1,373	770	-1,496	-274	447	180	-579	11,768
Engelmann spruce	875	841	457	692	877	-16	308	-570	526	-833	--	--	65	3,222
Mexican pinyon pine[a]	83	24	-17	6	4	5	3	--	--	--	--	--	--	109
Oneseed juniper[a]	1,048	554	738	910	863	921	888	735	735	363	277	169	500	8,700
Ponderosa pine	15,879	13,504	16,679	15,160	12,687	9,236	7,523	5,786	5,464	4,450	1,493	1,817	2,053	111,732
Redberry juniper[a]	7	11	9	29	35	40	26	--	3	5	5	11	3	185
Rocky Mountain juniper[a]	207	115	107	109	93	71	45	25	17	12	20	--	40	860
Singleleaf pinyon[a]	337	214	175	146	76	-163	5	--	7	--	--	--	--	796
Southwestern white pine	609	361	371	179	393	164	12	40	57	127	47	37	77	2,475
Subalpine fir	-75	-58	-77	-544	158	-243	14	--	--	--	--	--	--	-826
Twoneedle pinyon[a]	7,615	2,971	2,817	2,348	1,386	196	-13	324	156	40	51	--	7	17,900
Utah juniper[a]	2,792	1,352	1,539	1,526	1,448	1,557	1,489	1,171	850	471	428	294	543	15,461
White fir	818	705	846	752	100	88	620	128	601	136	121	274	-1,005	4,186
Softwood total	36,470	23,809	27,534	24,126	20,323	13,492	12,927	8,876	6,359	4,733	3,090	2,943	932	185,614
Arizona white oak[a]	1,815	748	647	569	448	280	153	-28	96	-117	43	--	29	4,682
Aspen	463	-301	166	125	288	274	288	-576	87	--	--	--	--	814
Bigtooth maple[a]	248	20	17	4	41	--	--	--	--	--	--	--	--	330
Boxelder	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	55	48	36	10	12	27	38	--	--	--	--	--	--	226
Desert ironwood[a]	27	-5	-28	4	6	5	7	1	--	--	2	3	--	23
Emory oak[a]	909	369	413	342	261	137	104	30	28	9	15	19	--	2,636
Gambel oak[a]	5,947	1,036	553	325	244	177	101	108	43	49	82	22	44	8,730
Mesquite[a]	327	107	142	18	59	30	20	5	--	--	--	--	--	708
Mexican blue oak[a]	13	30	31	49	53	17	5	12	7	6	8	4	--	236
New Mexico locust[a]	202	6	1	3	--	--	--	--	--	--	--	--	--	211
Oak--evergreen[a]	97	9	-20	16	9	--	14	--	--	--	--	--	--	125
Rocky Mountain maple[a]	4	3	7	3	--	--	--	--	--	--	--	--	--	17
Silverleaf oak[a]	265	81	131	99	53	43	12	17	10	--	4	--	--	714
Velvet mesquite[a]	285	111	128	78	-9	31	21	24	6	2	4	5	--	687
W. honey mesquite[a]	264	58	74	31	13	3	6	--	--	--	--	--	10	461
Hardwood total	10,922	2,320	2,300	1,675	1,477	1,022	770	-407	278	-51	158	53	83	20,599
All species	47,392	26,129	29,834	25,801	21,800	14,513	13,697	8,469	6,637	4,682	3,249	2,996	1,016	206,214

[a]Diameter taken at root collar rather than at breast height.

Table 23--Annual mortality of all trees on forest land by species and owner group, Arizona, 1998

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Alligator juniper[a]	1,656	--	146	1,802
Apache pine	196	--	--	196
Arizona cypress	42	--	--	42
Arizona pinyon pine[a]	125	--	144	269
Blue spruce	--	700	39	739
Border pinyon[a]	418	--	--	418
California juniper[a]	--	--	--	--
Chihuahua pine	11	8	--	19
Corkbark fir	180	--	367	547
Douglas-fir	6,649	40	202	6,891
Engelmann spruce	2,836	658	1,829	5,322
Mexican pinyon pine[a]	27	--	--	27
Oneseed juniper[a]	18	--	131	150
Ponderosa pine	7,895	902	2,704	11,501
Redberry juniper[a]	--	--	--	--
Rocky Mountain juniper[a]	4	--	--	4
Singleleaf pinyon[a]	13	--	193	206
Southwestern white pine	10	--	161	171
Subalpine fir	291	1,356	--	1,647
Twoneedle pinyon[a]	829	81	1,784	2,694
Utah juniper[a]	191	--	--	191
White fir	2,486	1,693	87	4,267
Softwood total	23,877	5,438	7,787	37,102
Arizona white oak[a]	588	--	289	877
Aspen	2,424	2,420	2,333	7,176
Bigtooth maple[a]	--	--	--	--
Boxelder	--	--	--	--
Cottonwood	--	--	--	--
Desert ironwood[a]	16	35	--	50
Emory oak[a]	76	5	24	105
Gambel oak[a]	701	--	132	833
Mesquite[a]	--	--	141	141
Mexican blue oak[a]	--	--	--	--
New Mexico locust[a]	16	--	--	16
Oak--evergreen[a]	--	17	51	68
Rocky Mountain maple[a]	--	--	--	--
Silverleaf oak[a]	139	--	--	139
Velvet mesquite[a]	8	63	--	71
W. honey mesquite[a]	--	--	--	--
Hardwood total	3,967	2,539	2,970	9,476
All species	27,845	7,977	10,757	46,579

[a]Diameter taken at root collar rather than at breast height.

Table 24--Annual mortality of all trees on forest land by species and diameter class, Arizona, 1998

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	49	20	18	46	50	216	--	--	159	--	--	--	1,244	1,802
Apache pine	16	--	--	--	180	--	--	--	--	--	--	--	--	196
Arizona cypress	9	--	33	--	--	--	--	--	--	--	--	--	--	42
Arizona pinyon pine[a]	7	--	132	131	--	--	--	--	--	--	--	--	--	269
Blue spruce	16	23	--	--	--	--	--	--	700	--	--	--	--	739
Border pinyon[a]	80	165	94	--	78	--	--	--	--	--	--	--	--	418
California juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chihuahua pine	--	19	--	--	--	--	--	--	--	--	--	--	--	19
Corkbark fir	14	86	173	115	159	--	--	--	--	--	--	--	--	547
Douglas-fir	210	254	159	578	531	626	--	--	2,073	818	--	--	1,642	6,891
Engelmann spruce	133	312	879	633	223	687	371	1,163	--	921	--	--	--	5,322
Mexican pinyon pine[a]	--	--	27	--	--	--	--	--	--	--	--	--	--	27
Oneseed juniper[a]	--	--	18	--	--	131	--	--	--	--	--	--	--	150
Ponderosa pine	1,068	1,760	1,167	1,350	1,056	1,333	595	1,137	870	--	1,166	--	--	11,501
Redberry juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	4	--	--	--	--	--	--	--	--	--	--	--	--	4
Singleleaf pinyon[a]	13	--	--	--	--	193	--	--	--	--	--	--	--	206
Southwestern white pine	21	44	10	96	--	--	--	--	--	--	--	--	--	171
Subalpine fir	175	138	185	848	--	301	--	--	--	--	--	--	--	1,647
Twoneedle pinyon[a]	179	381	521	336	210	592	474	--	--	--	--	--	--	2,694
Utah juniper[a]	12	19	24	73	62	--	--	--	--	--	--	--	--	191
White fir	148	210	332	490	703	609	455	276	--	--	--	--	1,043	4,267
Softwood total	2,152	3,430	3,772	4,698	3,253	4,689	1,895	2,577	3,802	1,738	1,166	--	3,929	37,102
Arizona white oak[a]	138	52	111	46	65	71	30	183	--	181	--	--	--	877
Aspen	513	1,384	1,312	1,540	749	854	84	740	--	--	--	--	--	7,176
Bigtooth maple[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boxelder	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Desert ironwood[a]	5	11	35	--	--	--	--	--	--	--	--	--	--	50
Emory oak[a]	14	18	49	--	24	--	--	--	--	--	--	--	--	105
Gambel oak[a]	325	164	192	152	--	--	--	--	--	--	--	--	--	833
Mesquite[a]	--	45	--	95	--	--	--	--	--	--	--	--	--	141
Mexican blue oak[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New Mexico locust[a]	16	--	--	--	--	--	--	--	--	--	--	--	--	16
Oak--evergreen[a]	--	17	51	--	--	--	--	--	--	--	--	--	--	68
Silverleaf oak[a]	67	72	--	--	--	--	--	--	--	--	--	--	--	139
Velvet mesquite[a]	8	--	--	--	63	--	--	--	--	--	--	--	--	71
W. honey mesquite[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	1,086	1,763	1,750	1,833	901	925	114	923	--	181	--	--	--	9,476
All species	3,238	5,194	5,522	6,531	4,154	5,614	2,009	3,500	3,802	1,919	1,166	--	3,929	46,579

[a]Diameter taken at root collar rather than at breast height.

Table 25--Annual mortality of all trees on forest land by species and cause of death, Arizona, 1998

Species	Cause of death							
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Total
	Thousand cubic feet							
Alligator juniper[a]	23	343	1,436	--	--	--	--	1,802
Apache pine	--	--	196	--	--	--	--	196
Arizona cypress	--	--	42	--	--	--	--	42
Arizona pinyon pine[a]	--	144	59	--	--	--	67	269
Blue spruce	--	700	--	--	--	39	--	739
Border pinyon[a]	9	--	356	--	52	--	--	418
California juniper[a]	--	--	--	--	--	--	--	--
Chihuahua pine	--	11	--	--	8	--	--	19
Corkbark fir	285	183	--	79	--	--	--	547
Douglas-fir	3,315	2,843	435	10	263	25	--	6,891
Engelmann spruce	200	4,842	58	22	183	16	--	5,322
Mexican pinyon pine[a]	--	27	--	--	--	--	--	27
Oneseed juniper[a]	--	--	150	--	--	--	--	150
Ponderosa pine	3,156	2,453	2,827	--	2,509	324	232	11,501
Redberry juniper[a]	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	--	--	--	--	--	--	4	4
Singleleaf pinyon[a]	193	13	--	--	--	--	--	206
Southwestern white pine	--	10	96	64	--	--	--	171
Subalpine fir	147	1,274	226	--	--	--	--	1,647
Twoneedle pinyon[a]	343	1,256	131	--	645	--	319	2,694
Utah juniper[a]	--	39	118	--	35	--	--	191
White fir	40	3,406	773	31	16	--	--	4,267
Softwood total	7,712	17,544	6,903	206	3,711	404	622	37,102
Arizona white oak[a]	--	633	148	--	--	38	58	877
Aspen	63	6,492	55	--	384	101	81	7,176
Bigtooth maple[a]	--	--	--	--	--	--	--	--
Boxelder	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--
Desert ironwood[a]	--	35	16	--	--	--	--	50
Emory oak[a]	--	32	11	--	39	24	--	105
Gambel oak[a]	--	40	335	--	244	79	136	833
Mesquite[a]	--	141	--	--	--	--	--	141
Mexican blue oak[a]	--	--	--	--	--	--	--	--
New Mexico locust[a]	--	--	16	--	--	--	--	16
Oak--evergreen[a]	--	--	--	--	--	--	68	68
Rocky Mountain maple[a]	--	--	--	--	--	--	--	--
Silverleaf oak[a]	13	--	114	--	--	--	12	139
Velvet mesquite[a]	--	4	4	--	--	--	63	71
W. honey mesquite[a]	--	--	--	--	--	--	--	--
Hardwood total	77	7,375	698	--	668	242	418	9,476
All species	7,789	24,919	7,601	206	4,379	646	1,039	46,579

[a]Diameter taken at root collar rather than at breast height.

Table 26--Average percent crown canopy cover by life form, average percent bare ground, total number and most common understory species recorded by forest type, and number of locations, Arizona, 1998

Forest type	Average shrub cover	Average forb cover	Average grass cover	Average bare ground	Total number of different species recorded	Most common understory species recorded[a]	Number of locations[b]
	- - - - - - - - - - - - - - - - - - Percent - - - - - - - - - - - - - - - - - -						
Aspen	4	10	6	2	27	Sedge	23.37
Blue spruce	1	2	12	3	4	Arizona fescue	2.75
Cottonwood	2	3	2	2	4	Skunkbush sumac	2.20
Deciduous woodland oak	6	3	8	5	30	Mountain muhly	44.44
Douglas-fir	3	3	3	2	20	Screwleaf muhly	37.62
Engelmann spruce	3	7	7	3	25	Common juniper	20.00
Spruce/fir	2	4	2	0	1	Clubmoss	3.00
Evergreen oak	14	2	11	4	117	Pointleaf manzanita	236.62
Juniper	11	4	16	17	135	Blue grama	386.45
Maple	10	9	5	4	7	Fendler meadowrue	0.71
Mesquite	16	15	24	20	106	Sideoats grama	140.25
Misc. western hardwoods	24	9	5	24	27	Creosotebush	13.53
Misc. western softwoods	19	2	3	3	14	Pointleaf manzanita	14.71
Pinyon-juniper	14	3	9	17	170	Blue grama	1089.12
Ponderosa pine	2	3	7	3	98	Mountain muhly	477.61
White fir	3	3	2	2	9	Common juniper	14.45
Nonstocked							182.86
Total							2689.70

[a]To be recorded, species had to have 5% or greater cover on a condition.
[b]Fractions due to mapping.

Table 27--Area, volume, growth, and mortality of live trees on forest land by county, Arizona

County	Area (1999)	Volume (1999)	Growth (1998)	Mortality (1998)
	- -Acres - -	*- - - - - - Thousand cubic feet - - - - - - - -*		
Apache	2,869,127	3,323,761	55,523	7,881
Cochise	675,714	269,151	815	3,023
Coconino	4,662,081	5,172,953	67,791	22,145
Gila	1,922,409	1,484,189	18,132	2,384
Graham	897,201	645,335	9,631	802
Greenlee	684,188	682,028	7,991	4,678
La Paz	5,789	89	1	--
Maricopa	163,311	29,498	-842	1,187
Mohave	1,520,330	617,824	6,477	68
Navajo	2,188,618	1,871,431	24,631	3,362
Pima	1,257,257	276,857	2,727	259
Pinal	213,360	42,862	425	66
Santa Cruz	420,780	143,556	1,537	35
Yavapai	1,925,870	1,000,851	11,367	688
Yuma	20,936	2,127	8	--
Total	19,426,972	15,562,512	206,214	46,579

Table 28--Area of nonreserved forest land by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class 85-119	50-84	20-49	0-19	Total
			Acres		
Aspen					
Sawtimber	--	46,408	14,202	--	60,610
Poletimber	--	17,348	7,845	--	25,193
Sapling/seedling	--	--	17,510	--	17,510
Nonstocked	--	--	--	--	--
Total	--	63,756	39,557	--	103,313
Blue spruce					
Sawtimber	1,580	12,277	--	--	13,858
Poletimber	--	--	--	--	--
Sapling/seedling	--	3,148	--	--	3,148
Nonstocked	--	--	--	--	--
Total	1,580	15,425	--	--	17,006
Cottonwood					
Sawtimber	--	--	10,753	--	10,753
Poletimber	--	--	2,973	--	2,973
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	13,726	--	13,726
Deciduous woodland oak					
Sawtimber	--	--	--	100,916	100,916
Poletimber	--	--	--	85,367	85,367
Sapling/seedling	--	--	--	96,560	96,560
Nonstocked	--	--	--	--	--
Total	--	--	--	282,842	282,842
Douglas-fir					
Sawtimber	--	86,537	98,028	--	184,566
Poletimber	--	--	13,290	--	13,290
Sapling/seedling	4,741	--	4,890	--	9,631
Nonstocked	--	--	--	--	--
Total	4,741	86,537	116,208	--	207,487
Engelmann spruce					
Sawtimber	9,532	70,303	17,545	--	97,380
Poletimber	--	--	6,276	--	6,276
Sapling/seedling	--	--	3,354	--	3,354
Nonstocked	--	--	--	--	--
Total	9,532	70,303	27,175	--	107,010
Evergreen oak					
Sawtimber	--	--	--	1,183,259	1,183,259
Poletimber	--	--	--	179,802	179,802
Sapling/seedling	--	--	--	41,709	41,709
Nonstocked	--	--	--	--	--
Total	--	--	--	1,404,771	1,404,771
Juniper					
Sawtimber	--	--	--	2,444,611	2,444,611
Poletimber	--	--	--	499,098	499,098
Sapling/seedling	--	--	--	49,270	49,270
Nonstocked	--	--	--	--	--
Total	--	--	--	2,992,979	2,992,979
Mesquite					
Sawtimber	--	--	--	406,628	406,628
Poletimber	--	--	--	801,210	801,210
Sapling/seedling	--	--	--	130,412	130,412
Nonstocked	--	--	--	--	--
Total	--	--	--	1,338,250	1,338,250

(con.)

Table 28 (Con.)

Forest type and stand-size class	Productivity class 85-119	50-84	20-49	0-19	Total
			Acres		
Misc. western hardwoods					
Sawtimber	--	--	--	29,506	29,506
Poletimber	--	--	--	58,751	58,751
Sapling/seedling	--	--	--	24,177	24,177
Nonstocked	--	--	--	--	--
Total	--	--	--	112,434	112,434
Other western softwoods					
Sawtimber	--	7,289	10,892	25,364	43,545
Poletimber	--	--	--	6,288	6,288
Sapling/seedling	--	6,321	4,716	--	11,037
Nonstocked	--	--	--	--	--
Total	--	13,611	15,608	31,652	60,870
Pinyon-juniper					
Sawtimber	--	--	--	5,062,058	5,062,058
Poletimber	--	--	--	1,667,221	1,667,221
Sapling/seedling	--	--	--	253,411	253,411
Nonstocked	--	--	--	--	--
Total	--	--	--	6,982,690	6,982,690
Ponderosa pine					
Sawtimber	6,288	605,400	2,031,979	6,288	2,649,956
Poletimber	--	--	137,414	--	137,414
Sapling/seedling	--	18,412	71,364	--	89,776
Nonstocked	--	--	--	--	--
Total	6,288	623,813	2,240,756	6,288	2,877,145
Spruce-fir					
Sawtimber	--	4,890	7,027	--	11,918
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	4,890	7,027	--	11,918
White fir					
Sawtimber	4,716	48,293	20,209	--	73,219
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	4,716	48,293	20,209	--	73,219
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	18,934	74,333	--	93,268
Total	--	18,934	74,333	--	93,268
Nonstocked woodland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	929,764	929,764
Total	--	--	--	929,764	929,764
All types					
Sawtimber	22,117	881,399	2,210,636	9,258,631	12,372,783
Poletimber	--	17,348	167,797	3,297,736	3,482,882
Sapling/seedling	4,741	27,881	101,834	595,539	729,995
Nonstocked	--	18,934	74,333	929,764	1,023,032
Total	26,857	945,563	2,554,601	14,081,670	17,608,691

Table 29--Area of nonreserved forest land by stand volume and owner group, Arizona, 1999

Stand volume per acre[a]	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Acres			
Less than 1,500 board feet	4,974,005	2,394,889	6,835,692	14,204,585
1,500 to 4,999 board feet	893,735	20,672	450,814	1,365,222
5,000 to 9,999 board feet	697,792	17,377	373,742	1,088,911
10,000 board feet or more	654,985	11,585	283,403	949,973
Total	7,220,517	2,444,523	7,943,651	17,608,691

[a]International ¼-inch rule.

Table 30--Area of nonreserved forest land by forest type and stocking condition, Arizona, 1999

Forest type	Stocking condition						
	Overstocked timberland	Fully stocked timberland	Medium to fully stocked timberland	Poorly stocked timberland	Nonstocked timberland	Woodland	Total
	Acres						
Aspen	15,445	49,238	27,547	11,083	--	--	103,313
Blue spruce	--	7,375	7,889	1,742	--	--	17,006
Cottonwood	--	6,223	4,530	2,973	--	--	13,726
Deciduous woodland oak	--	--	--	--	--	282,842	282,842
Douglas-fir	26,827	61,043	84,557	35,059	--	--	207,487
Engelmann spruce	1,580	47,241	24,706	33,483	--	--	107,010
Evergreen oak	--	--	--	--	--	1,404,771	1,404,771
Juniper	--	--	--	--	--	2,992,979	2,992,979
Mesquite	--	--	--	--	--	1,338,250	1,338,250
Misc. western hardwoods	--	--	--	--	--	112,434	112,434
Other western softwoods	--	20,141	17,109	23,621	--	--	60,870
Pinyon-juniper	--	--	--	--	--	6,982,690	6,982,690
Ponderosa pine	32,287	640,960	1,249,318	954,580	--	--	2,877,145
Spruce-fir	--	11,918	--	--	--	--	11,918
White fir	1,223	34,146	31,579	6,271	--	--	73,219
Nonstocked timberland	--	--	--	--	93,268	--	93,268
Nonstocked woodland	--	--	--	--	--	929,764	929,764
All types	77,362	878,284	1,447,236	1,068,812	93,268	14,043,730	17,608,691

Table 31--Area of nonreserved forest land by forest type and stand-age class, Arizona, 1999

Forest type	Stand-age class										All classes
	Nonstocked/ Unclassified	1-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	
	Acres										
Aspen	--	26,957	61,994	14,363	--	--	--	--	--	--	103,313
Blue spruce	--	3,148	13,858	--	--	--	--	--	--	--	17,006
Cottonwood	--	2,973	4,530	6,223	--	--	--	--	--	--	13,726
Deciduous woodland oak	12,057	102,635	81,044	87,106	--	--	--	--	--	--	282,842
Douglas-fir	--	16,234	81,843	73,158	29,893	6,358	--	--	--	--	207,487
Engelmann spruce	--	3,354	65,272	31,356	7,027	--	--	--	--	--	107,010
Evergreen oak	111,833	101,250	221,324	569,529	255,909	90,716	52,541	1,669	--	--	1,404,771
Juniper	64,266	220,858	1,327,842	882,397	383,099	31,808	76,558	4,580	--	1,572	2,992,979
Mesquite	215,286	739,147	209,050	110,201	48,923	12,588	3,053	--	--	--	1,338,250
Misc. western hardwoods	58,751	24,177	23,615	--	5,891	--	--	--	--	--	112,434
Other western softwoods	--	11,037	12,617	15,190	22,026	--	--	--	--	--	60,870
Pinyon-juniper	166,025	600,765	1,937,937	2,260,043	1,349,510	404,513	191,128	53,757	11,829	7,182	6,982,690
Ponderosa pine	--	143,422	1,623,123	869,270	212,474	16,427	6,354	6,075	--	--	2,877,145
Spruce-fir	--	--	4,890	--	7,027	--	--	--	--	--	11,918
White fir	--	--	21,643	45,299	6,276	--	--	--	--	--	73,219
Nonstocked timberland	93,268	--	--	--	--	--	--	--	--	--	93,268
Nonstocked woodland	929,764	--	--	--	--	--	--	--	--	--	929,764
All types	1,651,250	1,995,957	5,690,584	4,964,136	2,328,057	562,409	329,634	66,082	11,829	8,754	17,608,691

Table 32--Number of live trees on nonreserved forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand trees															
Alligator juniper[a]	94,154	53,692	32,247	22,259	15,693	11,122	7,699	5,544	3,237	2,469	1,568	1,061	1,228	880	2,111	254,964
Apache pine	486	486	39	39	117	39	--	--	--	39	--	--	--	--	--	1,245
Arizona cypress	7,801	1,941	723	341	302	115	187	--	39	37	--	--	--	--	--	11,487
Arizona pinyon pine[a]	17,945	5,670	5,905	3,532	2,091	1,400	784	320	112	40	32	--	--	--	--	37,833
Blue spruce	474	553	433	245	327	330	188	44	38	38	--	--	--	--	--	2,670
Border pinyon[a]	11,525	5,684	5,133	3,659	1,426	545	302	116	80	39	--	--	--	--	--	28,509
California juniper[a]	898	898	349	267	289	239	--	--	--	--	--	--	--	--	--	2,941
Chihuahua pine	1,886	943	1,029	531	303	151	38	--	--	--	--	--	--	--	--	4,881
Corkbark fir	5,968	2,823	1,367	830	635	360	283	282	85	--	29	--	--	--	--	12,662
Douglas-fir	52,655	25,852	14,427	9,844	7,138	3,991	2,802	1,872	1,212	744	392	331	388	119	725	122,490
Engelmann spruce	13,099	13,315	4,524	3,653	2,916	2,406	1,298	731	618	550	283	42	--	--	38	43,474
Mexican pinyon pine[a]	1,439	944	769	425	114	--	39	38	--	--	--	--	--	--	--	3,768
Oneseed juniper[a]	47,815	25,632	28,088	24,562	23,360	22,135	16,591	16,256	10,759	9,378	7,303	4,244	3,234	1,924	4,017	245,296
Ponderosa pine	209,375	151,275	106,359	85,188	63,509	42,231	26,736	16,579	10,997	7,376	5,019	3,820	1,757	1,431	1,648	733,299
Redberry juniper[a]	465	--	268	325	150	487	301	298	150	--	--	37	30	39	37	2,588
Rocky Mountain juniper[a]	23,022	13,983	4,587	3,262	1,886	1,751	1,003	789	712	304	196	185	115	--	310	52,106
Singleleaf pinyon[a]	8,126	3,400	2,974	2,424	1,427	1,001	402	171	73	--	41	--	--	--	--	20,038
Southwestern white pine	4,559	969	2,002	1,866	993	517	658	352	44	104	59	67	44	37	44	12,314
Subalpine fir	367	--	134	118	146	201	39	67	--	--	--	--	--	--	--	1,072
Twoneedle pinyon[a]	285,551	149,195	107,875	76,310	48,240	31,147	15,708	7,564	3,496	2,224	899	242	354	--	--	728,804
Utah juniper[a]	120,563	60,162	63,031	50,785	42,438	31,669	23,877	20,159	15,363	13,067	8,807	5,110	4,094	2,862	4,017	466,003
White fir	26,456	9,350	5,467	4,435	3,034	2,136	1,227	832	836	347	395	151	73	237	52	55,028
Softwood total	934,626	526,769	387,730	294,902	216,533	153,972	100,161	72,015	47,851	36,758	25,022	15,290	11,317	7,528	12,998	2,843,472
Arizona white oak[a]	81,876	44,331	40,158	31,496	21,060	12,699	7,869	4,683	2,599	1,776	1,003	520	266	--	316	250,651
Aspen	43,207	10,589	5,626	4,973	4,456	3,174	1,713	1,328	328	213	38	--	--	--	--	75,646
Bigtooth maple[a]	5,686	2,870	944	305	78	35	194	--	--	--	--	--	--	--	--	10,112
Cottonwood	--	933	112	150	112	37	37	37	37	--	--	--	--	--	--	1,458
Desert ironwood[a]	859	3,109	640	429	270	74	68	123	184	--	--	--	--	57	--	5,812
Emory oak[a]	46,302	19,848	20,100	17,686	11,310	6,104	3,985	1,791	1,481	451	308	106	64	33	--	129,571
Gambel oak[a]	435,495	87,330	59,285	23,253	8,635	4,664	2,236	1,294	835	820	340	436	264	119	261	625,269
Mesquite[a]	59,918	18,783	14,552	9,982	6,310	3,278	1,723	998	491	115	--	--	--	--	--	116,150
Mexican blue oak[a]	--	--	867	1,246	738	1,288	952	147	109	182	109	72	74	35	--	5,821
New Mexico locust[a]	74,824	8,563	956	191	38	71	--	--	--	--	--	--	--	--	--	84,643
Oak--evergreen[a]	15,666	7,302	4,285	1,750	1,853	784	375	--	280	--	--	--	--	--	--	32,295
Rocky Mountain maple[a]	--	--	177	35	109	35	--	--	--	--	--	--	--	--	--	357
Silverleaf oak[a]	31,814	10,525	5,421	3,372	2,102	912	342	419	203	74	76	--	76	--	--	55,337
Velvet mesquite[a]	13,551	3,713	5,579	3,715	2,389	952	586	295	257	208	74	--	--	37	--	31,358
W. honey mesquite[a]	8,952	8,813	2,829	1,886	1,560	425	225	74	74	--	--	--	--	--	74	24,911
Hardwood total	818,151	226,710	161,533	100,471	61,022	34,532	20,306	11,190	6,878	3,840	1,948	1,135	744	282	650	1,449,391
All species	1,752,777	753,478	549,264	395,373	277,555	188,504	120,467	83,205	54,729	40,597	26,969	16,425	12,062	7,810	13,648	4,292,863

[a]Diameter taken at root collar rather than at breast height.

Table 33--Total oven-dry weight of biomass of all live trees on nonreserved forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches)															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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand tons															
Alligator juniper[a]	54	198	277	441	624	713	805	816	677	714	581	509	669	568	2,496	10,142
Apache pine	2	10	2	2	16	8	--	--	--	36	--	--	--	--	--	77
Arizona cypress	39	42	27	20	30	19	51	--	20	30	--	--	--	--	--	279
Arizona pinyon pine[a]	12	22	102	143	161	188	147	89	38	22	12	--	--	--	--	936
Blue spruce	2	12	20	26	56	94	70	22	27	38	--	--	--	--	--	366
Border pinyon[a]	5	15	65	107	96	62	43	22	21	12	--	--	--	--	--	450
California juniper[a]	1	3	2	5	6	7	--	--	--	--	--	--	--	--	--	23
Chihuahua pine	9	20	42	31	34	26	14	--	--	--	--	--	--	--	--	176
Corkbark fir	30	61	55	69	107	96	118	184	55	--	39	--	--	--	--	814
Douglas-fir	290	633	711	973	1,256	1,097	1,171	1,076	939	742	483	476	664	235	2,622	13,369
Engelmann spruce	79	286	178	345	505	659	558	406	512	580	418	80	--	--	80	4,686
Mexican pinyon pine[a]	([b])	2	12	14	6	--	5	7	--	--	--	--	--	--	--	46
Oneseed juniper[a]	24	89	192	392	729	1,095	1,325	1,943	1,770	1,976	2,075	1,379	1,196	865	2,989	18,038
Ponderosa pine	1,047	3,025	5,068	7,084	9,449	10,400	10,139	9,144	8,624	7,734	7,557	7,152	4,065	3,870	6,592	100,950
Redberry juniper[a]	([b])	--	2	6	5	29	28	49	23	--	--	17	13	27	29	227
Rocky Mountain juniper[a]	16	72	62	90	108	152	132	139	172	105	82	83	87	--	241	1,542
Singleleaf pinyon[a]	3	13	49	102	100	122	74	51	25	--	27	--	--	--	--	565
Southwestern white pine	23	21	96	143	143	119	226	182	23	90	69	92	90	82	120	1,518
Subalpine fir	2	--	5	10	24	61	18	35	--	--	--	--	--	--	--	156
Twoneedle pinyon[a]	139	575	1,651	2,674	3,254	3,501	2,628	1,800	1,033	833	391	122	219	--	--	18,821
Utah juniper[a]	68	200	453	866	1,400	1,797	2,022	2,508	2,714	2,950	2,591	1,702	1,758	1,360	2,769	25,157
White fir	132	201	238	388	465	512	441	427	578	312	441	236	126	519	107	5,123
Softwood total	1,979	5,501	9,306	13,931	18,576	20,755	20,014	18,900	17,250	16,176	14,766	11,846	8,887	7,526	18,046	203,460
Arizona white oak[a]	135	339	1,106	1,799	2,079	1,985	1,842	1,600	1,093	930	716	431	256	--	542	14,853
Aspen	86	101	253	531	952	1,125	850	953	287	204	43	--	--	--	--	5,385
Bigtooth maple[a]	13	32	37	30	20	7	73	--	--	--	--	--	--	--	--	212
Cottonwood	--	9	3	9	14	8	11	14	20	--	--	--	--	--	--	87
Desert ironwood[a]	1	31	11	19	16	10	9	28	64	--	--	--	--	45	--	234
Emory oak[a]	71	147	545	965	1,175	1,006	996	648	696	238	214	94	78	54	--	6,928
Gambel oak[a]	903	1,070	2,931	2,415	1,693	1,446	966	753	623	714	370	493	384	221	652	15,634
Mesquite[a]	132	166	460	647	693	652	456	315	261	68	--	--	--	--	--	3,852
Mexican blue oak[a]	--	--	26	74	76	184	210	47	48	102	60	66	72	32	--	996
New Mexico locust[a]	137	115	63	21	7	19	--	--	--	--	--	--	--	--	--	362
Oak--evergreen[a]	23	46	104	73	151	91	58	--	107	--	--	--	--	--	--	653
Rocky Mountain maple[a]	--	--	7	3	17	7	--	--	--	--	--	--	--	--	--	33
Silverleaf oak[a]	58	81	183	232	246	199	111	165	91	54	60	--	78	--	--	1,558
Velvet mesquite[a]	18	27	170	214	277	180	176	116	126	119	53	--	--	23	--	1,498
W. honey mesquite[a]	23	62	93	122	232	82	67	26	42	--	--	--	--	--	178	927
Hardwood total	1,601	2,227	5,994	7,155	7,648	6,998	5,825	4,664	3,459	2,429	1,515	1,083	868	375	1,372	53,212
All species	3,580	7,728	15,300	21,086	26,223	27,754	25,839	23,564	20,709	18,605	16,281	12,929	9,755	7,901	19,418	256,672

[a]Diameter taken at root collar rather than at breast height.
[b]Less than 500 tons.

Table 34--Net volume of all live trees on nonreserved forest land by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Aspen	166,673	78,986	1,770	--	247,429
Blue spruce	36,676	--	243	--	36,919
Cottonwood	15,345	317	--	--	15,662
Deciduous woodland oak	158,418	112,213	24,935	--	295,566
Douglas-fir	606,342	16,157	4,760	--	627,259
Engelmann spruce	304,428	8,045	397	--	312,870
Evergreen oak	755,667	48,434	5,245	--	809,346
Juniper	1,174,287	95,479	1,803	--	1,271,570
Mesquite	79,083	70,195	6,207	--	155,484
Misc. western hardwoods	2,671	561	3,644	--	6,876
Other western softwoods	65,004	1,118	6,408	--	72,529
Pinyon-juniper	3,821,314	704,620	21,521	--	4,547,455
Ponderosa pine	5,107,766	98,567	26,677	--	5,233,010
Spruce-fir	50,079	--	--	--	50,079
White fir	210,140	--	--	--	210,140
Nonstocked timberland	--	--	--	10,620	10,620
Nonstocked woodland	--	--	--	33,817	33,817
All types	12,553,892	1,234,693	103,610	44,437	13,936,631

Table 35--Net volume of all live trees on nonreserved forest land by species and owner group, Arizona, 1999

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Alligator juniper[a]	438,884	7,335	351,030	797,249
Apache pine	3,178	--	--	3,178
Arizona cypress	8,127	--	--	8,127
Arizona pinyon pine[a]	67,489	--	7,786	75,275
Blue spruce	1,390	--	21,546	22,936
Border pinyon[a]	30,440	3,342	2,428	36,210
California juniper[a]	--	1,162	647	1,809
Chihuahua pine	783	--	5,197	5,980
Corkbark fir	21,939	--	26,159	48,098
Douglas-fir	432,042	--	211,629	643,670
Engelmann spruce	132,936	--	158,643	291,579
Mexican pinyon pine[a]	3,697	--	--	3,697
Oneseed juniper[a]	344,279	98,622	870,345	1,313,247
Ponderosa pine	3,364,909	74,158	1,518,406	4,957,473
Redberry juniper[a]	14,284	--	4,341	18,625
Rocky Mountain juniper[a]	30,009	99	83,440	113,548
Singleleaf pinyon[a]	24,044	--	21,336	45,380
Southwestern white pine	70,956	--	15,789	86,745
Subalpine fir	10,084	--	--	10,084
Twoneedle pinyon[a]	495,282	99,726	900,811	1,495,820
Utah juniper[a]	548,689	511,155	877,768	1,937,613
White fir	217,131	--	48,170	265,301
Softwood total	6,260,574	795,599	5,125,472	12,181,645
Arizona white oak[a]	250,419	3,243	209,394	463,056
Aspen	136,100	--	154,947	291,047
Bigtooth maple[a]	312	--	7,552	7,864
Cottonwood	3,055	--	1,775	4,830
Desert ironwood[a]	148	4,141	1,769	6,058
Emory oak[a]	147,198	3,890	94,144	245,231
Gambel oak[a]	271,416	10,661	186,233	468,310
Mesquite[a]	25	42,356	54,526	96,907
Mexican blue oak[a]	32,438	--	490	32,928
New Mexico locust[a]	1,575	281	1,613	3,469
Oak--evergreen[a]	833	5,322	11,435	17,590
Rocky Mountain maple[a]	1,385	--	133	1,517
Silverleaf oak[a]	39,010	--	8,465	47,474
Velvet mesquite[a]	25,810	5,044	12,005	42,858
W. honey mesquite[a]	25,622	--	226	25,848
Hardwood total	935,343	74,936	744,707	1,754,987
All species	7,195,917	870,535	5,870,179	13,936,631

[a]Diameter taken at root collar rather than at breast height.

Table 36--Net volume of all live trees on nonreserved forest land by species and diameter class, Arizona, 1999

Species	Diameter class (inches)													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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Alligator juniper[a]	28,003	41,891	56,286	63,258	69,482	68,883	56,497	57,696	44,835	38,754	51,843	42,885	176,936	797,249
Apache pine	53	107	805	408	--	--	--	1,806	--	--	--	--	--	3,178
Arizona cypress	658	827	1,339	853	2,204	--	825	1,422	--	--	--	--	--	8,127
Arizona pinyon pine[a]	8,827	12,202	13,476	15,636	12,092	7,190	3,115	1,777	960	--	--	--	--	75,275
Blue spruce	968	1,568	3,495	6,295	4,676	1,372	1,859	2,703	--	--	--	--	--	22,936
Border pinyon[a]	5,684	9,208	8,069	5,134	3,582	1,851	1,698	983	--	--	--	--	--	36,210
California juniper[a]	181	477	527	623	--	--	--	--	--	--	--	--	--	1,809
Chihuahua pine	1,193	1,298	1,616	1,194	680	--	--	--	--	--	--	--	--	5,980
Corkbark fir	2,640	3,919	6,881	6,434	8,239	13,174	3,925	--	2,886	--	--	--	--	48,098
Douglas-fir	28,781	43,804	60,608	55,137	61,121	56,572	50,463	40,384	26,558	26,046	35,806	12,910	145,480	643,670
Engelmann spruce	8,150	20,019	32,087	43,367	38,313	28,383	36,853	42,312	30,383	6,062	--	--	5,649	291,579
Mexican pinyon pine[a]	1,037	1,182	495	--	390	593	--	--	--	--	--	--	--	3,697
Oneseed juniper[a]	18,348	35,170	61,057	90,186	104,100	147,791	134,037	142,686	148,717	98,691	83,510	58,329	190,626	1,313,247
Ponderosa pine	179,526	356,240	502,577	551,277	530,334	471,510	443,732	394,393	400,723	375,829	212,168	201,130	338,033	4,957,473
Redberry juniper[a]	193	534	494	2,600	2,399	4,009	1,981	--	--	1,337	1,058	2,114	1,905	18,625
Rocky Mountain juniper[a]	5,570	7,831	9,028	12,451	10,452	10,925	12,924	7,723	6,233	6,221	6,685	--	17,506	113,548
Singleleaf pinyon[a]	4,247	8,646	8,408	10,112	6,031	4,114	1,703	--	2,119	--	--	--	--	45,380
Southwestern white pine	3,743	7,722	8,149	6,717	12,992	11,400	1,317	5,020	4,486	6,036	5,792	5,528	7,842	86,745
Subalpine fir	238	593	1,466	4,199	1,298	2,290	--	--	--	--	--	--	--	10,084
Twoneedle pinyon[a]	143,428	227,411	272,281	289,560	214,239	142,931	81,911	66,709	30,482	9,709	17,159	--	--	1,495,820
Utah juniper[a]	42,592	79,143	121,021	150,567	166,268	198,618	212,856	222,466	195,185	127,143	128,801	99,126	193,825	1,937,613
White fir	9,821	18,721	23,986	27,905	24,792	24,750	34,202	18,383	25,558	11,416	7,830	31,377	6,560	265,301
Softwood total	493,881	878,515	1,194,150	1,343,914	1,273,685	1,196,356	1,079,896	1,006,465	919,125	707,245	550,651	453,399	1,084,362	12,181,645
Arizona white oak[a]	30,374	53,620	65,516	65,048	61,488	55,237	36,315	31,594	26,068	14,466	8,146	--	15,185	463,056
Aspen	14,815	30,294	54,921	63,340	45,318	54,439	15,030	10,177	2,713	--	--	--	--	291,047
Bigtooth maple[a]	1,516	1,376	1,013	312	3,648	--	--	--	--	--	--	--	--	7,864
Cottonwood	163	565	857	471	668	878	1,230	--	--	--	--	--	--	4,830
Desert ironwood[a]	280	544	344	338	301	978	1,975	--	--	--	--	1,298	--	6,058
Emory oak[a]	16,792	32,321	41,916	36,824	38,396	25,502	27,376	8,887	7,707	4,101	3,524	1,885	--	245,231
Gambel oak[a]	90,926	80,671	60,897	51,481	35,654	28,272	23,161	26,013	12,795	16,511	14,317	9,139	18,472	468,310
Mesquite[a]	11,222	17,016	18,549	18,152	13,503	8,747	7,534	2,183	--	--	--	--	--	96,907
Mexican blue oak[a]	746	2,146	2,456	5,822	6,913	1,663	1,634	3,540	2,006	2,178	2,794	1,030	--	32,928
New Mexico locust[a]	2,011	648	240	570	--	--	--	--	--	--	--	--	--	3,469
Oak--evergreen[a]	2,691	2,091	4,348	2,782	1,822	--	3,857	--	--	--	--	--	--	17,590
Rocky Mountain maple[a]	286	125	777	330	--	--	--	--	--	--	--	--	--	1,517
Silverleaf oak[a]	5,211	7,265	8,036	6,980	4,021	5,774	2,843	2,108	2,248	--	2,988	--	--	47,474
Velvet mesquite[a]	4,340	5,842	8,030	5,458	5,513	3,595	4,096	3,800	1,713	--	--	470	--	42,858
W. honey mesquite[a]	2,410	3,419	6,890	2,481	2,091	831	1,407	--	--	--	--	--	6,319	25,848
Hardwood total	183,784	237,941	274,788	260,387	219,336	185,915	126,458	88,302	55,251	37,257	31,768	13,822	39,976	1,754,987
All species	677,665	1,116,456	1,468,938	1,604,301	1,493,021	1,382,271	1,206,354	1,094,767	974,376	744,502	582,420	467,222	1,124,338	13,936,631

[a]Diameter taken at root collar rather than at breast height.

Table 37--Net volume of all live trees on nonreserved forest land by species and forest type, Arizona, 1999

Species	Forest type																	All types
	Aspen	Blue spruce	Cottonwood	Deciduous woodland oak	Douglas-fir	Engelmann spruce	Evergreen oak	Juniper	Mesquite	Misc. western hardwoods	Other Western softwoods	Pinyon-juniper	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	Nonstocked woodland	
	Thousand cubic feet																	
Alligator juniper [a]	--	--	96	15,746	4,316	--	113,118	223,801	--	41	366	309,899	127,993	--	--	231	1,643	797,249
Apache pine	--	--	--	--	--	--	3,178	--	--	--	--	--	--	--	--	--	--	3,178
Arizona cypress	--	--	--	--	--	--	194	--	--	--	7,016	94	822	--	--	--	--	8,127
Arizona pinyon pine [a]	--	--	--	--	--	--	6,558	--	--	--	2,644	65,778	--	--	--	--	295	75,275
Blue spruce	69	22,867	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22,936
Border pinyon [a]	--	--	--	--	--	--	8,891	--	--	--	--	26,992	--	--	--	--	327	36,210
California juniper [a]	--	--	--	--	--	--	--	1,678	--	--	--	131	--	--	--	--	--	1,809
Chihuahua pine	--	--	--	66	--	--	1,571	347	--	--	1,820	--	2,176	--	--	--	--	5,980
Corkbark fir	2,965	--	--	--	10,616	8,624	--	--	--	--	4,316	--	778	20,800	--	--	--	48,098
Douglas-fir	16,902	2,189	--	12,384	370,956	52,154	1,399	4,744	--	465	7,025	6,335	134,036	2,228	32,854	--	--	643,670
Engelmann spruce	12,004	--	--	--	20,812	195,034	--	--	--	--	352	--	40,607	16,206	6,564	--	--	291,579
Mexican pinyon pine [a]	--	--	--	--	--	--	1,693	--	--	--	--	1,761	--	--	--	--	243	3,697
Oneseed juniper [a]	--	--	--	38	933	--	3,868	378,640	1,566	--	--	918,317	2,429	--	--	130	7,326	1,313,247
Ponderosa pine	34,902	3,660	4,763	106,678	79,089	19,814	37,680	69,488	--	103	1,748	137,398	4,437,551	--	15,788	8,505	304	4,957,473
Redberry juniper [a]	--	--	195	--	--	--	1,042	13,630	849	149	--	1,093	--	--	--	--	1,667	18,625
Rocky Mountain juniper [a]	341	--	--	4,321	3,214	--	2,723	5,435	--	--	--	74,878	22,345	--	--	291	--	113,548
Singleleaf pinyon [a]	--	--	--	--	--	--	3,969	--	42	--	--	38,327	867	--	--	--	2,175	45,380
Southwestern white pine	2,217	1,078	--	417	15,969	1,482	208	--	--	--	37,886	--	22,552	131	4,806	--	--	86,745
Subalpine fir	--	--	--	--	--	3,466	--	--	--	--	--	--	2,224	4,394	--	--	--	10,084
Twoneedle pinyon [a]	--	--	--	1,884	3,419	--	23,178	--	--	--	1,599	1,437,679	25,516	--	--	839	1,706	1,495,820
Utah juniper [a]	--	--	883	1,014	31	--	9,405	511,825	--	--	--	1,396,282	13,239	--	--	--	4,933	1,937,613
White fir	11,382	821	--	--	64,926	1,026	--	--	--	793	270	--	50,562	1,395	134,128	--	--	265,301
Softwood total	80,781	30,615	5,937	142,548	574,281	281,601	218,674	1,209,588	2,458	1,551	65,043	4,414,962	4,883,698	45,153	194,140	9,996	20,620	12,181,645
Arizona white oak [a]	--	--	2,817	1,627	251	--	280,325	28,185	--	1,033	33	89,209	58,029	--	--	--	1,548	463,056
Aspen	164,893	6,304	--	292	29,171	31,269	--	--	--	512	6,142	--	37,762	4,926	9,776	--	--	291,047
Bigtooth maple [a]	--	--	--	3,896	636	--	--	312	--	--	--	578	373	--	2,069	--	--	7,864
Cottonwood	--	--	4,559	--	--	--	271	--	--	--	--	--	--	--	--	--	--	4,830
Desert ironwood [a]	--	--	--	--	--	--	--	--	2,590	3,379	--	--	--	--	--	--	89	6,058
Emory oak [a]	--	--	1,677	1,082	1,382	--	209,199	7,357	--	--	270	13,949	6,314	--	--	--	4,002	245,231
Gambel oak [a]	218	--	672	144,563	19,751	--	8,868	18,449	--	401	367	24,763	245,660	--	3,972	624	--	468,310
Mesquite [a]	--	--	--	--	--	--	--	1,552	95,170	--	--	25	--	--	--	--	160	96,907
Mexican blue oak [a]	--	--	--	--	--	--	28,948	2,157	1,146	--	--	--	--	--	--	--	677	32,928
New Mexico locust [a]	1,537	--	--	281	424	--	208	128	--	--	--	--	710	--	181	--	--	3,469
Oak--evergreen [a]	--	--	--	1,125	--	--	13,378	159	--	--	674	2,185	70	--	--	--	--	17,590
Rocky Mountain maple [a]	--	--	--	153	1,364	--	--	--	--	--	--	--	--	--	--	--	--	1,517
Silverleaf oak [a]	--	--	--	--	--	--	44,880	--	--	--	--	1,597	394	--	--	--	603	47,474
Velvet mesquite [a]	--	--	--	--	--	--	4,165	672	33,431	--	--	114	--	--	--	--	4,477	42,858
W. honey mesquite [a]	--	--	--	--	--	--	431	3,013	20,690	--	--	73	--	--	--	--	1,641	25,848
Hardwood total	166,648	6,304	9,725	153,019	52,979	31,269	590,673	61,982	153,027	5,324	7,487	132,493	349,312	4,926	16,000	624	13,197	1,754,987
All species	247,429	36,919	15,662	295,566	627,259	312,870	809,346	1,271,570	155,484	6,876	72,529	4,547,455	5,233,010	50,079	210,140	10,620	33,817	13,936,631

[a]Diameter taken at root collar rather than at breast height.

Table 38--Net annual growth of all live trees on nonreserved forest land by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Alligator juniper[a]	2,961	59	2,568	5,588
Apache pine	55	--	--	55
Arizona cypress	160	--	--	160
Arizona pinyon pine[a]	1,113	--	-54	1,060
Blue spruce	59	--	682	742
Border pinyon[a]	408	97	52	557
California juniper[a]	--	14	14	27
Chihuahua pine	27	--	135	162
Corkbark fir	713	--	256	969
Douglas-fir	5,635	--	5,839	11,474
Engelmann spruce	796	--	1,669	2,465
Mexican pinyon pine[a]	80	--	--	80
Oneseed juniper[a]	2,620	590	5,267	8,477
Ponderosa pine	73,663	2,186	32,987	108,837
Redberry juniper[a]	102	--	42	145
Rocky Mountain juniper[a]	226	2	616	844
Singleleaf pinyon[a]	377	--	134	511
Southwestern white pine	1,465	--	495	1,960
Subalpine fir	201	--	--	201
Twoneedle pinyon[a]	5,633	1,634	9,002	16,268
Utah juniper[a]	3,958	4,325	5,656	13,938
White fir	3,236	--	1,351	4,587
Softwood total	103,490	8,907	66,709	179,106
Arizona white oak[a]	1,917	25	2,098	4,039
Aspen	1,491	--	1,223	2,714
Bigtooth maple[a]	4	--	323	327
Cottonwood	101	--	124	226
Desert ironwood[a]	1	18	34	53
Emory oak[a]	1,408	20	1,016	2,444
Gambel oak[a]	4,627	331	3,058	8,017
Mesquite[a]	([b])	287	421	708
Mexican blue oak[a]	222	--	6	228
New Mexico locust[a]	73	141	9	224
Oak--evergreen[a]	7	47	70	125
Rocky Mountain maple[a]	14	--	2	17
Silverleaf oak[a]	474	--	78	552
Velvet mesquite[a]	311	43	153	507
W. honey mesquite[a]	346	--	2	348
Hardwood total	10,998	912	8,618	20,527
All species	114,487	9,819	75,327	199,633

[a]Diameter taken at root collar rather than at breast height.
[b]Less than 500 cubic feet.

Table 39--Net annual growth of all live trees on nonreserved forest land by species and diameter class, Arizona, 1998

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	1,217	593	660	619	578	446	422	287	200	143	192	144	88	5,588
Apache pine	3	3	18	9	--	--	--	22	--	--	--	--	--	55
Arizona cypress	75	15	21	11	21	--	9	8	--	--	--	--	--	160
Arizona pinyon pine[a]	565	211	66	39	100	45	14	18	2	--	--	--	--	1,060
Blue spruce	54	34	169	228	92	44	54	67	--	--	--	--	--	742
Border pinyon[a]	264	75	68	75	41	13	17	4	--	--	--	--	--	557
California juniper[a]	4	7	9	7	--	--	--	--	--	--	--	--	--	27
Chihuahua pine	55	37	33	28	10	--	--	--	--	--	--	--	--	162
Corkbark fir	439	116	36	104	-54	240	25	--	62	--	--	--	--	969
Douglas-fir	2,762	1,703	2,332	1,601	1,469	960	1,082	736	-602	-499	398	180	-649	11,474
Engelmann spruce	794	716	653	643	632	-190	184	-590	442	-852	--	--	35	2,465
Mexican pinyon pine[a]	73	18	-19	--	4	5	--	--	--	--	--	--	--	80
Oneseed juniper[a]	1,030	540	712	897	846	906	843	712	713	342	275	167	495	8,477
Ponderosa pine	15,592	13,159	16,424	15,431	12,253	9,572	7,369	5,209	5,174	3,962	1,025	1,705	1,964	108,837
Redberry juniper[a]	6	8	6	25	29	36	14	--	--	5	5	8	3	145
Rocky Mountain juniper[a]	205	115	107	104	90	71	45	25	17	12	14	--	40	844
Singleleaf pinyon[a]	211	151	123	115	67	-168	5	--	7	--	--	--	--	511
Southwestern white pine	404	316	242	108	348	156	12	40	44	127	47	37	77	1,960
Subalpine fir	-45	-93	-24	229	77	58	--	--	--	--	--	--	--	201
Twoneedle pinyon[a]	6,736	2,749	2,609	2,205	1,244	280	-54	297	136	23	41	--	--	16,268
Utah juniper[a]	2,454	1,194	1,374	1,376	1,304	1,379	1,375	1,085	776	429	405	280	507	13,938
White fir	623	615	741	915	156	560	763	311	438	107	89	274	-1,005	4,587
Softwood total	33,520	22,281	26,357	24,768	19,305	14,414	12,181	8,231	7,411	3,799	2,491	2,794	1,555	179,106
Arizona white oak[a]	1,487	641	581	476	378	320	171	-52	92	-122	38	--	29	4,039
Aspen	540	295	396	704	473	526	270	-576	87	--	--	--	--	2,714
Bigtooth maple[a]	245	20	17	4	41	--	--	--	--	--	--	--	--	327
Cottonwood	55	48	36	10	12	27	38	--	--	--	--	--	--	226
Desert ironwood[a]	29	5	2	2	1	4	7	--	--	--	--	3	--	53
Emory oak[a]	843	338	373	320	247	128	95	30	28	9	15	19	--	2,444
Gambel oak[a]	5,298	973	566	310	242	177	101	108	43	49	82	22	44	8,017
Mesquite[a]	327	107	142	18	59	30	20	5	--	--	--	--	--	708
Mexican blue oak[a]	12	30	31	49	51	12	5	12	7	6	8	4	--	228
New Mexico locust[a]	216	4	1	3	--	--	--	--	--	--	--	--	--	224
Oak--evergreen[a]	97	9	-20	16	9	--	14	--	--	--	--	--	--	125
Rocky Mountain maple[a]	4	3	7	3	--	--	--	--	--	--	--	--	--	17
Silverleaf oak[a]	259	85	73	54	26	28	12	6	5	--	4	--	--	552
Velvet mesquite[a]	167	83	108	55	38	15	16	18	6	--	--	1	--	507
W. honey mesquite[a]	168	56	73	19	13	3	6	--	--	--	--	--	10	348
Hardwood total	9,749	2,696	2,386	2,042	1,589	1,267	755	-448	269	-59	147	49	83	20,527
All species	43,269	24,977	28,743	26,810	20,894	15,681	12,936	7,782	7,680	3,740	2,639	2,843	1,638	199,633

[a]Diameter taken at root collar rather than at breast height.

Table 40--Annual mortality of all trees on nonreserved forest land by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Alligator juniper [a]	361	--	146	507
Apache pine	--	--	--	--
Arizona cypress	--	--	--	--
Arizona pinyon pine [a]	125	--	144	269
Blue spruce	--	--	39	39
Border pinyon [a]	142	--	--	142
California juniper [a]	--	--	--	--
Chihuahua pine	11	--	--	11
Corkbark fir	180	--	367	547
Douglas-fir	4,289	--	202	4,491
Engelmann spruce	2,836	--	1,829	4,665
Mexican pinyon pine [a]	27	--	--	27
Oneseed juniper [a]	18	--	131	150
Ponderosa pine	4,627	--	2,704	7,331
Redberry juniper [a]	--	--	--	--
Rocky Mountain juniper [a]	4	--	--	4
Singleleaf pinyon [a]	13	--	193	206
Southwestern white pine	--	--	161	161
Subalpine fir	291	--	--	291
Twoneedle pinyon [a]	629	--	1,772	2,401
Utah juniper [a]	191	--	--	191
White fir	1,640	--	87	1,727
Softwood total	15,385	--	7,775	23,161
Arizona white oak [a]	363	--	289	652
Aspen	1,790	--	2,333	4,123
Bigtooth maple [a]	--	--	--	--
Cottonwood	--	--	--	--
Desert ironwood [a]	--	--	--	--
Emory oak [a]	76	--	24	100
Gambel oak [a]	373	--	132	505
Mesquite [a]	--	--	141	141
Mexican blue oak [a]	--	--	--	--
New Mexico locust [a]	--	--	--	--
Oak--evergreen [a]	--	17	51	68
Rocky Mountain maple [a]	--	--	--	--
Silverleaf oak [a]	22	--	--	22
Velvet mesquite [a]	8	--	--	8
W. honey mesquite [a]	--	--	--	--
Hardwood total	2,632	17	2,970	5,619
All species	18,017	17	10,745	28,779

[a] Diameter taken at root collar rather than at breast height.

Table 41--Annual mortality of all trees on nonreserved forest land by species and diameter class, Arizona, 1998

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	7	5	18	--	50	85	--	--	--	--	--	--	343	507
Apache pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arizona cypress	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arizona pinyon pine[a]	7	--	132	131	--	--	--	--	--	--	--	--	--	269
Blue spruce	16	23	--	--	--	--	--	--	--	--	--	--	--	39
Border pinyon[a]	19	72	52	--	--	--	--	--	--	--	--	--	--	142
California juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chihuahua pine	--	11	--	--	--	--	--	--	--	--	--	--	--	11
Corkbark fir	14	86	173	115	159	--	--	--	--	--	--	--	--	547
Douglas-fir	126	182	38	161	287	193	--	--	1,044	818	--	--	1,642	4,491
Engelmann spruce	133	222	417	528	223	687	371	1,163	--	921	--	--	--	4,665
Mexican pinyon pine[a]	--	--	27	--	--	--	--	--	--	--	--	--	--	27
Oneseed juniper[a]	--	--	18	--	--	131	--	--	--	--	--	--	--	150
Ponderosa pine	742	1,481	647	450	643	344	341	1,137	379	--	1,166	--	--	7,331
Redberry juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	4	--	--	--	--	--	--	--	--	--	--	--	--	4
Singleleaf pinyon[a]	13	--	--	--	--	193	--	--	--	--	--	--	--	206
Southwestern white pine	21	44	--	96	--	--	--	--	--	--	--	--	--	161
Subalpine fir	64	116	111	--	--	--	--	--	--	--	--	--	--	291
Twoneedle pinyon[a]	179	324	413	336	210	464	474	--	--	--	--	--	--	2,401
Utah juniper[a]	12	19	24	73	62	--	--	--	--	--	--	--	--	191
White fir	54	139	118	--	372	--	--	--	--	--	--	--	1,043	1,727
Softwood total	1,412	2,724	2,188	1,890	2,007	2,097	1,186	2,300	1,423	1,738	1,166	--	3,028	23,161
Arizona white oak[a]	79	52	47	46	65	--	--	183	--	181	--	--	--	652
Aspen	353	646	891	705	383	321	84	740	--	--	--	--	--	4,123
Bigtooth maple[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Desert ironwood[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Emory oak[a]	14	13	49	--	24	--	--	--	--	--	--	--	--	100
Gambel oak[a]	154	58	141	152	--	--	--	--	--	--	--	--	--	505
Mesquite[a]	--	45	--	95	--	--	--	--	--	--	--	--	--	141
Mexican blue oak[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New Mexico locust[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oak--evergreen[a]	--	17	51	--	--	--	--	--	--	--	--	--	--	68
Rocky Mountain maple[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silverleaf oak[a]	8	13	--	--	--	--	--	--	--	--	--	--	--	22
Velvet mesquite[a]	8	--	--	--	--	--	--	--	--	--	--	--	--	8
W. honey mesquite[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	616	845	1,180	998	471	321	84	923	--	181	--	--	--	5,619
All species	2,028	3,569	3,368	2,888	2,479	2,418	1,270	3,224	1,423	1,919	1,166	--	3,028	28,779

[a]Diameter taken at root collar rather than at breast height.

Table 42--Annual mortality of all trees on nonreserved forest land by species and cause of death, Arizona, 1998

Species	Cause of death							Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	
	Thousand cubic feet							
Alligator juniper[a]	18	343	146	--	--	--	--	507
Apache pine	--	--	--	--	--	--	--	--
Arizona cypress	--	--	--	--	--	--	--	--
Arizona pinyon pine[a]	--	144	59	--	--	--	67	269
Blue spruce	--	--	--	--	--	39	--	39
Border pinyon[a]	9	--	81	--	52	--	--	142
California juniper[a]	--	--	--	--	--	--	--	--
Chihuahua pine	--	11	--	--	--	--	--	11
Corkbark fir	285	183	--	79	--	--	--	547
Douglas-fir	3,315	686	256	--	223	11	--	4,491
Engelmann spruce	--	4,568	58	22	--	16	--	4,665
Mexican pinyon pine[a]	--	27	--	--	--	--	--	27
Oneseed juniper[a]	--	--	150	--	--	--	--	150
Ponderosa pine	2,050	1,790	496	--	2,464	324	208	7,331
Redberry juniper[a]	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	--	--	--	--	--	--	4	4
Singleleaf pinyon[a]	193	13	--	--	--	--	--	206
Southwestern white pine	--	--	96	64	--	--	--	161
Subalpine fir	--	65	226	--	--	--	--	291
Twoneedle pinyon[a]	331	1,135	99	--	645	--	191	2,401
Utah juniper[a]	--	39	118	--	35	--	--	191
White fir	40	1,640	--	31	16	--	--	1,727
Softwood total	6,242	10,644	1,784	196	3,434	390	470	23,161
Arizona white oak[a]	--	535	68	--	--	38	11	652
Aspen	63	3,455	55	--	384	101	65	4,123
Bigtooth maple[a]	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--
Desert ironwood[a]	--	--	--	--	--	--	--	--
Emory oak[a]	--	32	11	--	34	24	--	100
Gambel oak[a]	--	40	96	--	194	40	136	505
Mesquite[a]	--	141	--	--	--	--	--	141
Mexican blue oak[a]	--	--	--	--	--	--	--	--
New Mexico locust[a]	--	--	--	--	--	--	--	--
Oak--evergreen[a]	--	--	--	--	--	--	68	68
Rocky Mountain maple[a]	--	--	--	--	--	--	--	--
Silverleaf oak[a]	13	--	--	--	--	--	8	22
Velvet mesquite[a]	--	4	4	--	--	--	--	8
W. honey mesquite[a]	--	--	--	--	--	--	--	--
Hardwood total	77	4,206	234	--	612	203	288	5,619
All species	6,318	14,850	2,018	196	4,046	593	758	28,779

[a]Diameter taken at root collar rather than at breast height.

Table 43--Area of nonreserved forest land by county, Arizona

County	Area (1999)	Volume (1999)	Growth (1998)	Mortality (1998)
	- - - Acres- - -	*- - - - - - Thousand cubic feet - - - - - -*		
Apache	2,790,157	3,239,635	54,440	7,860
Cochise	532,271	159,711	1,667	110
Coconino	4,338,436	4,524,541	69,275	11,226
Gila	1,751,918	1,372,690	16,769	2,384
Graham	811,918	591,320	9,059	802
Greenlee	499,346	467,168	6,167	2,177
Maricopa	129,813	18,162	190	--
Mohave	1,227,048	472,138	4,921	--
Navajo	2,188,618	1,871,431	24,631	3,362
Pima	985,548	188,083	1,701	158
Pinal	200,625	35,363	295	4
Santa Cruz	393,227	129,068	1,311	35
Yavapai	1,747,539	866,788	9,203	662
Yuma	12,229	534	3	--
Total	17,608,691	13,936,631	199,633	28,779

Table 44--Area of nonreserved timberland[a] by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class 85-119	50-84	20-49	0-19	Total
			Acres		
Aspen					
Sawtimber	--	46,408	14,202	--	60,610
Poletimber	--	17,348	7,845	--	25,193
Sapling/seedling	--	--	17,510	--	17,510
Nonstocked	--	--	--	--	--
Total	--	63,756	39,557	--	103,313
Blue spruce					
Sawtimber	1,580	12,277	--	--	13,858
Poletimber	--	--	--	--	--
Sapling/seedling	--	3,148	--	--	3,148
Nonstocked	--	--	--	--	--
Total	1,580	15,425	--	--	17,006
Cottonwood					
Sawtimber	--	--	10,753	--	10,753
Poletimber	--	--	2,973	--	2,973
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	13,726	--	13,726
Douglas-fir					
Sawtimber	--	86,537	98,028	--	184,566
Poletimber	--	--	13,290	--	13,290
Sapling/seedling	4,741	--	4,890	--	9,631
Nonstocked	--	--	--	--	--
Total	4,741	86,537	116,208	--	207,487
Engelmann spruce					
Sawtimber	9,532	70,303	17,545	--	97,380
Poletimber	--	--	6,276	--	6,276
Sapling/seedling	--	--	3,354	--	3,354
Nonstocked	--	--	--	--	--
Total	9,532	70,303	27,175	--	107,010
Other western softwoods					
Sawtimber	--	7,289	10,892	25,364	43,545
Poletimber	--	--	--	6,288	6,288
Sapling/seedling	--	6,321	4,716	--	11,037
Nonstocked	--	--	--	--	--
Total	--	13,611	15,608	31,652	60,870
Ponderosa pine					
Sawtimber	6,288	605,400	2,031,979	6,288	2,649,956
Poletimber	--	--	137,414	--	137,414
Sapling/seedling	--	18,412	71,364	--	89,776
Nonstocked	--	--	--	--	--
Total	6,288	623,813	2,240,756	6,288	2,877,145
Spruce-fir					
Sawtimber	--	4,890	7,027	--	11,918
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	4,890	7,027	--	11,918
White fir					
Sawtimber	4,716	48,293	20,209	--	73,219
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	4,716	48,293	20,209	--	73,219
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	18,934	74,333	--	93,268
Total	--	18,934	74,333	--	93,268
All types					
Sawtimber	22,117	881,399	2,210,636	31,652	3,145,803
Poletimber	--	17,348	167,797	6,288	191,434
Sapling/seedling	4,741	27,881	101,834	--	134,456
Nonstocked	--	18,934	74,333	--	93,268
Total	26,857	945,563	2,554,601	37,940	3,564,961

[a]On tables 44 through 81, nonreserved timberland includes all productivity classes for traditional timberland types and excludes juniper, pinyon-juniper, oak, mesquite, locust, and maple forest types.

Table 45--Area of National Forest nonreserved timberland by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Aspen					
Sawtimber	--	12,197	14,202	--	26,399
Poletimber	--	4,890	7,845	--	12,736
Sapling/seedling	--	--	17,510	--	17,510
Nonstocked	--	--	--	--	--
Total	--	17,087	39,557	--	56,645
Blue spruce					
Sawtimber	--	1,742	--	--	1,742
Poletimber	--	--	--	--	--
Sapling/seedling	--	3,148	--	--	3,148
Nonstocked	--	--	--	--	--
Total	--	4,890	--	--	4,890
Cottonwood					
Sawtimber	--	--	6,223	--	6,223
Poletimber	--	--	2,973	--	2,973
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	9,196	--	9,196
Douglas-fir					
Sawtimber	--	56,322	64,023	--	120,344
Poletimber	--	--	9,745	--	9,745
Sapling/seedling	--	--	4,890	--	4,890
Nonstocked	--	--	--	--	--
Total	--	56,322	78,658	--	134,979
Engelmann spruce					
Sawtimber	1,631	43,228	13,872	--	58,730
Poletimber	--	--	6,276	--	6,276
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	1,631	43,228	20,148	--	65,006
Other western softwoods					
Sawtimber	--	7,289	10,892	19,076	37,257
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	7,289	10,892	19,076	37,257
Ponderosa pine					
Sawtimber	--	325,886	1,520,070	--	1,845,956
Poletimber	--	--	86,680	--	86,680
Sapling/seedling	--	6,603	42,608	--	49,211
Nonstocked	--	--	--	--	--
Total	--	332,490	1,649,357	--	1,981,847
Spruce-fir					
Sawtimber	--	4,890	--	--	4,890
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	4,890	--	--	4,890
White fir					
Sawtimber	--	40,490	20,209	--	60,700
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	40,490	20,209	--	60,700
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	12,859	56,084	--	68,943
Total	--	12,859	56,084	--	68,943
All types					
Sawtimber	1,631	492,045	1,649,490	19,076	2,162,242
Poletimber	--	4,890	113,518	--	118,409
Sapling/seedling	--	9,751	65,008	--	74,759
Nonstocked	--	12,859	56,084	--	68,943
Total	1,631	519,546	1,884,100	19,076	2,424,352

Table 46--Area of other publicly owned nonreserved timberland by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Aspen					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Blue spruce					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Cottonwood					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Douglas-fir					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Engelmann spruce					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Other western softwoods					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Ponderosa pine					
Sawtimber	--	--	37,651	--	37,651
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	6,698	--	6,698
Nonstocked	--	--	--	--	--
Total	--	--	44,349	--	44,349
Spruce-fir					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
White fir					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	--	--	--
All types					
Sawtimber	--	--	37,651	--	37,651
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	6,698	--	6,698
Nonstocked	--	--	--	--	--
Total	--	--	44,349	--	44,349

Table 47--Area of nonindustrial private nonreserved timberland by forest type, stand-size class, and productivity class, Arizona, 1999

Forest type and stand-size class	Productivity class				Total
	85-119	50-84	20-49	0-19	
	Acres				
Aspen					
Sawtimber	--	34,211	--	--	34,211
Poletimber	--	12,458	--	--	12,458
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	46,668	--	--	46,668
Blue spruce					
Sawtimber	1,580	10,535	--	--	12,115
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	1,580	10,535	--	--	12,115
Cottonwood					
Sawtimber	--	--	4,530	--	4,530
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	4,530	--	4,530
Douglas-fir					
Sawtimber	--	30,216	34,006	--	64,221
Poletimber	--	--	3,545	--	3,545
Sapling/seedling	4,741	--	--	--	4,741
Nonstocked	--	--	--	--	--
Total	4,741	30,216	37,551	--	72,507
Engelmann spruce					
Sawtimber	7,901	27,075	3,673	--	38,650
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	3,354	--	3,354
Nonstocked	--	--	--	--	--
Total	7,901	27,075	7,027	--	42,004
Other western softwoods					
Sawtimber	--	--	--	6,288	6,288
Poletimber	--	--	--	6,288	6,288
Sapling/seedling	--	6,321	4,716	--	11,037
Nonstocked	--	--	--	--	--
Total	--	6,321	4,716	12,576	23,614
Ponderosa pine					
Sawtimber	6,288	279,514	474,259	6,288	766,349
Poletimber	--	--	50,734	--	50,734
Sapling/seedling	--	11,809	22,058	--	33,867
Nonstocked	--	--	--	--	--
Total	6,288	291,323	547,050	6,288	850,950
Spruce-fir					
Sawtimber	--	--	7,027	--	7,027
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	--	--	7,027	--	7,027
White fir					
Sawtimber	4,716	7,803	--	--	12,519
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	4,716	7,803	--	--	12,519
Nonstocked timberland					
Sawtimber	--	--	--	--	--
Poletimber	--	--	--	--	--
Sapling/seedling	--	--	--	--	--
Nonstocked	--	6,075	18,250	--	24,325
Total	--	6,075	18,250	--	24,325
All types					
Sawtimber	20,486	389,354	523,495	12,576	945,911
Poletimber	--	12,458	54,279	6,288	73,025
Sapling/seedling	4,741	18,130	30,128	--	52,999
Nonstocked	--	6,075	18,250	--	24,325
Total	25,227	426,017	626,152	18,864	1,096,260

Table 48--Area of nonreserved timberland by stand volume and owner group, Arizona, 1999

Stand volume per acre[a]	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Acres			
Less than 1,500 board feet	336,043	6,698	167,002	509,743
1,500 to 4,999 board feet	752,661	8,689	318,266	1,079,616
5,000 to 9,999 board feet	680,662	17,377	333,910	1,031,949
10,000 board feet or more	654,985	11,585	277,082	943,652
Total	2,424,352	44,349	1,096,260	3,564,961

[a]International ¼-inch rule

Table 49--Number of growing stock trees on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Arizona cypress	7,801	1,941	610	154	267	115	187	--	39	37	--	--	--	--	--	11,152
Blue spruce	474	553	433	245	327	330	188	44	38	38	--	--	--	--	--	2,670
Chihuahua pine	1,414	943	759	343	227	76	38	--	--	--	--	--	--	--	--	3,800
Corkbark fir	5,441	2,823	1,367	830	635	360	283	282	85	--	29	--	--	--	--	12,135
Douglas-fir	43,805	24,323	13,267	8,935	6,575	3,728	2,723	1,759	1,173	744	392	331	347	81	686	108,869
Engelmann spruce	12,102	13,315	4,488	3,653	2,877	2,406	1,260	731	618	550	283	42	--	--	38	42,363
Ponderosa pine	162,627	127,334	91,635	76,731	58,663	38,260	24,043	14,928	9,882	6,555	4,686	3,536	1,613	1,291	1,573	623,358
Southwestern white pine	4,082	969	1,888	1,791	954	517	658	352	44	66	59	67	44	37	44	11,572
Subalpine fir	367	--	134	118	146	201	39	67	--	--	--	--	--	--	--	1,072
White fir	24,568	9,350	5,391	4,293	2,996	2,098	1,227	832	836	347	395	113	73	237	52	52,808
Softwood total	262,680	181,552	119,973	97,093	73,667	48,090	30,646	18,995	12,715	8,338	5,845	4,090	2,078	1,646	2,392	869,798
Aspen	40,671	9,148	4,972	4,287	4,134	2,989	1,570	1,216	262	137	38	--	--	--	--	69,422
Cottonwood	--	933	75	112	75	37	37	37	37	--	--	--	--	--	--	1,345
Hardwood total	40,671	10,081	5,047	4,399	4,209	3,026	1,607	1,253	299	137	38	--	--	--	--	70,767
All species	303,350	191,633	125,019	101,492	77,876	51,116	32,253	20,248	13,015	8,474	5,883	4,090	2,078	1,646	2,392	940,565

Table 50--Number of cull and hard dead trees on nonreserved timberland by owner group, and softwoods and hardwoods, Arizona, 1999

Owner group	Species group	Cull trees			Hard dead trees	Total
		Rough	Rotten	Total		
		Thousand trees				
National Forest	Sofwoods	4,211	192	4,403	23,026	27,429
	Hardwoods	546	687	1,233	10,315	11,548
	Total	4,758	879	5,637	33,341	38,978
Other public	Softwoods	--	--	--	--	--
	Hardwoods	--	--	--	--	--
	Total	--	--	--	--	--
Nonindustrial private	Softwoods	1,325	--	1,325	13,140	14,465
	Hardwoods	322	494	816	8,482	9,298
	Total	1,647	494	2,141	21,622	23,763
Total	Softwoods	5,536	192	5,728	36,166	41,894
	Hardwoods	868	1,181	2,049	18,797	20,846
	Total	6,404	1,373	7,777	54,964	62,741

Table 51--Net volume of growing stock on nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Aspen	159,274	77,652	1,770	--	238,696
Blue spruce	36,676	--	243	--	36,919
Cottonwood	9,177	--	--	--	9,177
Douglas-fir	560,514	15,500	4,725	--	580,739
Engelmann spruce	302,117	7,988	397	--	310,502
Other western softwoods	59,048	963	6,225	--	66,237
Ponderosa pine	4,594,861	81,812	22,026	--	4,698,699
Spruce-fir	49,843	--	--	--	49,843
White fir	203,300	--	--	--	203,300
Nonstocked timberland	--	--	--	8,481	8,481
All types	5,974,809	183,916	35,387	8,481	6,202,593

Table 52--Net volume of sawtimber (International ¼-inch rule) on nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand board feet				
Aspen	655,618	233,869	6,566	--	896,052
Blue spruce	166,146	--	673	--	166,819
Cottonwood	38,009	--	--	--	38,009
Douglas-fir	2,698,068	32,516	17,949	--	2,748,533
Engelmann spruce	1,520,019	14,361	--	--	1,534,381
Other western softwoods	276,313	1,897	29,184	--	307,394
Ponderosa pine	21,464,380	164,723	84,872	--	21,713,975
Spruce-fir	241,194	--	--	--	241,194
White fir	903,600	--	--	--	903,600
Nonstocked timberland	--	--	--	33,031	33,031
All types	27,963,347	447,366	139,244	33,031	28,582,988

Table 53--Net volume of sawtimber (Scribner rule) on nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand board feet				
Aspen	537,473	194,129	5,013	--	736,615
Blue spruce	131,856	--	546	--	132,402
Cottonwood	32,237	--	--	--	32,237
Douglas-fir	2,352,537	26,052	13,757	--	2,392,346
Engelmann spruce	1,249,183	10,681	--	--	1,259,865
Other western softwoods	239,488	1,499	25,351	--	266,338
Ponderosa pine	18,868,530	134,937	75,305	--	19,078,772
Spruce-fir	194,185	--	--	--	194,185
White fir	780,019	--	--	--	780,019
Nonstocked timberland	--	--	--	29,028	29,028
All types	24,385,508	367,299	119,971	29,028	24,901,807

Table 54--Net volume of growing stock on nonreserved timberland by species and owner group, Arizona, 1999

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Arizona cypress	7,535	--	--	7,535
Blue spruce	1,390	--	21,546	22,936
Chihuahua pine	307	--	3,662	3,969
Corkbark fir	21,939	--	26,159	48,098
Douglas-fir	418,076	--	193,461	611,537
Engelmann spruce	132,575	--	157,119	289,694
Ponderosa pine	3,191,037	62,503	1,327,502	4,581,042
Southwestern white pine	69,932	--	15,372	85,304
Subalpine fir	10,084	--	--	10,084
White fir	216,006	--	47,171	263,177
Softwood total	4,068,881	62,503	1,791,993	5,923,378
Aspen	125,628	--	149,174	274,801
Cottonwood	2,662	--	1,752	4,414
Hardwood total	128,289	--	150,926	279,215
All species	4,197,170	62,503	1,942,919	6,202,593

Table 55--Net volume of sawtimber (International ¼-inch rule) on nonreserved timberland by species and owner group, Arizona, 1999

Species	Owner group: National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Arizona cypress	30,072	--	--	30,072
Blue spruce	5,654	--	99,785	105,439
Chihuahua pine	--	--	9,516	9,516
Corkbark fir	100,409	--	116,391	216,801
Douglas-fir	2,040,551	--	855,751	2,896,302
Engelmann spruce	639,235	--	766,296	1,405,530
Ponderosa pine	14,738,144	321,686	6,283,574	21,343,404
Southwestern white pine	314,744	--	58,504	373,248
Subalpine fir	47,741	--	--	47,741
White fir	934,108	--	196,050	1,130,158
Softwood total	18,850,656	321,686	8,385,869	27,558,210
Aspen	439,606	--	568,412	1,008,018
Cottonwood	10,808	--	5,952	16,760
Hardwood total	450,414	--	574,364	1,024,778
All species	19,301,070	321,686	8,960,233	28,582,988

Table 56--Net volume of sawtimber (Scribner rule) on nonreserved timberland by species and owner group, Arizona, 1999

Species	Owner group: National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Arizona cypress	25,662	--	--	25,662
Blue spruce	4,397	--	78,590	82,988
Chihuahua pine	--	--	7,692	7,692
Corkbark fir	79,938	--	92,693	172,631
Douglas-fir	1,765,686	--	743,151	2,508,837
Engelmann spruce	515,483	--	619,396	1,134,879
Ponderosa pine	12,975,289	284,198	5,547,773	18,807,260
Southwestern white pine	275,863	--	49,633	325,495
Subalpine fir	37,268	--	--	37,268
White fir	807,500	--	169,922	977,422
Softwood total	16,487,084	284,198	7,308,850	24,080,133
Aspen	352,726	--	454,885	807,611
Cottonwood	8,924	--	5,139	14,063
Hardwood total	361,651	--	460,023	821,674
All species	16,848,735	284,198	7,768,874	24,901,807

Table 57--Net volume of growing stock on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Arizona cypress	548	439	1,244	853	2,204	--	825	1,422	--	--	--	--	--	7,535
Blue spruce	968	1,568	3,495	6,295	4,676	1,372	1,859	2,703	--	--	--	--	--	22,936
Chihuahua pine	821	823	1,081	565	680	--	--	--	--	--	--	--	--	3,969
Corkbark fir	2,640	3,919	6,881	6,434	8,239	13,174	3,925	--	2,886	--	--	--	--	48,098
Douglas-fir	26,537	40,177	56,567	52,248	59,497	54,266	49,469	40,384	26,558	26,046	31,349	8,710	139,730	611,537
Engelmann spruce	8,099	20,019	31,725	43,367	36,842	28,383	36,853	42,312	30,383	6,062	--	--	5,649	289,694
Ponderosa pine	158,813	327,278	470,145	507,609	484,622	430,821	405,413	358,302	378,731	351,757	196,510	181,965	329,076	4,581,042
Southwestern white pine	3,606	7,354	7,941	6,717	12,992	11,400	1,317	4,293	4,486	6,036	5,792	5,528	7,842	85,304
Subalpine fir	238	593	1,466	4,199	1,298	2,290	--	--	--	--	--	--	--	10,084
White fir	9,750	18,328	23,654	27,445	24,792	24,750	34,202	18,383	25,558	10,549	7,830	31,377	6,560	263,177
Softwood total	212,020	420,497	604,199	655,732	635,841	566,457	533,863	467,799	468,602	400,451	241,481	227,579	488,857	5,923,378
Aspen	13,833	27,431	53,559	61,272	43,935	52,115	12,386	7,556	2,713	--	--	--	--	274,801
Cottonwood	140	443	585	471	668	878	1,230	--	--	--	--	--	--	4,414
Hardwood total	13,973	27,874	54,144	61,743	44,603	52,993	13,616	7,556	2,713	--	--	--	--	279,215
All species	225,993	448,371	658,343	717,475	680,444	619,451	547,479	475,355	471,315	400,451	241,481	227,579	488,857	6,202,593

Table 58--Net volume of sawtimber (International ¼-inch rule) on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	4,021	3,595	9,540	--	4,655	8,260	--	--	--	--	--	30,072
Blue spruce	14,583	31,128	25,508	7,765	10,736	15,719	--	--	--	--	--	105,439
Chihuahua pine	3,699	2,358	3,459	--	--	--	--	--	--	--	--	9,516
Corkbark fir	29,310	32,792	44,353	70,885	22,587	--	16,874	--	--	--	--	216,801
Douglas-fir	197,814	229,065	291,632	286,688	271,879	231,297	146,039	153,660	190,479	51,442	846,307	2,896,302
Engelmann spruce	136,849	220,671	202,205	157,861	208,083	243,364	167,857	35,474	--	--	33,165	1,405,530
Ponderosa pine	1,579,035	2,162,255	2,340,029	2,233,888	2,192,675	2,019,174	2,279,741	2,153,797	1,211,762	1,129,663	2,041,386	21,343,404
Southwestern white pine	26,127	26,900	58,723	57,387	6,735	24,342	26,271	34,457	35,173	30,794	46,339	373,248
Subalpine fir	6,240	21,479	7,045	12,976	--	--	--	--	--	--	--	47,741
White fir	75,353	110,969	111,559	117,869	171,253	94,464	132,096	57,646	43,758	178,160	37,032	1,130,158
Softwood total	2,073,032	2,841,212	3,094,053	2,945,320	2,888,602	2,636,620	2,768,877	2,435,034	1,481,172	1,390,058	3,004,229	27,558,210
Aspen	([a])	316,667	250,823	305,863	75,626	43,925	15,114	--	--	--	--	1,008,018
Cottonwood	([a])	2,486	3,530	4,792	5,952	--	--	--	--	--	--	16,760
Hardwood total	([a])	319,153	254,354	310,654	81,578	43,925	15,114	--	--	--	--	1,024,778
All species	2,073,032	3,160,365	3,348,407	3,255,974	2,970,181	2,680,545	2,783,991	2,435,034	1,481,172	1,390,058	3,004,229	28,582,988

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 59--Net volume of sawtimber (Scribner rule) on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	3,044	2,916	8,128	--	4,141	7,433	--	--	--	--	--	25,662
Blue spruce	10,517	23,826	20,260	6,304	8,907	13,174	--	--	--	--	--	82,988
Chihuahua pine	2,796	1,939	2,956	--	--	--	--	--	--	--	--	7,692
Corkbark fir	21,074	25,072	35,436	58,095	18,655	--	14,299	--	--	--	--	172,631
Douglas-fir	143,381	177,752	236,964	240,231	235,048	199,041	129,030	137,352	173,598	47,297	789,144	2,508,837
Engelmann spruce	98,473	169,191	161,360	128,401	172,719	204,013	142,007	30,135	--	--	28,582	1,134,879
Ponderosa pine	1,194,317	1,758,444	1,985,788	1,950,841	1,952,153	1,823,132	2,073,278	1,977,390	1,120,829	1,050,881	1,920,208	18,807,260
Southwestern white pine	20,172	21,780	48,963	49,023	5,831	21,597	23,581	31,135	32,210	28,340	42,863	325,495
Subalpine fir	4,473	16,578	5,667	10,549	--	--	--	--	--	--	--	37,268
White fir	54,810	87,118	91,631	100,055	149,513	83,788	119,145	52,515	40,320	164,210	34,316	977,422
Softwood total	1,553,057	2,284,616	2,597,153	2,543,499	2,546,966	2,352,178	2,501,340	2,228,527	1,366,957	1,290,728	2,815,113	24,080,133
Aspen	([a])	243,386	200,775	250,409	63,067	37,122	12,852	--	--	--	--	807,611
Cottonwood	([a])	1,965	2,912	4,047	5,139	--	--	--	--	--	--	14,063
Hardwood total	([a])	245,351	203,687	254,456	68,206	37,122	12,852	--	--	--	--	821,674
All species	1,553,057	2,529,967	2,800,841	2,797,955	2,615,172	2,389,300	2,514,192	2,228,527	1,366,957	1,290,728	2,815,113	24,901,807

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 60--Net volume of trees on nonreserved timberland by class of timber, and softwoods and hardwoods, Arizona, 1999

Class of timber	Softwoods	Hardwoods	Total
	Thousand cubic feet		
Sawtimber trees			
Sawlog portion	4,715,776	137,285	4,853,061
Upper-stem portion	575,085	45,939	621,024
Total	5,290,861	183,224	5,474,085
Poletimber trees	632,516	95,991	728,507
All growing-stock trees	5,923,377	279,215	6,202,592
Rough cull trees	34,295	11,437	45,732
Rotten cull trees	1,654	4,150	5,804
Other live volume	211,917	350,470	562,388
Salvable dead trees	427,693	108,665	536,358
All timber	6,598,937	753,937	7,352,875

Table 61--Net volume of growing stock on nonreserved timberland by species and forest type, Arizona, 1999

	Forest type										
Species	Aspen	Blue spruce	Cottonwood	Douglas-fir	Engelmann spruce	Other western softwoods	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	All types
	Thousand cubic feet										
Arizona cypress	--	--	--	--	--	6,712	822	--	--	--	7,535
Blue spruce	69	22,867	--	--	--	--	--	--	--	--	22,936
Chihuahua pine	--	--	--	--	--	1,820	2,149	--	--	--	3,969
Corkbark fir	2,965	--	--	10,616	8,624	4,316	778	20,800	--	--	48,098
Douglas-fir	16,902	2,189	--	364,816	52,154	7,025	133,662	2,228	32,561	--	611,537
Engelmann spruce	10,481	--	--	20,812	194,673	352	40,607	16,206	6,564	--	289,694
Ponderosa pine	34,821	3,660	4,763	78,876	19,643	1,714	4,413,296	--	15,788	8,481	4,581,042
Southwestern white pine	2,217	1,078	--	15,205	1,482	37,886	22,499	131	4,806	--	85,304
Subalpine fir	--	--	--	--	3,466	--	2,224	4,394	--	--	10,084
White fir	11,382	821	--	64,881	1,026	270	49,600	1,395	133,804	--	263,177
Softwood total	78,835	30,615	4,763	555,206	281,068	60,095	4,665,638	45,153	193,523	8,481	5,923,378
Aspen	159,861	6,304	--	25,533	29,434	6,142	33,061	4,689	9,776	--	274,801
Cottonwood	--	--	4,414	--	--	--	--	--	--	--	4,414
Hardwood total	159,861	6,304	4,414	25,533	29,434	6,142	33,061	4,689	9,776	--	279,215
All species	238,696	36,919	9,177	580,739	310,502	66,237	4,698,699	49,843	203,300	8,481	6,202,593

Table 62--Net volume of sawtimber (International ¼-inch rule) on nonreserved timberland by species and forest type, Arizona, 1999

Species	Forest type										
	Aspen	Blue spruce	Cottonwood	Douglas-fir	Engelmann spruce	Other western softwoods	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	All types
	Thousand board feet										
Arizona cypress	--	--	--	--	--	27,030	3,041	--	--	--	30,072
Blue spruce	--	105,439	--	--	--	--	--	--	--	--	105,439
Chihuahua pine	--	--	--	--	--	3,942	5,574	--	--	--	9,516
Corkbark fir	10,174	--	--	51,449	29,850	18,965	4,146	102,217	--	--	216,801
Douglas-fir	69,377	6,740	--	1,797,416	264,008	28,345	579,981	12,154	138,281	--	2,896,302
Engelmann spruce	38,327	--	--	93,147	962,697	1,596	192,449	83,841	33,473	--	1,405,530
Ponderosa pine	177,828	14,660	21,249	364,664	100,935	2,424	20,541,557	--	87,055	33,031	21,343,404
Southwestern white pine	6,065	3,376	--	52,544	5,554	193,901	87,125	--	24,683	--	373,248
Subalpine fir	--	--	--	--	17,157	--	11,237	19,346	--	--	47,741
White fir	44,476	--	--	302,984	2,517	546	169,520	3,938	606,177	--	1,130,158
Softwood total	346,247	130,215	21,249	2,662,204	1,382,718	276,749	21,594,630	221,497	889,669	33,031	27,558,210
Aspen	549,805	36,604	--	86,329	151,663	30,645	119,345	19,697	13,931	--	1,008,018
Cottonwood	--	--	16,760	--	--	--	--	--	--	--	16,760
Hardwood total	549,805	36,604	16,760	86,329	151,663	30,645	119,345	19,697	13,931	--	1,024,778
All species	896,052	166,819	38,009	2,748,533	1,534,381	307,394	21,713,975	241,194	903,600	33,031	28,582,988

Table 63--Net volume of sawtimber (Scribner rule) on nonreserved timberland by species and forest type, Arizona, 1999

Species	Forest type										
	Aspen	Blue spruce	Cottonwood	Douglas-fir	Engelmann spruce	Other western softwoods	Ponderosa pine	Spruce-fir	White fir	Nonstocked timberland	All types
	Thousand board feet										
Arizona cypress	--	--	--	--	--	23,039	2,623	--	--	--	25,662
Blue spruce	--	82,988	--	--	--	--	--	--	--	--	82,988
Chihuahua pine	--	--	--	--	--	3,116	4,576	--	--	--	7,692
Corkbark fir	7,499	--	--	41,598	23,213	15,067	3,231	82,024	--	--	172,631
Douglas-fir	56,315	5,017	--	1,582,408	226,492	23,103	491,879	10,799	112,822	--	2,508,837
Engelmann spruce	30,297	--	--	74,010	777,820	1,199	156,565	67,505	27,484	--	1,134,879
Ponderosa pine	158,771	12,158	18,174	317,344	89,878	1,901	18,101,025	--	78,982	29,028	18,807,260
Southwestern white pine	4,916	2,787	--	43,676	4,635	173,656	74,114	--	21,710	--	325,495
Subalpine fir	--	--	--	--	13,426	--	8,668	15,173	--	--	37,268
White fir	37,434	--	--	265,309	1,877	374	141,199	3,114	528,115	--	977,422
Softwood total	295,233	102,949	18,174	2,324,346	1,137,340	241,455	18,983,880	178,615	769,112	29,028	24,080,133
Aspen	441,383	29,453	--	68,000	122,524	24,884	94,892	15,570	10,906	--	807,611
Cottonwood	--	--	14,063	--	--	--	--	--	--	--	14,063
Hardwood total	441,383	29,453	14,063	68,000	122,524	24,884	94,892	15,570	10,906	--	821,674
All species	736,615	132,402	32,237	2,392,346	1,259,865	266,338	19,078,772	194,185	780,019	29,028	24,901,807

Table 64--Net annual growth of growing stock on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Arizona cypress	127	--	--	127
Blue spruce	59	--	682	742
Chihuahua pine	9	--	91	100
Corkbark fir	713	--	256	969
Douglas-fir	5,298	--	5,334	10,632
Engelmann spruce	791	--	1,647	2,438
Ponderosa pine	69,254	1,867	28,478	99,599
Southwestern white pine	1,446	--	470	1,916
Subalpine fir	201	--	--	201
White fir	3,259	--	1,301	4,561
Softwood total	81,159	1,867	38,258	121,284
Aspen	1,340	--	1,782	3,123
Cottonwood	88	--	121	209
Hardwood total	1,428	--	1,904	3,332
All species	82,587	1,867	40,162	124,616

Table 65--Net annual growth of sawtimber (International ¼-inch rule) on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Arizona cypress	402	--	--	402
Blue spruce	207	--	4,959	5,166
Chihuahua pine	--	--	547	547
Corkbark fir	3,201	--	1,691	4,892
Douglas-fir	20,857	--	25,843	46,700
Engelmann spruce	5,237	--	10,478	15,715
Ponderosa pine	370,256	10,388	153,505	534,149
Southwestern white pine	5,382	--	1,884	7,266
Subalpine fir	2,236	--	--	2,236
White fir	13,782	--	5,925	19,707
Softwood total	421,560	10,388	204,833	636,781
Aspen	9,577	--	14,308	23,885
Cottonwood	273	--	189	462
Hardwood total	9,850	--	14,497	24,347
All species	431,410	10,388	219,330	661,129

Table 66--Net annual growth of sawtimber (Scribner rule) on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Arizona cypress	362	--	--	362
Blue spruce	168	--	3,919	4,086
Chihuahua pine	--	--	432	432
Corkbark fir	2,494	--	1,408	3,902
Douglas-fir	17,234	--	21,780	39,014
Engelmann spruce	3,825	--	8,567	12,392
Ponderosa pine	322,380	9,446	135,461	467,286
Southwestern white pine	4,803	--	1,685	6,488
Subalpine fir	1,907	--	--	1,907
White fir	11,954	--	5,119	17,073
Softwood total	365,126	9,446	178,371	552,943
Aspen	8,097	--	11,766	19,863
Cottonwood	247	--	171	418
Hardwood total	8,344	--	11,937	20,281
All species	373,470	9,446	190,308	573,224

Table 67--Net annual growth of growing stock on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Arizona cypress	52	8	18	11	21	--	9	8	--	--	--	--	--	127
Blue spruce	54	34	169	228	92	44	54	67	--	--	--	--	--	742
Chihuahua pine	31	23	23	14	10	--	--	--	--	--	--	--	--	100
Corkbark fir	439	116	36	104	-54	240	25	--	62	--	--	--	--	969
Douglas-fir	2,555	1,542	2,199	1,459	1,580	919	1,076	736	-602	-499	314	28	-675	10,632
Engelmann spruce	786	716	648	643	617	-190	184	-590	442	-852	--	--	35	2,438
Ponderosa pine	13,501	12,063	15,389	14,173	11,166	8,721	7,116	4,771	4,663	3,719	828	1,587	1,901	99,599
Southwestern white pine	395	295	237	108	348	156	12	33	44	127	47	37	77	1,916
Subalpine fir	-45	-93	-24	229	77	58	--	--	--	--	--	--	--	201
White fir	633	635	713	890	156	560	763	311	438	103	89	274	-1,005	4,561
Softwood total	18,401	15,337	19,407	17,858	14,013	10,509	9,240	5,336	5,048	2,598	1,278	1,925	333	121,284
Aspen	470	197	383	667	456	497	233	133	87	--	--	--	--	3,123
Cottonwood	52	39	32	10	12	27	38	--	--	--	--	--	--	209
Hardwood total	522	235	415	677	467	524	271	133	87	--	--	--	--	3,332
All species	18,923	15,573	19,822	18,536	14,481	11,032	9,511	5,469	5,135	2,598	1,278	1,925	333	124,616

Table 68--Net annual growth of sawtimber (International ¼-inch rule) on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	99	68	120	--	61	54	--	--	--	--	--	402
Blue spruce	2,273	1,353	561	264	321	395	--	--	--	--	--	5,166
Chihuahua pine	406	80	61	--	--	--	--	--	--	--	--	547
Corkbark fir	2,492	778	-244	1,349	150	--	368	--	--	--	--	4,892
Douglas-fir	20,027	8,857	9,610	5,741	6,563	4,604	-3,577	-2,982	2,005	177	-4,327	46,700
Engelmann spruce	12,926	4,498	3,848	-973	1,121	-3,397	2,467	-4,981	--	--	207	15,715
Ponderosa pine	171,109	83,405	68,226	53,529	43,996	30,275	30,653	24,503	5,587	10,425	12,440	534,149
Southwestern white pine	1,284	706	2,000	937	74	210	279	778	302	216	481	7,266
Subalpine fir	61	1,375	450	350	--	--	--	--	--	--	--	2,236
White fir	5,299	4,681	1,011	3,112	4,230	1,744	2,442	604	523	1,642	-5,581	19,707
Softwood total	215,976	105,802	85,642	64,309	56,515	33,885	32,632	17,922	8,419	12,460	3,220	636,781
Aspen	([a])	14,639	3,161	3,268	1,513	806	497	--	--	--	--	23,885
Cottonwood	([a])	56	66	151	189	--	--	--	--	--	--	462
Hardwood total	([a])	14,696	3,227	3,419	1,702	806	497	--	--	--	--	24,347
All species	215,976	120,498	88,869	67,728	58,217	34,691	33,130	17,922	8,419	12,460	3,220	661,129

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 69--Net annual growth of sawtimber (Scribner rule) on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	84	61	110	--	57	50	--	--	--	--	--	362
Blue spruce	1,651	1,118	474	226	276	341	--	--	--	--	--	4,086
Chihuahua pine	305	71	56	--	--	--	--	--	--	--	--	432
Corkbark fir	1,770	685	-159	1,158	130	--	319	--	--	--	--	3,902
Douglas-fir	15,075	7,529	8,474	5,170	6,006	4,149	-2,944	-2,670	1,903	169	-3,847	39,014
Engelmann spruce	9,419	3,902	3,331	-680	1,045	-2,726	2,142	-4,222	--	--	181	12,392
Ponderosa pine	132,064	73,910	62,265	49,544	41,044	28,598	29,079	23,285	5,557	9,976	11,965	467,286
Southwestern white pine	1,053	624	1,761	845	68	195	261	730	287	205	459	6,488
Subalpine fir	84	1,141	383	299	--	--	--	--	--	--	--	1,907
White fir	4,107	3,997	964	2,813	3,894	1,621	2,299	576	499	1,566	-5,263	17,073
Softwood total	165,612	93,038	77,658	59,375	52,519	32,229	31,156	17,699	8,246	11,917	3,496	552,943
Aspen	([a])	11,612	2,845	2,928	1,335	706	436	--	--	--	--	19,863
Cottonwood	([a])	51	60	136	171	--	--	--	--	--	--	418
Hardwood total	([a])	11,663	2,905	3,064	1,506	706	436	--	--	--	--	20,281
All species	165,612	104,700	80,563	62,439	54,025	32,935	31,592	17,699	8,246	11,917	3,496	573,224

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 70--Annual mortality of growing stock on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Arizona cypress	--	--	--	--
Blue spruce	--	--	39	39
Chihuahua pine	--	--	--	--
Corkbark fir	180	--	367	547
Douglas-fir	4,289	--	38	4,327
Engelmann spruce	2,836	--	1,829	4,665
Ponderosa pine	3,892	--	2,071	5,963
Southwestern white pine	--	--	161	161
Subalpine fir	291	--	--	291
White fir	1,601	--	71	1,672
Softwood total	13,090	--	4,576	17,666
Aspen	1,763	--	1,592	3,355
Cottonwood	--	--	--	--
Hardwood total	1,763	--	1,592	3,355
All species	14,853	--	6,168	21,021

Table 71--Annual mortality of sawtimber (International ¼-inch rule) on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Arizona cypress	--	--	--	--
Blue spruce	--	--	--	--
Chihuahua pine	--	--	--	--
Corkbark fir	876	--	1,384	2,260
Douglas-fir	23,932	--	126	24,058
Engelmann spruce	15,499	--	8,441	23,940
Ponderosa pine	14,490	--	8,427	22,917
Southwestern white pine	--	--	418	418
Subalpine fir	472	--	--	472
White fir	7,923	--	109	8,032
Softwood total	63,193	--	18,905	82,098
Aspen	2,453	--	6,289	8,742
Cottonwood	--	--	--	--
Hardwood total	2,453	--	6,289	8,742
All species	65,646	--	25,194	90,841

Table 72--Annual mortality of sawtimber (Scribner rule) on nonreserved timberland by species and owner group, Arizona, 1998

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Arizona cypress	--	--	--	--
Blue spruce	--	--	--	-
Chihuahua pine	--	--	--	--
Corkbark fir	696	--	1,028	1,724
Douglas-fir	21,451	--	90	21,541
Engelmann spruce	12,803	--	6,706	19,509
Ponderosa pine	12,573	--	7,671	20,244
Southwestern white pine	--	--	339	339
Subalpine fir	336	--	--	336
White fir	7,243	--	76	7,319
Softwood total	55,102	--	15,909	71,011
Aspen	1,924	--	4,983	6,908
Cottonwood	--	--	--	--
Hardwood total	1,924	--	4,983	6,908
All species	57,027	--	20,892	77,919

Table 73--Annual mortality of growing stock on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Arizona cypress	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blue spruce	16	23	--	--	--	--	--	--	--	--	--	--	--	39
Chihuahua pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Corkbark fir	14	86	173	115	159	--	--	--	--	--	--	--	--	547
Douglas-fir	115	182	38	161	134	193	--	--	1,044	818	--	--	1,642	4,327
Engelmann spruce	133	222	417	528	223	687	371	1,163	--	921	--	--	--	4,665
Ponderosa pine	617	1,160	480	384	643	344	--	790	379	--	1,166	--	--	5,963
Southwestern white pine	21	44	--	96	--	--	--	--	--	--	--	--	--	161
Subalpine fir	64	116	111	--	--	--	--	--	--	--	--	--	--	291
White fir	38	101	118	--	372	--	--	--	--	--	--	--	1,043	1,672
Softwood total	1,018	1,934	1,336	1,284	1,532	1,224	371	1,954	1,423	1,738	1,166	--	2,685	17,666
Aspen	341	646	875	705	383	321	84	--	--	--	--	--	--	3,355
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	341	646	875	705	383	321	84	--	--	--	--	--	--	3,355
All species	1,360	2,581	2,211	1,989	1,915	1,544	455	1,954	1,423	1,738	1,166	--	2,685	21,021

Table 74--Annual mortality of sawtimber (International ¼-inch rule) on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	--	--	--	--	--	--	--	--	--	--	--	--
Blue spruce	--	--	--	--	--	--	--	--	--	--	--	--
Chihuahua pine	--	--	--	--	--	--	--	--	--	--	--	--
Corkbark fir	815	569	876	--	--	--	--	--	--	--	--	2,260
Douglas-fir	126	665	646	1,063	--	--	6,228	4,993	--	--	10,336	24,058
Engelmann spruce	1,869	2,672	1,222	3,912	2,133	6,746	--	5,386	--	--	--	23,940
Ponderosa pine	1,648	1,751	3,205	1,866	--	4,626	2,341	--	7,480	--	--	22,917
Southwestern white pine	--	418	--	--	--	--	--	--	--	--	--	418
Subalpine fir	472	--	--	--	--	--	--	--	--	--	--	472
White fir	347	--	1,872	--	--	--	--	--	--	--	5,813	8,032
Softwood total	5,276	6,077	7,822	6,841	2,133	11,372	8,570	10,378	7,480	--	16,149	82,098
Aspen	([a])	3,899	2,295	2,006	542	--	--	--	--	--	--	8,742
Cottonwood	([a])	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	([a])	3,899	2,295	2,006	542	--	--	--	--	--	--	8,742
All species	5,276	9,976	10,117	8,847	2,675	11,372	8,570	10,378	7,480	--	16,149	90,841

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 75--Annual mortality of sawtimber (Scribner rule) on nonreserved timberland by species and diameter class, Arizona, 1998

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	--	--	--	--	--	--	--	--	--	--	--	--
Blue spruce	--	--	--	--	--	--	--	--	--	--	--	--
Chihuahua pine	--	--	--	--	--	--	--	--	--	--	--	--
Corkbark fir	600	428	696	--	--	--	--	--	--	--	--	1,724
Douglas-fir	90	505	491	903	--	--	5,403	4,526	--	--	9,622	21,541
Engelmann spruce	1,354	2,030	968	3,195	1,761	5,627	--	4,574	--	--	--	19,509
Ponderosa pine	1,243	1,440	2,719	1,635	--	4,176	2,122	--	6,910	--	--	20,244
Southwestern white pine	--	339	--	--	--	--	--	--	--	--	--	339
Subalpine fir	336	--	--	--	--	--	--	--	--	--	--	336
White fir	247	--	1,586	--	--	--	--	--	--	--	5,486	7,319
Softwood total	3,869	4,741	6,460	5,733	1,761	9,803	7,525	9,100	6,910	--	15,108	71,011
Aspen	([a])	2,982	1,830	1,641	454	--	--	--	--	--	--	6,908
Cottonwood	([a])	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	([a])	2,982	1,830	1,641	454	--	--	--	--	--	--	6,908
All species	3,869	7,724	8,290	7,374	2,215	9,803	7,525	9,100	6,910	--	15,108	77,919

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 76--Annual mortality of growing stock on nonreserved timberland by species and cause of death, Arizona, 1998

Species	Cause of death							
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Total
	Thousand cubic feet							
Arizona cypress	--	--	--	--	--	--	--	--
Blue spruce	--	--	--	--	--	39	--	39
Chihuahua pine	--	--	--	--	--	--	--	--
Corkbark fir	285	183	--	79	--	--	--	547
Douglas-fir	3,315	686	103	--	223	--	--	4,327
Engelmann spruce	--	4,568	58	22	--	16	--	4,665
Ponderosa pine	1,268	1,695	135	--	2,353	310	203	5,963
Southwestern white pine	--	--	96	64	--	--	--	161
Subalpine fir	--	65	226	--	--	--	--	291
White fir	40	1,601	--	31	--	--	--	1,672
Softwood total	4,908	8,798	619	196	2,576	365	203	17,666
Aspen	63	2,687	55	--	384	101	65	3,355
Cottonwood	--	--	--	--	--	--	--	--
Hardwood total	63	2,687	55	--	384	101	65	3,355
All species	4,971	11,485	674	196	2,960	467	268	21,021

Table 77--Annual mortality of sawtimber (International ¼-inch rule) on nonreserved timberland by species and cause of death, Arizona, 1998

Species	Cause of death						
	Insects	Disease	Fire	Weather	Suppression	Unknown	Total
	Thousand board feet						
Arizona cypress	--	--	--	--	--	--	--
Blue spruce	--	--	--	--	--	--	--
Chihuahua pine	--	--	--	--	--	--	--
Corkbark fir	1,478	782	--	--	--	--	2,260
Douglas-fir	20,257	3,136	--	665	--	--	24,058
Engelmann spruce	--	23,940	--	--	--	--	23,940
Ponderosa pine	4,381	5,495	--	12,106	287	648	22,917
Southwestern white pine	--	--	418	--	--	--	418
Subalpine fir	--	286	186	--	--	--	472
White fir	109	7,923	--	--	--	--	8,032
Softwood total	26,225	41,562	604	12,771	287	648	82,098
Aspen	--	7,328	--	1,414	--	--	8,742
Cottonwood	--	--	--	--	--	--	--
Hardwood total	--	7,328	--	1,414	--	--	8,742
All species	26,225	48,890	604	14,186	287	648	90,841

Table 78--Annual mortality of sawtimber (Scribner rule) on nonreserved timberland by species and cause of death, Arizona, 1998

Species	Cause of death						Total
	Insects	Disease	Fire	Weather	Suppression	Unknown	
	Thousand board feet						
Arizona cypress	--	--	--	--	--	--	--
Blue spruce	--	--	--	--	--	--	--
Chihuahua pine	--	--	--	--	--	--	--
Corkbark fir	1,142	581	--	--	--	--	1,724
Douglas-fir	18,495	2,541	--	505	--	--	21,541
Engelmann spruce	--	19,509	--	--	--	--	19,509
Ponderosa pine	3,834	4,574	--	11,086	209	541	20,244
Southwestern white pine	--	--	339	--	--	--	339
Subalpine fir	--	205	131	--	--	--	336
White fir	76	7,243	--	--	--	--	7,319
Softwood total	23,547	34,653	470	11,591	209	541	71,011
Aspen	--	5,824	--	1,084	--	--	6,908
Cottonwood	--	--	--	--	--	--	--
Hardwood total	--	5,824	--	1,084	--	--	6,908
All species	23,547	40,477	470	12,675	209	541	77,919

Table 79--Removals from nonreserved timberland by species and product, Arizona, 1998

Species	Product					All products
	Sawlogs	Pulpwood	Other products	Fuelwood	Logging residue	
	Thousand cubic feet					
Ponderosa pine	11,588	3,364	54	73	651	15,730
Douglas-fir	804	417	0	514	75	1,810
Spruce	154	409	44	0	26	633
True firs	199	5	0	0	9	213
Other species	189	5	0	84	12	290
Total species	12,934	4,200	98	671	773	18,677
	Thousand board feet, International ¼-inch rule					
Ponderosa pine	62,482	13,424	250	251	1,429	77,836
Douglas-fir	4,338	1,663	0	1,758	145	7,904
Spruce	830	1,630	206	0	50	2,716
True firs	1,075	21	0	0	20	1,117
Other species	1,017	21	0	288	25	1,351
Total species	69,743	16,758	456	2,297	1,669	90,923
	Thousand board feet, Scribner rule					
Ponderosa pine	54,809	11,775	220	220	1,253	68,277
Douglas-fir	3,805	1,459	0	1,542	127	6,933
Spruce	728	1,430	181	0	44	2,384
True firs	943	18	0	0	18	979
Other species	892	18	0	253	22	1,185
Total species	61,178	14,700	400	2,015	1,464	79,757

[a]Other products includes house logs and posts & poles.

Table 80--Removals from nonreserved timberland by species and owner group, Arizona, 1998.

Species	Owner group: National Forest	Owner group: Total other owners	All owners
	- - - - - - - - - - - - Thousand cubic feet - - - - - - - - - - - -		
Ponderosa pine	6,037	9,694	15,730
Douglas-fir	1,129	681	1,810
Spruce	339	294	633
True firs	21	193	213
Other species	97	193	290
Total species	7,623	11,054	18,677
	- - Thousand board feet, International ¼-inch rule - -		
Ponderosa pine	28,683	49,153	77,836
Douglas-fir	4,548	3,355	7,904
Spruce	1,433	1,284	2,717
True firs	101	1,015	1,116
Other species	336	1,015	1,351
Total species	35,101	55,822	90,923
	- - - - - - - Thousand board feet, Scriber rule - - - - - - - -		
Ponderosa pine	25,160	43,116	68,277
Douglas-fir	3,990	2,943	6,933
Spruce	1,257	1,127	2,384
True firs	89	890	979
Other species	294	890	1,185
Total species	30,790	48,967	79,757

Table 81--Removals from nonreserved timberland by product type and owner group, Arizona, 1998.

Product	Owner group: National Forest	Owner group: Total other owners	All owners
	- - - - - - - - - - - - Thousand cubic feet - - - - - - - - - - - -		
Sawlogs	4,049	8,885	12,934
Pulpwood	2,589	1,611	4,200
Other products[a]	--	98	98
Total products	6,637	10,595	17,232
Fuelwood	672	--	672
Logging residue	316	458	773
Total removals	7,625	11,053	18,677
	- - Thousand board feet, International ¼-inch rule - -		
Sawlogs	21,831	47,912	69,743
Pulpwood	10,328	6,430	16,758
Other products[a]	--	456	456
Total products	32,159	54,798	86,957
Fuelwood	2,297	--	2,297
Logging residue	644	1,025	1,669
Total removals	35,101	55,822	90,923
	- - - - - - - Thousand board feet, Scribner rule - - - - - - -		
Sawlogs	19,150	42,028	61,178
Pulpwood	9,060	5,640	14,700
Other products[a]	--	400	400
Total products	28,210	48,068	76,278
Fuelwood	2,015	--	2,015
Logging residue	565	899	1,464
Total removals	30,790	48,967	79,757

[a]Other products includes house logs and posts & poles.

Nonreserved Woodland

Table 82--Area of nonreserved woodland by forest type and owner group, Arizona, 1999

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Acres			
Deciduous woodland oak	107,344	24,264	151,234	282,842
Evergreen oak	851,275	64,895	488,601	1,404,771
Juniper	891,547	695,470	1,405,962	2,992,979
Mesquite	211,887	485,020	641,343	1,338,250
Misc. western hardwoods	19,436	63,769	29,229	112,434
Pinyon-juniper	2,160,293	971,193	3,851,204	6,982,690
Nonstocked woodland	554,383	95,563	279,819	929,764
All types	4,796,165	2,400,174	6,847,391	14,043,730

Table 83--Number of live trees on nonreserved woodland by species and diameter class, Arizona, 1999

Species	Diameter class (inches)															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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Alligator juniper[a]	63,293	38,575	25,025	17,962	12,839	9,461	6,534	4,901	3,016	1,979	1,345	887	1,228	769	1,778	189,590
Apache pine	486	486	39	39	117	39	--	--	--	39	--	--	--	--	--	1,245
Arizona cypress	--	--	--	112	35	--	--	--	--	--	--	--	--	--	--	147
Arizona pinyon pine[a]	17,945	5,670	5,755	3,532	2,054	1,400	784	245	112	40	32	--	--	--	--	37,571
Border pinyon[a]	11,525	5,684	5,133	3,659	1,426	545	302	116	80	39	--	--	--	--	--	28,509
California juniper[a]	898	898	349	267	289	239	--	--	--	--	--	--	--	--	--	2,941
Chihuahua pine	--	--	232	188	76	76	--	--	--	--	--	--	--	--	--	572
Douglas-fir	2,818	471	1,049	838	449	263	78	114	39	--	--	--	41	38	--	6,197
Mexican pinyon pine[a]	1,439	944	769	425	114	--	39	38	--	--	--	--	--	--	--	3,768
Oneseed juniper[a]	46,432	24,616	27,810	24,407	23,243	22,065	16,515	16,256	10,759	9,378	7,303	4,203	3,234	1,924	4,017	242,160
Ponderosa pine	27,485	14,410	12,071	7,452	4,617	3,663	2,549	1,494	999	788	332	283	144	139	37	76,463
Redberry juniper[a]	465	--	268	325	150	449	301	298	150	--	--	37	30	39	37	2,550
Rocky Mountain juniper[a]	13,529	9,479	2,914	2,253	1,099	982	862	630	595	304	144	185	76	--	310	33,363
Singleleaf pinyon[a]	6,222	3,400	2,937	2,384	1,346	1,001	402	171	73	--	41	--	--	--	--	17,975
Southwestern white pine	--	--	37	75	39	--	--	--	--	--	--	--	--	--	--	151
Twoneedle pinyon[a]	275,019	145,941	105,028	74,123	47,527	30,554	15,551	7,405	3,416	2,224	899	242	313	--	--	708,241
Utah juniper[a]	117,209	59,191	62,422	50,187	41,790	31,334	23,796	20,078	15,254	13,067	8,769	5,110	4,094	2,862	3,976	459,141
White fir	--	--	--	--	38	38	--	--	--	--	--	--	--	--	--	76
Softwood total	584,766	309,766	251,839	188,231	137,248	102,107	67,713	51,747	34,493	27,858	18,864	10,947	9,159	5,770	10,154	1,810,662
Arizona white oak[a]	68,460	36,322	33,649	26,791	17,787	11,068	7,092	4,178	2,447	1,704	816	486	266	--	199	211,263
Aspen	511	474	193	79	--	--	--	--	--	--	--	--	--	--	--	1,257
Bigtooth maple[a]	961	505	150	118	41	35	156	--	--	--	--	--	--	--	--	1,965
Cottonwood	--	--	--	--	37	--	--	--	--	--	--	--	--	--	--	37
Desert ironwood[a]	859	3,109	640	429	270	74	68	123	184	--	--	--	--	57	--	5,812
Emory oak[a]	40,962	19,381	18,970	16,926	11,007	5,955	3,985	1,671	1,400	451	308	106	64	33	--	121,220
Gambel oak[a]	278,304	48,540	33,754	13,506	4,066	1,732	734	265	299	178	33	210	147	81	33	381,883
Mesquite[a]	59,918	18,783	14,552	9,982	6,310	3,278	1,723	998	491	115	--	--	--	--	--	116,150
Mexican blue oak[a]	--	--	867	1,246	738	1,288	952	147	109	182	109	72	74	35	--	5,821
New Mexico locust[a]	25,177	1,932	257	44	--	--	--	--	--	--	--	--	--	--	--	27,410
Oak--evergreen[a]	15,666	6,813	4,168	1,633	1,775	744	375	--	280	--	--	--	--	--	--	31,454
Rocky Mountain maple[a]	--	--	135	--	--	--	--	--	--	--	--	--	--	--	--	135
Silverleaf oak[a]	26,095	9,572	5,154	3,295	2,064	912	342	419	203	74	76	--	76	--	--	48,281
Velvet mesquite[a]	13,551	3,713	5,579	3,715	2,389	952	586	295	257	208	74	--	--	37	--	31,358
W. honey mesquite[a]	8,952	8,813	2,829	1,886	1,560	425	225	74	74	--	--	--	--	--	74	24,911
Hardwood total	539,417	157,957	120,897	79,650	48,043	26,463	16,238	8,169	5,744	2,913	1,416	875	627	244	306	1,008,959
All species	1,124,183	467,723	372,737	267,881	185,291	128,570	83,952	59,916	40,236	30,771	20,280	11,821	9,787	6,014	10,460	2,819,621

[a]Diameter taken at root collar rather than at breast height.

Table 84--Net volume of all live trees on nonreserved woodland by forest type and owner group, Arizona, 1999

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Deciduous woodland oak	122,645	22,596	150,326	295,566
Evergreen oak	482,622	10,086	316,638	809,346
Juniper	403,493	278,635	589,443	1,271,570
Mesquite	40,936	46,704	67,844	155,484
Misc. western hardwoods	1,875	3,074	1,927	6,876
Pinyon-juniper	1,532,627	444,943	2,569,884	4,547,455
Nonstocked woodland	22,457	1,895	9,465	33,817
All types	2,606,656	807,933	3,705,526	7,120,114

Table 85--Net volume of all live trees on nonreserved woodland by species and diameter class, Arizona, 1999

Species	Diameter class(inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	20,682	32,513	43,908	52,632	55,059	58,513	51,141	43,881	37,566	31,184	51,843	37,154	148,172	664,248
Apache pine	53	107	805	408	--	--	--	1,806	--	--	--	--	--	3,178
Arizona cypress	--	194	94	--	--	--	--	--	--	--	--	--	--	288
Arizona pinyon pine[a]	8,511	12,202	13,227	15,636	12,092	5,111	3,115	1,777	960	--	--	--	--	72,631
Border pinyon[a]	5,684	9,208	8,069	5,134	3,582	1,851	1,698	983	--	--	--	--	--	36,210
California juniper[a]	181	477	527	623	--	--	--	--	--	--	--	--	--	1,809
Chihuahua pine	345	475	535	629	--	--	--	--	--	--	--	--	--	1,984
Douglas-fir	2,086	3,353	3,417	2,889	1,625	2,305	994	--	--	--	4,458	4,200	--	25,327
Mexican pinyon pine[a]	1,037	1,182	495	--	390	593	--	--	--	--	--	--	--	3,697
Oneseed juniper[a]	18,038	34,818	60,501	89,570	103,548	147,791	134,037	142,686	148,717	97,584	83,510	58,329	190,626	1,309,755
Ponderosa pine	17,483	25,774	31,114	40,605	43,458	38,255	34,989	34,648	21,991	24,072	15,658	19,166	4,438	351,651
Redberry juniper[a]	193	534	494	2,405	2,399	4,009	1,981	--	--	1,337	1,058	2,114	1,905	18,430
Rocky Mountain juniper[a]	3,421	5,150	5,057	6,326	8,634	7,946	10,403	7,723	4,162	6,221	4,809	--	17,506	87,357
Singleleaf pinyon[a]	4,163	8,436	7,835	10,112	6,031	4,114	1,703	--	2,119	--	--	--	--	44,513
Southwestern white pine	48	368	208	--	--	--	--	--	--	--	--	--	--	624
Twoneedle pinyon[a]	139,218	219,847	267,759	283,224	212,088	140,501	79,873	66,709	30,482	9,709	15,036	--	--	1,464,447
Utah juniper[a]	41,975	77,712	118,217	148,409	165,539	197,306	210,554	222,466	194,638	127,143	128,801	99,126	191,573	1,923,459
White fir	--	--	333	460	--	--	--	--	--	--	--	--	--	793
Softwood total	263,118	432,351	562,595	659,061	614,445	608,295	530,488	522,680	440,635	297,250	305,172	220,088	554,221	6,010,400
Arizona white oak[a]	24,998	45,232	54,703	55,062	54,583	47,981	34,313	30,011	20,817	14,119	8,146	--	11,962	401,926
Aspen	402	402	--	--	--	--	--	--	--	--	--	--	--	804
Bigtooth maple[a]	325	539	701	312	2,909	--	--	--	--	--	--	--	--	4,786
Cottonwood	--	--	271	--	--	--	--	--	--	--	--	--	--	271
Desert ironwood[a]	280	544	344	338	301	978	1,975	--	--	--	--	1,298	--	6,058
Emory oak[a]	15,835	30,643	40,635	36,027	38,396	22,774	25,174	8,887	7,707	4,101	3,524	1,885	--	235,588
Gambel oak[a]	49,153	44,445	26,315	19,542	11,971	6,420	8,366	5,727	807	8,596	7,444	6,206	2,053	197,045
Mesquite[a]	11,222	17,016	18,549	18,152	13,503	8,747	7,534	2,183	--	--	--	--	--	96,907
Mexican blue oak[a]	746	2,146	2,456	5,822	6,913	1,663	1,634	3,540	2,006	2,178	2,794	1,030	--	32,928
New Mexico locust[a]	489	128	--	--	--	--	--	--	--	--	--	--	--	617
Oak--evergreen[a]	2,578	1,865	4,128	2,595	1,822	--	3,857	--	--	--	--	--	--	16,846
Rocky Mountain maple[a]	153	--	--	--	--	--	--	--	--	--	--	--	--	153
Silverleaf oak[a]	5,017	7,164	7,938	6,980	4,021	5,774	2,843	2,108	2,248	--	2,988	--	--	47,080
Velvet mesquite[a]	4,340	5,842	8,030	5,458	5,513	3,595	4,096	3,800	1,713	--	--	470	--	42,858
W. honey mesquite[a]	2,410	3,419	6,890	2,481	2,091	831	1,407	--	--	--	--	--	6,319	25,848
Hardwood total	117,947	159,386	170,961	152,767	142,022	98,763	91,200	56,255	35,299	28,995	24,896	10,890	20,334	1,109,714
All species	381,065	591,737	733,556	811,828	756,467	707,057	621,688	578,935	475,935	326,245	330,068	230,978	574,555	7,120,114

[a]Diameter taken at root collar rather than at breast height.

Table 86--Net annual growth of all live trees on nonreserved woodland by forest type and owner group, Arizona, 1998

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Deciduous woodland oak	3,128	791	2,611	6,531
Evergreen oak	4,652	60	3,933	8,644
Juniper	4,385	2,358	4,786	11,528
Mesquite	476	316	623	1,416
Misc. western hardwoods	70	13	149	233
Pinyon-juniper	14,396	4,390	20,975	39,761
Nonstocked woodland	232	21	-3	249
All types	27,338	7,950	33,074	68,362

Table 87--Net annual growth of all live trees on nonreserved woodland by species and diameter class, Arizona, 1998

Species	Diameter class (inches)													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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Alligator juniper[a]	1,030	469	540	519	465	377	399	237	167	122	192	130	22	4,669
Apache pine	3	3	18	9	--	--	--	22	--	--	--	--	--	55
Arizona cypress	--	5	3	--	--	--	--	--	--	--	--	--	--	8
Arizona pinyon pine[a]	561	211	63	39	100	35	14	18	2	--	--	--	--	1,043
Border pinyon[a]	264	75	68	75	41	13	17	4	--	--	--	--	--	557
California juniper[a]	4	7	9	7	--	--	--	--	--	--	--	--	--	27
Chihuahua pine	21	14	10	14	--	--	--	--	--	--	--	--	--	60
Douglas-fir	210	154	113	141	-111	41	7	--	--	--	84	152	--	792
Mexican pinyon pine[a]	73	18	-19	--	4	5	--	--	--	--	--	--	--	80
Oneseed juniper[a]	1,005	534	705	893	841	906	843	712	713	340	275	167	495	8,428
Ponderosa pine	1,827	1,062	1,059	1,193	1,054	827	247	433	510	242	197	118	29	8,798
Redberry juniper[a]	6	8	6	24	29	36	14	--	--	5	5	8	3	143
Rocky Mountain juniper[a]	147	80	61	53	79	59	36	25	12	12	11	--	40	615
Singleleaf pinyon[a]	209	147	113	115	67	-168	5	--	7	--	--	--	--	496
Southwestern white pine	3	22	6	--	--	--	--	--	--	--	--	--	--	31
Twoneedle pinyon[a]	6,617	2,654	2,556	2,154	1,222	270	-67	297	136	23	37	--	--	15,900
Utah juniper[a]	2,442	1,177	1,343	1,353	1,301	1,374	1,356	1,085	770	429	405	280	503	13,818
White fir	--	--	28	24	--	--	--	--	--	--	--	--	--	53
Softwood total	14,422	6,641	6,682	6,614	5,091	3,775	2,871	2,831	2,319	1,174	1,206	855	1,091	55,573
Arizona white oak[a]	1,295	552	479	395	336	286	160	-60	68	-123	38	--	23	3,448
Aspen	49	25	--	--	--	--	--	--	--	--	--	--	--	74
Bigtooth maple[a]	6	8	15	4	38	--	--	--	--	--	--	--	--	71
Cottonwood	--	--	4	--	--	--	--	--	--	--	--	--	--	4
Desert ironwood[a]	29	5	2	2	1	4	7	--	--	--	--	3	--	53
Emory oak[a]	818	320	381	314	247	119	86	30	28	9	15	19	--	2,386
Gambel oak[a]	2,751	547	323	213	100	47	46	32	4	25	44	14	4	4,151
Mesquite[a]	327	107	142	18	59	30	20	5	--	--	--	--	--	708
Mexican blue oak[a]	12	30	31	49	51	12	5	12	7	6	8	4	--	228
New Mexico locust[a]	144	1	--	--	--	--	--	--	--	--	--	--	--	145
Oak--evergreen[a]	96	7	-21	15	9	--	14	--	--	--	--	--	--	119
Rocky Mountain maple[a]	2	--	--	--	--	--	--	--	--	--	--	--	--	2
Silverleaf oak[a]	256	83	72	54	26	28	12	6	5	--	4	--	--	547
Velvet mesquite[a]	167	83	108	55	38	15	16	18	6	--	--	1	--	507
W. honey mesquite[a]	168	56	73	19	13	3	6	--	--	--	--	--	10	348
Hardwood total	6,119	1,825	1,610	1,138	917	543	372	42	120	-83	109	41	37	12,789
All species	20,541	8,466	8,292	7,752	6,008	4,317	3,244	2,873	2,439	1,091	1,315	896	1,128	68,362

[a]Diameter taken at root collar rather than at breast height.

Table 88--Annual mortality of all trees on nonreserved woodland by forest type and owner group, Arizona, 1998

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Deciduous woodland oak	82	--	532	614
Evergreen oak	578	--	419	997
Juniper	245	--	5	250
Mesquite	4	--	141	145
Misc. western hardwoods	--	--	--	--
Pinyon-juniper	1,515	17	2,295	3,826
Nonstocked woodland	174	--	131	305
All types	2,598	17	3,522	6,137

Table 89--Annual mortality of all trees on nonreserved woodland by species and diameter class, Arizona, 1998

Species	Diameter class (inches) 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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	All classes
	Thousand cubic feet													
Alligator juniper[a]	7	5	--	--	50	85	--	--	--	--	--	--	343	489
Apache pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arizona cypress	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arizona pinyon pine[a]	7	--	132	131	--	--	--	--	--	--	--	--	--	269
Border pinyon[a]	19	72	52	--	--	--	--	--	--	--	--	--	--	142
California juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chihuahua pine	--	11	--	--	--	--	--	--	--	--	--	--	--	11
Douglas-fir	--	--	--	--	153	--	--	--	--	--	--	--	--	153
Mexican pinyon pine[a]	--	--	27	--	--	--	--	--	--	--	--	--	--	27
Oneseed juniper[a]	--	--	18	--	--	131	--	--	--	--	--	--	--	150
Ponderosa pine	39	218	104	66	--	--	300	347	--	--	--	--	--	1,075
Redberry juniper[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rocky Mountain juniper[a]	4	--	--	--	--	--	--	--	--	--	--	--	--	4
Singleleaf pinyon[a]	13	--	--	--	--	193	--	--	--	--	--	--	--	206
Southwestern white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Twoneedle pinyon[a]	179	324	413	336	210	464	474	--	--	--	--	--	--	2,401
Utah juniper[a]	12	19	24	73	62	--	--	--	--	--	--	--	--	191
White fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Softwood total	281	648	771	606	475	874	775	347	--	--	--	--	343	5,118
Arizona white oak[a]	59	34	47	46	65	--	--	183	--	181	--	--	--	614
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bigtooth maple[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Desert ironwood[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Emory oak[a]	14	13	28	--	24	--	--	--	--	--	--	--	--	79
Gambel oak[a]	87	--	--	--	--	--	--	--	--	--	--	--	--	87
Mesquite[a]	--	45	--	95	--	--	--	--	--	--	--	--	--	141
Mexican blue oak[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
New Mexico locust[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oak--evergreen[a]	--	17	51	--	--	--	--	--	--	--	--	--	--	68
Rocky Mountain maple[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silverleaf oak[a]	8	13	--	--	--	--	--	--	--	--	--	--	--	22
Velvet mesquite[a]	8	--	--	--	--	--	--	--	--	--	--	--	--	8
W. honey mesquite[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwood total	176	123	127	141	88	--	--	183	--	181	--	--	--	1,019
All species	457	771	897	747	564	874	775	530	--	181	--	--	343	6,137

[a]Diameter taken at root collar rather than at breast height.

Table 90--Area by county and land class, Arizona, 1999

County	Forest land [a]			Nonforest	Water	Total
	Timberland	Reserved timberland	Other forest land			
	Acres					
Apache	938,602	12,279	1,918,246	4,298,779	12,363	7,180,269
Cochise	1,620	20,716	653,378	3,299,652	--	3,975,367
Coconino	1,626,390	150,588	2,885,103	7,225,307	37,301	11,924,689
Gila	166,344	13,180	1,742,885	1,135,447	16,529	3,074,385
Graham	122,140	6,560	768,500	2,065,769	7,571	2,970,541
Greenlee	124,691	64,695	494,803	503,881	--	1,188,070
La Paz	--	--	5,789	2,869,775	13,178	2,888,742
Maricopa	--	7,977	155,335	5,724,134	16,465	5,903,910
Mohave	--	12,916	1,507,414	6,952,497	142,806	8,615,633
Navajo	475,638	--	1,712,980	4,185,709	1,636	6,375,963
Pima	5,893	6,365	1,244,999	4,625,083	--	5,882,340
Pinal	--	4,948	208,412	3,213,561	12,280	3,439,202
Santa Cruz	--	--	420,780	371,055	--	791,835
Yavapai	65,702	12,446	1,847,722	3,294,820	--	5,220,690
Yuma	--	--	20,936	3,511,435	--	3,532,371
Total	3,527,021	312,670	15,587,281	53,276,905	260,129	72,964,006

[a] On this and all subsequent tables, timberland includes nonreserved forest land with productivity class 20 cubic feet per acre per year and greater.

Table 91--Area of reserved timberland and other forest land by forest type, Arizona, 1999

Forest type	Forest land		Total
	Reserved timberland	Other forest land	
	Acres		
Aspen	43,779	--	43,779
Blue spruce	--	--	--
Cottonwood	--	--	--
Deciduous woodland oak	--	311,532	311,532
Douglas-fir	32,122	--	32,122
Engelmann spruce	20,319	--	20,319
Evergreen oak	--	1,616,135	1,616,135
Juniper	--	3,106,068	3,106,068
Maple woodland	--	8,875	8,875
Mesquite	--	1,426,544	1,426,544
Misc. western hardwoods	--	126,657	126,657
Other western softwoods	14,222	50,579	64,801
Pinyon-juniper	--	7,777,827	7,777,827
Ponderosa pine	170,014	6,288	176,303
Spruce-fir	6,536	--	6,536
White fir	17,700	--	17,700
Nonstocked timberland	7,977	--	7,977
Nonstocked woodland	--	1,156,776	1,156,776
All types	312,670	15,587,281	15,899,951

Table 92--Area of nonreserved timberland by county and ownership class, Arizona, 1999

County	Ownership class							
	National Forest	Bureau of Land Management	Miscellaneous federal	State	County and municipal	Indian Trust	Other private	Total
	Acres							
Apache	327,891	--	--	--	--	600,411	10,300	938,602
Cochise	1,620	--	--	--	--	--	--	1,620
Coconino	1,505,955	--	32,764	11,585	--	43,107	32,980	1,626,390
Gila	149,555	--	--	--	--	16,788	--	166,344
Graham	30,941	--	--	--	--	91,199	--	122,140
Greenlee	124,691	--	--	--	--	--	--	124,691
Maricopa	--	--	--	--	--	--	--	--
Mohave	--	--	--	--	--	--	--	--
Navajo	193,028	--	--	--	--	282,611	--	475,638
Pima	5,893	--	--	--	--	--	--	5,893
Pinal	--	--	--	--	--	--	--	--
Santa Cruz	--	--	--	--	--	--	--	--
Yavapai	65,702	--	--	--	--	--	--	65,702
Yuma	--	--	--	--	--	--	--	--
Total	2,405,277	--	32,764	11,585	--	1,034,116	43,280	3,527,021

Table 93--Area of nonreserved timberland by forest type and owner group, Arizona, 1999

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Acres			
Aspen	56,645	--	46,668	103,313
Blue spruce	4,890	--	12,115	17,006
Cottonwood	9,196	--	4,530	13,726
Deciduous woodland oak	--	--	--	--
Douglas-fir	134,979	--	72,507	207,487
Engelmann spruce	65,006	--	42,004	107,010
Evergreen oak	--	--	--	--
Juniper	--	--	--	--
Maple woodland	--	--	--	--
Mesquite	--	--	--	--
Misc. western hardwoods	--	--	--	--
Other western softwoods	18,181	--	11,037	29,218
Pinyon-juniper	--	--	--	--
Ponderosa pine	1,981,847	44,349	844,661	2,870,857
Spruce-fir	4,890	--	7,027	11,918
White fir	60,700	--	12,519	73,219
Nonstocked timberland	68,943	--	24,325	93,268
Nonstocked woodland	--	--	--	--
All types	2,405,277	44,349	1,077,395	3,527,021

Table 94--Area of nonreserved timberland by owner group and stand-size class, Arizona, 1999

Owner group	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Acres				
National Forest	2,143,166	118,409	74,759	68,943	2,405,277
Other public	37,651	--	6,698	--	44,349
Nonindustrial private	933,335	66,737	52,999	24,325	1,077,395
Total	3,114,151	185,145	134,456	93,268	3,527,021

Table 95--Area of nonreserved timberland by owner group and productivity class, Arizona, 1999

Owner group	Productivity class			Total
	85-119	50-84	20-49	
	Acres			
National Forest	1,631	519,546	1,884,100	2,405,277
Other public	--	--	44,349	44,349
Nonindustrial private	25,227	426,017	626,152	1,077,395
Total	26,857	945,563	2,554,601	3,527,021

Table 96--Area of nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				Total
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Acres				
Aspen	60,610	25,193	17,510	--	103,313
Blue spruce	13,858	--	3,148	--	17,006
Cottonwood	10,753	2,973	--	--	13,726
Deciduous woodland oak	--	--	--	--	--
Douglas-fir	184,566	13,290	9,631	--	207,487
Engelmann spruce	97,380	6,276	3,354	--	107,010
Evergreen oak	--	--	--	--	--
Juniper	--	--	--	--	--
Maple woodland	--	--	--	--	--
Mesquite	--	--	--	--	--
Misc. western hardwoods	--	--	--	--	--
Other western softwoods	18,181	--	11,037	--	29,218
Pinyon-juniper	--	--	--	--	--
Ponderosa pine	2,643,668	137,414	89,776	--	2,870,857
Spruce-fir	11,918	--	--	--	11,918
White fir	73,219	--	--	--	73,219
Nonstocked timberland	--	--	--	93,268	93,268
Nonstocked woodland	--	--	--	--	--
Total	3,114,151	185,145	134,456	93,268	3,527,021

Table 97--Number of live trees on nonreserved timberland by species and diameter class, Arizona, 1999

Species	Diameter class (inches)															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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Alligator juniper[a]	30,860	15,117	7,070	4,259	2,854	1,624	1,128	643	222	490	223	175	--	112	333	65,109
Arizona cypress	467	--	112	37	--	--	37	--	--	--	--	--	--	--	--	654
Blue spruce	474	553	433	245	327	330	188	44	38	38	--	--	--	--	--	2,670
Chihuahua pine	1,886	943	417	151	76	--	38	--	--	--	--	--	--	--	--	3,510
Corkbark fir	5,968	2,823	1,367	830	635	360	283	282	85	--	29	--	--	--	--	12,662
Douglas-fir	49,837	25,381	13,378	9,005	6,689	3,728	2,723	1,759	1,173	744	392	331	347	81	725	116,293
Engelmann spruce	13,099	13,315	4,524	3,653	2,916	2,406	1,298	731	618	550	283	42	--	--	38	43,474
Oneseed juniper[a]	1,383	1,016	278	155	117	70	76	--	--	--	--	41	--	--	--	3,136
Ponderosa pine	181,419	136,865	93,906	77,581	58,854	38,568	24,187	15,085	9,998	6,589	4,686	3,536	1,613	1,291	1,611	655,789
Redberry juniper[a]	--	--	--	--	--	38	--	--	--	--	--	--	--	--	--	38
Rocky Mountain juniper[a]	9,492	4,504	1,673	1,009	787	770	140	159	117	--	52	--	39	--	--	18,743
Singleleaf pinyon[a]	1,904	--	37	41	81	--	--	--	--	--	--	--	--	--	--	2,063
Southwestern white pine	4,559	969	1,964	1,791	954	517	658	352	44	104	59	67	44	37	44	12,163
Subalpine fir	367	--	134	118	146	201	39	67	--	--	--	--	--	--	--	1,072
Twoneedle pinyon[a]	10,532	3,254	2,691	2,031	635	593	157	159	80	--	--	--	41	--	--	20,174
Utah juniper[a]	3,354	971	608	598	647	334	80	80	109	--	38	--	--	--	41	6,862
White fir	26,456	9,350	5,467	4,435	2,996	2,098	1,227	832	836	347	395	151	73	237	52	54,952
Softwood total	342,054	215,061	134,061	105,940	78,715	51,637	32,260	20,194	13,319	8,862	6,158	4,343	2,158	1,758	2,843	1,019,363
Arizona white oak[a]	13,416	8,009	6,470	4,705	3,273	1,631	778	505	152	72	187	35	--	--	117	39,349
Aspen	42,696	10,115	5,433	4,894	4,456	3,174	1,713	1,328	328	213	38	--	--	--	--	74,389
Bigtooth maple[a]	4,725	2,365	793	188	38	--	38	--	--	--	--	--	--	--	--	8,147
Cottonwood	--	933	112	150	75	37	37	37	37	--	--	--	--	--	--	1,420
Emory oak[a]	4,868	467	790	685	303	149	--	120	81	--	--	--	--	--	--	7,463
Gambel oak[a]	157,191	38,790	25,531	9,748	4,569	2,933	1,501	1,029	536	642	307	226	117	38	227	243,385
New Mexico locust[a]	49,647	6,632	699	147	38	71	--	--	--	--	--	--	--	--	--	57,233
Oak--evergreen[a]	--	--	--	38	--	--	--	--	--	--	--	--	--	--	--	38
Rocky Mountain maple[a]	--	--	42	35	109	35	--	--	--	--	--	--	--	--	--	222
Silverleaf oak[a]	5,719	953	268	77	38	--	--	--	--	--	--	--	--	--	--	7,055
Hardwood total	278,262	68,264	40,138	20,667	12,900	8,030	4,068	3,021	1,134	927	532	261	117	38	345	438,702
All species	620,317	283,325	174,200	126,607	91,614	59,667	36,328	23,214	14,453	9,789	6,690	4,604	2,275	1,796	3,188	1,458,065

[a]Diameter taken at root collar rather than at breast height.

Table 98--Number of growing-stock trees on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Arizona cypress	467	--	112	37	--	--	37	--	--	--	--	--	--	--	--	654
Blue spruce	474	553	433	245	327	330	188	44	38	38	--	--	--	--	--	2,670
Chihuahua pine	1,414	943	417	151	76	--	38	--	--	--	--	--	--	--	--	3,039
Corkbark fir	5,441	2,823	1,367	830	635	360	283	282	85	--	29	--	--	--	--	12,135
Douglas-fir	43,805	24,323	13,267	8,935	6,575	3,728	2,723	1,759	1,173	744	392	331	347	81	686	108,869
Engelmann spruce	12,102	13,315	4,488	3,653	2,877	2,406	1,260	731	618	550	283	42	--	--	38	42,363
Ponderosa pine	162,155	127,334	91,291	76,577	58,625	38,260	24,043	14,928	9,882	6,555	4,686	3,536	1,613	1,291	1,573	622,351
Southwestern white pine	4,082	969	1,888	1,791	954	517	658	352	44	66	59	67	44	37	44	11,572
Subalpine fir	367	--	134	118	146	201	39	67	--	--	--	--	--	--	--	1,072
White fir	24,568	9,350	5,391	4,293	2,996	2,098	1,227	832	836	347	395	113	73	237	52	52,808
Softwood total	254,874	179,610	118,790	96,630	73,211	47,900	30,496	18,995	12,676	8,300	5,845	4,090	2,078	1,646	2,392	857,531
Aspen	40,671	9,148	4,972	4,287	4,134	2,989	1,570	1,216	262	137	38	--	--	--	--	69,422
Cottonwood	--	933	75	112	75	37	37	37	37	--	--	--	--	--	--	1,345
Hardwood total	40,671	10,081	5,047	4,399	4,209	3,026	1,607	1,253	299	137	38	--	--	--	--	70,767
All species	295,544	189,691	123,837	101,030	77,419	50,926	32,103	20,248	12,975	8,437	5,883	4,090	2,078	1,646	2,392	928,298

Table 99--Net volume of growing stock on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Arizona cypress	112	127	--	--	584	--	--	--	--	--	--	--	--	822
Blue spruce	968	1,568	3,495	6,295	4,676	1,372	1,859	2,703	--	--	--	--	--	22,936
Chihuahua pine	461	419	397	--	680	--	--	--	--	--	--	--	--	1,956
Corkbark fir	2,640	3,919	6,881	6,434	8,239	13,174	3,925	--	2,886	--	--	--	--	48,098
Douglas-fir	26,537	40,177	56,567	52,248	59,497	54,266	49,469	40,384	26,558	26,046	31,349	8,710	139,730	611,537
Engelmann spruce	8,099	20,019	31,725	43,367	36,842	28,383	36,853	42,312	30,383	6,062	--	--	5,649	289,694
Ponderosa pine	158,565	326,823	469,946	507,609	484,622	430,821	405,413	358,302	378,731	351,757	196,510	181,965	329,076	4,580,140
Southwestern white pine	3,606	7,354	7,941	6,717	12,992	11,400	1,317	4,293	4,486	6,036	5,792	5,528	7,842	85,304
Subalpine fir	238	593	1,466	4,199	1,298	2,290	--	--	--	--	--	--	--	10,084
White fir	9,750	18,328	23,654	27,445	24,792	24,750	34,202	18,383	25,558	10,549	7,830	31,377	6,560	263,177
Softwood total	210,974	419,325	602,072	654,315	634,221	566,457	533,038	466,377	468,602	400,451	241,481	227,579	488,857	5,913,750
Aspen	13,833	27,431	53,559	61,272	43,935	52,115	12,386	7,556	2,713	--	--	--	--	274,801
Cottonwood	140	443	585	471	668	878	1,230	--	--	--	--	--	--	4,414
Hardwood total	13,973	27,874	54,144	61,743	44,603	52,993	13,616	7,556	2,713	--	--	--	--	279,215
All species	224,948	447,199	656,216	716,057	678,824	619,451	546,654	473,933	471,315	400,451	241,481	227,579	488,857	6,192,965

Table 100--Net volume of sawtimber (Scribner rule) on nonreserved timberland by species and diameter class, Arizona, 1999

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	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Arizona cypress	--	--	2,623	--	--	--	--	--	--	--	--	2,623
Blue spruce	10,517	23,826	20,260	6,304	8,907	13,174	--	--	--	--	--	82,988
Chihuahua pine	1,037	--	2,956	--	--	--	--	--	--	--	--	3,993
Corkbark fir	21,074	25,072	35,436	58,095	18,655	--	14,299	--	--	--	--	172,631
Douglas-fir	143,381	177,752	236,964	240,231	235,048	199,041	129,030	137,352	173,598	47,297	789,144	2,508,837
Engelmann spruce	98,473	169,191	161,360	128,401	172,719	204,013	142,007	30,135	--	--	28,582	1,134,879
Ponderosa pine	1,193,867	1,758,444	1,985,788	1,950,841	1,952,153	1,823,132	2,073,278	1,977,390	1,120,829	1,050,881	1,920,208	18,806,810
Southwestern white pine	20,172	21,780	48,963	49,023	5,831	21,597	23,581	31,135	32,210	28,340	42,863	325,495
Subalpine fir	4,473	16,578	5,667	10,549	--	--	--	--	--	--	--	37,268
White fir	54,810	87,118	91,631	100,055	149,513	83,788	119,145	52,515	40,320	164,210	34,316	977,422
Softwood total	1,547,803	2,279,761	2,591,648	2,543,499	2,542,826	2,344,745	2,501,340	2,228,527	1,366,957	1,290,728	2,815,113	24,052,945
Aspen	[a]	243,386	200,775	250,409	63,067	37,122	12,852	--	--	--	--	807,611
Cottonwood	[a]	1,965	2,912	4,047	5,139	--	--	--	--	--	--	14,063
Hardwood total	[a]	245,351	203,687	254,456	68,206	37,122	12,852	--	--	--	--	821,674
All species	1,547,803	2,525,111	2,795,335	2,797,955	2,611,031	2,381,867	2,514,192	2,228,527	1,366,957	1,290,728	2,815,113	24,874,619

[a] Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 101--Net volume of growing stock on nonreserved timberland by species and owner group, Arizona, 1999

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Arizona cypress	822	--	--	822
Blue spruce	1,390	--	21,546	22,936
Chihuahua pine	35	--	1,920	1,956
Corkbark fir	21,939	--	26,159	48,098
Douglas-fir	418,076	--	193,461	611,537
Engelmann spruce	132,575	--	157,119	289,694
Ponderosa pine	3,190,703	62,503	1,326,934	4,580,140
Southwestern white pine	69,932	--	15,372	85,304
Subalpine fir	10,084	--	--	10,084
White fir	216,006	--	47,171	263,177
Softwood total	4,061,564	62,503	1,789,682	5,913,750
Aspen	125,628	--	149,174	274,801
Cottonwood	2,662	--	1,752	4,414
Hardwood total	128,289	--	150,926	279,215
All species	4,189,853	62,503	1,940,608	6,192,965

Table 102--Net volume of sawtimber (Scribner rule) on nonreserved timberland by species and owner group, Arizona, 1999

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Arizona cypress	2,623	--	--	2,623
Blue spruce	4,397	--	78,590	82,988
Chihuahua pine	--	--	3,993	3,993
Corkbark fir	79,938	--	92,693	172,631
Douglas-fir	1,765,686	--	743,151	2,508,837
Engelmann spruce	515,483	--	619,396	1,134,879
Ponderosa pine	12,975,289	284,198	5,547,323	18,806,810
Southwestern white pine	275,863	--	49,633	325,495
Subalpine fir	37,268	--	--	37,268
White fir	807,500	--	169,922	977,422
Softwood total	16,464,045	284,198	7,304,702	24,052,945
Aspen	352,726	--	454,885	807,611
Cottonwood	8,924	--	5,139	14,063
Hardwood total	361,651	--	460,023	821,674
All species	16,825,696	284,198	7,764,725	24,874,619

Table 103--Net volume of growing stock on nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Aspen	159,274	77,652	1,770	--	238,696
Blue spruce	36,676	--	243	--	36,919
Cottonwood	9,177	--	--	--	9,177
Douglas-fir	560,514	15,500	4,725	--	580,739
Engelmann spruce	302,117	7,988	397	--	310,502
Other western softwoods	50,644	--	6,225	--	56,869
Ponderosa pine	4,594,600	81,812	22,026	--	4,698,439
Spruce-fir	49,843	--	--	--	49,843
White fir	203,300	--	--	--	203,300
Nonstocked timberland	--	--	--	8,481	8,481
All types	5,966,144	182,953	35,387	8,481	6,192,965

Table 104--Net volume of sawtimber (Scribner rule) on nonreserved timberland by forest type and stand-size class, Arizona, 1999

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand board feet				
Aspen	537,473	194,129	5,013	--	736,615
Blue spruce	131,856	--	546	--	132,402
Cottonwood	32,237	--	--	--	32,237
Douglas-fir	2,352,537	26,052	13,757	--	2,392,346
Engelmann spruce	1,249,183	10,681	--	--	1,259,865
Other western softwoods	214,382	--	25,351	--	239,733
Ponderosa pine	18,867,947	134,937	75,305	--	19,078,189
Spruce-fir	194,185	--	--	--	194,185
White fir	780,019	--	--	--	780,019
Nonstocked timberland	--	--	--	29,028	29,028
All types	24,359,819	365,800	119,971	29,028	24,874,619

Table 105--Net volume of growing stock on nonreserved timberland by forest type and owner group, Arizona, 1999

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Aspen	95,111	--	143,585	238,696
Blue spruce	1,831	--	35,088	36,919
Cottonwood	7,425	--	1,752	9,177
Douglas-fir	414,341	--	166,398	580,739
Engelmann spruce	159,990	--	150,512	310,502
Other western softwoods	50,644	--	6,225	56,869
Ponderosa pine	3,273,614	62,503	1,362,321	4,698,439
Spruce-fir	13,351	--	36,492	49,843
White fir	166,228	--	37,071	203,300
Nonstocked timberland	7,317	--	1,165	8,481
All types	4,189,853	62,503	1,940,608	6,192,965

Table 106--Net volume of sawtimber (Scribner rule) on nonreserved timberland by forest type and owner group, Arizona, 1999

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Aspen	290,954	--	445,661	736,615
Blue spruce	5,444	--	126,958	132,402
Cottonwood	27,098	--	5,139	32,237
Douglas-fir	1,739,332	--	653,014	2,392,346
Engelmann spruce	641,601	--	618,264	1,259,865
Other western softwoods	214,382	--	25,351	239,733
Ponderosa pine	13,199,161	284,198	5,594,830	19,078,189
Spruce-fir	46,600	--	147,585	194,185
White fir	633,329	--	146,690	780,019
Nonstocked timberland	27,794	--	1,234	29,028
All types	16,825,696	284,198	7,764,725	24,874,619

Table 107--Net volume of trees on nonreserved timberland by class of timber, and softwoods and hardwoods, Arizona, 1999

Class of timber	Softwoods	Hardwoods	Total
	Thousand cubic feet		
Sawtimber trees			
Sawlog portion	4,709,566	137,285	4,846,851
Upper-stem portion	573,884	45,939	619,823
Total	5,283,450	183,224	5,466,674
Poletimber trees	630,300	95,991	726,291
All growing-stock trees	5,913,750	279,215	6,192,965
Rough cull trees	33,929	11,437	45,366
Rotten cull trees	1,654	4,150	5,804
Live woodland tree volume	207,115	349,514	556,629
Salvable dead trees	425,157	108,665	533,822
All timber	6,581,605	752,982	7,334,587

Table 108--Net annual growth of growing stock on nonreserved timberland by forest type and owner group, Arizona, 1998

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Aspen	1,434	--	2,865	4,300
Blue spruce	59	--	1,016	1,075
Cottonwood	300	--	121	421
Douglas-fir	6,870	--	3,166	10,035
Engelmann spruce	786	--	1,165	1,951
Other western softwoods	-1,994	--	191	-1,803
Ponderosa pine	72,162	1,867	30,371	104,399
Spruce-fir	415	--	240	655
White fir	2,149	--	831	2,980
Nonstocked timberland	282	--	109	391
All types	82,463	1,867	40,075	124,404

Table 109--Net annual growth of sawtimber (Scribner rule) on nonreserved timberland by forest type and owner group, Arizona, 1998

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Aspen	8,095	--	17,237	25,332
Blue spruce	185	--	5,832	6,017
Cottonwood	1,273	--	171	1,444
Douglas-fir	32,013	--	12,749	44,762
Engelmann spruce	5,057	--	5,611	10,669
Other western softwoods	-13,087	--	835	-12,252
Ponderosa pine	329,645	9,446	142,525	481,616
Spruce-fir	1,735	--	1,255	2,990
White fir	7,457	--	3,565	11,023
Nonstocked timberland	801	--	164	965
All types	373,175	9,446	189,945	572,566

Table 110--Annual mortality of growing stock on nonreserved timberland by forest type and owner group, Arizona, 1998

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Aspen	1,523	--	996	2,518
Blue spruce	--	--	186	186
Cottonwood	--	--	--	--
Douglas-fir	1,216	--	340	1,556
Engelmann spruce	3,053	--	2,020	5,073
Other western softwoods	3,108	--	--	3,108
Ponderosa pine	4,050	--	2,317	6,366
Spruce-fir	--	--	263	263
White fir	1,903	--	47	1,949
Nonstocked timberland	--	--	--	--
All types	14,853	--	6,168	21,021

Table 111--Annual mortality of sawtimber (Scribner rule) on nonreserved timberland by forest type and owner group, Arizona, 1998

Forest type	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Aspen	2,545	--	2,412	4,957
Blue spruce	--	--	62	62
Cottonwood	--	--	--	--
Douglas-fir	4,340	--	1,641	5,981
Engelmann spruce	13,499	--	7,483	20,982
Other western softwoods	17,592	--	--	17,592
Ponderosa pine	12,095	--	8,518	20,613
Spruce-fir	--	--	777	777
White fir	6,956	--	--	6,956
Nonstocked timberland	--	--	--	--
All types	57,027	--	20,892	77,919

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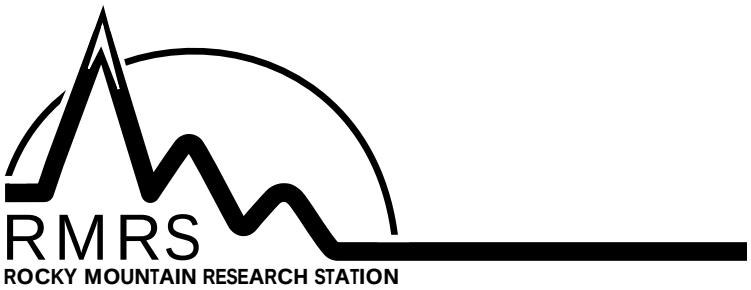

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