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Forest Statistics for Land Outside National Forests in Western Montana, 1989

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RESEARCH SUMMARY

There are about 1.2 million acres of forest land outside the National Forests in western Montana, all of it timberland. Nearly 83 percent of the forest land is privately owned. The estimated volume of wood on these lands is more than 1.8 billion cubic feet. Net annual growth in 1988 was over 49 million cubic feet. This report highlights additional information on total land area, timberland area, volume, growth, and mortality.

PREFACE

The primary objective of Forest Survey—a continuing, nationwide undertaking of the Forest Service,

U.S. Department of Agriculture—is to provide an assessment of the renewable resources for the forest lands of the Nation. Fundamental to the accomplishment of the objective are the periodic State-by-State resource inventories. Originally, Forest Survey was authorized by the McSweeney-McNary Act of 1928. The current authorization is through the Renewable Resources Research Act of 1978.

The Intermountain Research Station with headquarters in Ogden, UT, conducts the forest resource inventories for the Rocky Mountain States of Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. These inventories provide information on the extent and condition of the forests—their volume of wood and stand dynamics as expressed by growth, removals, and mortality for State, privately owned, and most other forest lands not in the National Forest System. These data, when combined with similar information on National Forest lands, provide a basis for forming forest policies and programs and for the orderly development and use of the resources.

ACKNOWLEDGMENTS

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INTRODUCTION

This report presents the principal findings of the most recent Forest Survey of the timberland resources outside the National Forests in western Montana (fig. 1). Phase I of the survey began in 1987 with the collection and reconciliation of area information and aerial photo interpretation. The field phase began in 1988 and was completed in 1989.

Figure 1—Western Montana counties.

The resource statistics in this report include estimates for those lands in private ownership and those public lands administered by the Bureau of Land Management (BLM), U.S. Department of the Interior (USDI), other Federal agencies, the State of Montana, and county and municipal governments. Reserved areas, such as those lands administered by the National Park Service, USDI, are not field sampled but are included in the total area summaries (table 1). Area estimates for those lands administered by the National Forest System, Forest Service, U.S. Department of Agriculture, are also included in table 1. However, associated resource estimates are not included in this report but will be combined with the estimates

presented here and in other Survey Unit reports to form the basis for a comprehensive statewide analysis of Montana's forest resource situation.

HIGHLIGHTS

Area

Total land area of the four counties that comprise western Montana is nearly 5.1 million acres. Almost two-thirds of this area is in public ownership, the majority—61 percent—is administered by the National Forest System (fig. 2). Forest industry owns 34 percent of the 1.7 million acres of private land.

Figure 2—Distribution of land area by ownership in western Montana, 1989.

About 63 percent of the 1.9 million acres of land outside National Forests is forested (fig. 3), and all of it is classified as timberland. Only 49,579 acres of timberland are reserved from harvest. This reserved area is part of the Mission Mountains Tribal Wilderness and Primitive Area of the Flathead Indian Reservation.

The nonreserved timberland area is split primarily between two owner groups: nonindustrial private (35 percent) and forest industry (47 percent). The characteristics of the timberland acres within these two groups largely describe the forest land in western Montana. The remaining 18 percent of the timberland area is in the other public owner group, which includes State and BLM lands.

Douglas-fir (*Pseudotsuga menziesii*) is the predominant timber species and, as a forest type, occupies 622,265 acres of the nonreserved timberland area (fig. 4). The 182,784 acres in lodgepole pine, combined with the 170,198 acres in the ponderosa pine forest type, account for much of the rest of the timberland area.

Half of the Douglas-fir area is owned by forest industry, and 30 percent is in nonindustrial private ownership. The latter owner group also owns about two-thirds of the acres of ponderosa pine.

Figure 3—Distribution of land area outside National Forests by type of land in western Montana, 1989.

Figure 4—Distribution of timberland area outside National Forests by forest type in western Montana, 1989.

The distribution of the timberland area by stand-size class gives some indication of the kinds and sizes of forest products potentially available for harvest. Sawtimber stands occupy 58 percent of the timberland area (fig. 5). Roughly equal amounts occur in the poletimber and sapling/seedling categories. Only 4 percent is currently nonstocked.

About 41 percent of the area in the sawtimber stand-size class is in nonindustrial private ownership. Almost 284,000 acres, or over two-thirds of the nonindustrial private timberland area, is stocked by sawtimber stands. Another 50,515 acres are in the poletimber stand-size class, and 60,767 acres are currently characterized by sapling/seedling stands.

The distribution of the forest industry owned timberland by stand-size class differs considerably. Sawtimber stands presently occupy 262,756 acres, but this is less than half of the total timberland area in this owner group. In fact, much of the industry owned timberland is stocked by poletimber and sapling/seedling stands:

Stand-size class	Forest industry	Nonindustrial private
	----- Acres -----	
Sawtimber	262,756	283,594
Poletimber	126,624	50,515
Sapling/seedling	143,759	60,767
Nonstocked	22,174	19,773

Figure 5—Distribution of timberland area outside National Forests by stand-size class in western Montana, 1989.

The distribution of the other public timberland by stand-size class proportionally approximates that of the nonindustrial private owner group: two-thirds in sawtimber-size stands and nearly equal amounts in the poletimber (15 percent) and sapling/seedling (16 percent) stands. Only 1 percent is nonstocked.

Volume per acre is another indicator of harvest potential. Roughly 56 percent of the timberland acres support stands containing, on the average, less than 5,000 board feet per acre (International 1/4-inch rule), including 23 percent that contain less than 1,500 board feet per acre (fig. 6). Less than one-fifth of the area supports stands averaging 10,000 or more board feet per acre.

All of the timberland acres are capable of producing 20 cubic feet of wood fiber or more per acre on an annual basis. However, only 14 percent of the area is capable of producing 85 cubic feet or more per acre per year.

Stand Composition and Volume

The timberlands of western Montana support 436 million growing-stock trees. Most are coniferous species, with 2 percent aspen (*Populus tremuloides*) and cottonwood (*Populus* spp.). Almost 60 percent are less than 5.0 inches diameter at breast height (d.b.h.), and only 14 percent are sawtimber-sized trees (fig. 7). In addition to the growing-stock trees, timberland stands contain just less than 4 million rough and rotten cull trees. There are over 8 million trees that are dead but still sufficiently sound to meet minimum merchantability standards.

An estimated 59 percent of the timberland acres are less than fully stocked, and 4 percent—over 42,700 acres—are nonstocked (fig. 8).

Figure 6—Distribution of timberland area outside National Forests by stand-volume class in western Montana, 1989.

Figure 7—Distribution of growing-stock trees on timberland outside National Forests by tree-size class in western Montana, 1989.

Figure 8—Distribution of timberland area outside National Forests by stocking condition in western Montana, 1989.

The 220,644 acres in the fully stocked and overstocked condition are at full stocking with growing-stock trees, but cull trees are present in sufficient number to create an overstocked condition on 4 percent of the timberland area. Mature stands, where trees in excess of 100 years old make up the majority of stocking, occupy 263,141 acres.

Timberland supports 1.8 billion cubic feet of growing stock, including 5.3 billion board feet (Scribner rule) of sawtimber. The volume in cull and salvable dead trees adds another 71 million cubic feet to the timberland “woodpile.”

Sawtimber stands contain almost 83 percent of the board-foot volume on timberland and over half is in Douglas-fir. Poletimber and sapling/seedling stands account for 12 percent and 5 percent respectively.

Forest industry owns an estimated 747 million cubic feet or 41 percent of the growing-stock volume. Volume on nonindustrial private land amounts to around 667 million cubic feet—37 percent. Timberland sawtimber volume, however, is roughly equivalent for the two owner groups—1.9 billion board feet (Scribner) on industry land and 2.0 billion on nonindustrial land.

Currently, volume per acre is lowest for forest industry owned timberland with an average of 3,523 board feet (Scribner). Nonindustrial private stand volume averages around 4,874 board feet per acre, and other public timberlands support an average 6,300 board feet per acre.

Growing-stock volume is fairly well distributed. About 31 percent is in poletimber trees, another 50 percent is in sawtimber trees under 17.0 inches d.b.h., and trees 17.0 inches d.b.h. and larger account for the remaining 19 percent (fig. 9). Two-thirds of the sawtimber volume is in trees less than 17.0 inches d.b.h.

Douglas-fir, lodgepole pine (*Pinus contorta*), and ponderosa pine (*Pinus ponderosa*) account for 80 percent of the growing-stock and sawtimber volume (fig. 10). Douglas-fir alone accounts for 38 percent of the growing-stock volume and 41 percent of the sawtimber volume. The bulk of growing-stock volume is in sawtimber stands.

Components of Change

Annual growth increased growing-stock volume by over 57 million cubic feet in 1988, but mortality reduced the gain in cubic foot volume to a net of less than 50 million. Seventy percent of the 7.2 million cubic feet of mortality was accounted for by Engelmann spruce (*Picea engelmannii*) (24 percent), Douglas-fir (23 percent), and lodgepole pine (23 percent) (fig. 11). Over one-third of the volume lost was due to insects and disease.

Productivity of the timberland in western Montana is moderate. On the average, a typical acre has the potential to produce 64 cubic feet of wood annually. Actual gross production is estimated to be about 48 cubic feet per acre. Net productivity averaged just under 42 cubic feet per acre in 1988, or 65 percent of potential. Actual net productivity is essentially the same for the timberland acres within each owner group. All three average around the overall rate of 42 cubic feet per acre per year.

Figure 9—Distribution of growing-stock volume on timberland outside National Forests by tree-size class in western Montana, 1989.

Figure 10—Distribution of growing-stock volume on timberland outside National Forests by species in western Montana, 1989.

Figure 11—Annual mortality of growing stock on timberland outside National Forests by species in western Montana, 1988.

HOW THE INVENTORY WAS CONDUCTED

The inventory was designed to provide reliable statistics primarily at the State and Survey Unit levels.

Prefield

Initial area estimates were based on the classification of 8,116 sample points systematically placed on the latest aerial photographs available. The sample points were summarized and grouped into strata for subsequent field sampling. The photo points, adjusted to meet known land areas, were used to compute area expansion factors for the sampling strata means.

Field

Land classification and estimates for timberland characteristics and volume were based on observations and measurements recorded at 328 field sample locations, of which 211 were forested (fig. 12).

Sample trees for timberland were selected using a 10-point cluster. Trees less than 5.0 inches d.b.h. were measured on a $\frac{1}{300}$ -acre fixed radius plot. Trees 5.0 inches d.b.h. or larger were selected using a variable radius plot. Locations were measured using a 40-basal-area-factor angle gauge.

Compilation

The photo and field data were encoded for subsequent computer manipulation to assure accuracy and consistency of codes and to produce quality control summaries. Final estimates from these data were based on statistical summaries, a portion of which is included in this bulletin. Volume and defect were computed using the most appropriate equations, including those developed by Kemp (1958) and Moisen (1990).

Figure 12—Distribution of timberland field locations outside National Forests in western Montana, 1989.

DATA RELIABILITY

Individual cells within tables should be used with caution. Some are based on small sample sizes, which may result in high sampling errors. The standard error percentages shown in tables 2 and 3 were calculated at the 67 percent confidence level.

STANDARD FOREST SURVEY TERMINOLOGY

Basal area—The cross-sectional area of a tree 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.).

Christmas tree grade—Pinyon species are classified as Christmas trees using the following guidelines:

Premium—Excellent conical form with no gaps in branches and a straight bole.

Standard—Good conical form with small gaps in branches and bole slightly malformed.

Utility—Conical in form with branches missing and bole bent or malformed.

Cull—Not meeting one of the above classifications or over 12 feet in height.

Cord—A pile of stacked wood equivalent to 128 cubic feet of wood and air space having standard dimensions of 4 by 4 by 8 feet.

Cull trees—Live trees that are unmerchantable now or prospectively (see Rough trees and Rotten trees).

Cull volume—Portions of a tree's volume that are not usable for wood products because of rot, missing or dead material, or other cubic-foot defect.

Deferred forest land—Forest lands within the National Forest System that are under study for possible inclusion in the Wilderness System.

Diameter at breast height (d.b.h.)—Diameter of the stem measured at 4.5 feet above the ground.

Diameter at root collar (d.r.c.)—Diameter equivalent at the point nearest the ground line that represents the basal area of the tree stem or stems.

Diameter classes—Tree diameters, either d.b.h. or d.r.c., grouped into 2-inch classes.

Farmer/rancher-owned lands—Lands owned by a person who operates a farm or a ranch and who either does the work or directly supervises the work.

Fenceposts—Juniper and oak species are evaluated for post potential using the following criteria:

Line post—A 7-foot minimum length with 5 to 7 inches diameter at the butt, 2.5 inches minimum small end diameter, and reasonably straight and solid.

Corner post—An 8-foot minimum length with 7 to 9 inches diameter at the butt, 2.5 inches minimum small end diameter, and reasonably straight and solid.

Forest industry lands—Lands owned by companies or individuals operating a primary wood-processing plant.

Forest lands—Lands at least 10 percent stocked by forest trees of any size, including lands that formerly had such tree cover and that will be naturally or artificially regenerated. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if less than 120 feet wide.

Forest trees—Woody plants having a well-developed stem or stems, usually more than 12 feet in height at maturity, with a generally well-defined crown.

Forest type—A classification of forest land based upon and named for the tree species presently forming a plurality of live-tree stocking.

Gross annual growth—The average annual increase in the net volume of trees during a specified period.

Growing-stock trees—Live sawtimber trees, poletimber trees, saplings, and seedlings of timber species meeting specified standards of quality and vigor; excludes cull trees.

Growing-stock volume—Net cubic-foot volume in live poletimber-size and sawtimber-size growing-stock trees from a 1-foot stump to a minimum 4-inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Growth—See definition for Net annual growth.

Hardwood trees—Trees that are usually broad-leaved and deciduous.

Indian lands—Indian lands held in trust by the Federal Government.

Industrial wood—All commercial roundwood products except fuelwood.

Land area—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains, streams, sloughs, estuaries, and canals less than 120 feet wide; and lakes, reservoirs, and ponds less than 1 acre in size.

Logging residue—The unused portions of growing-stock trees cut or killed by logging.

Miscellaneous Federal lands—Lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or Bureau of Land Management, U.S. Department of the Interior.

Mortality—The net volume of growing-stock trees that have died from natural causes during a specified period.

National Forest lands—Public lands administered by the Forest Service, U.S. Department of Agriculture.

National Resource lands—Public lands administered by the Bureau of Land Management, U.S. Department of the Interior.

Net annual growth—Gross annual growth minus average annual mortality.

Net dead volume—Total net volume of dead trees plus the net volume of dead material in live trees.

Net volume in board feet—The gross board-foot volume in the sawlog portion of growing-stock trees, less deductions for cull volume.

Net volume in cubic feet—Gross cubic-foot volume in the merchantable portion of trees less deductions for cull volume. For timber species, volume is computed for the merchantable stem from a 1-foot stump to a minimum 4-inch top diameter outside bark (d.o.b.), or to the point where the central stem breaks into limbs. For woodland species, volume is computed outside bark (o.b.) for all woody material above d.r.c. that is larger than 1.5 inches d.o.b.

Nonforest lands—Lands that do not currently qualify as forest land.

Nonindustrial private—All private ownerships except forest industry.

Nonstocked areas—Forest land less than 10 percent stocked with live trees.

Other private lands—Privately owned lands other than forest industry or Indian Trust.

Other public lands—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture.

Other removals—The net volume of growing-stock trees removed from the inventory by cultural operations such as timber-stand improvement, by land clearing, and by changes in land use, such as a shift to wilderness.

Poletimber stands—Stands at least 10 percent stocked with growing-stock trees, in which half or more of the stocking is sawtimber or poletimber trees or both, with poletimber stocking exceeding that of sawtimber (see definition for Stocking).

Poletimber trees—Live trees of timber species at least 5 inches d.b.h. but smaller than sawtimber size.

Potential growth—The average net annual cubic-foot growth per acre at culmination of mean annual growth attainable in fully stocked natural stands.

Primary wood-processing plants—Plants using roundwood products such as sawlogs, pulpwood bolts, veneer logs, and so forth.

Productivity class—A classification of forest land that reflects biological potential. For timberlands the index used is the potential net annual growth at culmination of mean annual increment in fully stocked natural stands. For woodland, characteristics that affect the land's ability to produce wood, such as soil depth and aspect, are used. Furthermore, woodland is classified as high site where sustained wood production is likely, or low site where the continuous production of wood is unlikely.

Removals—The net volume of growing-stock trees removed from the inventory by harvesting, cultural operations, land clearings, or changes in land use.

Reserved forest land—Forest land withdrawn from tree utilization through statute or administrative designation.

Residues:

Coarse residues—Plant residues suitable for chipping, such as slabs, edgings, and ends.

Fine residues—Plant residues not suitable for chipping, such as sawdust, shavings, and veneer clippings.

Plant residues—Wood materials from primary manufacturing plants that are not used for any product.

Rotten trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with more than half of the cull volume attributable to rotten or missing material.

Rough trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with less than half of the cull volume attributable to rotten or missing material.

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

Salvable dead trees—Standing dead trees that are currently merchantable by regional standards.

Saplings—Live trees of timber species 1 to 4.9 inches d.b.h. or woodland species 1 to 2.9 inches d.r.c.

Sapling and seedling stands—Timberland stands at least 10 percent stocked on which more than half of the stocking is saplings or seedlings or both.

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

Sawlog top—The point on the bole of sawtimber trees above which a sawlog cannot be produced. The minimum sawlog top is 7 inches d.o.b. for softwoods and 9 inches d.o.b. for hardwoods.

Sawtimber stands—Stands at least 10 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber trees—Live trees of timber species meeting regional size and defect specifications. Softwood trees must be at least 9 inches d.b.h. and hardwood trees 11 inches d.b.h.

Sawtimber volume—Net volume in board feet of the sawlog portion of live sawtimber trees.

Seedlings—Established live trees of timber species less than 1 inch d.b.h. or woodland species less than 1 inch d.r.c.

Softwood trees—Coniferous trees that are usually evergreen and have needle or scalelike leaves.

Standard error—An expression of the degree of confidence that can be placed on an estimated total or average obtained by statistical sampling methods. Standard errors do not include technique errors that could occur in photo classification of areas, field measurements, or compilation of data.

Stand-size classes—A classification of forest land based on the predominant size of trees present (see Sawtimber stands, Poletimber stands, and Sapling and seedling stands).

State, county, and municipal lands—Lands administered by States, counties, and local public agencies, or lands leased by these governmental units for more than 50 years.

Stocking—An expression of the extent to which growing space is effectively utilized by present or potential growing-stock trees of timber species.

Stocking condition—A categorization of timberland reflecting the degree to which the site is being utilized by growing-stock trees and other conditions affecting current and prospective timber growth (see Stocking):

Overstocked—Areas at least 60 percent stocked with growing-stock trees, but overstocked with all live trees.

Fully stocked—Areas at least 60 percent stocked with growing-stock trees and not overstocked.

Medium to fully stocked—Areas 35 percent to 60 percent stocked with growing-stock trees. Includes areas where other trees or inhibiting vegetation or surface conditions prevent occupancy by growing-stock trees.

Poorly stocked—Areas less than 35 percent stocked with growing-stock trees.

Nonstocked—Forest land less than 10 percent stocked with growing-stock trees.

Mature—Stands of timber species over 100 years old.

Timberland—Forest land where timber species make up at least 10 percent stocking.

Timber species—Tree species traditionally used for industrial wood products. In the Rocky Mountain States, these include aspen and cottonwood hardwood species and all softwood species except pinyon and juniper.

Timber stand improvement—Treatments such as thinning, pruning, release cutting, girdling, weeding, or poisoning of unwanted trees aimed at improving growing conditions for the remaining trees.

Upper-stem portion—That part of the main stem or fork of sawtimber trees above the sawlog top to a minimum top diameter of 4 inches outside bark or to the point where the main stem or fork breaks into limbs.

Water—Streams, sloughs, estuaries, and canals more than 120 feet wide, and lakes, reservoirs, and ponds more than 1 acre in size at mean high water level.

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

Woodland—Forest land where timber species make up less than 10 percent stocking.

Woodland species—Tree species not usually converted into industrial wood products. Common uses are fuelwood, fenceposts, and Christmas trees.

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FOREST SURVEY TABLES

Table 1—Total area by ownership class and land class in western Montana, 1989

[illegible]

¹ Data not available for this report.

² Not included with miscellaneous Federal, a component of other public, for purpose of clarity. These lands are reserved and are included in tables 1, 2, and 4 only.

³ U.S. Department of Commerce, Bureau of Census 1980.

Table 2—Area of forest land outside National Forests with percent standard error in western Montana, 1989

Item	Acres	Percent standard error
Timberland	1,179,702	±2.2
Woodland	—	±0.0
Reserved forest land: ¹		
Timberland	49,579	
Woodland	—	
Total forest land ²	1,229,281	

¹Reserved land areas are estimated from aerial photos without field verification; therefore, standard errors are not calculated.

²On this and all following tables, totals may vary due to rounding.

Table 3—Net volume, net annual growth, and annual mortality of growing stock and sawtimber on timberland outside National Forests with percent standard error in western Montana

Item	All species	
	Volume	Percent standard error
Net volume, 1989:		
Growing stock (M cubic feet)	1,818,386	±6.4
Sawtimber ¹ (M board feet)	6,400,967	±7.2
Sawtimber ² (M board feet)	5,298,355	±7.4
Net annual growth, 1988:		
Growing stock (M cubic feet)	49,407	±8.8
Sawtimber ¹ (M board feet)	215,687	±9.8
Sawtimber ² (M board feet)	184,270	±10.0
Annual mortality, 1988:		
Growing stock (M cubic feet)	7,159	±22.3
Sawtimber ¹ (M board feet)	22,943	±27.1
Sawtimber ² (M board feet)	19,359	±27.8

¹International ¼-inch rule.

²Scribner rule.

Table 4—Total land area outside National Forests by major land class and owner group in western Montana, 1989

Land class	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Acres -----						
Timberland:						
Reserved	—	—	—	—	49,579	49,579
Nonreserved	155,852	53,888	209,740	555,313	414,649	1,179,702
Total	155,852	53,888	209,740	555,313	464,228	1,229,281
Woodland:						
Reserved	—	—	—	—	—	—
Nonreserved	—	—	—	—	—	—
Total	—	—	—	—	—	—
Total forest land:						
Reserved	—	—	—	—	49,579	49,579
Nonreserved	155,852	53,888	209,740	555,313	414,649	1,179,702
Total	155,852	53,888	209,740	555,313	464,228	1,229,281
Nonforest land	36,315	9,112	45,427	23,670	668,303	737,400
Total land area	192,167	63,000	255,167	578,983	1,132,531	1,966,681

TIMBERLAND TABLES

Area

Table 5—Area of timberland outside National Forests by forest type, stand-size class, and productivity class in western Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	—	66,462	256,433	73,309	396,204
Poletimber	—	—	—	49,809	22,305	72,114
Sapling and seedling	—	—	9,816	34,862	78,362	123,040
Nonstocked	—	—	—	—	30,907	30,907
Total	—	—	76,278	341,104	204,883	622,265
Ponderosa pine:						
Sawtimber	5,855	5,363	38,641	66,505	21,173	137,537
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	2,682	20,058	9,921	32,661
Nonstocked	—	—	—	—	—	—
Total	5,855	5,363	41,323	86,563	31,094	170,198
Lodgepole pine:						
Sawtimber	—	—	7,389	52,215	2,682	62,286
Poletimber	—	—	5,504	72,661	13,376	91,541
Sapling and seedling	—	—	—	8,185	20,772	28,957
Nonstocked	—	—	—	—	—	—
Total	—	—	12,893	133,061	36,830	182,784
Western larch:						
Sawtimber	—	—	—	8,684	5,503	14,187
Poletimber	—	—	—	23,155	—	23,155
Sapling and seedling	—	—	—	30,925	6,798	37,723
Nonstocked	—	—	—	—	7,731	7,731
Total	—	—	—	62,764	20,032	82,796
Western redcedar:						
Sawtimber	—	—	—	7,731	—	7,731
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	7,731	—	7,731
Spruce-fir:						
Sawtimber	—	—	5,503	22,466	6,798	34,767
Poletimber	—	—	—	15,463	6,842	22,305
Sapling and seedling	—	—	—	7,731	7,731	15,462
Nonstocked	—	—	—	—	—	—
Total	—	—	5,503	45,660	21,371	72,534
Engelmann spruce:						
Sawtimber	—	—	18,145	7,731	—	25,876
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	4,160	4,160
Total	—	—	18,145	7,731	4,160	30,036
Cottonwood: ¹						
Sawtimber	—	5,504	—	5,854	—	11,358
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	5,504	—	5,854	—	11,358
All types:						
Sawtimber	5,855	10,867	136,140	427,619	109,465	689,946
Poletimber	—	—	5,504	161,088	42,523	209,115
Sapling and seedling	—	—	12,498	101,761	123,584	237,843
Nonstocked	—	—	—	—	42,798	42,798
Total	5,855	10,867	154,142	690,468	318,370	1,179,702

¹Includes paper birch.

Table 6—Area of other publicly owned timberland by forest type, stand-size class, and productivity class in western Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	—	20,132	64,027	13,378	97,537
Poletimber	—	—	—	6,442	2,682	9,124
Sapling and seedling	—	—	—	2,681	13,285	15,966
Nonstocked	—	—	—	—	851	851
Total	—	—	20,132	73,150	30,196	123,478
Ponderosa pine:						
Sawtimber	—	5,363	1,202	19,329	—	25,894
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	2,682	3,107	—	5,789
Nonstocked	—	—	—	—	—	—
Total	—	5,363	3,884	22,436	—	31,683
Lodgepole pine:						
Sawtimber	—	—	1,886	2,149	2,682	6,717
Poletimber	—	—	—	14,525	5,645	20,170
Sapling and seedling	—	—	—	2,682	8,880	11,562
Nonstocked	—	—	—	—	—	—
Total	—	—	1,886	19,356	17,207	38,449
Western larch:						
Sawtimber	—	—	—	1,886	—	1,886
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	1,886	—	1,886
Western redcedar:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Spruce-fir:						
Sawtimber	—	—	—	8,880	—	8,880
Poletimber	—	—	—	—	2,682	2,682
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	8,880	2,682	11,562
Engelmann spruce:						
Sawtimber	—	—	2,682	—	—	2,682
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	2,682	—	—	2,682
Cottonwood: ¹						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
All types:						
Sawtimber	—	5,363	25,902	96,271	16,060	143,596
Poletimber	—	—	—	20,967	11,009	31,976
Sapling and seedling	—	—	2,682	8,470	22,165	33,317
Nonstocked	—	—	—	—	851	851
Total	—	5,363	28,584	125,708	50,085	209,740

¹Includes paper birch.

Table 7—Area of forest industry owned timberland by forest type, stand-size class, and productivity class in western Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	—	29,469	108,319	33,627	171,415
Poletimber	—	—	—	31,658	15,463	47,121
Sapling and seedling	—	—	—	25,383	54,119	79,502
Nonstocked	—	—	—	—	14,443	14,443
Total	—	—	29,469	165,360	117,652	312,481
Ponderosa pine:						
Sawtimber	—	—	969	18,383	—	19,352
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	218	9,921	10,139
Nonstocked	—	—	—	—	—	—
Total	—	—	969	18,601	9,921	29,491
Lodgepole pine:						
Sawtimber	—	—	—	33,333	—	33,333
Poletimber	—	—	—	38,657	7,731	46,388
Sapling and seedling	—	—	—	—	7,731	7,731
Nonstocked	—	—	—	—	—	—
Total	—	—	—	71,990	15,462	87,452
Western larch:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	17,652	—	17,652
Sapling and seedling	—	—	—	30,925	—	30,925
Nonstocked	—	—	—	—	7,731	7,731
Total	—	—	—	48,577	7,731	56,308
Western redcedar:						
Sawtimber	—	—	—	7,731	—	7,731
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	7,731	—	7,731
Spruce-fir:						
Sawtimber	—	—	—	7,731	—	7,731
Poletimber	—	—	—	15,463	—	15,463
Sapling and seedling	—	—	—	7,731	7,731	15,462
Nonstocked	—	—	—	—	—	—
Total	—	—	—	30,925	7,731	38,656
Engelmann spruce:						
Sawtimber	—	—	15,463	7,731	—	23,194
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	15,463	7,731	—	23,194
Cottonwood: ¹						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
All types:						
Sawtimber	—	—	45,901	183,228	33,627	262,756
Poletimber	—	—	—	103,430	23,194	126,624
Sapling and seedling	—	—	—	64,257	79,502	143,759
Nonstocked	—	—	—	—	22,174	22,174
Total	—	—	45,901	350,915	158,497	555,313

¹Includes paper birch.

Table 8—Area of nonindustrial private timberland by forest type, stand-size class, and productivity class in western Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	—	16,861	84,087	26,304	127,252
Poletimber	—	—	—	11,709	4,160	15,869
Sapling and seedling	—	—	9,816	6,798	10,958	27,572
Nonstocked	—	—	—	—	15,613	15,613
Total	—	—	26,677	102,594	57,035	186,306
Ponderosa pine:						
Sawtimber	5,855	—	36,470	28,793	21,173	92,291
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	16,733	—	16,733
Nonstocked	—	—	—	—	—	—
Total	5,855	—	36,470	45,526	21,173	109,024
Lodgepole pine:						
Sawtimber	—	—	5,503	16,733	—	22,236
Poletimber	—	—	5,504	19,479	—	24,983
Sapling and seedling	—	—	—	5,503	4,161	9,664
Nonstocked	—	—	—	—	—	—
Total	—	—	11,007	41,715	4,161	56,883
Western larch:						
Sawtimber	—	—	—	6,798	5,503	12,301
Poletimber	—	—	—	5,503	—	5,503
Sapling and seedling	—	—	—	—	6,798	6,798
Nonstocked	—	—	—	—	—	—
Total	—	—	—	12,301	12,301	24,602
Western redcedar:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Spruce-fir:						
Sawtimber	—	—	5,503	5,855	6,798	18,156
Poletimber	—	—	—	—	4,160	4,160
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	5,503	5,855	10,958	22,316
Engelmann spruce:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	4,160	4,160
Total	—	—	—	—	4,160	4,160
Cottonwood: ¹						
Sawtimber	—	5,504	—	5,854	—	11,358
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	5,504	—	5,854	—	11,358
All types:						
Sawtimber	5,855	5,504	64,337	148,120	59,778	283,594
Poletimber	—	—	5,504	36,691	8,320	50,515
Sapling and seedling	—	—	9,816	29,034	21,917	60,767
Nonstocked	—	—	—	—	19,773	19,773
Total	5,855	5,504	79,657	213,845	109,788	414,649

¹Includes paper birch.

Table 9—Area of timberland outside National Forests by stand volume and owner group in western Montana, 1989

Stand volume per acre ¹	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Acres -----						
Less than 1,500 board feet	13,748	9,140	22,888	184,099	62,762	269,749
1,500 to 4,999 board feet	46,035	9,054	55,089	176,149	152,334	383,572
5,000 to 9,999 board feet	49,612	9,054	58,666	141,652	132,428	332,746
10,000 board feet or more	46,457	26,640	73,097	53,413	67,125	193,635
All classes	155,852	53,888	209,740	555,313	414,649	1,179,702

¹International ¼-inch rule.**Table 10—Area of timberland outside National Forests by forest type and stocking condition in western Montana, 1989**

Forest type	Stocking condition					Mature	Nonstocked	All classes
	Overstocked	Fully stocked	Medium to fully stocked	Poorly stocked				
	----- Acres -----							
Douglas-fir	4,160	34,650	223,808	158,229	170,511	30,907	622,265	
Ponderosa pine	—	19,543	51,209	70,085	29,361	—	170,198	
Lodgepole pine	40,394	67,816	25,180	19,605	29,789	—	182,784	
Western larch	—	30,887	14,529	22,260	7,389	7,731	82,796	
Western redcedar	—	—	—	7,731	—	—	7,731	
Spruce-fir	7,732	7,731	29,502	11,892	15,678	—	72,535	
Engelmann spruce	—	7,731	7,731	—	10,413	4,160	30,035	
Cottonwood ¹	—	—	5,855	5,503	—	—	11,358	
All types	52,286	168,358	357,814	295,305	263,141	42,798	1,179,702	

¹Includes paper birch.

Number of Trees

Table 11—Number of growing-stock trees on timberland outside National Forests by species and diameter class in western Montana, 1989

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 -----																	
Douglas-fir	50,006	44,460	24,034	19,866	11,423	7,321	3,482	2,286	1,166	721	456	199	54	48	92	165,614	
Ponderosa pine	11,681	6,151	4,262	4,706	3,529	2,471	1,950	1,477	733	556	288	155	66	47	50	38,122	
Western white pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Lodgepole pine	32,888	45,275	27,353	15,549	7,917	2,214	588	290	38	31	—	—	7	—	—	132,150	
Whitebark pine	1,784	416	413	197	—	12	—	—	—	—	7	—	—	—	—	2,829	
Western larch	5,994	9,187	5,833	3,409	1,544	1,235	483	350	179	97	94	77	29	17	14	28,542	
Grand fir	—	550	—	145	—	—	—	—	—	—	—	—	2	—	—	697	
Subalpine fir	15,787	7,617	6,435	2,244	1,567	485	204	83	35	29	—	—	—	—	—	34,486	
Engelmann spruce	6,981	4,240	1,817	1,660	640	426	342	315	158	90	24	61	17	19	5	16,795	
Western redcedar	9,369	—	—	—	—	38	56	—	55	—	37	10	18	15	3	9,601	
Total softwoods	134,490	117,896	70,147	47,776	26,620	14,202	7,105	4,801	2,364	1,524	906	502	193	146	164	428,836	
Aspen	1,756	1,756	543	250	175	129	42	33	—	—	—	—	—	—	—	4,684	
Cottonwood ¹	1,859	—	165	—	109	—	67	36	38	47	18	15	6	—	15	2,375	
Total hardwoods	3,615	1,756	708	250	284	129	109	69	38	47	18	15	6	—	15	7,059	
All species	138,105	119,652	70,855	48,026	26,904	14,331	7,214	4,870	2,402	1,571	924	517	199	146	179	435,895	

¹Includes paper birch.

Table 12—Number of cull and salvable dead trees on timberland outside National Forests by owner group, and softwoods and hardwoods in western Montana, 1989

Owner group	Species group	Cull trees			Salvable dead trees	Total
		Rough	Rotten	Total		
----- Thousand trees -----						
Other public: State:	Softwoods	342	48	390	1,452	1,842
	Hardwoods	—	18	18	—	18
	Total	342	66	408	1,452	1,860
Other:	Softwoods	1	—	1	250	251
	Hardwoods	—	—	—	—	—
	Total	1	—	1	250	251
Total other public:	Softwoods	343	48	391	1,702	2,093
	Hardwoods	—	18	18	—	18
	Total	343	66	409	1,702	2,111
Forest industry:	Softwoods	897	404	1,301	2,588	3,889
	Hardwoods	—	—	—	—	—
	Total	897	404	1,301	2,588	3,889
Nonindustrial private:	Softwoods	1,404	553	1,957	4,315	6,272
	Hardwoods	—	184	184	—	184
	Total	1,404	737	2,141	4,315	6,456
Total:	Softwoods	2,644	1,005	3,649	8,605	12,254
	Hardwoods	—	202	202	—	202
	Total	2,644	1,207	3,851	8,605	12,456

Volume

Table 13—Net volume of growing stock on timberland outside National Forests by forest type and stand-size class in western Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	----- Thousand cubic feet -----				
Douglas-fir	703,961	90,578	49,548	1,835	845,922
Ponderosa pine	217,448	—	13,484	—	230,932
Lodgepole pine	138,012	277,748	7,716	—	423,476
Western larch	24,525	50,738	15,422	402	91,087
Western redcedar	11,638	—	—	—	11,638
Spruce-fir	91,125	43,592	1,186	—	135,903
Engelmann spruce	69,599	—	—	—	69,599
Cottonwood ¹	9,829	—	—	—	9,829
All types	1,266,137	462,656	87,356	2,237	1,818,386

¹Includes paper birch.

Table 14—Net volume of sawtimber (International ¼-inch rule) on timberland outside National Forests by forest type and stand-size class in western Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
----- Thousand board feet, International 1/4-inch rule -----					
Douglas-fir	2,826,928	190,198	181,069	7,947	3,206,142
Ponderosa pine	1,124,174	—	55,471	—	1,179,645
Lodgepole pine	468,817	423,007	5,013	—	896,837
Western larch	105,778	84,929	77,415	—	268,122
Western redcedar	53,038	—	—	—	53,038
Spruce-fir	348,183	100,523	6,144	—	454,850
Engelmann spruce	300,967	—	—	—	300,967
Cottonwood ¹	41,366	—	—	—	41,366
All types	5,269,251	798,657	325,112	7,947	6,400,967

¹Includes paper birch.

Table 15—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by forest type and stand-size class in western Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	----- Thousand board feet, Scribner rule -----				
Douglas-fir	2,343,157	151,897	142,923	6,158	2,644,135
Ponderosa pine	926,870	—	43,773	—	970,643
Lodgepole pine	392,401	357,313	3,816	—	753,530
Western larch	85,154	67,333	65,684	—	218,171
Western redcedar	43,759	—	—	—	43,759
Spruce-fir	291,537	79,806	4,191	—	375,534
Engelmann spruce	257,712	—	—	—	257,712
Cottonwood ¹	34,871	—	—	—	34,871
All types	4,375,461	656,349	260,387	6,158	5,298,355

¹Includes paper birch.

Table 16—Net volume of growing stock on timberland outside National Forests by species and owner group in western Montana, 1989

Species	Owner group					Total
	Other public			Forest Industry	NonIndustrial private	
	State	Other	Total other public			
----- Thousand cubic feet -----						
Douglas-fir	131,920	52,029	183,949	279,256	242,820	706,025
Ponderosa pine	72,724	2,499	75,223	48,501	174,486	298,210
Western white pine	—	—	—	—	—	—
Lodgepole pine	48,887	50,093	98,980	216,468	147,788	463,236
Whitebark pine	352	—	352	—	1,252	1,604
Western larch	16,988	—	16,988	93,178	41,669	151,835
Grand fir	291	—	291	716	410	1,417
Subalpine fir	7,414	12,125	19,539	39,180	18,431	77,150
Engelmann spruce	7,267	—	7,267	62,400	19,530	89,197
Western redcedar	—	—	—	6,050	333	6,383
Total softwoods	285,843	116,746	402,589	745,749	646,719	1,795,057
Aspen	376	1,155	1,531	—	9,951	11,482
Cottonwood¹	138	35	173	965	10,709	11,847
Total hardwoods	514	1,190	1,704	965	20,660	23,329
All species	286,357	117,936	404,293	746,714	667,379	1,818,386

¹Includes paper birch.

Table 17—Net volume of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in western Montana, 1989

Species	Owner group					
	Other public			Forest Industry	NonIndustrial private	Total
	State	Other	Total other public			
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	527,392	239,439	766,831	1,023,306	833,138	2,623,275
Ponderosa pine	394,127	13,081	407,208	239,331	902,420	1,548,959
Western white pine	—	—	—	—	—	—
Lodgepole pine	120,117	129,985	250,102	329,814	385,211	965,127
Whitebark pine	1,184	—	1,184	—	1,585	2,769
Western larch	81,862	—	81,862	371,017	153,525	606,404
Grand fir	1,360	—	1,360	—	—	1,360
Subalpine fir	9,866	36,966	46,832	81,321	40,429	168,582
Engelmann spruce	30,924	—	30,924	273,741	75,885	380,550
Western redcedar	—	—	—	28,414	1,537	29,951
Total softwoods	1,166,832	419,471	1,586,303	2,346,944	2,393,730	6,326,977
Aspen	1,279	—	1,279	—	25,243	26,522
Cottonwood¹	663	170	833	4,507	42,128	47,468
Total hardwoods	1,942	170	2,112	4,507	67,371	73,990
All species	1,168,774	419,641	1,588,415	2,351,451	2,461,101	6,400,967

¹Includes paper birch.

Table 18—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in western Montana, 1989

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand board feet, Scribner rule -----						
Douglas-fir	442,291	198,962	641,253	850,261	681,471	2,172,985
Ponderosa pine	324,471	10,638	335,109	194,881	736,109	1,266,099
Western white pine	—	—	—	—	—	—
Lodgepole pine	101,229	110,026	211,255	280,701	325,583	817,539
Whitebark pine	952	—	952	—	1,405	2,357
Western larch	65,722	—	65,722	301,852	117,519	485,093
Grand fir	1,211	—	1,211	—	—	1,211
Subalpine fir	8,001	29,873	37,874	66,848	33,316	138,038
Engelmann spruce	26,270	—	26,270	235,027	65,585	326,882
Western redcedar	—	—	—	22,529	1,331	23,860
Total softwoods	970,147	349,499	1,319,646	1,952,099	1,962,319	5,234,064
Aspen	1,065	—	1,065	—	21,565	22,630
Cottonwood ¹	577	148	725	4,003	36,933	41,661
Total hardwoods	1,642	148	1,790	4,003	58,498	64,291
All species	971,789	349,647	1,321,436	1,956,102	2,020,817	5,298,355

¹Includes paper birch.

Table 19—Net volume of growing stock on timberland outside National Forests by species and diameter class in western Montana, 1989

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 -----																
Douglas-fir	59,222	113,552	116,341	119,021	79,970	71,527	46,366	36,094	27,234	14,837	4,621	4,424	12,816	706,025		
Ponderosa pine	7,357	23,424	32,196	37,558	43,674	47,061	30,492	28,438	18,020	11,500	6,404	5,003	7,083	298,210		
Western white pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Lodgepole pine	110,534	143,616	122,364	53,117	17,926	11,255	1,746	1,931	—	—	748	—	—	463,237		
Whitebark pine	603	528	—	195	—	—	—	—	278	—	—	—	—	1,604		
Western larch	17,918	23,756	19,842	23,770	14,355	14,659	8,864	6,070	7,867	6,999	3,029	2,087	2,619	151,835		
Grand fir	—	1,125	—	—	—	—	—	—	—	—	291	—	—	1,416		
Subalpine fir	25,009	15,866	18,519	8,124	4,142	2,717	1,258	1,516	—	—	—	—	—	77,151		
Engelmann spruce	6,145	11,202	8,259	9,629	10,138	13,546	9,851	5,898	1,917	6,504	2,171	3,229	708	89,197		
Western redcedar	—	—	—	415	839	—	1,220	—	1,355	481	843	897	333	6,383		
Total softwoods	226,788	333,069	317,521	251,829	171,044	160,765	99,797	79,947	56,671	40,321	18,107	15,640	23,559	1,795,058		
Aspen	1,451	2,379	2,580	2,850	1,005	1,216	—	—	—	—	—	—	—	11,481		
Cottonwood ¹	234	—	1,592	—	1,380	990	1,433	2,122	884	857	469	—	1,886	11,847		
Total hardwoods	1,685	2,379	4,172	2,850	2,385	2,206	1,433	2,122	884	857	469	—	1,886	23,328		
All species	228,473	335,448	321,693	254,679	173,429	162,971	101,230	82,069	57,555	41,178	18,576	15,640	25,445	1,818,386		

¹Includes paper birch.

Table 20—Net volume of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in western Montana, 1989

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, International 1/4-inch rule -----													
Douglas-fir	408,507	560,591	409,438	385,957	260,713	208,737	162,130	88,798	28,585	27,896	81,923	2,623,275	
Ponderosa pine	106,913	175,896	245,199	290,767	198,829	191,558	124,172	80,559	45,668	36,564	52,843	1,548,958	
Western white pine	—	—	—	—	—	—	—	—	—	—	—	—	
Lodgepole pine	480,300	299,395	100,282	61,941	9,342	9,939	—	—	3,929	—	—	—	
Whitebark pine	—	1,184	—	—	—	—	1,585	—	—	—	—	965,128	
Western larch	80,706	135,099	82,266	84,052	52,571	36,642	46,938	42,344	18,334	12,532	14,920	2,769	
Grand fir	—	—	—	—	—	—	—	—	1,360	—	—	606,404	
Subalpine fir	75,769	42,467	21,626	14,240	6,520	7,959	—	—	—	—	—	1,360	
Engelmann spruce	34,752	52,744	55,091	72,730	52,183	31,029	10,061	36,029	12,458	19,275	4,198	168,581	
Western redcedar	—	1,990	4,072	—	5,830	—	6,315	2,226	3,865	4,116	1,537	380,550	
Total softwoods	1,186,947	1,269,366	917,964	909,687	585,988	485,864	351,201	249,956	114,199	100,383	155,421	29,951	
Aspen	XXXXX	15,073	5,204	6,245	—	—	—	—	—	—	—	6,326,976	
Cottonwood ¹	XXXXX	—	6,986	4,922	6,893	9,928	4,038	3,842	2,118	—	8,742	26,522	
Total hardwoods	XXXXX	15,073	12,190	11,167	6,893	9,928	4,038	3,842	2,118	—	8,742	47,469	
All species	1,186,947	1,284,439	930,154	920,854	592,881	495,792	355,239	253,798	116,317	100,383	164,163	73,991	
												6,400,967	

¹Includes paper birch.

Table 21—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in western Montana, 1989

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, Scribner rule -----													
Douglas-fir	313,687	440,009	338,214	327,808	224,851	181,911	144,296	79,030	25,441	24,827	72,911	2,172,985	
Ponderosa pine	69,677	131,516	197,084	241,651	167,892	163,187	106,458	69,354	39,907	32,343	47,031	1,266,100	
Western white pine	—	—	—	—	—	—	—	—	—	—	—	—	
Lodgepole pine	407,459	249,882	85,587	54,004	8,265	8,846	—	—	3,496	—	—	817,539	
Whitebark pine	—	952	—	—	—	—	1,405	—	—	—	—	2,357	
Western larch	59,055	95,567	64,776	69,690	44,612	31,752	41,379	37,522	16,308	11,153	13,278	485,092	
Grand fir	—	—	—	—	—	—	—	—	1,211	—	—	1,211	
Subalpine fir	61,109	34,145	17,865	12,258	5,650	7,012	—	—	—	—	—	138,039	
Engelmann spruce	28,487	43,526	46,478	62,660	45,583	27,149	8,955	32,066	11,087	17,155	3,736	326,882	
Western redcedar	—	1,464	3,086	—	4,535	—	5,013	1,812	3,161	3,458	1,330	23,859	
Total softwoods	939,474	997,061	753,090	768,071	501,388	419,857	307,506	219,784	100,611	88,936	138,286	5,234,064	
Aspen	XXXXX	12,694	4,434	5,501	—	—	—	—	—	—	—	22,629	
Cottonwood ¹	XXXXX	—	5,916	4,253	6,049	8,772	3,588	3,419	1,885	—	7,780	41,662	
Total hardwoods	XXXXX	12,694	10,350	9,754	6,049	8,772	3,588	3,419	1,885	—	7,780	64,291	
All species	939,474	1,009,755	763,440	777,825	507,437	428,629	311,094	223,203	102,496	88,936	146,066	5,298,355	

¹Includes paper birch.

Table 22—Net volume of timber on timberland outside National Forests by class of timber, and softwoods and hardwoods in western Montana, 1989

Class of timber	Softwoods	Hardwoods	Total
----- <i>Thousand cubic feet</i> -----			
Sawtimber trees:			
Sawlog portion	1,084,675	11,789	1,096,464
Upper-stem portion	150,526	3,303	153,829
Total	1,235,201	15,092	1,250,293
Poletimber trees	559,857	8,236	568,093
All growing-stock trees	1,795,058	23,328	1,818,386
Rough cull trees	18,499	—	18,499
Rotten cull trees	5,190	636	5,826
Salvable dead trees	46,635	—	46,635
All timber	1,865,382	23,964	1,889,346

Growth

Table 26—Net annual growth of growing stock on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public			Forest Industry	NonIndustrial private	
	State	Other	Total other public			
----- Thousand cubic feet -----						
Douglas-fir	2,971	927	3,898	7,651	6,111	17,660
Ponderosa pine	1,460	50	1,510	1,275	4,792	7,577
Western white pine	—	—	—	-78	—	-78
Lodgepole pine	1,305	1,072	2,377	5,527	3,871	11,775
Whitebark pine	-43	—	-43	—	74	31
Western larch	350	—	350	3,419	1,677	5,446
Grand fir	7	—	7	45	18	70
Subalpine fir	300	217	517	4,230	167	4,914
Engelmann spruce	119	—	119	1,088	-322	885
Western redcedar	—	—	—	140	4	144
Total softwoods	6,469	2,266	8,735	23,297	16,392	48,424
Aspen	136	19	155	—	598	753
Cottonwood ¹	2	1	3	12	215	230
Total hardwoods	138	20	158	12	813	983
All species	6,607	2,286	8,893	23,309	17,205	49,407

¹Includes paper birch.

Table 27—Net annual growth of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public			Forest industry	NonIndustrial private	
	State	Other	Total other public			
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	15,141	5,123	20,264	30,087	27,847	78,198
Ponderosa pine	11,499	325	11,824	8,862	34,046	54,732
Western white pine	—	—	—	—429	—	—429
Lodgepole pine	2,450	12,150	14,600	28,397	12,929	55,926
Whitebark pine	—253	—	—253	—	13	—240
Western larch	811	—	811	10,329	6,511	17,651
Grand fir	29	—	29	—	—	29
Subalpine fir	98	597	695	2,270	842	3,807
Engelmann spruce	541	—	541	2,395	820	3,756
Western redcedar	—	—	—	657	17	674
Total softwoods	30,316	18,195	48,511	82,568	83,025	214,104
Aspen	28	—	28	—	766	794
Cottonwood ¹	12	3	15	57	717	789
Total hardwoods	40	3	43	57	1,483	1,583
All species	30,356	18,198	48,554	82,625	84,508	215,687

¹Includes paper birch.

Table 28—Net annual growth of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public		Total other public	Forest industry	Nonindustrial private	
	State	Other				
----- Thousand board feet, Scribner rule -----						
Douglas-fir	12,789	4,250	17,039	24,572	23,350	64,961
Ponderosa pine	9,545	278	9,823	6,724	28,079	44,626
Western white pine	—	—	—	-342	—	-342
Lodgepole pine	2,253	10,876	13,129	25,421	11,665	50,215
Whitebark pine	-216	—	-216	—	12	-204
Western larch	797	—	797	9,129	5,783	15,709
Grand fir	26	—	26	—	—	26
Subalpine fir	99	547	646	2,210	772	3,628
Engelmann spruce	489	—	489	2,319	798	3,606
Western redcedar	—	—	—	573	16	589
Total softwoods	25,782	15,951	41,733	70,606	70,475	182,814
Aspen	26	—	26	—	712	738
Cottonwood ¹	11	3	14	51	653	718
Total hardwoods	37	3	40	51	1,365	1,456
All species	25,819	15,954	41,773	70,657	71,840	184,270

¹Includes paper birch.

Table 29—Net annual growth of growing stock on timberland outside National Forests by species and diameter class in western Montana, 1988

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																	
Douglas-fir	4,262	3,656	3,239	2,412	1,562	1,067	705	363	335	169	-195	43	42	17,660			
Ponderosa pine	497	628	1,313	1,184	1,103	1,126	545	642	305	134	105	61	-66	7,577			
Western white pine	—	—	—	-78	—	—	—	—	—	—	—	—	—	-78			
Lodgepole pine	5,584	2,670	1,983	997	273	182	40	31	—	—	14	—	—	11,774			
Whitebark pine	37	36	—	2	-25	—	-22	—	3	—	—	—	—	31			
Western larch	2,133	899	692	650	298	324	96	72	123	83	43	28	15	5,446			
Grand fir	—	63	—	—	—	—	—	—	—	—	7	—	—	70			
Subalpine fir	3,815	382	304	63	190	90	59	12	—	—	—	—	—	4,915			
Engelmann spruce	313	367	107	95	114	88	17	72	-208	67	-17	-42	-88	885			
Western redcedar	—	—	—	23	23	—	27	—	22	8	23	14	4	144			
Total softwoods	16,641	8,701	7,628	5,348	3,538	2,877	1,467	1,192	580	461	-20	104	-93	48,424			
Aspen	434	113	52	91	36	27	—	—	—	—	—	—	—	753			
Cottonwood ¹	3	—	50	—	46	21	34	34	16	5	2	—	19	230			
Total hardwoods	437	113	102	91	82	48	34	34	16	5	2	—	19	983			
All species	17,078	8,814	7,730	5,439	3,620	2,925	1,501	1,226	596	466	-18	104	-74	49,407			

¹Includes paper birch.

Table 30—Net annual growth of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in western Montana, 1988

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, International 1/4-inch rule																	
Douglas-fir	38,505	14,322	9,380	6,651	4,406	2,317	2,127	1,085	-1,187	289	304	78,199					
Ponderosa pine	15,693	9,045	8,507	8,515	4,124	4,769	2,247	1,012	809	504	-493	54,732					
Western white pine	—	-429	—	—	—	—	—	—	—	—	—	-429					
Lodgepole pine	47,959	5,323	1,386	857	178	145	—	—	78	—	—	55,926					
Whitebark pine	—	12	-141	—	-124	—	13	—	—	—	—	-240					
Western larch	7,573	3,768	1,735	1,913	565	434	727	506	211	139	80	17,651					
Grand fir	—	—	—	—	—	—	—	—	29	—	—	29					
Subalpine fir	1,539	392	1,023	467	309	77	—	—	—	—	—	3,807					
Engelmann spruce	3,412	498	560	392	21	364	-1,111	462	-59	-239	-545	3,755					
Western redcedar	—	125	113	—	117	—	96	37	104	66	17	675					
Total softwoods	114,681	33,056	22,563	18,795	9,596	8,106	4,099	3,102	-15	759	-637	214,105					
Aspen	XXXXX	485	180	129	—	—	—	—	—	—	—	794					
Cottonwood ¹	XXXXX	—	223	94	141	140	67	22	11	—	90	788					
Total hardwoods	XXXXX	485	403	223	141	140	67	22	11	—	90	1,582					
All species	114,681	33,541	22,966	19,018	9,737	8,246	4,166	3,124	-4	759	-547	215,687					

¹Includes paper birch.

Table 31—Net annual growth of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in western Montana, 1988

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, Scribner rule -----															
Douglas-fir	28,923	13,052	8,504	6,061	3,988	2,104	1,893	965	-1,056	257	270		64,961		
Ponderosa pine	10,202	7,952	7,533	7,507	3,640	4,190	1,974	898	722	447	-439		44,626		
Western white pine	—	-342	—	—	—	—	—	—	—	—	—		-342		
Lodgepole pine	42,876	4,903	1,296	779	163	129	—	—	69	—	—		50,215		
Whitebark pine	—	11	-120	—	-107	—	12	—	—	—	—		-204		
Western larch	6,315	3,486	1,672	1,781	526	403	674	468	189	124	71		15,709		
Grand fir	—	—	—	—	—	—	—	—	26	—	—		26		
Subalpine fir	1,457	446	942	429	283	70	—	—	—	—	—		3,627		
Engelmann spruce	3,046	518	576	403	58	334	-989	411	-53	-212	-485		3,607		
Western redcedar	—	111	93	—	93	—	85	34	96	61	16		589		
Total softwoods	92,819	30,137	20,496	16,960	8,644	7,230	3,649	2,776	-7	677	-567		182,814		
Aspen	XXXXX	450	168	120	—	—	—	—	—	—	—		738		
Cottonwood ¹	XXXXX	—	206	87	129	127	60	19	10	—	80		718		
Total hardwoods	XXXXX	450	374	207	129	127	60	19	10	—	80		1,456		
All species	92,819	30,587	20,870	17,167	8,773	7,357	3,709	2,795	3	677	-487		184,270		

¹Includes paper birch.

Mortality

Table 32—Annual mortality of growing stock on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public			Forest Industry	Nonindustrial private	
	State	Other	Total other public			
----- <i>Thousand cubic feet</i> -----						
Douglas-fir	304	—	304	664	703	1,671
Ponderosa pine	442	—	442	158	727	1,327
Western white pine	—	—	—	78	—	78
Lodgepole pine	259	—	259	1,048	325	1,632
Whitebark pine	47	—	47	—	—	47
Western larch	74	—	74	49	—	123
Grand fir	—	—	—	—	—	—
Subalpine fir	63	—	63	358	167	588
Engelmann spruce	29	—	29	920	744	1,693
Western redcedar	—	—	—	—	—	—
Total softwoods	1,218	—	1,218	3,275	2,666	7,159
Aspen	—	—	—	—	—	—
Cottonwood ¹	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—
All species	1,218	—	1,218	3,275	2,666	7,159

¹Includes paper birch.

Table 33—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	836	—	836	2,337	2,787	5,960
Ponderosa pine	1,285	—	1,285	1,179	1,909	4,373
Western white pine	—	—	—	429	—	429
Lodgepole pine	801	—	801	918	—	1,719
Whitebark pine	265	—	265	—	—	265
Western larch	406	—	406	—	—	406
Grand fir	—	—	—	—	—	—
Subalpine fir	112	—	112	1,370	—	1,482
Engelmann spruce	85	—	85	4,629	3,595	8,309
Western redcedar	—	—	—	—	—	—
Total softwoods	3,790	—	3,790	10,862	8,291	22,943
Aspen	—	—	—	—	—	—
Cottonwood ¹	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—
All species	3,790	—	3,790	10,862	8,291	22,943

¹Includes paper birch.

Table 34—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in western Montana, 1988

Species	Owner group					Total
	Other public			Forest Industry	NonIndustrial private	
	State	Other	Total other public			
----- Thousand board feet, Scribner rule -----						
Douglas-fir	715	—	715	1,943	2,320	4,978
Ponderosa pine	1,037	—	1,037	1,049	1,514	3,600
Western white pine	—	—	—	342	—	342
Lodgepole pine	684	—	684	761	—	1,445
Whitebark pine	227	—	227	—	—	227
Western larch	310	—	310	—	—	310
Grand fir	—	—	—	—	—	—
Subalpine fir	92	—	92	1,130	—	1,222
Engelmann spruce	76	—	76	4,015	3,144	7,235
Western redcedar	—	—	—	—	—	—
Total softwoods	3,141	—	3,141	9,240	6,978	19,359
Aspen	—	—	—	—	—	—
Cottonwood¹	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—
All species	3,141	—	3,141	9,240	6,978	19,359

¹Includes paper birch.

Table 35—Annual mortality of growing stock on timberland outside National Forests by species and diameter class in western Montana, 1988

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 -----																	
Douglas-fir	274	231	175	253	111	217	50	84	—	—	233	—	43	1,671	—	—	
Ponderosa pine	135	442	79	165	117	74	87	—	—	69	—	—	158	1,326	—	—	
Western white pine	—	—	—	78	—	—	—	—	—	—	—	—	—	78	—	—	
Lodgepole pine	866	365	359	—	43	—	—	—	—	—	—	—	—	1,633	—	—	
Whitebark pine	—	—	—	—	25	—	22	—	—	—	—	—	—	47	—	—	
Western larch	49	—	12	—	62	—	—	—	—	—	—	—	—	123	—	—	
Grand fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Subalpine fir	188	69	161	170	—	—	—	—	—	—	—	—	—	588	—	—	
Engelmann spruce	61	32	185	184	236	238	269	51	227	—	52	53	105	1,693	—	—	
Western redcedar	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total softwoods	1,573	1,139	971	850	594	529	428	135	227	69	285	53	306	7,159	—	—	
Aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Cottonwood ¹	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total hardwoods	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
All species	1,573	1,139	971	850	594	529	428	135	227	69	285	53	306	7,159	—	—	

¹Includes paper birch.

Table 36—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in western Montana, 1988

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, International 1/4-inch rule -----																
Douglas-fir	567	1,189	582	1,151	288	486	—	—	1,434	—	263	—	5,960	—	—	—	
Ponderosa pine	245	764	655	463	579	—	—	489	—	—	1,178	—	4,373	—	—	—	
Western white pine	—	429	—	—	—	—	—	—	—	—	—	—	429	—	—	—	
Lodgepole pine	1,475	—	244	—	—	—	—	—	—	—	—	—	1,719	—	—	—	
Whitebark pine	—	—	141	—	124	—	—	—	—	—	—	—	265	—	—	—	
Western larch	36	—	370	—	—	—	—	—	—	—	—	—	406	—	—	—	
Grand fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Subalpine fir	585	898	—	—	—	—	—	—	—	—	—	—	1,483	—	—	—	
Engelmann spruce	541	1,013	1,286	1,277	1,428	265	1,219	—	301	317	661	—	8,308	—	—	—	
Western redcedar	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total softwoods	3,449	4,293	3,278	2,891	2,419	751	1,219	489	1,735	317	2,102	—	22,943	—	—	—	
Aspen	XXXXX	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Cottonwood ¹	XXXXX	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total hardwoods	XXXXX	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
All species	3,449	4,293	3,278	2,891	2,419	751	1,219	489	1,735	317	2,102	—	22,943	—	—	—	

¹Includes paper birch.

Table 37—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in western Montana, 1988

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, Scribner rule -----													
Douglas-fir	401	933	486	979	246	423	—	—	1,276	—	234	4,978	
Ponderosa pine	164	565	523	387	493	—	—	419	—	—	1,049	3,600	
Western white pine	—	342	—	—	—	—	—	—	—	—	—	342	
Lodgepole pine	1,238	—	207	—	—	—	—	—	—	—	—	1,445	
Whitebark pine	—	—	120	—	107	—	—	—	—	—	—	227	
Western larch	21	—	288	—	—	—	—	—	—	—	—	309	
Grand fir	—	—	—	—	—	—	—	—	—	—	—	—	
Subalpine fir	481	741	—	—	—	—	—	—	—	—	—	1,222	
Engelmann spruce	482	850	1,094	1,104	1,249	233	1,085	—	268	282	589	7,236	
Western redcedar	—	—	—	—	—	—	—	—	—	—	—	—	
Total softwoods	2,787	3,431	2,718	2,470	2,095	656	1,085	419	1,544	282	1,872	19,359	
Aspen	XXXXX	—	—	—	—	—	—	—	—	—	—	—	
Cottonwood ¹	XXXXX	—	—	—	—	—	—	—	—	—	—	—	
Total hardwoods	XXXXX	—	—	—	—	—	—	—	—	—	—	—	
All species	2,787	3,431	2,718	2,470	2,095	656	1,085	419	1,544	282	1,872	19,359	

¹Includes paper birch.

Table 38—Annual mortality of growing stock on timberland outside National Forests by species and cause of death in western Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown ¹	Logging	
----- Thousand cubic feet -----									
Douglas-fir	512	423	260	—	105	—	297	74	1,671
Ponderosa pine	913	130	—	15	30	59	180	—	1,327
Western white pine	—	—	—	—	78	—	—	—	78
Lodgepole pine	168	60	157	—	267	83	838	59	1,632
Whitebark pine	25	22	—	—	—	—	—	—	47
Western larch	—	—	—	—	106	—	17	—	123
Grand fir	—	—	—	—	—	—	—	—	—
Subalpine fir	52	61	139	28	118	—	—	190	588
Engelmann spruce	—	117	744	—	529	—	303	—	1,693
Western redcedar	—	—	—	—	—	—	—	—	—
Total softwoods	1,670	813	1,300	43	1,233	142	1,635	323	7,159
Aspen	—	—	—	—	—	—	—	—	—
Cottonwood ²	—	—	—	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—	—	—	—
All species	1,670	813	1,300	43	1,233	142	1,635	323	7,159

¹Because many destructive agents often attack trees in concert or in succession, it is often difficult to identify the actual causal agent. When the primary cause of death cannot be precisely determined, it is listed as unknown.

²Includes paper birch.

Table 39—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and cause of death in western Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	
----- Thousand board feet, International 1/4-inch rule -----									
Douglas-fir	2,208	687	1,196	—	504	—	1,271	94	5,960
Ponderosa pine	3,587	315	—	—	—	—	470	—	4,372
Western white pine	—	—	—	—	429	—	—	—	429
Lodgepole pine	615	—	—	—	—	—	1,104	—	1,719
Whitebark pine	141	124	—	—	—	—	—	—	265
Western larch	—	—	—	—	305	—	101	—	406
Grand fir	—	—	—	—	—	—	—	—	—
Subalpine fir	266	229	—	—	202	—	—	786	1,483
Engelmann spruce	—	554	3,595	—	2,855	—	1,305	—	8,309
Western redcedar	—	—	—	—	—	—	—	—	—
Total softwoods	6,817	1,909	4,791	—	4,295	—	4,251	880	22,943
Aspen	—	—	—	—	—	—	—	—	—
Cottonwood ¹	—	—	—	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—	—	—	—
All species	6,817	1,909	4,791	—	4,295	—	4,251	880	22,943

¹Includes paper birch.

Table 40—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and cause of death in western Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	
	----- Thousand board feet, Scribner rule -----								
Douglas-fir	1,865	536	1,037	—	413	—	1,062	65	4,978
Ponderosa pine	2,941	271	—	—	—	—	388	—	3,600
Western white pine	—	—	—	—	342	—	—	—	342
Lodgepole pine	518	—	—	—	—	—	926	—	1,444
Whitebark pine	120	107	—	—	—	—	—	—	227
Western larch	—	—	—	—	229	—	80	—	309
Grand fir	—	—	—	—	—	—	—	—	—
Subalpine fir	206	188	—	—	180	—	—	649	1,223
Engelmann spruce	—	481	3,145	—	2,485	—	1,125	—	7,236
Western redcedar	—	—	—	—	—	—	—	—	—
Total softwoods	5,650	1,583	4,182	—	3,649	—	3,581	714	19,359
Aspen	—	—	—	—	—	—	—	—	—
Cottonwood¹	—	—	—	—	—	—	—	—	—
Total hardwoods	—	—	—	—	—	—	—	—	—
All species	5,650	1,583	4,182	—	3,649	—	3,581	714	19,359

¹Includes paper birch.

COUNTY TABLES

Table 41—Area of timberland outside National Forests by county in western Montana, 1989

County	Area
	<i>Acres</i>
Granite	192,021
Mineral	109,684
Missoula	725,679
Ravalli	152,318
Total	1,179,702

Table 42—Net volume of growing stock and sawtimber on timberland outside National Forests by county in western Montana, 1989

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
Granite	275,001	1,023,683	847,319
Mineral	144,217	407,893	338,170
Missoula	1,176,110	3,983,312	3,290,796
Ravalli	223,058	986,079	822,070
Total	1,818,386	6,400,967	5,298,355

Table 43—Net annual growth of growing stock and sawtimber on timberland outside National Forests by county in western Montana, 1988

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
	<i>Thousand cubic feet</i>		
Granite	4,564	26,149	22,798
Mineral	4,288	18,123	15,406
Missoula	33,751	133,672	114,466
Ravalli	6,804	37,743	31,600
Total	49,407	215,687	184,270

Table 44—Annual mortality of growing stock and sawtimber on timberland outside National Forests by county in western Montana, 1988

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
	<i>Thousand cubic feet</i>		
Granite	1,578	4,839	4,225
Mineral	801	3,569	3,034
Missoula	4,102	12,256	10,178
Ravalli	678	2,279	1,922
Total	7,159	22,943	19,359

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Conner, Roger C.; O'Brien, Renee A. 1991. Forest statistics for land outside National Forests in western Montana, 1989. Resour. Bull. INT-74. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 44 p.

Presents land area, timberland area, associated volume, and components of change for the forest lands outside the National Forests in western Montana.

KEYWORDS: forest survey, inventory, volume

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