

Timber Resource Statistics For Eastern Oregon, 1999

David L. Azuma, Paul A. Dunham,
Bruce A. Hiserote, and
Charles F. Veneklas



United States
Department of
Agriculture



Forest
Service



Pacific Northwest
Research Station

Resource Bulletin
PNW-RB-238
December 2002



Authors

David L. Azuma is a research forester, **Paul A. Dunham** is a forester, **Bruce A. Hiserote** is a forester, and **Charles F. Veneklase** is a computer specialist, Forestry Sciences Laboratory, P.O. Box 3890, Portland, OR 97208-3890.

Abstract

Azuma, David L.; Dunham, Paul A.; Hiserote, Bruce A.; Veneklas, Charles F. 2002. Timber resource statistics for eastern Oregon, 1999. Resour. Bull. PNW-RB-238. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 42 p.

This report is a summary of timber resource statistics for eastern Oregon, which includes Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler Counties. Data were collected as part of a statewide multiresource inventory. The inventory sampled all private and public lands except those administered by the National Forest System. The National Forest System provided area statistics from their regional inventories of the various forests. Statistical tables summarize all ownerships and provide estimates of land area, timber volume, growth, mortality, and harvest.

Keywords: Forest surveys, forest inventory, statistics (forest), timber resources, resources (forest), eastern Oregon.

Summary

Eastern Oregon has an estimated 42.2 million acres of land. About 32 percent of this land is forested with 76 percent of the forested portion being nonreserved timberland. About 71 percent of the timberland exists on National Forest System lands. Within the timberland area outside of national forests, net volume of growing stock is estimated as 3.5 billion cubic feet. About 41 percent of the growing-stock volume is on forest industry land, 48 percent on other private land, and 11 percent on other public land. Approximately 99 percent of the total growing-stock volume is in coniferous species, with ponderosa pine accounting for 43 percent followed by Douglas-fir at 22 percent of the conifer volume. Estimated net annual growth of growing stock for nonfederal lands is 59 million cubic feet, and average annual mortality for this timber is an estimated 45 million cubic feet.

Preface

Forest Inventory and Analysis (FIA) is a nationwide program of the USDA Forest Service authorized by the Forest and Rangeland Renewable Resources Research Act of 1978. Work units, located at Forest Service research and experiment stations, conduct forest resource inventories throughout the 50 states. The FIA Program of the Pacific Northwest Research Station in Portland, Oregon, is responsible for forest inventories in Alaska, California, Hawaii, Oregon, and Washington.

Contents

v	Counties in Eastern Oregon
1	Introduction
1	Inventory Procedures (Nonfederal Lands)
2	Land and Water Area Updated
2	Change in Ownership Definitions
2	Analysis of Change Between Inventories for Nonfederal Lands
2	Highlights
3	Reliability of Inventory Data
4	Terminology
9	Names of Trees
10	Acknowledgments
10	Metric Equivalents
10	Literature Cited

List of Tables

Table 1—Estimated land area, by county, land class, and administrative status, eastern Oregon, 1999

Table 2—Estimated area of reserved timberland outside of national forests, and other forest land, by forest type, eastern Oregon, 1999

Table 3—Estimated area of timberland, by county and owner class, eastern Oregon, 1999

Table 4—Estimated area of timberland outside of national forests, by county and forest type, eastern Oregon, 1999

Table 5—Estimated area of timberland outside of national forests, by county and stand-size class, eastern Oregon, 1999

Table 6—Estimated area of timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 7—Estimated area of timberland outside of national forests, by owner class, stand-size class, and forest type group, eastern Oregon, 1999

Table 8—Estimated area of timberland, by cubic-foot site class and owner class, eastern Oregon, 1999

Table 9—Estimated area of timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999

Table 10—Estimated number of growing-stock trees on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999

Table 11—Estimated net volume of growing stock and sawtimber on timberland outside of national forests, by class of timber, owner class, and species group, eastern Oregon, 1999

Table 12—Estimated net volume of growing stock on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999

Table 13—Estimated net volume of sawtimber on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999

Table 14—Estimated net volume of growing stock on timberland outside of national forests, by species and owner class, eastern Oregon, 1999

Table 15—Estimated net volume of sawtimber on timberland outside of national forests, by species and owner class, eastern Oregon, 1999

Table 16—Estimated net volume of growing stock on timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999

Table 17—Estimated net volume of sawtimber on timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999

Table 18—Estimated net volume of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 19—Estimated net volume of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 20—Estimated net volume of timber on timberland outside of national forests, by class of timber and species group, eastern Oregon, 1999

Table 21—Estimated current gross annual growth of growing stock on timberland outside of national forests, by owner class and species group, eastern Oregon, 1999

Table 22—Estimated current net annual growth of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 23—Estimated current net annual growth of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 24—Estimated average annual mortality of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 25—Estimated average annual mortality of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Table 26—Estimated area, net volume of growing stock and net volume of sawtimber on timberland outside of national forests, by stand age and owner class, eastern Oregon, 1999

Table 27—Estimated gross annual growth, average annual mortality, and average annual removals of growing stock on timberland outside of national forests, by owner and species, eastern Oregon, 1999

Table 28—Estimated gross annual growth, average annual mortality, and average annual removals of sawtimber on timberland outside of national forests, by owner and species, eastern Oregon, 1999

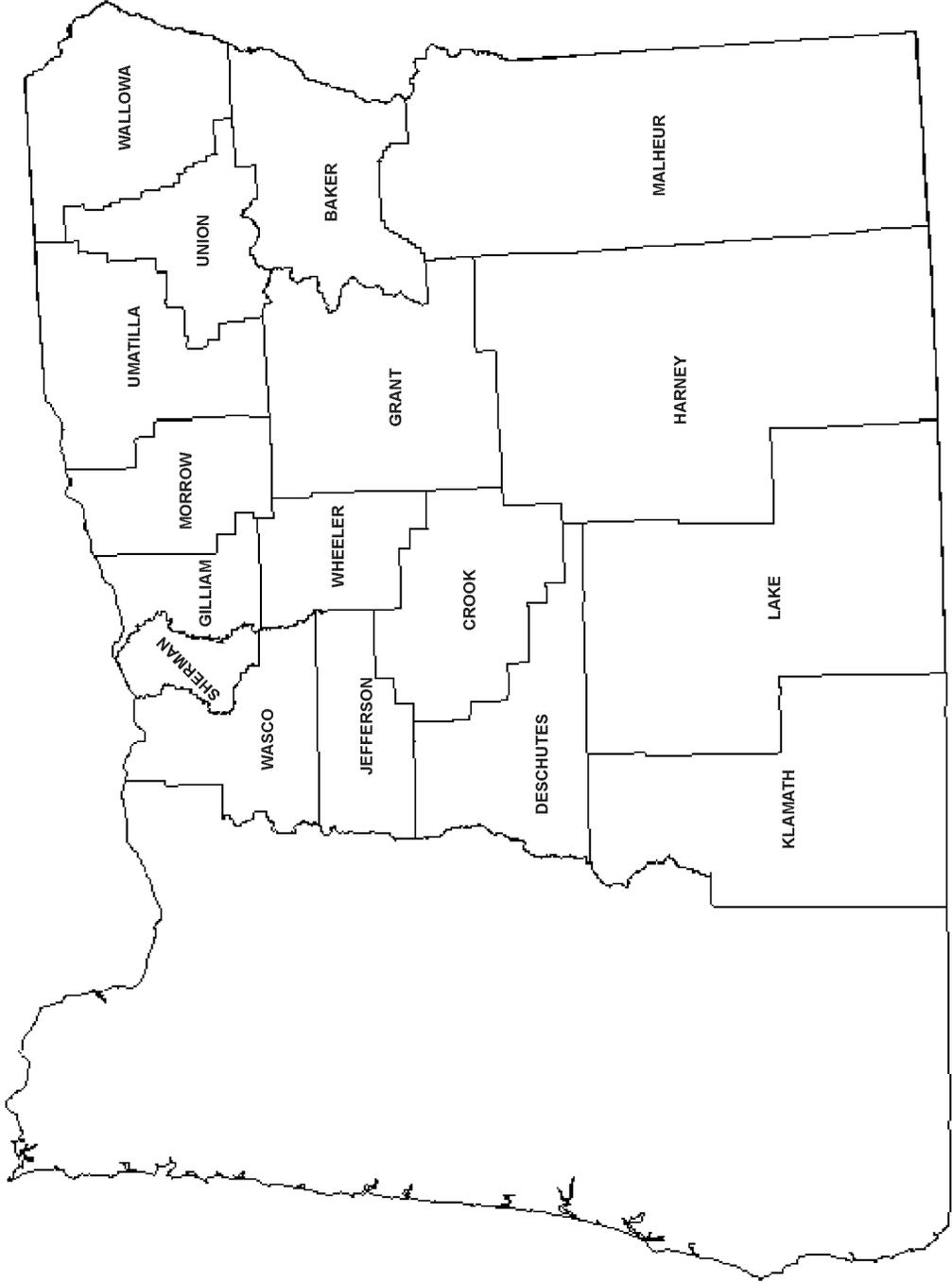
Table 29—Estimated changes in area of timberland outside of national forests, by owner class, eastern Oregon, 1988, 1999

Table 30—Estimated changes in net volume of growing stock on timberland outside of national forests, by species group and owner class, eastern Oregon, 1988, 1999

Table 31—Estimated changes in net volume of sawtimber on timberland outside of national forests, by species group and owner class, eastern Oregon, 1988, 1999

Table 32—Estimated timber harvest volume by year and owner class, eastern Oregon, 1962 to 2000

Counties in eastern Oregon



This page has been left blank intentionally.
Document continues on next page.

Introduction

The Forest Inventory and Analysis (FIA) unit of the Pacific Northwest Research Station conducted a multiresource inventory in eastern Oregon's forests in 1998 and 1999. This inventory included all lands except those administered by the USDA Forest Service. This report summarizes the timber resource statistics for eastern Oregon's forests. Some statistical tables include inventory data provided by the USDA Forest Service for area on their lands. Other resources sampled but not included in this report include understory vegetation, crown cover, coarse woody debris, and snags. These data will lead to further analysis of the status of eastern Oregon's forests.

The FIA unit has been reporting statistics for eastern Oregon since the 1930s. Bolsinger and Berger (1975), Farrenkopf (1982), and Gedney et al. (1989) reported inventory statistics in the 1960s, 1970s and 1980s, respectively. The current sampling system is a systematic grid of plots implemented in the early 1960s. McKay et al. (1994) used an updated 1992 data set to report the latest forest statistics for eastern Oregon.

This report contains statistical tables that provide current estimates of forest land area, number of trees, timber volume, growth, mortality, and harvest. In several tables, data supplied for the 1997 Resources Planning Act (RPA) (Smith et al. 2001) by the National Forest System are incorporated. Estimates are provided of change in volume and area of nonfederal lands between the 1980s and the present inventory. Change estimates are not available for federal lands. The national forest statistics include areas that are withdrawn from full production but still meet the FIA definition of timberland. National forest lands are not all equally available for timber production owing to various management decisions.

Inventory Procedures (Nonfederal Lands)

Eastern Oregon was inventoried by using a double sampling for stratification scheme (Cochran 1977). The sampling is implemented on a permanent systematic grid producing an even geographic distribution of both secondary (field) and primary (photo) plots across the state. Photo plots are placed at random inside each square of the grid.

The primary sample for eastern Oregon consists of a grid of nearly 70,000 points established in 1987 by using aerial photography from 1982 with some updates from 1994. Data collected on each point included, but were not limited to, land use, plant community, and stage of development. For conifer stands, percentage of crown cover and a height code also were collected. The primary sample is used for the stratification of the secondary sample points to increase the precision of estimates.

The secondary sample consisted of 4,378 forest and nonforest field locations established in previous inventories and remeasured or reclassified in the 1998-99 period. This sample represents about a 1 in 16 subsample of the primary grid. The ratio of 1 field to 16 photo plots provides a sufficient number of plots to meet the required sampling precision for estimates of forest area and volume.

The national forest plots were taken on a similar grid system with a different plot design (Max et. al 1996). The data were collected for these inventories between 1993 and 1996.

The 1998 FIA inventory also included reserved lands, which were excluded from previous FIA inventories. The major addition is from Crater Lake National Park with about 220,000 acres.

In 1986, a cluster of five subplots covering an area of about 8 acres was installed at timberland grid locations. At that time, the cluster of subplots sampled a single homogeneous condition, by moving subplots into the condition if necessary. At each subplot, variable-radius sampling was used to select trees over 5 inches diameter at breast height (d.b.h.), and a fixed-radius plot was used to sample seedlings and saplings.

In 1998, the sampling design was modified to remove potential bias inherent in the 1986 procedures. The term “condition class” was defined for the modified design to identify different situations that could occur on a plot. A condition class, or “condition,” refers to an area with a distinct land class (timberland, woodland, nonforest, etc.) and vegetative condition (forest type, stand age, etc.). The modified design requires that all subplots for a cluster (the plot) remain fixed. For plots that straddle two or more conditions, we now sample all conditions by mapping the boundaries around each condition essentially subdividing the plot. The information pertinent to each condition was recorded as condition class attributes. When multiple conditions exist on a plot, all data in one condition are processed together. This can impact the amount of information available for classifying stand characteristics, such as forest type, stand size, and stand age. For example, on 4,378 secondary sample locations outside of national forest lands in the 1998 inventory, 4,768 condition classes were sampled, of which 586 were timberland conditions. On the 464 plots that contained a timberland condition, roads were the most common nonforest condition followed by grassland steppe or high desert shrub land.

Land and Water Area Updated

The Bureau of the Census compiles and publishes the area of land and water in the United States every 10 years. These area figures, available by state and county, are accepted and used by FIA in Portland as the gross number of acres to be inventoried in each county. The previous inventory was based on 1980 census data, and the current inventory uses 1990 census figures. Raster-scanned U.S. Geological Survey topographic maps and a geographic information system are now used by the Bureau of the Census to identify water bodies and landforms and to determine the size of areas much smaller than was possible previously. As a result, the definition of inland water was changed to reflect the finer resolution: streams with a minimum width of 200 feet are now recognized, compared to 660 feet in 1980; and small water bodies are now at least 4.5 acres in size, compared to 40 acres in the past.

Change in Ownership Definitions

Lands owned by Native Americans are now classified as “other private.” In the 1988 inventory, these lands were defined as “other public.” Forest industry is no longer divided into two categories: “forest industry with mills” or “forest industry without mills”; instead both are now classed as forest industry.

Analysis of Change Between Inventories for Nonfederal Lands

To analyze change in forest statistics, the 1987 data were recompiled to account for technical changes in the 1998-99 inventory. The summaries presented in tables 29 through 31 have been developed from remeasured plots outside of National Forest System lands and include recompiled data from the 1987 inventory. Volume in the change tables is based on trees that were either measured twice, or measured for the first time in the 1998-99 inventory and were projected backward for the 1987 values. Caution should be used in comparing present statistics and those published by Gedney et al. (1989), because of the procedural changes.

Access was denied on and trees were not projected forward from the previous inventory on 137,000 acres representing approximately 197 million cubic feet in the 1988 inventory. The volume and area for these plots are shown as losses in the area and volume change tables. These lands are not actually withdrawn from the resource base but are reported as losses for comparison purposes.

Highlights

National forest timber harvests have dramatically declined in the 1990s. From 1970 to 1989, timber harvest volume from national forests averaged 1.16 billion board feet per year. That number dropped to 0.47 billion per year between 1990 and 2000, with an average of 0.24 billion from 1994 to 2000, a decrease of 79 percent from the 1970 to 1989 period.

Reliability of Inventory Data

Private lands, composing only 28 percent of the timberland in eastern Oregon, produced on average, 34 percent of the harvest volume per year in the 1980s, and 62 percent from 1990 to 2000. There has been a decline in standing volume on private lands from the 1988 inventory of 4.7 to 3.5 billion cubic feet in 1999. In the last 11 years, periodic removals are about 2.5 percent greater than the periodic gross growth. If mortality is included as lost volume, the volume lost is 27 percent greater than growth.

Less than 3 percent of timberland outside of the National Forest System has a large sawtimber size class (average stand d.b.h. greater than 21 inches). Of forest industry timberland, 56 percent has a small sawtimber size class (average stand d.b.h. between 9 and 21 inches); the percentage for other lands outside of national forests is 69 percent. The small sawtimber size class accounts for 83 percent of the growing-stock volume and 87 percent of the sawtimber volume in eastern Oregon.

There was little net change in land use in eastern Oregon between 1988 and 1999. An estimated 50,000 acres of the 2.9 million timberland acres went to another land use, 32,000 acres going to urban uses and the rest to roads. An estimated 40,000 acres moved into the timberland class; most of these areas had marginal tree stocking at the previous inventory. The timber volume associated with plots leaving timberland designation was about 95 million cubic feet; the volume on land becoming timberland was about 3 million cubic feet. The net loss in volume is much more substantial than the loss in acres.

Access was denied to about 137,000 acres in the 1998 inventory.

Inventories are designed to provide sampling errors consistent with national standards set by the USDA Forest Service. The target sampling errors for total timberland area are 3 percent per million acres, and 10 percent per billion cubic feet of growing-stock volume.

The sample design for this inventory provides the highest precision when estimates are aggregated for all of eastern Oregon. As the sample is divided into smaller units, the confidence intervals increase as a proportion of the estimate. Confidence intervals are quantitative expressions of the variability inherent in the sampling and estimation procedures. The tabulation below indicates, for instance, a 68-percent (one standard error) chance that the true timberland area outside of national forest (estimated at 2,945,000 acres) is within the range of 2,867,000 to 3,023,000 acres.

Area estimates and standard errors for timberland outside of national forests, by owner class, are displayed below:

Owner	Timberland area	Net volume
	<i>Thousand acres</i>	<i>Million cubic feet</i>
Other public	236±30	385±78
Forest industry	1,603±75	1,447±96
Other private	1,105±74	1,682±145
All owners	2,945±78	3,514±179

Confidence intervals vary with the size of the estimate and the amount of variance associated with the estimate. The following is a set of approximate confidence intervals calculated by using a regression analysis between actual standard error and the estimate involved. These approximate intervals allow the user to estimate the error around all values in the following tables. These regressions have r-square values greater than 0.80, indicating that 80 percent of the variance in the relation was explained by the equation. The actual error estimates for cells in tables can be obtained from the Portland FIA unit.

Timberland area			Growing-stock volume		
Estimate	Confidence interval		Estimate	Confidence interval	
-- Thousand acres --		Percent	-- Million cubic feet --		Percent
3,000	±93	3	6,000	±326	5
2,000	±76	4	4,000	±230	6
1,500	±66	4	2,000	±134	8
1,000	±54	5	1,000	±86	9
800	±48	6	800	±77	10
600	±42	7	600	±67	11
400	±34	8	400	±58	14
200	±25	12	200	±48	24
100	±18	18	100	±43	43
50	±13	26	50	±41	82
25	±10	40			
15	±8	53			
10	±6	60			
5	±5	99			

Terminology

Available other forest land—Forest land incapable of growing 20 cubic feet per acre per year (mean annual increment at culmination in fully stocked, natural stands) of industrial wood because of adverse conditions such as sterile soils, dry climate, poor drainage, subalpine sites, steepness, or rockiness but available for harvest.

Bureau of Land Management land—Land administered by the U.S. Department of the Interior, Bureau of Land Management.

Class of timber—A classification of trees as growing stock, cull, and salvable dead. Growing-stock trees are divided into poletimber and sawtimber trees.

Condition class—A mapped area on a plot with a distinct land class (for example, timberland, oak woodland, nonforest) or a distinct vegetative condition (for example, forest type, stand size). The condition identified at plot center is the only condition that is remeasured and used for the analysis of periodic change.

County and municipal lands—Lands owned by county and other municipalities.

Cull trees—Live trees of noncommercial species, and live trees of commercial species that are more than 75 percent defective. Noncommercial species are junipers, Pacific yew, Pacific dogwood, apple, and willow. Cull trees are not growing-stock trees.

Cull trees, rotten—Cull trees with defect caused primarily by rot.

Cull trees, sound—Trees of noncommercial species or cull trees of commercial species with defect caused primarily by poor form and roughness.

Diameter class—A classification of trees based on diameter outside the bark measured at breast height, 4½ feet above the ground. The common abbreviation for diameter at breast height is d.b.h. Trees are grouped into 2-inch classes up to 21 inches d.b.h., after which the class intervals become broader.

Even-aged stands—Stands where 70 percent or more of the tree stocking falls within three adjacent 10-year age classes.

Farmer-owned lands—Lands owned by the operators of farms.

Forest industry lands—Lands owned by companies that grow timber for industrial use. Includes companies both with and without wood processing plants.

Forest land—Land at least 10 percent stocked with live trees, or land that had this minimum tree stocking in the past and is not currently developed for nonforest use. The minimum area recognized is 1 acre.

Forest types—Stands are assigned a pure softwood, pure hardwood, softwood-hardwood mix, or hardwood-softwood mix. Stands with 70 percent or more of the stocking in live softwood trees are classified as pure softwood types and are assigned the type name of the softwood species with the greatest stocking among all softwoods on the condition class plot. Stands with 70 percent or more of the stocking in live hardwood trees are classified as pure hardwood types and are assigned the type name of the hardwood species with the greatest stocking among all hardwoods on the condition class plot. Mixed species types are assigned if softwood stocking is between 31 to 69 percent total stocking on the plot: stands with 50 to 69 percent of the stocking in live softwood trees are classed as softwood-hardwood types, and receive a type name that includes the softwood species with the greatest softwood stocking, followed by the hardwood species with the greatest hardwood stocking; stands with 51 to 69 percent of the stocking in live hardwood trees are classed as hardwood-softwood types, and receive a type name that includes the hardwood species with the greatest hardwood stocking, followed by the softwood species with the greatest softwood stocking. For ease in reporting, the secondary forest type will be identified after a slash as “softwood” or “hardwood” in the summary tables

Growing-stock trees—All live trees except cull trees (see “cull trees”).

Growing-stock volume—Net volume in cubic feet of live sawtimber and poletimber growing-stock trees from the top of a stump 12 inches tall to a minimum 4-inch top (of central stem) inside the bark. Net volume is gross volume less deductions for rot and missing bole sections.

Growth, current net annual, growing stock—The increase in growing-stock volume on timberland during the last year of the period between the previous and current inventories. Components of current net annual growth for growing-stock volume include (a) the increment in net volume of poletimber and sawtimber growing-stock trees alive at the beginning of the year and surviving to year end; plus (b) ingrowth, the net volume of growing-stock trees reaching poletimber or sawtimber size during the year; minus (c) mortality, the net volume of poletimber and sawtimber growing-stock trees that died during the year.

Growth, current net annual, sawtimber—The increase in sawtimber volume on timberland during the last year of the period between the previous and current inventories. Components of current net annual growth for sawtimber volume include (a) the increment

in net volume of sawtimber trees alive at the beginning of the year and surviving to year end; plus (b) ingrowth, the net volume of trees reaching sawtimber size during the year; minus (c) mortality, the net volume of sawtimber trees that died during the year.

Growth, periodic gross, growing stock—The increase in growing-stock volume between the previous and current inventories that is attributable to increasing tree size. Periodic gross growth includes (a) the increment in net volume of poletimber and sawtimber growing-stock trees alive at both the previous and current inventories; (b) the increment in net volume of poletimber and sawtimber growing-stock trees alive at the previous inventory and harvested between inventories; and (c) ingrowth, the net volume of growing-stock trees reaching poletimber or sawtimber size between inventories.

Growth, periodic gross, sawtimber—The increase in sawtimber volume between the previous and current inventories that is attributable to increasing tree size. Periodic gross growth includes (a) the increment in net volume of sawtimber trees alive at both the previous and current inventories; (b) the increment in net volume of sawtimber trees alive at the previous inventory and harvested between inventories; and (c) ingrowth, the net volume of trees reaching sawtimber size between inventories.

Hardwoods—Nonconiferous trees, usually broadleaved. See “Names of Trees” for a list of hardwood species in this report.

Industrial wood—All commercial roundwood products except fuelwood. Roundwood includes logs or bolts that are in straight sections at least 8 feet long for hardwoods and 12 feet long for softwoods.

Land area—Area reported as land by the Bureau of the Census (U.S. Department of Commerce 1990). Total land area includes dry land and land temporarily or partially covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, and canals less than 200 feet wide; and lakes, reservoirs, and ponds less than 4.5 acres in area.

Land class—A classification of land by major use. The minimum area for classification is 1 acre.

Mean annual increment (MAI) at culmination—A measure of the productivity of forest land expressed as the average increase in cubic-foot volume per acre per year. For a given species and site index, the mean is based on the age at which the MAI culminates for fully stocked natural stands. The MAI is based on the site index of the plot.

Mortality, average annual, growing stock—The annual net volume of poletimber and sawtimber growing-stock trees that died between the previous and current inventories.

Mortality, average annual, sawtimber—The annual net volume of sawtimber trees that died between the previous and current inventories.

Mortality, periodic, growing stock—The net volume of poletimber and sawtimber growing-stock trees that died between the previous and current inventories not including removals.

National forest lands—Federal lands that have been designated by Executive order or statute as national forest or purchase units and other lands under the administration of the U.S. Department of Agriculture, Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Native American lands—Tribal lands, and allotted lands held in trust by the federal government. Native American lands are grouped with farmer and miscellaneous private lands as other private lands.

Net volume—Gross volume less deductions for sound and rotten defects. Growing-stock net volume is gross cubic-foot volume less deductions for rot and missing bole sections on poletimber and sawtimber growing-stock trees. Sawtimber net volume is gross board-foot volume less deductions for rot, sweep, crook, missing bole sections, and other defects that affect the use of sawtimber trees for lumber.

Noncommercial species—A tree species not commonly used for industrial wood products: junipers, Pacific yew, Pacific dogwood, apple, and willow. Noncommercial species will not be included in growing-stock volume tables; however, if one or more of these species dominate on a plot, the forest type might be classified as a noncommercial species.

Nonforest land—Land that has never supported forests or formerly was forested and currently is developed for nonforest uses. Included are lands used for agricultural crops, Christmas tree farms, cottonwood plantations, improved pasture, residential areas, city parks, constructed roads, operating railroads and their right-of-way clearings, powerline and pipeline clearings, streams more than 30 feet wide, and 1- to 40-acre areas of water classified by the Bureau of the Census, U.S. Department of Commerce, as land. If intermingled in forest areas, unimproved roads and other nonforest strips must be more than 120 feet wide, and clearings or other areas must be 1 acre or larger to qualify as nonforest land.

Nonstocked areas—Timberland less than 10 percent stocked with live trees. Recent clearcuts scheduled for planting are classified as nonstocked area.

Other private lands—Private lands not owned by forest industry. Native American lands, farmer-owned lands, and miscellaneous private lands are included.

Other public lands—Lands administered by public agencies other than the U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior, Bureau of Land Management. Other public lands do not include Native American lands, which are included with other private lands.

Poletimber stands—Stands with a quadratic mean diameter (mean diameter weighted by basal area) from 5.0 to 9.0 inches at breast height if a softwood stand and from 5.0 to 11.0 inches at breast height if a hardwood stand.

Poletimber trees—Live growing-stock trees of commercial species that are 5.0 inches in d.b.h. or larger but smaller than sawtimber trees.

Reserved other forest—Forest land incapable of growing 20 cubic feet per acre per year (mean annual increment at culmination in fully stocked, natural stands) of industrial wood that has been dedicated to noncommodity use through statute, ordinance, or administrative order.

Reserved timberland—Forest land capable of growing 20 cubic feet or more per acre per year (mean annual increment at culmination in fully stocked, natural stands) of industrial wood that has been dedicated to noncommodity use through statute, ordinance, or administrative order.

Roundwood—Logs, bolts, or other round sections cut from trees.

Sapling and seedling stands—Stands with a quadratic mean diameter (mean diameter weighted by basal area) less than 5.0 inches at breast height.

Sapling and seedling trees—Live trees of commercial species that are less than 5.0 inches in d.b.h. with a minimum height of 6.0 inches and have no diseases, defects, or deformities likely to prevent their becoming poletimber trees. Saplings have a minimum diameter of 1.0 inch.

Saw-log portion—The bole of sawtimber trees between the stump and the saw-log top. Saw-log top is 7.0 inches in diameter outside bark on softwoods and 9.0 inches in diameter outside bark on hardwoods.

Sawtimber stands—Stands with a quadratic mean diameter (mean diameter weighted by basal area) 9.0 inches and larger at breast height if a softwood stand and 11.0 inches and larger at breast height if a hardwood stand. Small sawtimber stands are sawtimber stands with a mean diameter (weighted by basal area) less than 21.0 inches at breast height. Large sawtimber stands are sawtimber stands that have a mean diameter 21.0 inches or larger at breast height.

Sawtimber trees—Live softwood trees of commercial species at least 9.0 inches in d.b.h. and live hardwood trees of commercial species at least 11.0 inches in d.b.h. At least 25 percent of the board-foot volume in a sawtimber tree must be free from defect. Softwood trees must contain at least one 12-foot saw log with a top diameter of not less than 7 inches outside bark; hardwood trees must contain at least one 8-foot saw log with a top diameter of not less than 9 inches outside bark.

Sawtimber volume—Net volume of sawtimber trees measured in board feet. Softwood volume is estimated from the top of a stump 12 inches tall up to a minimum 6-inch top diameter, inside bark, and hardwood volume is estimated from the top of a stump 12 inches tall up to a minimum 8-inch top diameter, inside bark. Net sawtimber volume equals gross volume less deduction for rot, sweep, crook, and other defects that affect use for lumber.

Scribner rule—The common board-foot log rule used locally in eastern Oregon to determine sawtimber volume. Scribner volume is estimated in terms of 16-foot logs for softwoods and hardwoods. See “Sawtimber volume” for utilization limits.

Site class—A classification of the potential productivity of forest land expressed as mean annual increment (MAI) at culmination in fully stocked natural stands. Six classes in this report are based on a range of MAI values that were calculated on every plot.

Site index—A measure of the productivity of forest land expressed as the average height of dominant and codominant trees at a specified age.

Softwoods—Coniferous trees, usually evergreen, with needles or scalelike leaves. See “Names of Trees” for a list of softwood species in this report.

Stand age—The 10-year age class that best characterizes the stand. See “even-aged stand” and “uneven-aged stand” for more details.

Stand-size class—A classification of stands based on tree size. Stand-size classes are sawtimber, poletimber, and sapling-seedling stands.

State lands—Lands owned by states or administered by state agencies.

Timber harvest—Volume of roundwood removed from forest land for products. Timber harvest statistics reported in table 32 were collected by the Oregon Department of Forestry.

Timber volume—Includes the net volume in cubic feet of poletimber and sawtimber trees and salvable dead sawtimber trees, and the net volume in cubic feet of cull trees of commercial species. In table 17, the volume of cull trees includes the gross volume of noncommercial species. Volume is measured from the top of a stump 12 inches tall to a minimum 4-inch top diameter, inside bark.

Timberland—Forest land capable of growing 20 cubic feet or more per acre per year (mean annual increment at culmination in fully stocked, natural stands) of industrial wood and not in a reserved status through removal of the area from timber utilization by statute, ordinance, or administrative order; and not in a withdrawn status where it is pending consideration for reserved status.

Uneven-aged stands—Stands where less than 70 percent of the tree stocking falls in three adjacent 10-year age classes.

Upper stem portion—The bole of sawtimber trees above the saw-log top—7.0 inches diameter outside bark for softwoods and 9.0 inches diameter outside bark for hardwoods to a minimum top diameter of 4.0 inches inside bark, or to the point where the central stem divides into limbs.

Names of Trees

Common name	Scientific name ¹
Softwood:	
Douglas-fir	<i>Pseudotsuga menziesii</i> (Mirb.) Franco
Engelmann spruce	<i>Picea engelmannii</i> Parry ex Engelm.
Grand fir	<i>Abies grandis</i> (Dougl. ex D. Don) Lindl.
Incense-cedar	<i>Calocedrus decurrens</i> (Torr.) Florin
Jeffrey pine	<i>Pinus jeffreyi</i> Grev. & Balf.
Lodgepole pine	<i>Pinus contorta</i> Dougl. ex Loud.
Mountain hemlock	<i>Tsuga mertensiana</i> (Bong.) Carr.
Noble fir	<i>Abies procera</i> Rehd.
Pacific silver fir	<i>Abies amabilis</i> Dougl. ex Forbes
Pacific yew	<i>Taxus brevifolia</i> Nutt.
Ponderosa pine	<i>Pinus ponderosa</i> Dougl. ex Laws.
Shasta red fir	<i>Abies shastensis</i> (Lemmon)
Subalpine fir	<i>Abies lasiocarpa</i> (Hook.) Nutt.
Sugar pine	<i>Pinus lambertiana</i> Dougl.
Western hemlock	<i>Tsuga heterophylla</i> (Raf.) Sarg.
Western juniper	<i>Juniperus occidentalis</i> Hook.
Western larch	<i>Larix occidentalis</i> Nutt.
Western redcedar	<i>Thuja plicata</i> Donn ex D. Don
Western white pine	<i>Pinus monticola</i> Dougl. ex D. Don
White fir	<i>Abies concolor</i> (Gord. & Glend.) Lindl. ex Hildebr.
Whitebark pine	<i>Pinus albicaulis</i> Engelm.
Hardwoods:	
Black cottonwood	<i>Populus trichocarpa</i> (Torr. & Gray)
Cherry	<i>Prunus</i> spp.
Oregon white oak	<i>Quercus garryana</i> Dougl. ex Hook.
Quaking aspen	<i>Populus tremuloides</i> Michx.
White alder	<i>Alnus rhombifolia</i> Nutt.
Willow	<i>Salix</i> spp.

¹ Nomenclature per Little (1979).

Acknowledgments

Many people were involved in the collection of data and the design of the inventory. Thanks go to the data collection staff: Brett Anderson, Christina Anthony, Joy Archuleta, Dale Baer, Jennifer Baker, Del Barge, Adam Blackwood, Steve Bolon, Sarah Butler, Perry Colclasure, Shaun Curtis, Brian Daum, Sebastien DeLion, Peter DelZotto, Paul Dunham, Szilard Farkas, Perttu Finni, Andrei Fiodorov, Jennifer Gomoll, Walter Grabowiecki, Erica Hanson, Kalle Harkonen, Sarah Hedrich, Mike Hogan, Ellie Husk, Jari Jokinen, Dana Katz, Juha Kauppila, Kim Kuhne, J.D. Lloyd, Kitty McCovey, Tom Meade, Cecilia Meyers, Scott Nelson, Dominic Ortiz, Mikko Paivinen, Melissa Patterson, Aimee Porcaro, Bob Rhoads, Tony Rodriguez, Sam Solano, Julie Theil, Chuck Veneklase, Mark Weber, and Len Zeoli. Thanks to Darius Adams, Chuck Bolsinger, Steve Fairweather, Mike Huschmann, and Gary Lettman, who provided valuable reviews. Dale Weyermann provided the maps and Paul Dunham the cover photograph. A special thanks to the many landowners who allowed field crews on their lands to visit plots and measure trees.

Metric Equivalents

1 acre = 0.405 hectare
1 acre = 4046.86 square meters
1,000 acres = 404.7 hectares
1,000 cubic feet = 28.3 cubic meters
1 cubic foot per acre = 0.07 cubic meter per hectare
1 foot = 0.3048 meter
1 inch = 2.54 centimeters
1 mile = 1.609 kilometers

Literature Cited

- Bolsinger, C.L.; Berger, J.M. 1975.** The timber resources of the Blue Mountain area, Oregon. Resour. Bull. PNW-57. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 62 p.
- Cochran, W.G. 1977.** Sampling techniques. 3rd ed. New York: John Wiley and Sons. 413 p.
- Farrenkopf, T.O. 1982.** Forest statistics for eastern Oregon, 1977. Resour. Bull. PNW-94. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 28 p.
- Gedney, D.; Azuma, D.L.; Bolsinger, C.L.; McKay, N. 1999.** Western juniper in eastern Oregon. Gen. Tech. Rep. PNW-GTR-464. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.
- Gedney, D.R.; Bassett, P.M.; Mei, M.A. 1989.** Timber resource statistics for all forest land, except national forests in eastern Oregon. Resour. Bull. PNW-RB-164. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 25 p.
- Little, E.L., Jr. 1979.** Checklist of United States trees (native and naturalized). Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.

- Max, T.A.; Schreuder, H.T.; Hazard, J.W. [et al.]. 1996.** The Pacific Northwest Region vegetation and inventory monitoring system. Res. Pap. PNW-RP-493. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 22 p.
- McKay, N.; Lettman, G.J.; Mei, M.A. 1994.** Timber resource statistics for timberland outside national forests in eastern Oregon. Resour. Bull. PNW-RB-203. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 40 p.
- Smith, W.B.; Vissage, J.S.; Darr, D.R.; Sheffield, R.M. 2001.** Forest resources of the United States, 1997. Gen. Tech. Rep. NC-219. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 190 p.
- U.S. Department of Commerce. 1990.** 1990 census of population. Volume 1: Characteristics of the population. Part 1: United States summary. Washington, DC.

Table 1—Estimated land area, by county, land class, and administrative status, eastern Oregon, 1999^a

County	Forest land				Total forest	Non-forest	All land ^c
	Available timberland	Reserved timberland	Available ^b other forest	Reserved other forest			
<i>Thousand acres</i>							
Baker	641	47	54	8	750	1,214	1,964
Crook	445	17	487	—	949	958	1,907
Deschutes	865	121	149	—	1,135	797	1,932
Gilliam	—	—	1	—	1	770	771
Grant	1,495	180	375	—	2,050	848	2,898
Harney	459	0	394	—	853	5,633	6,486
Jefferson	352	27	342	—	721	419	1,140
Klamath	2,304	330	283	5	2,922	882	3,804
Lake	1,181	18	284	15	1,498	3,709	5,207
Malheur	12	—	72	—	84	6,244	6,328
Morrow	187	—	20	—	207	1,094	1,301
Sherman	—	—	—	—	—	527	527
Umatilla	539	21	44	—	604	1,454	2,058
Union	658	109	62	—	829	474	1,303
Wallowa	523	472	41	9	1,045	968	2,013
Wasco	391	—	271	—	662	862	1,524
Wheeler	257	13	246	—	516	581	1,097
Total	10,306	1,355	3,125	37	14,823	27,434	42,260

— = none found or less than 500 acres.

^a Totals may be off because of rounding; data subject to sampling error. Includes data for the national forests from their regional surveys, submitted to 1997 RPA, Smith et al. 2001.

^b Includes estimates for western juniper forests from Gedney et al. 1999.

^c Source: U.S. Department of Commerce 1990.

Table 2—Estimated area of reserved timberland outside of national forests, and other forest land, by forest type, eastern Oregon, 1999^a

Forest type	Reserved timberland	Other forest		Total
		Available	Reserved	
<i>Thousand acres</i>				
Softwood:				
Douglas-fir	—	75	—	75
Engelmann spruce	—	2	—	2
Incense-cedar	—	8	—	8
Lodgepole pine	62	15	—	77
Mountain hemlock	53	8	5	66
Ponderosa pine	—	311	—	311
Shasta red fir	27	—	—	27
Western juniper ^b	—	2,239	6	2,245
White fir	—	—	—	—
Total	142	2,658	11	2,811
Hardwood:				
Black cottonwood	—	7	—	7
Oregon white oak	—	10	—	10
Quaking aspen	—	—	—	—
Total	—	17	—	17
Nonstocked	2	24	—	26
All types	144	2,699	11	2,854

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Juniper area from Gedney et al. 1999.

Table 3—Estimated area of timberland, by county and owner class, eastern Oregon, 1999^a

County	Public						Private				
	National forest	Bureau of Land Management	State	County	Total public	Forest industry	Native American	Miscellaneous private	Total private	All owners	
Baker	523	6	—	—	530	41	—	71	112	642	
Crook	367	—	—	—	367	52	—	26	78	445	
Deschutes	762	14	3	—	779	62	—	23	85	864	
Gilliam	—	—	—	—	—	—	—	—	—	—	
Grant	1,294	17	16	—	1,327	91	—	77	168	1,495	
Harney	448	5	—	—	453	—	—	5	5	458	
Jefferson	140	—	—	—	140	72	112	27	211	351	
Klamath	1,449	71	37	—	1,557	595	—	151	746	2,303	
Lake	897	7	—	—	904	225	—	51	276	1,180	
Malheur	4	—	—	—	4	3	—	5	8	12	
Morrow	123	—	—	—	123	45	—	20	65	188	
Sherman	—	—	—	—	—	—	—	—	—	—	
Umatilla	344	3	7	—	354	72	17	95	184	538	
Union	444	—	—	—	444	127	—	86	213	657	
Wallowa	268	9	8	4	289	127	—	107	234	523	
Wasco	155	—	16	—	171	25	171	24	220	391	
Wheeler	143	12	—	—	155	65	—	37	102	257	
Total	7,361	144	88	4	7,597	1,603	300	805	2,707	10,304	

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes data for national forests from their regional surveys submitted for 1997 RPA, Smith et al. 2001.

Table 4—Estimated area of timberland outside of national forests, by county and forest type, eastern region, 1999^a

Forest type	County														Total			
	Baker	Crook	Deschutes	Gilliam	Grant	Harney	Jefferson	Klamath	Lake	Malheur	Morrow	Sherman	Umatilla	Union		Wallowa	Wasco	Wheeler
<i>Thousand acres</i>																		
Softwood:																		
Douglas-fir	20	3	—	—	57	—	63	23	—	3	27	—	79	44	128	108	24	579
Engelmann spruce	8	—	—	—	—	—	8	—	—	—	5	—	7	—	12	—	—	36
Grand fir	—	—	—	—	—	—	16	—	—	—	—	—	7	20	33	17	5	104
Incense-cedar	—	—	—	—	—	—	—	13	—	—	—	—	—	—	—	—	—	13
Lodgepole pine	8	—	20	—	24	—	8	235	57	—	—	—	22	16	9	8	—	408
Mountain hemlock	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	—	24
Ponderosa pine	52	58	76	—	92	11	110	393	118	—	26	—	59	83	69	39	62	1,246
Shasta red fir	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—	—	7
Western hemlock	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—	7
Western juniper	—	6	—	—	2	—	7	5	7	4	6	—	—	—	2	—	—	40
Western larch	—	—	—	—	—	—	—	—	—	—	—	—	—	23	—	2	6	30
White fir	8	5	6	—	17	—	—	105	74	—	—	—	—	—	—	—	6	221
Total	97	72	103	—	192	11	212	782	255	8	65	—	175	185	253	204	103	2,716
Hardwood:																		
Oregon white oak	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	—	24
Quaking aspen	—	—	—	—	—	—	—	7	15	—	—	—	—	—	—	—	—	21
Total	—	—	—	—	—	—	—	7	15	—	—	—	—	—	—	24	—	46
Nonstocked	21	6	—	—	8	—	—	66	14	—	—	—	19	28	2	8	12	183
All types	118	78	103	—	201	11	212	855	284	8	65	—	195	213	255	236	114	2,945

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

Table 5—Estimated area of timberland outside of national forests, by county and stand-size class, eastern Oregon, 1999^a

County	Large sawtimber	Small sawtimber	Poletimber	Seedling- sapling	Nonstocked ^b	All classes
<i>Thousand acres</i>						
Baker	1	52	8	34	21	118
Crook	—	58	14	—	6	78
Deschutes	—	74	—	29	—	103
Gilliam	—	—	—	—	—	—
Grant	—	165	11	17	8	201
Harney	—	5	5	—	—	11
Jefferson	24	149	32	7	—	212
Klamath	24	455	125	184	66	855
Lake	—	144	86	40	14	284
Malheur	—	8	—	—	—	8
Morrow	—	59	—	6	—	65
Sherman	—	—	—	—	—	—
Umatilla	—	140	20	15	19	195
Union	2	109	36	38	28	213
Wallowa	1	203	23	26	2	255
Wasco	16	131	33	47	8	236
Wheeler	2	72	22	7	12	114
Total	70	1,825	416	450	183	2,945

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 6—Estimated area of timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other Private	All owners
<i>Thousand acres</i>				
Softwood:				
Douglas-fir	28	257	294	579
Engelmann spruce	4	17	16	36
Grand fir	8	55	41	104
Incense-cedar	6	7	—	13
Lodgepole pine	37	271	100	408
Mountain hemlock	—	—	24	24
Ponderosa pine	97	701	449	1,246
Shasta red fir	7	—	—	7
Western hemlock	—	—	7	7
Western juniper	—	11	28	40
Western larch	—	21	10	30
White fir	21	176	25	221
Total	208	1,515	993	2,716
Hardwood:				
Oregon white oak	16	—	8	24
Quaking aspen	—	8	14	21
Total	16	8	22	46
Nonstocked ^b	12	81	90	183
All types	236	1,603	1,105	2,945

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 7—Estimated area of timberland outside of national forests, by owner class, stand-size class, and forest type group, eastern Oregon, 1999^a

Stand-size class	Other public	Forest industry	Other private	All owners
<i>Thousand acres</i>				
Large sawtimber:				
Softwood	8	14	48	70
Hardwood	—	—	—	—
Total	8	14	48	70
Small sawtimber:				
Softwood	166	904	755	1,825
Hardwood	—	—	—	—
Total	166	904	755	1,825
Poletimber:				
Softwood	7	291	96	393
Hardwood	16	—	7	23
Total	23	291	103	416
Seedlings and saplings:				
Softwood	26	306	95	428
Hardwood	—	8	15	23
Total	26	314	110	450
All stand-size classes:				
Softwood	207	1,515	994	2,716
Hardwood	16	8	22	46
Nonstocked ^b	12	81	90	183
Total	236	1,603	1,105	2,945

— = Less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Stand-size class and forest type group were not determined for nonstocked stands. Nonstocked areas are less than 10 percent stocked with live trees.

Table 8—Estimated area of timberland, by cubic-foot site class and owner class, eastern Oregon, 1999^a

Owner	Site class (cubic feet) ^b						All classes
	≥225	165-224	120-164	85-119	50-84	20-49	
	<i>Thousand acres</i>						
National forest	—	57	177	1,605	4,255	1,266	7,360
Other public	—	7	8	23	63	136	236
Forest industry	—	—	17	104	591	892	1,603
Other private	—	—	29	73	366	636	1,105
All owners	—	64	231	1,805	5,275	2,930	10,304

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Site class is the mean annual increment cubic-foot growth per acre at culmination in fully stocked, natural stands.

Table 9—Estimated area of timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999^a

Forest type	Large sawtimber	Small sawtimber	Poletimber	Seedling- sapling	All classes
<i>Thousand acres</i>					
Softwood:					
Douglas-fir	22	451	51	56	579
Engelmann spruce	—	28	8	—	36
Grand fir	—	65	30	9	104
Incense-cedar	—	13	—	—	13
Lodgepole pine	—	108	81	218	408
Mountain hemlock	—	24	—	—	24
Ponderosa pine	43	939	163	101	1,246
Shasta red fir	5	—	—	1	7
Western hemlock	—	7	—	—	7
Western juniper	—	24	9	7	40
Western larch	—	17	—	14	30
White fir	—	148	52	22	221
Total	70	1,825	393	428	2,716
Hardwood:					
Oregon white oak	—	—	16	8	24
Quaking aspen	—	—	7	15	21
Total	—	—	23	23	46
Nonstocked ^b	—	—	—	183	183
All types	70	1,825	416	634	2,945

— = less than 500 acres or none found.

^a Totals may be off because of rounding; data subject to sampling error.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 10—Estimated number of growing-stock trees on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999^a

Species	Diameter class (inches at breast height)														All classes
	1.0- 2.9	3.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+			
<i>Thousand trees</i>															
Softwood:															
Douglas-fir	26,474	16,414	13,389	11,548	8,619	7,069	4,616	2,753	1,801	1,401	1,668	321	96,073		
Engelmann spruce	1,694	2,755	2,672	291	339	232	186	221	189	110	219	107	9,015		
Grand fir	23,963	9,761	5,949	2,718	2,702	1,428	1,195	615	394	289	360	14	49,389		
Incense-cedar	4,224	2,015	2,134	1,988	873	285	214	103	99	162	69	51	12,217		
Jeffrey pine	—	—	—	—	—	—	38	47	—	—	8	—	93		
Lodgepole pine	82,685	28,287	13,118	7,572	5,989	3,222	2,187	898	392	142	127	—	144,620		
Mountain hemlock	1,823	729	202	1,094	442	317	489	412	438	146	66	—	6,157		
Noble fir	—	729	902	248	252	317	156	36	59	—	69	11	2,780		
Pacific silver fir	2,187	1,094	528	565	167	510	144	184	29	92	20	—	5,522		
Ponderosa pine	70,408	47,471	33,625	28,212	18,227	12,976	9,766	7,237	3,544	2,678	3,430	611	238,185		
Shasta red fir	2,800	—	—	—	—	60	40	32	47	20	80	82	3,162		
Subalpine fir	4,426	1,471	649	335	85	126	44	34	59	21	—	—	7,252		
Sugar pine	930	620	339	119	123	198	40	64	44	—	24	13	2,514		
Western hemlock	4,010	1,823	703	295	93	248	100	—	30	23	13	—	7,337		
Western larch	2,483	1,474	2,242	1,727	1,221	1,353	863	467	328	140	124	—	12,421		
Western redcedar	1,458	365	228	263	—	64	43	—	—	—	81	7	2,510		
Western white pine	—	—	—	—	—	—	—	—	—	—	8	14	22		
White fir	34,488	25,435	13,875	9,756	7,811	3,446	2,183	1,486	694	496	459	113	100,242		
Whitebark pine	360	—	—	174	—	—	45	—	—	—	—	—	580		
Total	264,412	140,444	90,556	66,905	46,942	31,851	22,350	14,590	8,150	5,722	6,825	1,345	700,091		
Hardwood:															
Black cottonwood	—	—	—	—	—	—	—	—	—	—	30	8	38		
Cherry	3,803	360	218	—	—	—	—	—	—	—	—	—	4,381		
Oregon white oak	1,094	2,121	1,921	471	227	185	101	—	—	—	—	—	6,119		
Quaking aspen	2,286	2,551	1,004	250	190	300	—	95	—	23	18	—	6,718		
Total	7,183	5,032	3,143	721	417	486	101	95	—	23	47	8	17,256		
All species	271,595	145,476	93,699	67,626	47,359	32,337	22,451	14,685	8,150	5,744	6,873	1,353	717,347		

— = less than 500 trees or none found.
^a Totals may be off because of rounding; data subject to sampling error. Growing-stock trees are all live trees except cull trees (noncommercial species are classified as sound cull trees).

Table 11—Estimated net volume of growing stock and sawtimber on timberland outside of national forests, by class of timber, owner class, and species group, eastern Oregon, 1999^a

Class of timber and owner class	Average volume	Species group		All species
		Softwoods	Hardwoods	
	<i>Cubic feet per acre</i>	<i>----- Million cubic feet -----</i>		
Growing stock: ^b				
Other public	1,631	378	8	385
Forest industry	903	1,440	7	1,447
Other private	1,522	1,670	12	1,682
Total, growing stock	1,193	3,488	27	3,514
	<i>Board feet per acre</i>	<i>----- Million board feet -----</i>		
Sawtimber (Scribner rule): ^c				
Other public	6,763	1,590	6	1,596
Forest industry	3,150	5,031	19	5,050
Other private	6,249	6,875	29	6,905
Total, sawtimber	4,601	13,497	54	13,551

^a Totals may be off because of rounding; data subject to sampling error.

^b Includes growing stock trees 5.0 inches in diameter at breast height (d.b.h.) and larger.

^c Includes softwood sawtimber trees 9.0 inches in d.b.h. and larger and hardwood sawtimber trees 11.0 inches in d.b.h. and larger.

Table 12—Estimated net volume of growing stock on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999^a

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
<i>Million cubic feet</i>											
Softwood:											
Douglas-fir	20	53	76	91	99	77	73	77	134	62	762
Engelmann spruce	5	2	3	4	3	8	10	8	21	21	85
Grand fir	10	15	29	24	27	22	20	16	32	2	195
Incense-cedar	4	6	5	3	3	2	3	5	3	8	42
Jeffrey pine	—	—	—	—	1	1	—	—	1	—	3
Lodgepole pine	23	40	65	53	53	24	16	9	7	—	289
Mountain hemlock	—	4	5	5	10	13	18	7	6	—	68
Noble fir	1	2	3	6	4	1	3	—	9	2	32
Pacific silver fir	1	3	2	10	4	7	1	5	2	—	35
Ponderosa pine	51	108	145	169	192	200	132	130	262	122	1,510
Shasta red fir	—	—	—	—	—	1	1	1	4	9	16
Subalpine fir	1	1	1	1	1	1	1	1	—	—	8
Sugar pine	—	1	1	2	—	1	1	—	1	3	11
Western hemlock	2	2	—	5	2	—	2	—	—	—	13
Western larch	8	11	12	15	10	6	4	2	2	—	69
Western redcedar	—	2	—	2	2	—	—	—	6	1	13
Western white pine	—	—	—	—	—	—	—	—	1	4	4
White fir	20	41	59	44	37	36	23	21	28	21	330
Whitebark pine	—	—	—	—	1	—	—	—	—	—	1
Total	146	289	405	433	448	399	308	281	521	256	3,488
Hardwood:											
Black cottonwood	—	—	—	—	—	—	—	—	2	1	3
Oregon white oak	4	2	2	2	2	—	—	—	—	—	12
Quaking aspen	1	1	1	4	—	2	—	1	1	—	11
Total	6	3	3	6	2	2	—	1	3	1	27
All species	152	293	408	439	449	402	308	282	524	257	3,514

— = less than 500,000 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5.0 inches in diameter at breast height (d.b.h.) and larger.

Table 13—Estimated net volume of sawtimber on timberland outside of national forests, by species and diameter class, eastern Oregon, 1999^a

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
<i>Million board feet, Scribner rule</i>									
Softwood:									
Douglas-fir	236	336	424	356	355	393	730	377	3,206
Engelmann spruce	10	19	12	38	53	43	122	136	433
Grand fir	89	86	109	93	94	71	153	10	704
Incense-cedar	6	6	7	7	11	19	13	34	104
Jeffrey pine	—	—	4	6	—	—	4	—	14
Lodgepole pine	210	214	242	113	79	45	39	—	942
Mountain hemlock	13	16	37	52	74	31	28	—	250
Noble fir	10	23	21	7	17	—	56	12	146
Pacific silver fir	8	39	18	34	7	27	10	—	144
Ponderosa pine	402	588	780	884	623	652	1,412	744	6,085
Shasta red fir	—	2	2	2	4	3	23	47	82
Subalpine fir	3	4	5	2	3	3	—	—	21
Sugar pine	2	7	2	5	6	—	8	22	51
Western hemlock	—	22	7	—	8	1	—	—	38
Western larch	36	53	34	21	13	5	5	—	168
Western redcedar	—	7	7	—	—	—	33	7	54
Western white pine	—	—	—	—	—	—	3	25	28
White fir	160	147	141	144	102	99	131	100	1,025
Whitebark pine	—	—	2	—	—	—	—	—	2
Total	1,184	1,568	1,854	1,766	1,448	1,391	2,772	1,515	13,497
Hardwood:									
Black cottonwood	—	—	—	—	—	—	9	6	15
Oregon white oak	—	5	3	—	—	—	—	—	8
Quaking aspen	—	11	—	10	—	4	5	—	31
Total	—	17	3	10	—	4	14	6	54
All species	1,184	1,584	1,857	1,777	1,448	1,395	2,785	1,521	13,551

— = less than 500,000 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger, and hardwood sawtimber trees 11.0 inches in d.b.h. and larger.

Table 14—Estimated net volume of growing stock on timberland outside of national forests, by species and owner class, eastern Oregon, 1999^a

Species	Other public	Forest industry	Other private	All owners
<i>Million cubic feet</i>				
Softwood:				
Douglas-fir	57	279	426	762
Engelmann spruce	3	9	73	85
Grand fir	19	86	90	195
Incense-cedar	6	22	13	42
Jeffrey pine	2	1	—	3
Lodgepole pine	15	156	118	289
Mountain hemlock	—	—	68	68
Noble fir	—	—	32	32
Pacific silver fir	—	—	35	35
Ponderosa pine	213	625	673	1,510
Shasta red fir	16	—	—	16
Subalpine fir	—	—	8	8
Sugar pine	5	7	—	11
Western hemlock	—	—	13	13
Western larch	4	34	31	69
Western redcedar	—	—	13	13
Western white pine	2	1	2	4
White fir	36	221	74	330
Whitebark pine	—	—	1	1
Total	378	1,440	1,670	3,488
Hardwood:				
Black cottonwood	—	2	1	3
Oregon white oak	8	2	3	12
Quaking aspen	—	4	7	11
Total	8	7	12	27
All species	385	1,447	1,682	3,514

— = less than 500,000 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches diameter at breast height and larger.

Table 15—Estimated net volume of sawtimber on timberland outside of national forests, by species and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Million board feet, Scribner rule</i>				
Softwood:				
Douglas-fir	222	1,068	1,917	3,206
Engelmann spruce	18	29	386	433
Grand fir	55	318	332	704
Incense-cedar	20	53	31	104
Jeffrey pine	8	6	—	14
Lodgepole pine	43	497	403	942
Mountain hemlock	—	—	250	250
Noble fir	—	—	146	146
Pacific silver fir	—	—	144	144
Ponderosa pine	976	2,307	2,802	6,085
Shasta red fir	82	—	—	82
Subalpine fir	—	—	21	21
Sugar pine	29	22	—	51
Western hemlock	—	—	38	38
Western larch	6	86	76	168
Western redcedar	—	—	54	54
Western white pine	13	3	12	28
White fir	119	644	262	1,025
Whitebark pine	—	—	2	2
Total	1,590	5,031	6,875	13,497
Hardwood:				
Black cottonwood	—	7	8	15
Oregon white oak	6	—	3	8
Quaking aspen	—	11	19	31
Total	6	19	29	54
All types	1,596	5,050	6,905	13,551

— = less than 500,000 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches in d.b.h. and larger.

Table 16—Estimated net volume of growing stock on timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999^a

Forest type	Large sawtimber	Small sawtimber	Poletimber	Seedling- sapling	All classes
<i>Million cubic feet</i>					
Softwood:					
Douglas-fir	44	838	44	11	938
Engelmann spruce	—	86	13	—	99
Grand fir	—	140	10	—	150
Incense-cedar	—	13	—	—	13
Lodgepole pine	—	209	56	45	310
Mountain hemlock	—	117	—	—	117
Ponderosa pine	67	1,236	126	16	1,444
Shasta red fir	15	—	—	—	15
Western hemlock	—	30	—	—	30
Western juniper	—	6	—	—	6
Western larch	—	46	—	4	50
White fir	—	228	47	14	288
Total	126	2,949	295	89	3,459
Hardwood:					
Oregon white oak	—	—	12	1	13
Quaking aspen	—	—	6	1	7
Total	—	—	19	1	20
Nonstocked ^b	—	—	—	34	34
All types	126	2,949	314	124	3,514

— = less than 500,000 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches in diameter at breast height and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 17—Estimated net volume of sawtimber on timberland outside of national forests, by forest type and stand-size class, eastern Oregon, 1999^a

Forest type	Large sawtimber	Small sawtimber	Poletimber	Seedling- sapling	All classes
<i>Million board feet, Scribner rule</i>					
Softwood:					
Douglas-fir	234	3,526	100	24	3,884
Engelmann spruce	—	442	45	—	487
Grand fir	—	562	38	—	600
Incense-cedar	—	58	—	—	58
Lodgepole pine	—	799	155	68	1,022
Mountain hemlock	—	463	—	—	463
Ponderosa pine	360	4,863	286	44	5,553
Shasta red fir	77	—	—	—	77
Western hemlock	—	109	—	—	109
Western juniper	—	21	—	—	21
Western larch	—	182	—	4	186
White fir	—	785	95	25	904
Total	670	11,809	719	166	13,365
Hardwood:					
Oregon white oak	—	—	17	1	18
Quaking aspen	—	—	20	—	20
Total	—	—	36	1	38
Nonstocked ^b	—	—	—	148	148
All types	670	11,809	756	315	13,551

— = less than 500,000 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches d.b.h. and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 18—Estimated net volume of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Million cubic feet</i>				
Softwood:				
Douglas-fir	71	317	550	938
Engelmann spruce	3	20	75	99
Grand fir	15	59	76	150
Incense-cedar	7	6	—	13
Lodgepole pine	14	152	143	310
Mountain hemlock	—	—	117	117
Ponderosa pine	200	646	597	1,444
Shasta red fir	15	—	—	15
Western hemlock	—	—	30	30
Western juniper	—	1	4	6
Western larch	—	34	17	50
White fir	45	199	44	288
Total	371	1,435	1,653	3,459
Hardwood:				
Oregon white oak	12	—	1	13
Quaking aspen	—	1	6	7
Total	12	1	7	20
Nonstocked ^b	2	11	22	35
All types	385	1,447	1,682	3,514

— = less than 500,000 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches in diameter at breast height and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 19—Estimated net volume of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Million board feet, Scribner rule</i>				
Softwood:				
Douglas-fir	305	1,139	2,440	3,884
Engelmann spruce	18	80	390	487
Grand fir	47	246	307	600
Incense-cedar	31	27	—	58
Lodgepole pine	40	478	504	1,022
Mountain hemlock	—	—	463	463
Ponderosa pine	878	2,327	2,349	5,553
Shasta red fir	77	—	—	77
Western hemlock	—	—	109	109
Western juniper	—	5	16	21
Western larch	—	109	77	186
White fir	176	599	129	904
Total	1,571	5,010	6,784	13,365
Hardwood:				
Oregon white oak	17	—	1	18
Quaking aspen	—	—	20	20
Total	17	—	21	38
Nonstocked ^b	8	40	99	148
All types	1,596	5,050	6,905	13,551

— = less than 500,000 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches d.b.h. and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 20—Estimated net volume of timber on timberland outside of national forests, by class of timber and species group, eastern Oregon, 1999^a

Class of timber	Softwood species	Hardwood species	All species
Growing-stock trees:			
Sawtimber trees—			
Saw-log portion	2,924	12	2,936
Upper stem portion	128	3	131
Total, sawtimber	3,052	15	3,067
Poletimber trees	435	12	448
All growing-stock trees	3,488	27	3,514
Cull trees:			
Sound cull	33	—	33
Rotten cull	150	4	153
Total, cull trees	182	4	186
All timber	3,670	31	3,701

— = less than 500,000 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches in diameter at breast height and larger.

Table 21—Estimated current gross annual growth of growing stock on timberland outside of national forests, by owner class and species group, eastern Oregon, 1999^a

Owner class	Average volume	Species group		All species
		Softwoods	Hardwoods	
	<i>Cubic feet per acre</i>	<i>----- Thousand cubic feet-----</i>		
Growing stock: ^b				
Other public	46	10,753	166	10,919
Forest industry	33	51,092	1,267	52,359
Other private	37	40,978	241	41,219
Total, growing stock	35	102,823	1,675	104,497

^a Totals may be off because of rounding; data subject to sampling error.

^b Includes growing-stock trees 5.0 inches in diameter at breast height and larger.

Table 22—Estimated current net annual growth of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Thousand cubic feet</i>				
Softwood:				
Douglas-fir	146	5,974	7,154	13,275
Engelmann spruce	33	647	209	889
Grand fir	569	556	625	1,750
Incense-cedar	75	213	—	288
Lodgepole pine	279	2,200	1,034	3,513
Mountain hemlock	—	—	-1,119	-1,119
Ponderosa pine	4,578	19,463	10,975	35,016
Shasta red fir	-137	—	—	-137
Western hemlock	—	—	-2	-2
Western juniper	—	57	18	75
Western larch	—	545	130	676
White fir	209	3,358	-78	3,489
Total	5,752	33,013	18,947	57,712
Hardwood:				
Oregon white oak	245	—	1	246
Quaking aspen	—	617	122	739
Total	245	617	123	985
Nonstocked ^b	27	258	363	648
All types	6,025	33,888	19,433	59,345

— = less than 500 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches in diameter at breast height and larger. Negative net annual growth is the result of annual mortality exceeding gross annual growth.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 23—Estimated current net annual growth of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Thousand board feet, Scribner rule</i>				
Softwood:				
Douglas-fir	1,210	34,946	45,369	81,526
Engelmann spruce	228	2,112	4,158	6,498
Grand fir	1,603	5,331	3,835	10,769
Incense-cedar	537	1,273	—	1,809
Lodgepole pine	634	12,791	5,529	18,954
Mountain hemlock	—	—	-4,220	-4,220
Ponderosa pine	24,725	84,040	55,439	164,205
Shasta red fir	-503	—	—	-503
Western hemlock	—	—	332	332
Western juniper	—	215	105	320
Western larch	—	4,567	1,143	5,710
White fir	1,274	21,494	753	23,520
Total	29,709	166,769	112,443	308,920
Hardwood:				
Oregon white oak	602	—	6	607
Quaking aspen	—	—	764	764
Total	602	—	770	1,371
Nonstocked^b	164	2,051	1,939	4,154
All types	30,474	168,820	115,151	314,446

— = less than 500 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches d.b.h. and larger. Negative net annual growth is the result of annual mortality exceeding gross annual growth.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 24—Estimated average annual mortality of growing stock on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999

Forest type	Other public	Forest industry	Other private	All owners
<i>Thousand cubic feet</i>				
Softwood:				
Douglas-fir	929	3,962	6,531	11,422
Engelmann spruce	41	351	1,197	1,589
Grand fir	208	963	1,195	2,367
Incense-cedar	94	71	—	165
Lodgepole pine	235	2,679	2,603	5,516
Mountain hemlock	—	—	2,043	2,043
Ponderosa pine	1,981	6,425	6,040	14,446
Shasta red fir	320	—	—	320
Western hemlock	—	—	589	589
Western juniper	—	13	38	51
Western larch	—	455	296	751
White fir	898	3,394	947	5,239
Total	4,705	18,313	21,479	44,497
Hardwood:				
Oregon white oak	176	—	11	187
Quaking aspen	—	21	86	107
Total	176	21	97	294
Nonstocked ^b	25	54	178	258
All types	4,906	18,388	21,754	45,049

— = less than 500 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5 inches in diameter at breast height and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 25—Estimated average annual mortality of sawtimber on timberland outside of national forests, by forest type and owner class, eastern Oregon, 1999^a

Forest type	Other public	Forest industry	Other private	All owners
<i>Thousand board feet, Scribner rule</i>				
Softwood:				
Douglas-fir	3,738	13,639	27,980	45,357
Engelmann spruce	215	1,478	5,788	7,482
Grand fir	493	3,487	4,638	8,618
Incense-cedar	380	312	—	692
Lodgepole pine	484	7,284	8,551	16,320
Mountain hemlock	—	—	8,483	8,483
Ponderosa pine	8,586	22,455	23,147	54,188
Shasta red fir	1,624	—	—	1,624
Western hemlock	—	—	2,238	2,238
Western juniper	—	43	131	174
Western larch	—	1,399	1,384	2,783
White fir	3,208	9,502	2,690	15,400
Total	18,729	59,599	85,031	163,359
Hardwood:				
Oregon white oak	210	—	22	232
Quaking aspen	—	—	237	237
Total	210	—	259	469
Nonstocked ^b	68	479	938	1,484
All types	19,008	60,078	86,227	165,313

— = less than 500 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches d.b.h. and larger.

^b Nonstocked areas are less than 10 percent stocked with live trees.

Table 26—Estimated area, net volume of growing stock, and net volume of sawtimber on timberland outside of national forests, by stand age and owner class, eastern Oregon, 1999^a

Stand age	Other public			Forest industry			Other private			All owners		
	Thousand acres	Growing-stock volume Million cubic feet	Sawtimber volume Million board feet ^b	Area Thousand acres	Growing-stock volume Million cubic feet	Sawtimber volume Million board feet ^b	Area Thousand acres	Growing-stock volume Million cubic feet	Sawtimber volume Million board feet ^b	Area Thousand acres	Growing-stock volume Million cubic feet	Sawtimber volume Million board feet ^b
Even aged:												
0-9	—	—	—	51	—	—	15	—	—	67	—	—
10-19	32	8	14	225	40	56	78	13	26	334	61	95
20-29	4	—	—	283	135	374	101	49	108	388	184	481
30-39	7	3	8	22	23	79	7	11	27	36	37	115
40-49	7	10	34	33	22	65	23	36	105	63	68	203
50-59	8	10	11	66	71	222	20	28	81	95	108	314
60-69	13	29	127	108	103	317	32	32	116	154	164	559
70-79	7	18	82	55	102	379	88	166	612	150	287	1,073
80-89	10	4	14	160	218	778	117	184	777	288	406	1,570
90-99	3	1	4	82	99	319	86	100	410	171	199	733
100-109	10	7	31	27	25	99	36	63	249	72	94	379
110-119	—	—	—	19	32	145	21	42	199	40	74	344
120-129	11	15	70	—	—	—	—	—	—	11	15	70
130-139	—	—	—	—	—	—	4	3	18	4	3	18
140-149	—	—	—	—	—	—	—	—	—	—	—	—
150-159	—	—	—	—	—	—	—	—	—	—	—	—
160-169	—	—	—	—	—	—	—	—	—	—	—	—
170-179	1	—	3	6	2	9	—	—	—	7	2	12
180-189	—	—	—	—	—	—	—	—	—	—	—	—
190-199	—	—	—	—	—	—	—	—	—	—	—	—
200-299	—	—	—	—	—	—	41	133	670	41	133	670
300+	—	—	—	—	—	—	—	—	—	—	—	—
Uneven aged:												
0-49	20	29	109	50	46	141	23	21	87	92	96	337
50-99	69	189	798	278	341	1,292	223	415	1,721	570	945	3,812
100-149	20	42	199	74	117	485	123	261	1,112	217	421	1,796
150-199	7	18	88	43	61	244	28	56	216	77	135	548
200-299	—	—	—	6	4	16	24	65	355	31	69	371
300+	—	—	—	5	6	27	—	—	—	5	6	27
Nonstocked ^c	6	1	5	11	1	4	16	4	14	33	6	23
All classes	236	385	1,596	1,603	1,447	5,050	1,105	1,682	6,905	2,945	3,514	13,551

— = none found or less than 500 acres, 500,000 cubic feet, or 500,000 board feet.

^a Totals may be off because of rounding; data subject to sampling error.

^b Scribner rule (16-foot rule).

^c Non-stocked areas are less than 10 percent stocked with live trees.

Table 27—Estimated gross annual growth, average annual mortality, and average annual removals of growing stock on timberland outside of national forests, by owner and species, eastern Oregon, 1999^a

Species	Other public				Forestry industry				Other private				All owners			
	Current gross annual growth	Average annual mortality	Average annual removals	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals	
<i>Thousand cubic feet</i>																
Softwood:																
Douglas-fir	1,315	610	603	15,156	8,698	2,991	10,943	4,559	10,995	20,956	8,160	26,755	20,956	8,160	26,755	
Engelmann spruce	74	41	—	123	489	183	1,099	1,217	—	1,663	1,442	123	1,663	1,442	123	
Grand fir	867	417	—	7,334	2,854	1,550	2,992	1,645	1,258	6,713	3,611	8,593	6,713	3,611	8,593	
Incense-cedar	113	103	—	1,600	706	364	210	211	—	1,028	678	1,600	1,028	678	1,600	
Jeffrey pine	151	16	—	—	16	9	—	—	—	167	24	—	167	24	—	
Lodgepole pine	523	262	889	8,356	5,025	2,802	2,683	2,242	3,054	8,232	5,306	12,299	8,232	5,306	12,299	
Mountain hemlock	—	—	—	—	—	—	467	733	4,123	467	733	4,123	467	733	4,123	
Noble fir	—	—	—	—	—	—	567	829	629	567	829	629	567	829	629	
Pacific silver fir	—	—	—	—	—	—	222	1,022	38	222	1,022	38	222	1,022	38	
Ponderosa pine	6,247	2,027	583	40,331	24,495	5,810	18,723	6,541	19,107	49,466	14,378	60,021	49,466	14,378	60,021	
Shasta red fir	176	366	160	—	—	—	—	—	—	176	366	160	176	366	160	
Subalpine fir	—	—	—	109	—	—	161	97	—	161	97	109	161	97	109	
Sugar pine	86	45	—	465	345	60	—	—	—	431	105	465	431	105	465	
Western hemlock	—	—	—	—	—	—	298	135	—	298	135	—	298	135	—	
Western larch	62	66	—	622	484	574	522	527	474	1,067	1,167	1,096	1,067	1,167	1,096	
Western redcedar	—	—	—	—	—	—	155	134	—	155	134	—	155	134	—	
Western white pine	8	21	—	138	5	5	1	22	—	14	47	138	14	47	138	
White fir	1,132	796	302	15,857	7,975	4,011	1,904	1,658	2,555	11,011	6,464	18,714	11,011	6,464	18,714	
Whitebark pine	—	—	—	—	—	—	29	21	—	29	21	—	29	21	—	
Total	10,753	4,769	2,536	90,092	51,092	18,358	40,978	21,591	42,233	102,823	44,719	134,861	102,823	44,719	134,861	
Hardwood:																
Black cottonwood	—	—	—	—	40	25	14	24	—	55	49	—	55	49	—	
Cherry	—	—	—	—	—	—	12	3	—	12	3	—	12	3	—	
Oregon white oak	166	126	—	—	24	25	57	48	—	247	198	—	247	198	—	
Quaking aspen	—	—	—	—	1,203	63	158	121	—	1,361	184	—	1,361	184	—	
Total	166	126	—	—	1,267	113	241	195	—	1,675	434	—	1,675	434	—	
All species	10,919	4,895	2,536	90,092	52,359	18,471	41,219	21,786	42,233	104,497	45,152	134,861	104,497	45,152	134,861	

— = less than 500 cubic feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5.0 inches in diameter at breast height and larger.

Table 28—Estimated gross annual growth, average annual mortality, and average annual removals of sawtimber on timberland outside of national forests, by owner and species, eastern Oregon, 1999^a

Species	Other public			Forestry industry			Other private			All owners		
	Current gross annual growth	Average annual mortality	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals	Current gross annual growth	Average annual mortality	Average annual removals
<i>Thousand board feet, Scribner rule</i>												
Softwood:												
Douglas-fir	5,330	2,371	2,631	39,900	11,426	65,857	55,595	20,512	52,085	100,825	34,309	120,572
Engelmann spruce	444	215	—	860	687	626	5,545	6,076	—	6,849	6,979	626
Grand fir	2,978	1,144	—	14,901	5,311	27,384	16,895	5,931	4,237	34,774	12,387	31,621
Incense-cedar	499	328	—	2,977	861	4,665	445	509	—	3,922	1,699	4,665
Jeffrey pine	767	64	—	102	44	—	—	—	—	869	108	—
Lodgepole pine	1,337	621	2,821	18,810	7,716	30,039	10,423	7,063	9,128	30,570	15,400	41,988
Mountain hemlock	—	—	—	—	—	—	2,249	2,675	13,821	2,249	2,675	13,821
Noble fir	—	—	—	—	—	—	2,805	3,729	3,644	2,805	3,729	3,644
Pacific silver fir	—	—	—	—	—	—	995	4,128	—	995	4,128	—
Ponderosa pine	32,564	9,319	2,295	103,002	21,203	120,779	88,960	27,072	75,734	224,525	57,594	198,807
Shasta red fir	1,080	1,878	1,045	—	—	—	—	—	—	1,080	1,878	1,045
Subalpine fir	567	284	—	—	—	448	402	254	—	402	254	448
Sugar pine	—	—	—	1,441	196	2,166	—	—	—	2,008	480	2,166
Western hemlock	—	—	—	—	—	—	1,179	405	—	1,179	405	—
Western larch	124	99	—	1,079	1,438	1,613	4,684	1,281	1,330	5,887	2,818	2,943
Western redcedar	—	—	—	—	—	—	504	541	—	504	541	—
Western white pine	60	145	—	34	27	711	6	139	—	101	311	711
White fir	3,647	2,445	850	42,270	10,861	53,966	9,912	5,407	8,666	55,830	18,713	63,482
Whitebark pine	—	—	—	—	—	—	56	25	—	56	25	—
Total	49,395	18,913	9,642	225,377	59,772	308,253	200,653	85,749	168,644	475,425	164,434	486,540
Hardwood:												
Black cottonwood	—	—	—	222	119	—	85	126	—	307	245	—
Oregon white oak	86	94	—	—	—	—	45	42	—	131	136	—
Quaking aspen	—	—	—	3,299	187	—	596	310	—	3,895	497	—
Total	86	94	—	3,521	307	—	726	478	—	4,333	879	—
All species	49,482	19,008	9,642	228,898	60,078	308,253	201,379	86,227	168,644	479,758	165,313	486,540

— = less than 500 board feet or none found.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5.0 inches in diameter at breast height and larger.

Table 29—Estimated changes in area of timberland outside of national forests, by owner class, eastern Oregon, 1988, 1999^a

Description of change	Other public	Forest industry	Other private	All owners
		<i>Thousand acres</i>		
Timberland area published in 1988	522	1,523	933	2,978
New estimate of timberland area for 1988, based on remeasured plot only	538	1,555	986	3,079
Adjustments to 1988 area:				
Reclassification of Native American ownership (public to private)	-308	—	308	—
Access-denied area not remeasured or projected ^b	—	-20	-117	-137
Adjusted timberland area for 1988	230	1,535	1,177	2,942
Area change (1988-1999) owing to:				
Changes in land class—				
Timberland to rights-of-way	-7	-13	—	-20
Timberland to urban	-11	—	-19	-30
Nonforest to timberland ^c	7	7	45	59
Other forest to timberland	8	15	—	23
Net change	-3	9	26	32
Changes in ownership—				
From other public	—	—	—	—
From forest industry	8	-8	—	—
From other private	8	58	-66	—
Net change	16	50	-66	—
Timberland area in 1999, based on remeasured plots only	242	1,594	1,137	2,973
Timberland area in 1999, based on all sampled plots	236	1,603	1,105	2,945

— = none found or less than 500 acres.

^a Totals may be off because of rounding; data subject to sampling error. Negative values are losses of timberland and positive values are gains in timberland. Losses are shown by the 1984-86 owner and gains are shown by the 1999 owner.

^b Acres from plots where access was denied and which were not projected.

^c Includes 42,000 acres that changed because of plot design changes.

Table 30—Estimated changes in net volume of growing stock on timberland outside of national forests, by species group and owner class, eastern Oregon, 1988, 1999^a

Description	Softwood species				Hardwood species			
	Other public	Forest industry	Other private	All owners	Other public	Forest industry	Other private	All owners
	<i>Million cubic feet</i>							
Volume published in 1988	1,307	2,017	1,503	4,713	3	7	13	22
Estimate of 1988 volume based on re-measured plots only	1,210	1,770	1,272	4,252	4	6	14	24
Adjustments to 1986 volume:								
Reclassification of Native American ownership (public to private)	-832	—	832	—	—	—	—	—
Access denied not re-measured or projected ^b	—	-35	-162	-197	—	—	—	—
Adjusted volume for 1988	378	1,735	1,942	4,055	5	6	14	24
Volume changes due to:								
Changes in land class—								
Timberland to nonforest	-42	-27	-23	-92	—	—	—	—
Nonforest to timberland ^c	25	22	41	88	—	—	—	—
Net change	-17	-5	18	-4	—	—	—	—
Changes in owner—								
From other public	—	—	—	—	—	—	—	—
From forest industry	4	-4	—	—	3	-3	—	—
From other private	8	65	-73	—	—	—	—	—
Net change	12	61	-73	—	3	-3	—	—
Growth, mortality, and harvest—								
Periodic gross growth	124	598	495	1,217	4	1	5	10
Periodic mortality	-26	-117	-154	-297	-1	—	-2	-3
Periodic removals	-27	-812	-421	-1,260	—	—	—	—
Net change	71	-331	-80	-340	3	1	3	7
Total volume in 1999 based on re-measured plots only	444	1,454	1,803	3,702	8	5	18	31
Total volume in 1999 based on all sample plots	378	1,440	1,670	3,488	8	7	12	27

— = none found or less than 500,000 cubic feet.

^a Totals may be off because of rounding; data subject to sampling error. Includes growing-stock trees 5.0 inches in diameter at breast height and larger. Negative values are losses of timberland and positive values are gains of timberland.

^b Growing-stock volume from the 1988 inventory that was on access-denied land that was not projected.

^c Includes updates of owner or land class assigned to a plot in 1988.

Table 31—Estimated changes in net volume of sawtimber on timberland outside of national forests, by species group and owner class, eastern Oregon, 1988, 1999^a

Description	Softwood species				Hardwood species			
	Other public	Forest industry	Other private	All owners	Other public	Forest industry	Other private	All owners
	<i>Million board feet, Scribner rule</i>							
Volume published in 1988	5,600	7,594	5,095	18,289	—	13	16	30
Estimate of 1988 volume based on re-measured plots only	5,127	6,450	4,620	16,197	—	9	22	31
Adjustments to 1986 volume:								
Reclassification of Native American ownership (public to private)	-3,636	—	3,636	—	—	—	—	—
Access denied	—	-155	-593	-748	—	—	—	—
not re-measured or projected ^b								
Adjusted volume for 1988	1,491	6,292	7,663	15,449	—	9	22	31
Volume changes owing to:								
Changes in land class—								
Timberland to nonforest	-126	-136	-88	-350	—	—	—	—
Nonforest to timberland ^c	147	70	180	397	—	—	—	—
Net change	21	-66	92	47	—	—	—	—
Changes in owner—								
From other public	—	—	—	—	—	—	—	—
From forest industry	19	-19	—	—	4	-4	—	—
From other private	23	229	-252	—	—	—	—	—
Net change	42	210	-252	—	4	-4	—	—
Growth, mortality, and harvest—								
Periodic gross growth	538	2,419	2,183	5,140	2	5	13	20
Periodic mortality	-102	-337	-528	-967	-1	—	—	-1
Periodic removals	-109	-3,468	-1,809	-5,385	—	—	—	—
Net change	327	-1,386	-154	-1,212	1	5	13	19
Total volume in 1999 based on re-measured plots only	1,881	5,051	7,346	14,278	6	10	34	50
Total volume in 1999 based on all sample plots	1,590	5,031	6,875	13,497	6	19	29	54

— = none found or less than 500,000 cubic feet.
^a Totals may be off because of rounding; data subject to sampling error. Includes softwood sawtimber trees 9.0 inches in diameter at breast height (d.b.h.) and larger and hardwood sawtimber trees 11.0 inches d.b.h. and larger. Negative values are losses of timberland and positive values are gains of timberland.
^b Sawtimber volume from the 1988 inventory that was on access-denied land that was not projected.
^c Includes updates of owner or land class assigned to a plot in 1988.

Table 32—Estimated timber harvest volume by year and owner class, eastern Oregon, 1962 to 2000

Year	National forest	BLM	Private	Other public	All owners
<i>Thousand board feet, Scribner rule</i>					
1962	852,700	19,547	594,821	1,380	1,468,448
1963	966,700	21,456	561,068	5,575	1,554,799
1964	1,064,700	22,756	635,467	2,477	1,725,400
1965	1,181,800	11,571	656,107	13,857	1,863,335
1966	1,089,900	42,559	666,340	3,783	1,802,582
1967	1,133,900	27,311	578,027	1,360	1,740,598
1968	1,182,548	39,307	717,585	2,869	1,942,309
1969	1,230,907	26,326	791,521	8,757	2,057,511
1970	1,017,762	23,291	740,612	2,397	1,784,062
1971	1,147,075	35,768	930,701	2,875	2,116,419
1972	1,319,580	33,961	784,993	10,158	2,148,692
1973	1,237,425	45,891	654,524	9,742	1,947,582
1974	1,178,107	25,666	958,359	9,423	2,171,555
1975	1,151,508	16,662	835,393	0	2,003,563
1976	1,257,108	29,403	679,472	8,056	1,974,039
1977	1,123,840	39,060	641,383	6,666	1,810,949
1978	1,191,396	24,660	606,507	4,003	1,826,566
1979	998,422	32,590	545,576	4,850	1,581,438
1980	836,395	15,818	677,712	4,937	1,534,862
1981	795,876	14,602	570,967	5,849	1,387,294
1982	736,877	12,242	715,460	7,582	1,472,161
1983	1,202,214	38,021	671,860	15,442	1,927,537
1984	1,283,996	39,841	329,538	5,859	1,659,234
1985	1,401,873	16,209	514,193	4,748	1,937,023
1986	1,528,419	24,634	518,138	15,607	2,086,798
1987	1,366,157	45,164	588,899	11,291	2,011,511
1988	1,249,876	39,848	602,512	694	1,892,930
1989	1,368,712	37,808	765,787	15,390	2,187,697
1990	1,001,303	49,806	634,308	6,862	1,692,279
1991	1,068,605	54,459	728,749	5,124	1,856,937
1992	785,918	13,102	924,660	1,167	1,724,847
1993	685,830	22,557	827,654	6,766	1,542,807
1994	340,074	8,620	737,902	5,204	1,091,800
1995	317,565	14,355	600,399	8,828	941,147
1996	211,554	34,854	581,163	3,754	831,325
1997	318,707	8,963	581,540	1,433	910,643
1998	199,927	10,743	617,483	2,740	830,893
1999	141,964	9,456	598,419	5,723	775,562
2000	140,083	3,290	491,504	11,886	646,763

Source: Oregon Timber Harvest Reports, Oregon Department of Forestry.

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Pacific Northwest Research Station

Web site	http://www.fs.fed.us/pnw
Telephone	(503) 808-2592
Publication requests	(503) 808-2138
FAX	(503) 808-2130
E-mail	pnw_pnwpubs@fs.fed.us
Mailing address	Publications Distribution Pacific Northwest Research Station P.O. Box 3890 Portland, OR 97208-3890

U.S. Department of Agriculture
Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, OR 97208-3890

Official Business
Penalty for Private Use, \$300