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# Colorado's Timber Resources

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## PREFACE

Forest Survey is a continuing nationwide undertaking conducted by the Forest Service, U.S. Department of Agriculture, with the primary objective of providing an assessment of the renewable resources on the Nation's forest lands. This requires 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, administers the forest resource inventories for the Rocky Mountain States of Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Wyoming, western South Dakota, western Texas, and Oklahoma's Panhandle. These inventories provide information on the extent and condition of State and privately owned forest lands, volume of timber, and rates of timber growth and mortality. These data, when combined with similar information for Federal lands, provide a basis for forest policies and programs and for the orderly development and use of the resources.

## ACKNOWLEDGMENTS

This report is the result of the combined efforts of numerous people on the Forest Survey staff. In addition to the photo interpretation and field crews, several individuals played key roles in the reduction of basic data into information describing the extent, nature, and condition of the forest resources in Colorado: Dennis Collins supervised the data collection; Sharon Woudenberg and Shirley Waters compiled the data and made summaries; and Susan Brown and Velma Inama transformed the data summaries into tables of information. Also, we acknowledge the Colorado State Forest Service for its cooperation and assistance in collecting the inventory data. And we extend a special note of gratitude to the private land owners who allowed the field crews access to the sample locations on their properties.

## RESEARCH SUMMARY

Presents highlights of the forest resources of Colorado as of 1983. Describes the extent, condition, and location of the resources, and discusses levels of some nontimber use of forest lands. Includes statistical tables: area by land classes, ownership, growing-stock and sawtimber volumes, growth, mortality, roundwood products output, and utilization.

## HIGHLIGHTS

### Area

- About 21 million acres of Colorado's land area is forest land (31 percent), most of it in the western two-thirds of the State.
- Around 15 million acres are timberland and 6 million acres are woodland.
- Nearly three-fourths of the forest land is publicly owned. Most of it is in the seven National Forests.
- Much of the privately owned forest land is woodland.
- Spruce is the dominant forest type covering some 4.4 million acres, followed (not surprisingly) by aspen with about 3.5 million acres.
- About half of Colorado's timberlands are classed as sawtimber stands.
- Productivity of the timberlands is relatively low, with only about a third having the potential to produce over 50 cubic feet of wood per acre per year.

### Inventory

- Volume in growing-stock trees is estimated to be about 17 billion cubic feet. Three-fourths of it is on public lands.
- Nearly 13 percent of the total volume is in live cull and salvable dead trees.
- Roughly a third of the volume is in Engelmann spruce. Lodgepole pine and aspen combined make up another third.
- Nearly 70 percent of the growing-stock volume is in trees less than 15 inches diameter at breast height (d.b.h.).
- About 77.6 million cubic feet of mortality in 1982 left a net growth of some 273 million cubic feet.
- Net growth per acre was 25 cubic feet per year compared to the average potential of 42 cubic feet.
- Because harvest levels have been less than net growth, the volume of growing-stock inventory has been increasing.

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## INTRODUCTION

Colorado's forest lands serve a diverse and vital role. For many travelers from the East, the forested slopes of the front range are the first view of the Rocky Mountain West, whether traveling by highway, rail, or air. These forested mountains are a treasured visual resource at all times of the year both for visitors and for the many residents massed along the urbanized front range. In winter, Colorado's mountains host national and international skiers at some of the largest ski area complexes in the Nation.

Along with esthetic and recreational values, the forested areas are a vital source of water, providing irrigation for the extensive agriculture in the eastern part of the State. West of the Continental Divide, watersheds feed the Colorado River system, which is the lifeblood for much of the arid Southwest and southern California.

Historically, Colorado's forest industry has not been a major factor on the national scene, but the timber products served local uses that had vital national significance. Forests provided the timbers and lumber for the early mining booms and later supplied the trees, timbers, and lumber for railroads and farms and ranches as the Mountain West was developed. Currently, Colorado forests supply both industrial material, primarily sawlogs (McLain 1985), and an expanding home fuelwood market (McLain and Booth 1985).

In addition to these uses, Colorado forests also provide wildlife habitat and grazing for domestic livestock, both in the timberlands and woodlands.

This report describes the current condition of the timberlands, based on surveys conducted in 1981 through 1983.

Colorado consists of 66.6 million acres, of which 66.3 million is land and 0.3 million is water (table 1). In 1983 about 27 million acres (roughly 41 percent of the land area) was publicly owned.

Table 1--Total land and water area by ownership class, Colorado, 1983

Ownership class	Area
	- - Thousand acres - -
Land:	
Public:	
National Forest	14,430.8
Other public:	
Bureau of Land Management	8,333.0
National Parks <sup>1</sup>	610.3
Miscellaneous Federal	271.6
State	3,022.9
County and municipal	316.2
Total other public	<u>12,554.0</u>
Total public	<u>26,984.8</u>
Private	<u>39,315.9</u>
Total land area	<u>66,300.7</u>
Census water	<u>317.5</u>
Total land and water <sup>2</sup>	<u>66,618.2</u>

<sup>1</sup>National Park area is included in this table and tables 2 and 3 only. No volume tables are included for National Parks.

<sup>2</sup>U.S. Bureau of the Census, land and water area of the United States, 1980.

## THE TIMBERLAND

### How Much, Where, and Who Owns It

Colorado's forests: 15 million acres of timberlands and 6 million acres of woodlands.

Nearly a third of the State's 66.6 million acres are forested. Included are over 15 million acres classed as timberlands, capable of producing industrial roundwood timber products, and 6 million acres of woodlands that include pinyon, juniper, and miscellaneous hardwood forest types (table 2). The forested lands extend throughout the western two-thirds of the State. The timberlands are concentrated along the "backbone" of the Rockies, running roughly north-south through the central portion of the State (fig. 1).

Table 2--Total land area by major land class and ownership class, Colorado, 1983

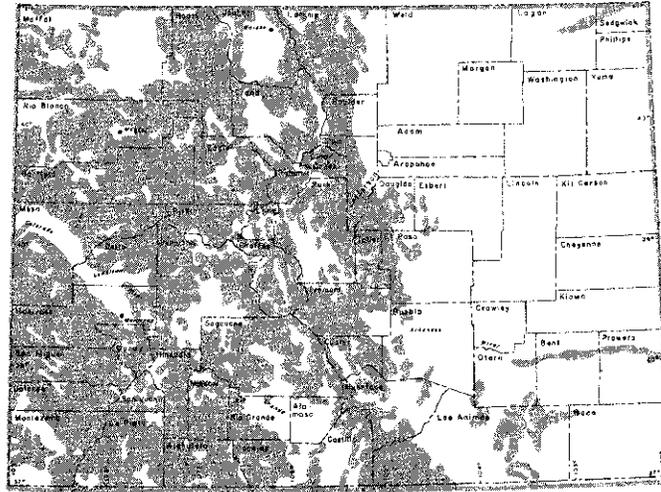
Land class	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
- - - - - Thousand acres - - - - -				
Timberland:				
Deferred	752.2	--	--	752.2
Reserved	632.9	233.9	--	866.8
Nonreserved	8,953.3 <sup>1</sup>	1,515.0	3,365.2	13,833.5
Total	<u>10,338.4</u>	<u>1,748.9</u>	<u>3,365.2</u>	<u>15,452.5</u>
Woodland: <sup>2</sup>				
Reserved	--	212.1	--	212.1
Nonreserved	12.5	3,183.2	2,625.4	5,821.1
Total	<u>12.5</u>	<u>3,395.3</u>	<u>2,625.4</u>	<u>6,033.2</u>
Total forest land:				
Deferred	752.2	--	--	752.2
Reserved	632.9	446.0	--	1,078.9
Nonreserved	8,965.8	4,698.2	5,990.6	19,654.6
Total	<u>10,350.9</u>	<u>5,144.2</u>	<u>5,990.6</u>	<u>21,485.7</u>
Nonforest land <sup>3</sup>	4,079.9	7,409.8	33,325.3	44,815.0
Total land area	<u>14,430.8</u>	<u>12,554.0</u>	<u>39,315.9</u>	<u>66,300.7</u>

<sup>1</sup>Includes 1,447.5 thousand acres of 0-19 productivity class (noncommercial timberland).

<sup>2</sup>Woodland area is reported on this table and tables 1 and 5 only. No volume tables will be included in this report for woodland.

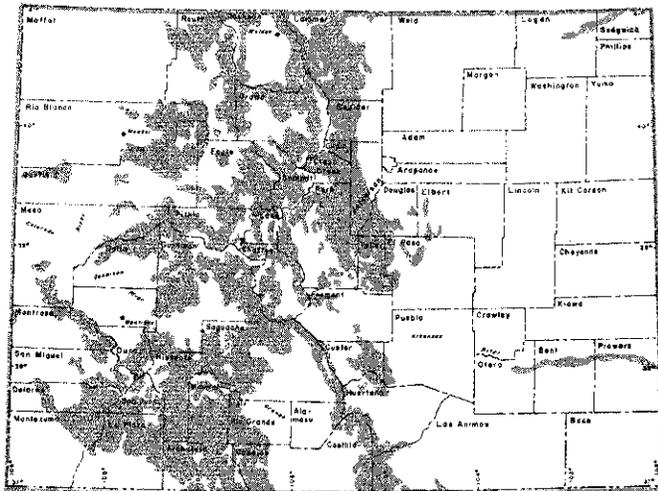
<sup>3</sup>Includes 612.1 thousand acres of National grasslands and all of Eastern Colorado that was administratively determined to be nonforest land.

**FOREST LAND**



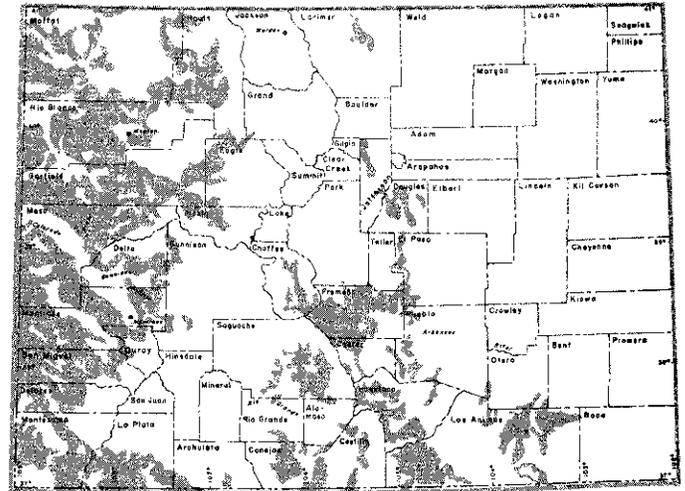
A.

**TIMBERLAND**



B.

**WOODLAND**



C.

Figure 1—Geographical distribution of forest land in Colorado.

**Most of the forest is publicly owned.**

Most of Colorado's forests are administered by public agencies and, not surprisingly, the seven National Forests in the State are the primary keepers (tables 2 and 3). The other big public land custodian is the U.S. Department of the Interior, Bureau of Land Management (BLM).

**Nearly half of the private forest land is woodland.**

Private owners have nearly 60 percent of the land in the State but that includes three-fourths of the nonforest land, largely representing the agricultural lands in the State's eastern third. While private owners have over a fourth of the forest land, nearly half of it is woodland.

Table 3--Area of forest land by forest type, ownership class, and land class, Colorado, 1983

Forest type	Ownership class and land class												Total
	National Forest			Other public			Nonindustrial private			All owners			
	Deferred	Reserved	Nonreserved	Reserved	Nonreserved	Reserved	Nonreserved	Reserved	Nonreserved	Deferred	Reserved	Nonreserved	
	----- Thousand acres -----												
Douglas-fir	31.2	17.5	849.1	28.2	448.7	--	430.9	31.2	45.7	1,728.7	1,805.6		
Ponderosa pine	24.3	1.8	1,144.2	25.4	302.8	--	1,273.4	24.3	27.2	2,720.4	2,771.9		
Lodgepole pine	169.1	29.8	1,507.0	62.9	190.5	--	284.9	169.1	92.7	1,982.4	2,244.2		
Limber pine	0.1	0.3	26.9	0.8	6.2	--	31.3	0.1	1.1	64.4	65.6		
Spruce-subalpine fir	--	--	--	85.4	124.5	--	137.1	--	85.4	261.6	347.0		
White fir	1.3	--	6.5	0.8	20.0	--	92.7	1.3	0.8	119.2	121.3		
Spruce	445.3	552.7	3,101.9	11.1	90.1	--	230.7	445.3	563.8	3,422.7	4,431.8		
Aspen	80.9	30.8	2,317.7	16.7	325.3	--	785.4	80.9	47.5	3,428.4	3,556.8		
Cottonwood	--	--	--	2.6	6.9	--	98.8	--	2.6	105.7	108.3		
Total timberland	752.2	632.9	8,953.3 <sup>1</sup>	233.9	1,515.0	--	3,365.2	752.2	866.8	13,833.5	15,452.5		
Pinyon-Juniper	--	--	9.6	185.9	3,074.4	--	1,567.6	--	185.9	4,651.6	4,837.5		
Juniper	--	--	--	1.6	44.4	--	406.4	--	1.6	450.8	452.4		
Oak	--	--	2.7	21.8	64.0	--	638.5	--	21.8	705.2	727.0		
Riparian	--	--	--	0.2	0.2	--	3.4	--	0.2	3.6	3.8		
Other west hardwoods	--	--	0.2	2.6	0.2	--	9.5	--	2.6	9.9	12.5		
Total woodland <sup>2</sup>	--	--	12.5	212.1	3,183.2	--	2,625.4	--	212.1	5,821.1	6,033.2		
All types	752.2	632.9	8,965.8	446.0	4,698.2	--	5,990.6	752.2	1,078.9	19,654.6	21,485.7		

<sup>1</sup>Includes 1,447.5 thousand acres of 0-19 productivity class (noncommercial timberland).

<sup>2</sup>Woodland area is reported on this table and tables 2 and 14 only. No volume tables will be included in this report for woodland.

The "reserved" category represents forest area already set aside for nontimber use such as wilderness. For National Forests this also includes areas currently under study for wilderness ("deferred"), which is all on timberlands. The reserved areas on other public lands are divided nearly equally between timberland and woodland. Currently, the reserved category accounts for about 8 percent of the total forest land.

## Timberland Types and Owners

Five major forest types occur in Colorado.

Spruce is the most extensive and most is publicly owned but . . .

The timberlands of Colorado have been classified by forest type, which is based on and named for the tree species that dominates the stand. This provides a good indication of the kinds of potential timber products growing on an area and, generally, the type of forest management involved in harvesting. There are, however, a mix of tree species in most forest types, and habitat conditions also vary, so a given forest type may contain a variety of timber resources and management needs.

**Spruce**—Comprised primarily of Engelmann spruce (*Picea engelmannii*), this is the single most extensive forest type, occupying about 4.4 million acres. Added to this is another 347,000 acres of the closely associated mix of spruce and subalpine fir (*Abies lasiocarpa*). Minor amounts of blue spruce (*Picea pungens*) are sometimes mixed in these and other forest types. Over 90 percent of the spruce type is on National Forests, primarily growing at high elevations that are wet sites with heavy snowpacks. About a million acres (23 percent) of the type are reserved from commercial use:

	Nonreserved	Reserved and deferred
	----- Thousand acres -----	
National Forest	3,101.9	998.0
Other public	90.1	11.1
Private	<u>230.7</u>	—
Total	3,422.7	1,009.1

aspen has more "available" acres.

**Aspen**—The aspen type extends over 3.5 million acres. Although second largest in total area, it actually has more acres "available" for commercial use than the spruce type. Golden mountainsides of quaking aspen (*Populus tremuloides*) punctuated with dark conifer crowns are a familiar autumn scene on postcards and travel brochures of Colorado, and one of its most famous resort towns bears the tree's name. Aspen's range extends into the lower middle elevations and a fairly large portion, 785,000 acres, is privately owned:

	Nonreserved	Reserved and deferred
	----- Thousand acres -----	
National Forest	2,317.7	111.7
Other public	325.3	16.7
Private	<u>785.4</u>	—
Total	3,428.4	128.4

Ponderosa pine has been the most important species historically.

**Ponderosa Pine**—Historically, the key species in this type, ponderosa pine (*Pinus ponderosa*), has been the most important. It provides lumber and timbers from low-elevation stands and is easily reached from towns, mines, and ranches in the valleys. Nearly half the type is privately owned, and little of the type in public ownership is reserved from commercial use:

	Nonreserved	Reserved and deferred
	----- Thousand acres -----	
National Forest	1,144.2	26.1
Other public	302.8	25.4
Private	<u>1,273.4</u>	—
Total	2,720.4	51.5

**Lodgepole Pine**—This is a familiar type at upper middle and high elevations. Traditionally, lodgepole pine (*Pinus contorta*) has been the "king" of small roundwood prod-

Lodgepole pine, the "king" of small round-wood products, and...

ucts such as fenceposts and corral rails. It was named for the use native Americans found it suited for, namely in their lodges and teepees. Over 85 percent of the lodgepole pine is publicly owned, primarily on National Forests, and about 12 percent is reserved from commercial use:

	Nonreserved	Reserved and deferred
	----- Thousand acres -----	
National Forest	1,507.0	198.9
Other public	190.5	62.9
Private	284.9	—
Total	1,982.4	261.8

Douglas-fir are also important commercially.

**Douglas-fir**—Extending over 1.8 million acres, this type occupies sites slightly more moist and at higher elevations than ponderosa pine. However, it is also a common component in the pine and other types. Commercially it is one of the more important types. About three-fourths of the type is in public ownership, and just over 4 percent is reserved from commercial use:

	Nonreserved	Reserved and deferred
	----- Thousand acres -----	
National Forest	849.1	48.7
Other public	448.7	28.2
Private	430.9	—
Total	1,728.7	76.9

Other types are important for wildlife habitat, fuelwood, or industrial wood products.

**Other**—The white fir, cottonwood, and limber pine types are scattered throughout lower and middle elevations. Because cottonwood (*Populus deltoides* east and *P. fremontii* west of the Continental Divide) grows almost exclusively along stream courses, it plays an important role in protecting the riparian zone and providing wildlife habitat. Some use is made for industrial wood products, and it is also an important source of fuelwood (McLain 1985; McLain and Booth 1985). White fir (*Abies concolor*) is limited to the southern part of the State and is often found growing in rocky terrain in association with Douglas-fir (*Pseudotsuga menziesii*). Detailed data on ownership and land class for forest types are presented in the appendix.

## Productivity

Colorado's forest land is comparatively low in productivity but...

In terms of wood-growing potential Colorado's forest land has generally low productivity (fig. 2). About a third of the land is considered moderately productive—capable of producing 50 feet of wood per acre per year, or more. The bulk, however, is less productive, and 12 percent is in the lowest potential category, under 20 cubic feet per acre per year. This reflects the general topography and climate of the forest areas: much of it is at high elevations with a short, cool growing season, and for the middle and lower elevations the "sunbelt" climate of summer means limited rainfall. But wood growth potential alone does not indicate the important and even critical role of other forest resources and uses.

some of the major forest types are moderately productive.

Some differences in productivity exist among forest types. Fairly large proportions of the spruce, aspen, and Douglas-fir types are moderately productive, but the lodgepole pine and ponderosa pine types have only a small portion in this category:

Forest type	Potential for growing 50 ft <sup>3</sup> /yr or more
	Percent of type
Spruce	57
Douglas-fir	37
Aspen	35
Ponderosa pine	15
Lodgepole pine	14

Detailed data on forest type, stand size, and productivity class are in the appendix, tables 14 through 38.

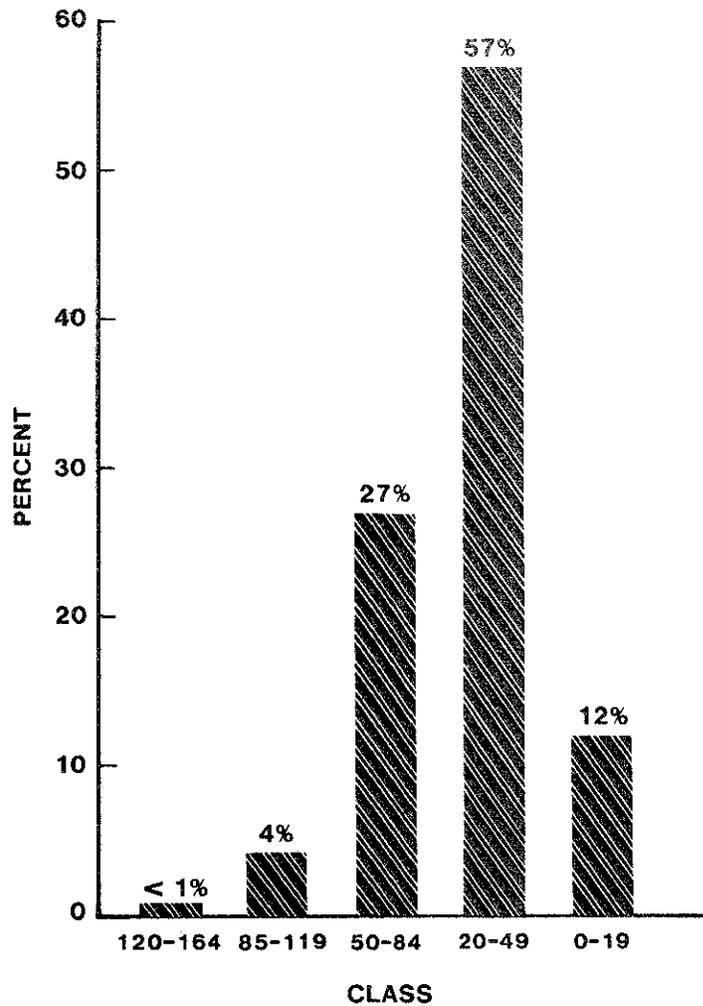


Figure 2—Distribution of Colorado's timberland by productivity class.

## Stand-size Classes

**Sawtimber stands dominate.**

Sawtimber stands occupy about half of Colorado's timberlands. Just under a quarter are pole timber stands and the remainder is about equally divided among seedling-saplings, nonstocked, and lands not yet classified as to timber size (fig. 3). (Lands in the 0-19 cubic feet per acre per year productivity class were previously excluded from the "commercial forest land" category and have not been classified by size in available National Forest data.) National Forests have a smaller proportion of their lands in sawtimber stands. However, all of the areas not classified as to size are on the National Forests, and likely a portion of these are sawtimber size. Similarly, National Forests have a somewhat smaller proportion of pole stands than do other public and private lands. Area by stand-size class and ownership is summarized in table 4 and presented in detail in the appendix tables.

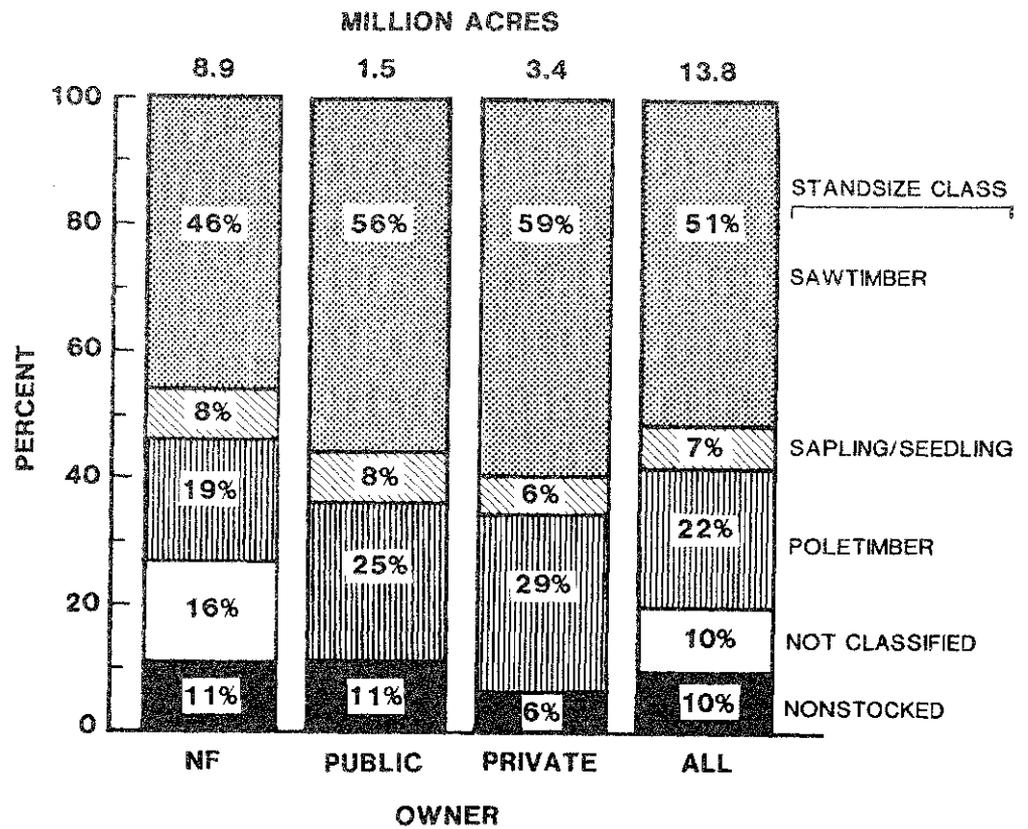


Figure 3—Area of timberland by stand-size class and owner.

Table 4--Area of timberland by stand-size class and ownership class, Colorado, 1983

Stand-size class	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
----- Thousand acres -----				
Sawtimber stands	4,143.9	853.4	1,998.1	6,995.4
Poletimber stands	1,718.1	376.2	958.6	3,052.9
Sapling and seedling stands	696.5	120.6	211.2	1,028.3
Nonstocked areas	947.3	164.8	197.3	1,309.4
<b>Total</b>	<b>7,505.8<sup>1</sup></b>	<b>1,515.0</b>	<b>3,365.2</b>	<b>12,386.0</b>

<sup>1</sup>Does not include 1,447.5 thousand acres of productivity class 0-19 as this information was not available by stand-size class for this report.

## THE WOODPILE

Access and availability for harvest are important concerns.

The volume, type, and size of the timber available for commercial use is of continuing concern to many in Colorado. The wood industry of the State is largely dependent on this resource as are forest managers who must plan harvesting to be compatible with other resource concerns such as recreation and watershed protection. Often the access needed to manage a broad range of resources is provided by roads first built for timber harvesting. This section focuses on characteristics of the forest relating to growth and harvest of timber crops.

### Volume

Growing-stock volume amounts to 17 billion cubic feet.

The estimated 17 billion cubic feet of growing stock on Colorado's timberlands are distributed among owners in about the same proportion as area—National Forests have about two-thirds of the volume, other public lands just over 9 percent, and a fourth is in private ownership (fig. 4). These are based on net volumes after defect has been deducted from the total volume of live growing-stock trees.

Half of this volume is in softwood sawlogs.

The volume in the sawlog portion of softwood sawtimber trees totals 9.7 billion cubic feet, about half the total volume on all Colorado timberlands. Upper stem portions and hardwood sawtimber trees account for another 10 percent of the volume. About a fourth of the volume—5.2 billion cubic feet—is in poletimber trees of growing-stock quality. The remaining 2.4 billion cubic feet, nearly 13 percent of the volume, is in live cull and salvable dead trees (table 5).

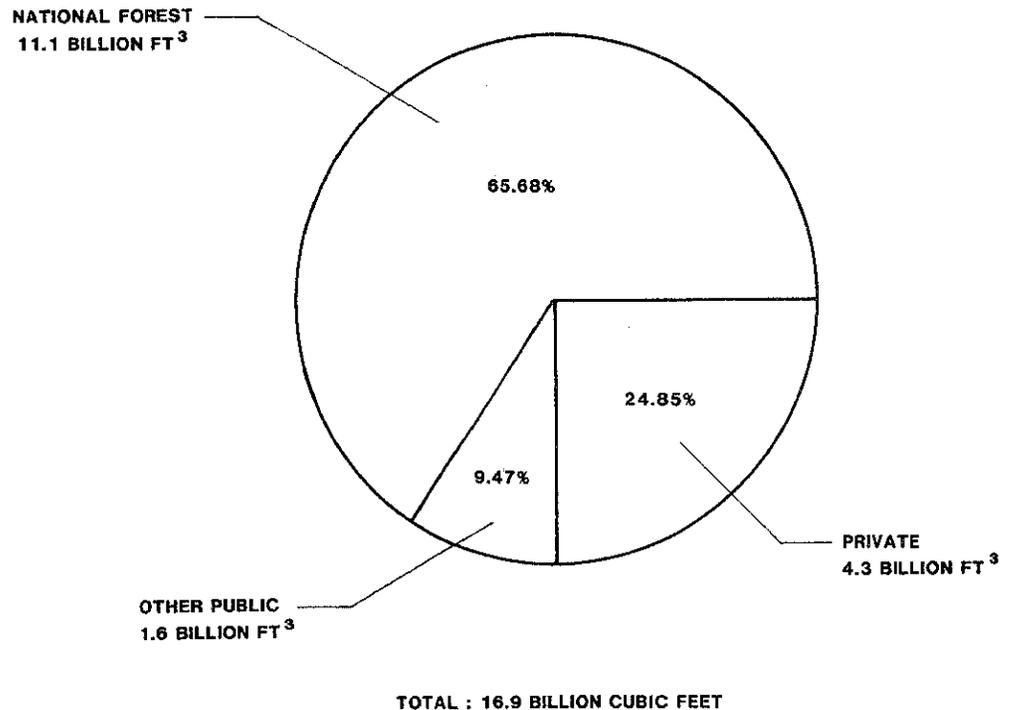


Figure 4—Net volume of growing stock by ownership class, 1982.

Table 5--Net volume of timber on timberland by class of timber, and softwoods and hardwoods, Colorado, 1983

Class of timber	Softwoods	Hardwoods	All classes
- - - - - Million cubic feet - - - - -			
Sawtimber trees:			
Sawlog portion	9,713.3	755.8	10,469.1
Upper-stem portion	1,024.1	244.0	1,268.1
Total	10,737.4	999.8	11,737.2
Poletimber trees	3,167.6	1,993.4	5,161.0
All growing-stock trees	13,905.0	2,993.2	16,898.2
Sound cull trees	249.5	110.0	359.5
Rotten cull trees	282.1	486.5	768.6
Salvable dead trees	1,156.4	144.9	1,301.3
All timber	15,593.0	3,734.6	19,327.6

Engelmann spruce accounts for a third of the net growing-stock volume and...

**By Species**--Engelmann spruce accounts for about a third of the net growing-stock volume. Another third is composed of lodgepole pine (18 percent) and aspen (17 percent). Douglas-fir, ponderosa pine, and subalpine fir account for most of the rest (fig. 5). The bulk (over 80 percent) of the volume of high-altitude species--Engelmann spruce, subalpine fir, and lodgepole--is on the National Forests. Over half (55 percent) of the total hardwood volume is also on National Forest lands (fig. 6). Private lands have about a fourth of the total volume and nearly two-thirds of the ponderosa pine volume. Douglas-fir volume is about evenly divided among ownerships, and aspen volume is divided about the same as total volume--56 percent National Forest, 35 percent private, and 9 percent other public (table 6). These proportions are all based on net cubic foot volume of growing stock.

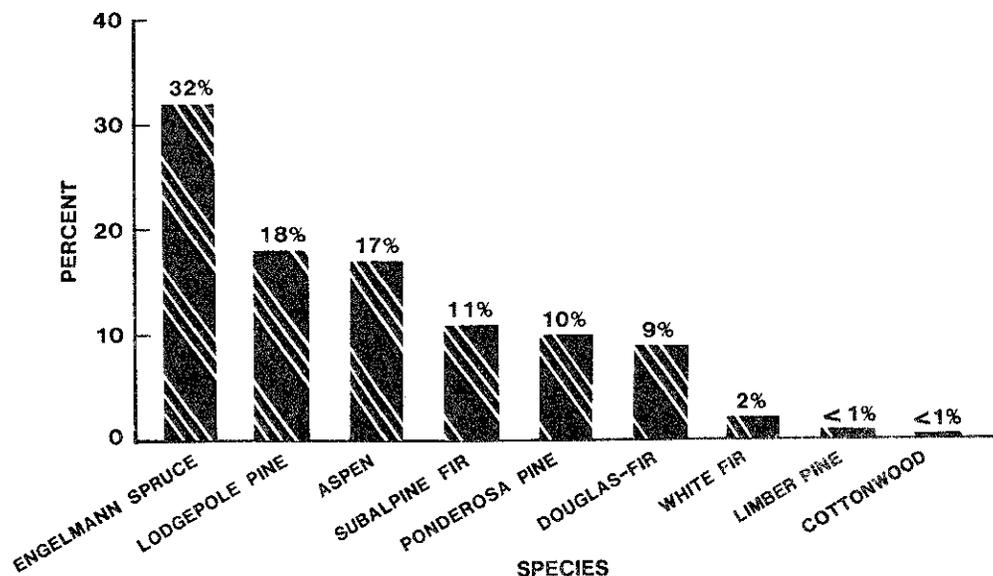


Figure 5--Distribution of net growing-stock volume by species, 1982.

MID TO LOW ELEVATION - SOFTWOOD

HIGHER ELEVATION - SOFTWOOD

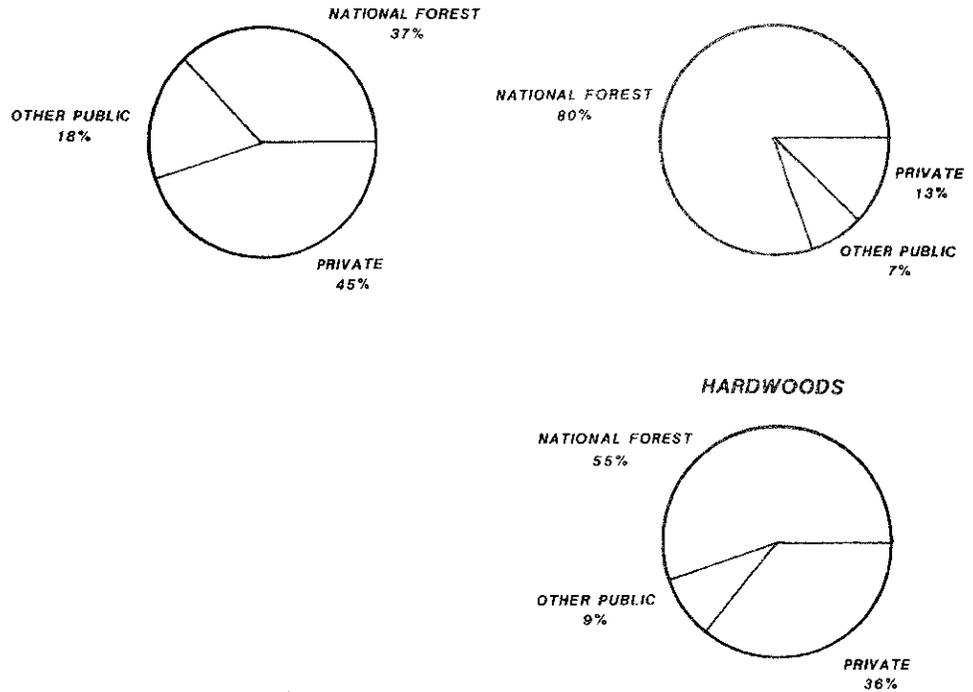


Figure 6—Percentage of growing-stock volume (cubic foot) by ownership class for three species groups.

Table 6--Net volume of growing stock on timberland by ownership class and species, Colorado, 1983

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
----- Million cubic feet -----				
Douglas-fir	515.8	442.4	548.5	1,506.7
Ponderosa pine	465.5	175.8	1,026.4	1,667.7
Lodgepole pine	2,228.0	320.3	535.7	3,084.0
Limber pine	7.4	8.7	38.1	54.2
Subalpine fir	1,488.6	120.5	181.2	1,790.3
White fir	190.4	21.7	93.2	305.3
Engelmann spruce	4,539.5	233.3	640.9	5,413.7
Other softwoods	50.5	6.7	25.9	83.1
<b>Total softwoods</b>	<b>9,485.7</b>	<b>1,329.4</b>	<b>3,089.9</b>	<b>13,905.0</b>
Aspen	1,630.5	266.6	996.1	2,893.2
Cottonwood	6.6	5.7	87.3	99.6
Other hardwoods	0.4	--	--	0.4
<b>Total hardwoods</b>	<b>1,637.5</b>	<b>272.3</b>	<b>1,083.4</b>	<b>2,993.2</b>
<b>All species</b>	<b>11,123.2</b>	<b>1,601.7</b>	<b>4,173.3</b>	<b>16,898.2</b>

over 40 percent of the sawtimber volume.

Volume by diameter class is important because...

tree size is an indicator of potential use.

Some notable differences among forest types exist when considering sawtimber volumes. Engelmann spruce has 32 percent of the cubic volume but over 42 percent of the sawtimber volume, while aspen with 17 percent of the cubic volume has only 8 percent of the sawtimber volume. This in part reflects tree size, with spruce stands heavy toward larger trees and aspen having relatively few sawtimber trees. Moreover, because of merchantability standards aspen and other hardwood species must be 11 inches diameter at breast height (d.b.h.) to be considered sawtimber size, while spruce and the other coniferous species need only attain 9 inches d.b.h. to be classed as sawtimber. For other major species, growing-stock cubic volume and sawtimber volume (table 7) are proportioned about equally.

**By Tree Size**—Most of the growing-stock volume (over 69 percent) is in trees less than 15 inches d.b.h., but there is considerable variation in diameter distribution among major species (table 8). Lodgepole pine, aspen, and subalpine fir have a high proportion in the 8-inch and 10-inch diameter classes, while Engelmann spruce, ponderosa pine, and Douglas-fir all have a fairly large portion of their volume in mid-diameter and large-diameter classes, up to 30 inches d.b.h. and larger (fig. 7). These tree sizes give some idea of the utilization potential and processing requirements for Colorado timber.

Traditionally, smaller size trees, particularly lodgepole pine, have been important for posts, corral rails, and similar small roundwood products. Ponderosa pine and Douglas-fir also provide these products in lower elevation areas outside of lodgepole range. Aspen is also occasionally used for corral rails and other "aboveground" uses, but it is considerably less durable than the pines. Ponderosa pine, Douglas-fir, and Engelmann spruce have provided most of the sawlog products, but lodgepole pine also became an important source with the adoption of high-speed mills geared to efficient processing of small logs. Detailed data on sawlog volume by diameter and total number of trees by diameter class are provided in the appendix tables.

Table 7--Net volume of sawtimber (International 1/4-inch rule) on timberland by ownership class and species, Colorado, 1983

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
- - - Million board feet, International 1/4-inch rule - - -				
Douglas-fir	2,142.1	1,722.3	2,038.7	5,903.1
Ponderosa pine	2,040.0	738.2	3,956.5	6,734.7
Lodgepole pine	7,123.0	747.8	1,252.2	9,123.0
Limber pine	29.7	25.8	123.7	179.2
Subalpine fir	5,110.2	379.2	437.6	5,927.0
White fir	924.2	72.6	299.9	1,296.7
Engelmann spruce	21,941.4	880.5	2,581.0	25,402.9
Other softwoods	174.4	21.1	83.1	278.6
<b>Total softwoods</b>	<b>39,485.0</b>	<b>4,587.5</b>	<b>10,772.7</b>	<b>54,845.2</b>
Aspen	2,989.0	402.1	1,505.5	4,896.6
Cottonwood	31.3	13.6	252.5	297.4
Other hardwoods	0.2	--	--	0.2
<b>Total hardwoods</b>	<b>3,020.5</b>	<b>415.7</b>	<b>1,758.0</b>	<b>5,194.2</b>
<b>All species</b>	<b>42,505.5</b>	<b>5,003.2</b>	<b>12,530.7</b>	<b>60,039.4</b>

Table 8--Net volume of growing stock on timberland by species and diameter class, Colorado, 1983

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+
----- Million cubic feet -----														
Douglas-fir	102.6	188.6	211.7	208.7	184.5	170.7	125.3	95.4	72.7	40.8	34.4	23.4	47.9	1,506.7
Ponderosa pine	63.2	154.2	189.9	248.9	278.3	214.8	137.3	93.7	68.7	60.0	37.8	42.7	78.2	1,667.7
Lodgepole pine	462.2	726.0	708.2	544.5	356.2	158.9	85.3	31.0	6.5	3.8	0.5	0.9	--	3,084.0
Limber pine	4.9	8.9	6.6	11.8	5.4	4.0	5.5	2.7	0.6	0.1	0.9	1.1	0.9	54.2
Subalpine fir	285.0	331.2	332.0	248.1	178.8	156.7	113.0	68.7	37.3	24.1	10.0	4.1	1.3	1,790.3
White fir	16.4	30.7	30.7	35.2	35.0	31.5	18.8	20.1	17.5	19.3	10.2	18.7	21.2	305.3
Engelmann spruce	286.3	466.0	629.3	723.5	679.6	632.6	545.8	421.0	346.5	252.7	171.0	106.2	133.2	5,413.7
Other softwoods	10.1	11.3	17.9	13.1	13.0	10.5	3.6	1.1	1.6	0.3	0.3	0.3	--	83.1
<b>Total softwoods</b>	<b>1,230.7</b>	<b>1,936.9</b>	<b>2,126.3</b>	<b>2,033.8</b>	<b>1,730.8</b>	<b>1,380.5</b>	<b>1,034.6</b>	<b>733.7</b>	<b>551.4</b>	<b>401.1</b>	<b>265.1</b>	<b>197.4</b>	<b>282.7</b>	<b>13,905.0</b>
Aspen	533.0	705.1	717.8	427.6	260.5	132.9	70.0	28.6	10.7	6.7	--	0.3	--	2,893.2
Cottonwood	5.2	11.3	20.7	11.1	2.9	11.8	6.1	6.1	5.2	--	0.6	1.0	17.6	99.6
Other hardwoods	--	0.2	0.2	(i)	--	--	--	(1)	--	--	--	--	--	0.4
<b>Total hardwoods</b>	<b>538.2</b>	<b>716.6</b>	<b>738.7</b>	<b>438.7</b>	<b>263.4</b>	<b>144.7</b>	<b>76.1</b>	<b>34.7</b>	<b>15.9</b>	<b>6.7</b>	<b>0.6</b>	<b>1.3</b>	<b>17.6</b>	<b>2,993.2</b>
<b>All species</b>	<b>1,768.9</b>	<b>2,653.5</b>	<b>2,865.0</b>	<b>2,472.5</b>	<b>1,994.2</b>	<b>1,525.2</b>	<b>1,110.7</b>	<b>768.4</b>	<b>567.3</b>	<b>407.8</b>	<b>265.7</b>	<b>198.7</b>	<b>300.3</b>	<b>16,898.2</b>

<sup>1</sup>Less than 0.05 million cubic feet.

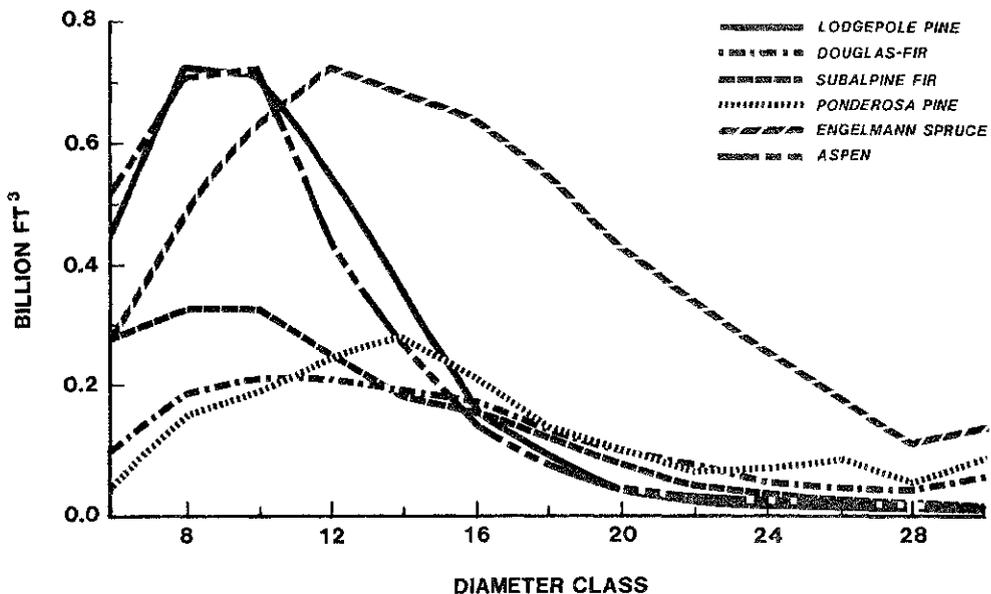


Figure 7—Distribution of growing-stock volume by diameter class of six principal species.

## Impacts and Changes

Changes in the forest resource are a reflection of . . .

growth, mortality, and removals.

Net growth was over 272 million cubic feet in 1982.

You can never walk through the same forest twice: a simple way to say the forest is in a continual state of change. The vegetation grows and dies, and the other physical components are continually being modified. The changes can be "natural" or "human induced" and come sometimes slowly and subtly, sometimes suddenly and drastically. The latter are the most spectacular and, whether from logging, fire, or weather, impact all components of the forest environment.

In terms of wood production, the amount of new wood grown over some specified period is thought to be a good indicator of the nature and condition of the timberlands. By convention, the growth is expressed in some unit of volume per year.

There are three major factors that affect the forest in terms of future wood volumes: how much **grows**, how much **dies**, and how much is **removed**.

**Net Growth**—In 1982 Colorado's timberlands grew about 350.4 million cubic feet of wood including 1.4 billion board feet (International 1/4-inch rule) of sawtimber. Unfortunately, during that same year, trees containing some 77.6 million cubic feet (275 million board feet of sawtimber) died from one cause or another. That was about 22 percent of the year's growth. This left a net increase in wood volume of about 272.8 million cubic feet.

This net growth, however, exceeds the estimated harvest in both sawtimber and growing-stock volume, so there is a net annual increase in inventory of about 1.5 percent in growing-stock and 1.9 percent in sawtimber volumes. The hardwood inventory is increasing at a faster rate than inventory for softwoods. The timber harvest volume indicated should be considered an estimate that probably somewhat understates total removal from growing stock (table 9). Harvest data are based on volume of wood received by wood-using plants and on green fuelwood harvest. Trees damaged in harvest, logs missed in yarding, and other growing-stock reductions through thinnings, clearing for roads, powerlines, and so forth, are not measured by these harvest figures.

Table 9--Net growth, removal, and change in growing stock in Colorado by ownership, 1982

	Owner class			
	National Forest	Other public	Private	Total
	- - - - - Million cubic feet - - - - -			
Net growth	162.4	27.9	82.6	272.8
Harvest <sup>1</sup>	17.3	1.2	5.8	24.3
Net change	145.1	26.7	77.1	248.5
Percent of inventory				
Harvest	-0.16%	-0.07%	-0.14%	0.14%
Change	+1.30%	+1.67%	+1.85%	+1.47%

<sup>1</sup>Estimated from McLain (1985) and McLain and Booth (1985). Growing-stock harvest includes sawlog volumes and green (live) fuelwood.

Actual growth is less than "potential" overall...

but private lands are producing slightly better.

When the productive potential of the timberland is compared to actual growth, it appears that all ownerships are growing timber at less than potential, averaging 25 cubic feet per acre per year total (gross) growth compared to the average productive potential of 42 cubic feet per acre per year for all lands (fig. 8). Productivity is fairly similar for all ownerships, but private lands are producing somewhat better, with gross growth about 63 percent of potential and net about 53 percent. This compares to 57 percent gross and 42 percent net for National Forest and other public lands.

In absolute terms, National Forests are incurring considerably more mortality and growth and producing more harvest than are other ownerships. However, in proportion to their total inventory, net growth and harvest are quite similar among all owners, with harvest considerably less than net growth, and less than 1 percent of growing-stock inventory (table 10).

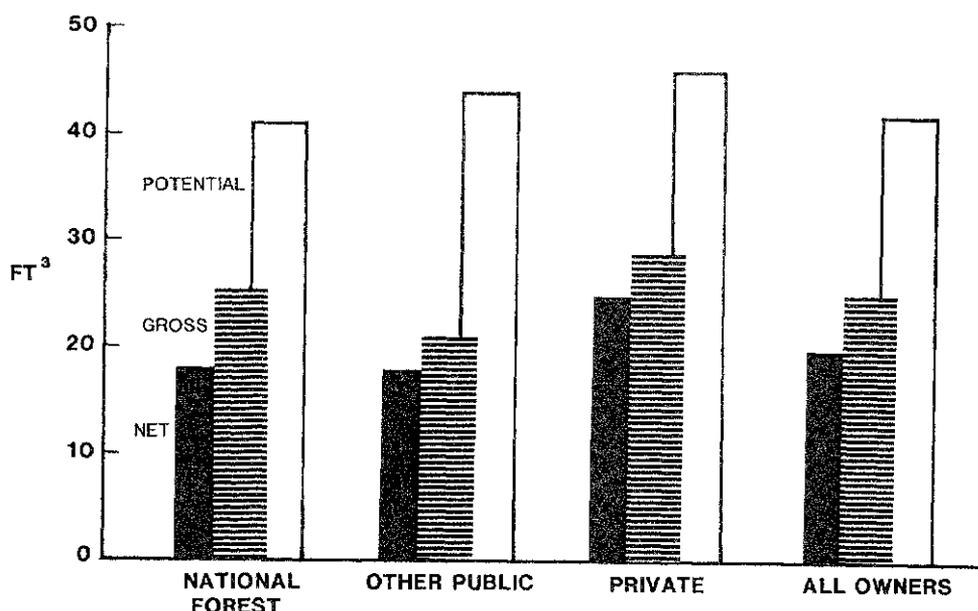


Figure 8—Annual growth per acre per year of growing stock: potential, gross, and net, by ownership class, 1982.

Table 10--Summary of components of change, Colorado timberland, 1982

Component	Growing stock			Sawtimber		
	Total	Softwood	Hardwood	Total	Softwood	Hardwood
	-- Million cubic feet --			-- Million board feet, -- International 4-inch rule		
Gross growth	350.4	257.3	93.1	1,534	1,243	291
Mortality	77.6	60.4	17.2	275	252	23
Net growth	272.8	196.9	75.9	1,259	991	268
Timber harvest <sup>1</sup>	24.3	20.8	3.5	123.6	108.4	15.2
Net change	248.5	176.1	72.4	1,135.4	882.6	252.8
Change as percent of inventory	+1.47%	+1.27%	+2.42%	+1.89%	+1.61%	+4.91%

<sup>1</sup>Estimated from McLain (1985) and McLain and Booth (1985). Growing-stock harvest includes sawlog volumes and green (live) fuelwood. Sawtimber volume includes only sawlogs. Other removals such as damaged or other growing stock not removed, and thinnings, land clearing, etc., not included.

Insects and disease are major killers.

**Mortality**—Insects and disease are the two leading identified causes of mortality, each contributing about one-fourth of the total. Weather accounts for an additional 11 percent of all mortality. Fire, animal damage, logging, and suppression are relatively minor, but the exact cause or causes for nearly a third of the losses could not be identified. Many destructive agents attack trees in concert or in succession, making it difficult to identify the actual causal agent. When the primary cause of death cannot be determined, it is listed as unknown.

Cause of death	Percent of growing-stock mortality
Insects	25
Disease	25
Weather	11
Animal	2
Suppression	2
Logging	2
Fire	1
Unknown	32

The mortality rate for a few species is higher than average.

In total, mortality amounted to about 0.46 percent of the inventory volume. The loss for most species was considerably less, but subalpine fir with 1.1 percent mortality, white fir with 0.7 percent, and aspen with 0.6 percent are all suffering a higher rate of mortality than the average. Detailed data on cause of death by species for growing stock and sawtimber are presented in the appendix.

The timber growth picture has improved...

**Removals**—In their 1964 survey report Miller and Choate noted that increased management and harvest levels could better help capture the growth potential of Colorado's forest land. Even though figure 9 data are crude and are an average of both "healthy," vigorous stands and stands still deteriorating, it appears that some progress has been made toward improving the timber growth picture. Currently, the harvest level is substantially below growth indicating a potential for again expanding the harvest.

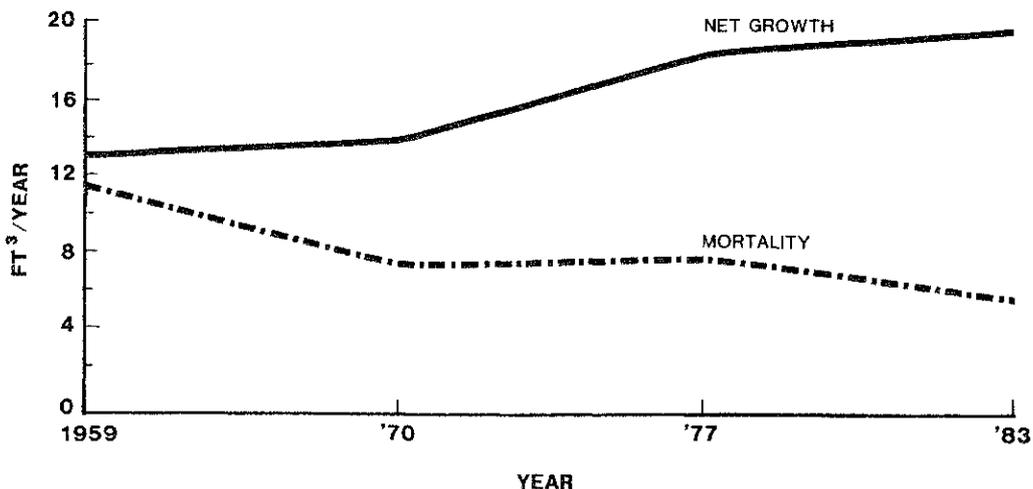


Figure 9—Comparison of net growth and mortality on timberland, 1959, 1970, 1977, and 1983.

with harvest levels peaking in 1970.

Nearly 20 million cubic feet of roundwood products were removed in 1982...

but fuelwood harvest was twice that amount...

most of it dead material.

Figure 10 shows general trends of Colorado timber harvest for intermittent years over the past 3 decades. Methods of reporting were not completely comparable from year to year, but it is evident the harvest level peaked about 1970 and has since declined. Data on volume removals from growing-stock trees are available for only two other points in time (1970 and 1976), but product output gives a general picture of the downward trend.

In 1982 removals from growing stock amounted to about 25 million cubic feet (table 11). Of that amount, 78.4 percent (19.5 million cubic feet) were roundwood products. Another 4.0 million cubic feet went for fuelwood and roughly 1.4 million cubic feet were left at the logging sites as residues. However, the total volume of wood harvested is significantly greater than the figures indicate because harvest of dead trees is not included. And there was a lot of dead wood removed from the forest.

Of the approximately 1.3 billion cubic feet of volume available in salvable dead trees, about 31.5 million cubic feet was harvested in 1982. That represents only 2.4 percent of the total, but it is a substantial amount and of some interest because nearly all of it (95 percent) was for fuelwood (McLain and Booth 1985). That brought the total fuelwood harvest from timberlands to 34.9 million cubic feet. If you add to that amount the 6.5 million cubic feet of fuelwood removed from other forest land, principally the woodlands, the total fuelwood harvest statewide was about 42.4 million cubic feet, more than twice the industrial roundwood harvest for the same year.

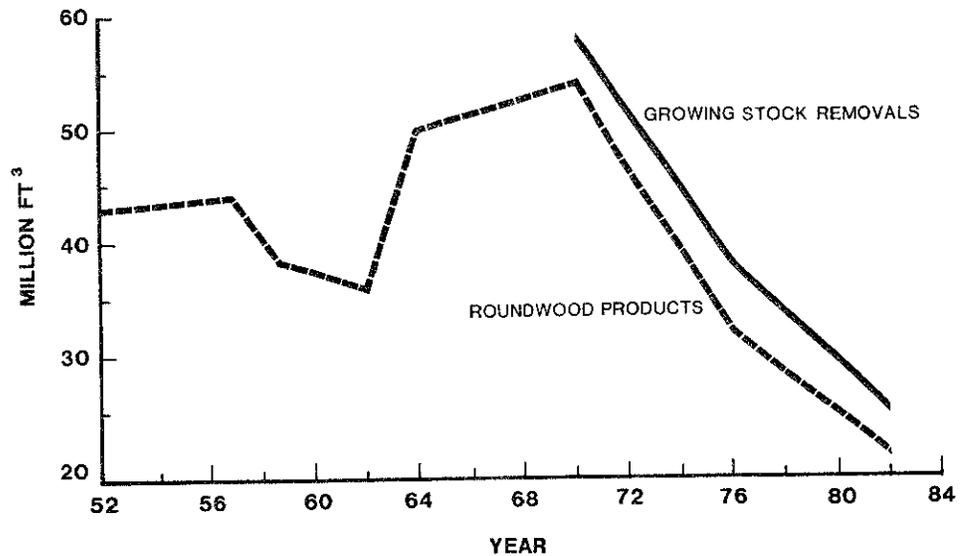


Figure 10—Products output and growing-stock removals, selected years.

Table 11--Annual removals from growing stock and sawtimber on timberland in Colorado by source, 1982

Source	Growing stock Thousand cubic feet	Sawtimber	
		Thousand board feet (Scribner rule)	Thousand board feet (International 1-inch rule)
Roundwood products			
Sawlogs	18,606	89,352	106,562
Other industrial	939	2,684	3,190
Total	19,545	92,036	109,752
Fuelwood	3,970	18,708	22,301
Logging residues	1,425	2,101	2,396
Total removals	24,940	112,845	134,449

Three principal softwood species were cut, mostly from public lands.

"Paper changes"...

biological and physical changes...

and changes in inventory techniques prevent direct comparison to earlier surveys but...

overall, forest area has declined since 1959.

Spruce, ponderosa pine, and lodgepole pine were the principal softwood species harvested. Hardwoods accounted for only about 15 percent of the growing-stock removals and most of it was aspen (table 12). Over 76 percent of those removals came from public lands, primarily the National Forests (table 13).

**Some General Trends**--During the past several decades there have been two surveys of Colorado forest lands and several additional assessments of their status in intervening years. During this period there have been several important changes in Colorado's forest resource. Some of these are "paper changes" such as change in classifications of forest land and in definitions used in describing the forest resource. These changes are nevertheless important in that they determine the status and availability of forest resources for various uses. In addition, there are physical and biological changes due to growth, harvest, and other resource use activities.

Because of changes in definitions, and because of sampling errors, improvements in analysis techniques, and other factors, it is not possible to make precise comparisons of past surveys and analyses. However, comparison of some items provides insight into changes, even with approximations instead of precisely comparable data. Following are some comparisons of data from various analyses of Colorado forests made in recent decades.

The only previous field survey, reported in 1964 (Miller and Choate), showed about 22.6 million acres of forest land of which about 12.3 million was classed as commercial, using then-existing standards. Since then, area of forest land has appeared to decrease slightly (1970 and 1977 acreage estimates were based on adjustments to original data;

Table 12--Annual removals from growing stock and sawtimber on timberland in Colorado by species, 1982<sup>1</sup>

Species	Growing stock Thousand cubic feet	Sawtimber	
		Thousand board feet (Scribner rule)	Thousand board feet (International 4-inch rule)
Spruce	8,050.8	37,173.0	44,297.1
Ponderosa pine	7,321.7	33,494.3	39,901.2
Lodgepole pine	3,657.4	15,447.0	18,403.0
Douglas-fir	1,301.3	5,991.8	7,140.0
Fir	857.9	3,597.3	4,286.7
Other softwoods	12.0	53.0	63.2
<b>Total softwoods</b>	<b>21,211.1</b>	<b>95,756.4</b>	<b>114,091.2</b>
Aspen	3,400.1	15,593.9	18,578.3
Cottonwood	328.5	1,501.8	1,788.9
<b>Total hardwoods</b>	<b>3,728.6</b>	<b>17,095.7</b>	<b>20,367.2</b>
<b>Total all species</b>	<b>24,939.7</b>	<b>112,852.1</b>	<b>134,458.4</b>

<sup>1</sup>Includes fuelwood.

Table 13--Annual removals from growing stock and sawtimber on timberlands in Colorado by ownership group, 1982

Ownership group	Growing stock Thousand cubic feet	Sawtimber	
		Thousand board feet (Scribner rule)	Thousand board feet (International 4-inch rule)
Forest Service	17,860.2	81,900.7	97,590.9
Other public	1,217.4	5,391.8	6,424.1
Private	5,862.1	25,559.7	30,443.3
<b>Total volume</b>	<b>24,939.7</b>	<b>112,852.2</b>	<b>134,458.3</b>

USDA FS 1973, 1982). Commercial forest land declined slightly, but the 1983 survey shows an increase due to the reclassification of some low-productivity Forest Service lands and the elimination of the term "commercial forest land."

	Forest land	Timberland
	----- Million acres -----	
1959	22.6	12.3
1970	22.5	12.3
1977	22.3	12.1
1983	21.5	13.8

During the period of these analyses, definitions and classifications of land shifted as areas were classified for wilderness study and other land-use categories were changed. Details of these are available in previous reports (Green and Setzer 1974; Green and Van Hooser 1983; Miller and Choate 1964).

The downward trend in growing-stock volume seems reversed since 1970...

Bearing in mind the sampling errors and definitional changes involved, figure 11 gives a general approximation of trends in timber volumes. Several features are of interest. The decline in growing-stock volume as estimated for 1970 reflects changes in status of land and definitions of commercial forests. There were also a relatively high level of harvest and large-scale losses to the Engelmann spruce bark beetle epidemic that devastated large areas of the forest. Another feature is that since 1970 growing-stock volume has continued to increase, and a larger proportion of the volume is in growing stock. This is one indication that rot, cull, and mortality are declining.

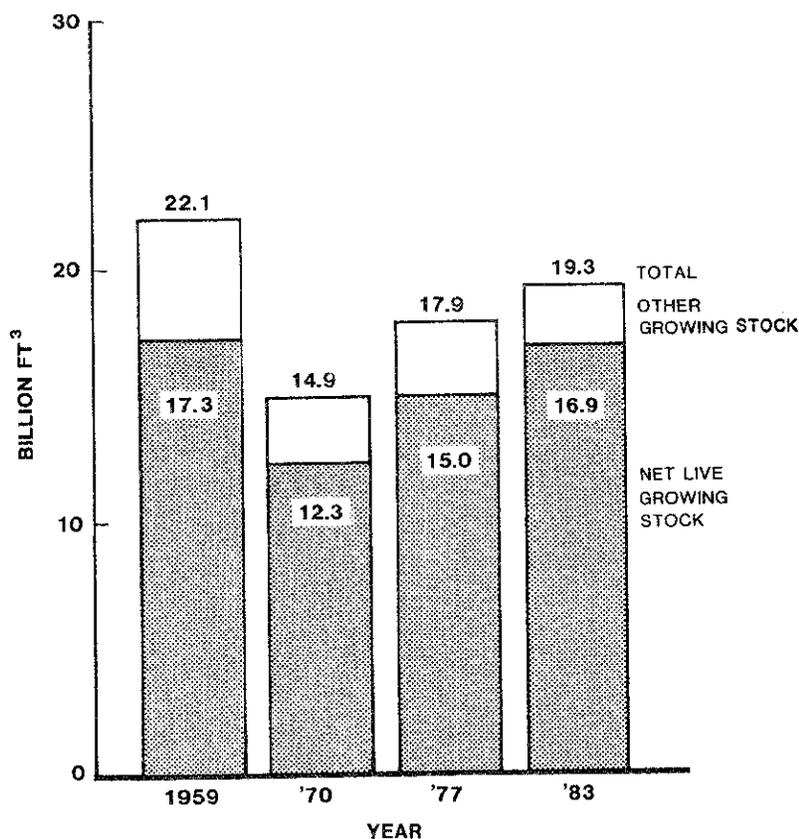


Figure 11—Comparison of total and growing-stock volumes of timber on timberland, 1959, 1970, 1977, and 1983.

due in part to lower mortality and increased growth.

Primary wood processing is a multimillion-dollar industry.

## Recreation

Recreational use of Colorado's forest lands is increasing.

Another expression of this is in figure 9, which shows growth and mortality components for 4 years. In the first survey reported in 1959 (Miller), net growth was low, and mortality nearly equaled net growth. In the 1983 survey, mortality has dropped substantially to 5.6 cubic feet per acre per year, and net growth increased to nearly 20 cubic feet per acre per year. The intervening analyses, which used various adjustments to estimate growth and mortality, indicate a fairly consistent trend.

For a number of Colorado residents the importance of the forestry resource is in the employment generated. The most recent survey of primary forest industry employment, in 1982, showed about \$24 million in primary wood products (mostly lumber) were produced, and the estimated employment in this primary processing was about 1,000 to 1,500 (estimated from industrial roundwood volumes used and about five to six persons employed per million board feet processed; ratios developed by Charles Keegan, Bureau of Business and Economics Research, University of Montana). This does not include secondary manufacture of wood products such as furniture, prefabrication, and so on. For 1982, McLain (1985) reported 84 operating sawmills, five houselog plants, three post and pole yards, and one each excelsior plant, pole treating plant, and shake mill.

## OTHER USES

This report has focused on the timber resource, but often management and harvest of timber must be planned to protect other resources such as water, wildlife, and recreation.

Outdoor recreation has grown rapidly throughout the Nation, and Colorado has certainly shared in this boom. Because there are many different forest land owners, both public and private, comprehensive data on that portion of outdoor recreation that occurs on forest land are generally not available. Data from two major Federal agencies—the USDA Forest Service and USDI National Park Service—give some idea of use levels and trends. Figure 12 shows that recreation on forests climbed rapidly into the late 1970's and since then has held fairly constant at about 20 million visitor days (one visitor for 12 hours). National Parks have leveled off at just under 6 million visits. Periodic data are also available for some other public land owners. The Corps of Engineers showed about 4 million visits in 1982 and State Parks about 6 to 7 million.

Much of the Corps of Engineers' recreation is related to water recreation in reservoirs, and National and State Parks include various geological and historical attractions that may not be directly related to forest land. However, the 20 million visits to

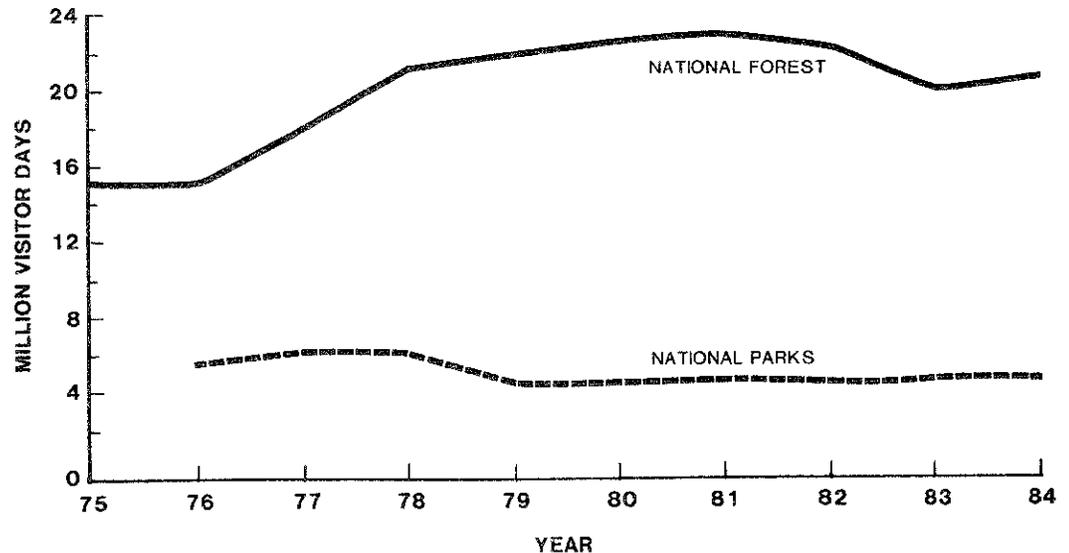


Figure 12—Recreation visits to National Forests and National Parks, 1975-84.

National Forests indicate that forests play a major role in the State's outdoor recreation picture. During the past decade, the principal activities on National Forests have been:

Camping	20 to 25 percent
Mechanized travel	22 to 25 percent
Winter sports	13 to 20 percent
Hiking, climbing	5 to 7 percent
Other: (wildlife observing, photography, sightseeing, and so forth)	29 to 32 percent

## Grazing

Domestic livestock depend upon Colorado's forest lands...

Forest lands are also an important source for grazing domestic livestock. From the late 1970's to 1984, just under 1 million animal unit months of grazing have been provided in Colorado's National Forest System lands. This constitutes about 10 percent of all National Forest grazing nationwide and is of considerable importance locally to cattle-owners and sheepowners who depend on these lands for summer grazing.

as do diverse wildlife populations.

The wildlife associated with these lands is also of considerable interest. In 1982 the estimated populations of several major species on National Forest lands were:

Elk	105,950
Deer (mule deer)	182,715
Black bear	6,339
Bighorn sheep	3,676
Antelope	2,907

These animals are of prime importance to tourists and are a basic part of the compelling nature of Colorado's back country.

## A CLOSING NOTE

Colorado's timberlands are the centerpiece of its attraction both as a place to live and a place to visit. Residents and visitors alike are apt to look at the forests more as an integral part of spectacular landscapes than as a source of lumber, packing crates, and bathroom tissue.

Although Colorado's forest industry historically has not been a major factor on the national scene, it has economic significance locally, and in the past it has served local uses of vital national significance. And the inventory volume in Colorado's timberlands is sufficient to support increased harvest levels and an expansion of forest industries.

However, the store of other values generated by the forests tends to temper plans for any sudden major expansion of industry requiring significant increases in timber harvests. In addition to the recreation and esthetic values, the forests of Colorado are vital watersheds that feed the major river systems flowing east and west from the State. The river systems are the lifeblood for agriculture and an increasing population in the arid Southwest and southern California.

## TERMINOLOGY

**Acceptable trees**—Growing-stock trees meeting specified standards of size and quality but not qualifying as desirable trees.

**Area condition class**—A classification 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):

Class 10—Areas fully stocked with desirable trees and not overstocked.

Class 20—Areas fully stocked with desirable trees but overstocked with all live trees.

Class 30—Areas medium to fully stocked with desirable trees and with less than 30 percent of the area controlled by other trees, or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees, or both.

Class 40—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees, or conditions that ordinarily prevent occupancy by desirable trees, or both.  
Class 50—Areas poorly stocked with desirable trees but fully stocked with growing-stock trees.  
Class 60—Areas poorly stocked with desirable trees but with medium to full stocking of growing-stock trees.  
Class 70—Areas nonstocked or poorly stocked with desirable trees and poorly stocked with growing-stock trees.  
Class 80—Low-risk old-growth stands.  
Class 90—High-risk old-growth stands.  
Nonstocked—Areas less than 10 percent stocked with growing-stock trees.

**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.).

**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, form, missing material, or other cubic-foot defect. Form and sound defects include severe sweep and crook, forks, extreme form reduction, large deformities, and dead material.

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

**Desirable trees**—Growing-stock trees (1) having no serious defect in quality to limit present or prospective use for timber products, (2) of relatively high vigor, and (3) containing no pathogens that may result in death or serious deterioration within the next decade.

**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 labeled by the midpoint of the class.

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

**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.

**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 growing-stock trees from a 1-foot stump to a minimum 4.0-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**—Dicotyledonous trees, usually broad-leaved and deciduous.

**High-risk old-growth stands**—Timber stands over 100 years old in which the majority of the trees are not expected to survive more than 10 years.

**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 residues**—The unused portions of growing-stock trees cut or killed by logging.

**Low-risk old-growth stands**—Timber stands over 100 years old in which the majority of the trees are expected to survive more than 10 years.

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

**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 U.S. Department of Agriculture, Forest Service.

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

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

**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 4.0-inch top diameter outside bark, 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 in diameter (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.

**Old-growth stands**—Stands of timber species over 100 years old.

**Other private lands**—Privately owned lands other than forest industry or farmer-owned.

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

**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 5.0 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 timberland, the index used is the potential net annual growth at culmination of mean annual increment in fully stocked natural stands. For woodland, site characteristics such as soil depth and aspect, which affect the land's ability to produce wood, 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 or down dead trees that are currently merchantable by regional standards.

**Saplings**—Live trees of timber species 1.0 to 4.9 inches d.b.h. or woodland species 1.0 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 7.0 inches diameter o.b. for softwoods, and 9.0 inches diameter 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 9.0 inches d.b.h. and hardwood trees 11.0 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 1.0 inch d.b.h. or woodland species less than 1.0 inch d.r.c.

**Softwood trees**—Monocotyledonous trees, usually evergreen, having 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. Percentage stocking is the ratio of actual stocking to full stocking for comparable sites and stands, using basal area as the basis for comparison.

**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 4.0 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 dead volume**—Net volume of dead woodland trees and dead net volume portion of live woodland tree species.
- Woodland species live volume**—Net cubic-foot volume in live woodland tree species.
- Woodland species**—Tree species not usually converted into industrial wood products. Common uses are fuelwood, fenceposts, and Christmas trees.

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## APPENDIX: TABLES 14-38

Table 14--Area of other public and privately owned forest land, excluding National Forest, with percent standard error, Colorado, 1983

Item	Softwoods		Hardwoods		All types	
	Thousand acres	Percent standard error	Thousand acres	Percent standard error	Thousand acres	Percent standard error
Timberland	3,663.8	± 2.3	1,216.4	± 4.8	4,880.2	± 1.8
Woodland <sup>1</sup>	5,092.8	± 1.8	715.8	±10.4	5,808.6	± 1.9
Reserved forest land: <sup>2</sup>						
Timberland	214.6		19.3		233.9	
Woodland <sup>1</sup>	187.5		24.6		212.1	
<b>Total forest land</b>	<b>9,158.7</b>		<b>1,976.1</b>		<b>11,134.8</b>	

<sup>1</sup>Woodland area is reported on this table and tables 4 and 5 only. No volume tables will be included in this report for woodland.

<sup>2</sup>Reserved land areas are estimated from aerial photos without field verification. Therefore, standard errors are not calculated.

Table 15--Net volume, net annual growth, and annual mortality of growing stock and sawtimber on other public and privately owned timberland, excluding National Forest, with percent standard error, Colorado

Item	Softwoods		Hardwoods		All types	
	Volume	Percent standard error	Volume	Percent standard error	Volume	Percent standard error
<b>Net volume, 1983:</b>						
Growing stock (Million cubic feet)	4,419.3	± 3.8	1,355.7	± 7.3	5,775.0	± 3.3
Sawtimber <sup>1</sup> (Million board feet)	15,360.2	± 4.5	2,173.7	±13.3	17,533.9	± 4.3
Sawtimber <sup>2</sup> (Million board feet)	13,037.1	± 4.5	1,849.2	±13.3	14,886.3	± 4.3
<b>Net annual growth, 1982:</b>						
Growing stock (Thousand cubic feet)	81,802	± 5.8	28,641	±10.7	110,443	± 5.1
Sawtimber <sup>1</sup> (Thousand board feet)	330,402	± 6.9	123,512	±23.2	453,914	± 8.2
Sawtimber <sup>2</sup> (Thousand board feet)	279,262	± 6.9	105,961	±23.1	385,223	± 8.2
<b>Annual mortality, 1982:</b>						
Growing stock (Thousand cubic feet)	10,548	±14.6	9,842	±19.3	20,390	±12.3
Sawtimber <sup>1</sup> (Thousand board feet)	39,381	±17.5	11,093	±39.5	50,474	±16.9
Sawtimber <sup>2</sup> (Thousand board feet)	33,464	±17.4	9,418	±39.3	42,882	±16.8

<sup>1</sup>International ¼-inch rule.

<sup>2</sup>Scribner rule.

Table 16--Area of timberland by forest type, stand-size class, and productivity class, Colorado, 1983

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
Douglas-fir:						
Sawtimber	--	24.4	438.4	661.2	10.7	1,134.7
Poletimber	--	--	97.0	214.3	--	311.3
Sapling and seedling	--	--	14.4	27.3	--	41.7
Nonstocked	--	--	22.4	94.3	5.7	122.4
Total	--	24.4	572.2	997.1	16.4	1,610.1
Ponderosa pine:						
Sawtimber	5.8	18.7	272.3	1,371.7	9.0	1,677.5
Poletimber	--	--	30.1	243.1	--	273.2
Sapling and seedling	--	--	0.4	25.2	5.8	31.4
Nonstocked	--	--	41.8	485.0	19.5	546.3
Total	5.8	18.7	344.6	2,125.0	34.3	2,528.4
Lodgepole pine:						
Sawtimber	--	16.3	163.0	625.7	--	805.0
Poletimber	--	8.2	40.7	620.0	20.7	689.6
Sapling and seedling	--	--	13.3	198.1	--	211.4
Nonstocked	--	--	--	39.5	--	39.5
Total	--	24.5	217.0	1,483.3	20.7	1,745.5
Limber pine:						
Sawtimber	--	--	--	37.6	16.9	54.5
Poletimber	--	--	--	1.4	--	1.4
Sapling and seedling	--	--	--	1.2	--	1.2
Nonstocked	--	--	--	--	1.0	1.0
Total	--	--	--	40.2	17.9	58.1
Spruce-subalpine fir:						
Sawtimber	--	11.4	67.0	75.8	4.5	158.7
Poletimber	--	--	28.5	15.1	--	43.6
Sapling and seedling	--	5.8	14.9	23.9	--	44.6
Nonstocked	--	--	1.4	5.8	7.5	14.7
Total	--	17.2	111.8	120.6	12.0	261.6

(con.)

Table 16--(con.)

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
White fir:						
Sawtimber	1.4	8.8	28.3	33.7	--	72.2
Poletimber	--	--	11.3	6.1	--	17.4
Sapling and seedling	--	10.3	9.2	6.3	--	25.8
Nonstocked	--	3.8	--	--	--	3.8
Total	1.4	22.9	48.8	46.1	--	119.2
Spruce:						
Sawtimber	2.3	198.5	1,115.7	873.8	7.2	2,197.5
Poletimber	--	5.1	120.1	158.6	--	283.8
Sapling and seedling	--	24.9	112.6	99.7	--	237.2
Nonstocked	--	14.0	57.6	115.5	--	187.1
Total	2.3	242.5	1,406.0	1,247.6	7.2	2,905.6
Aspen:						
Sawtimber	--	94.2	295.0	417.0	7.6	813.8
Poletimber	--	29.7	486.3	855.7	36.7	1,408.4
Sapling and seedling	--	1.0	94.2	293.4	46.4	435.0
Nonstocked	--	2.2	72.8	308.8	10.8	394.6
Total	--	127.1	948.3	1,874.9	101.5	3,051.8
Cottonwood:						
Sawtimber	--	--	70.9	10.6	--	81.5
Poletimber	--	--	24.2	--	--	24.2
Sapling and seedling	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--
Total	--	--	95.1	10.6	--	105.7
All types:						
Sawtimber	9.5	372.3	2,450.6	4,107.1	55.9	6,995.4
Poletimber	--	43.0	838.2	2,114.3	57.4	3,052.9
Sapling and seedling	--	42.0	259.0	675.1	52.2	1,028.3
Nonstocked	--	20.0	196.0	1,048.9	44.5	1,309.4
Total	9.5	477.3	3,743.8	7,945.4	210.0	12,386.0 <sup>1</sup>

<sup>1</sup>Does not include 1,447.5 thousand acres of productivity class 0-19 for National Forest lands as this information was not available by stand-size class for this report.

Table 17--Area of National Forest timberland by forest type, stand-size class, and productivity class, Colorado, 1983

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
Douglas-fir:						
Sawtimber	--	7.2	247.3	243.1		497.6
Poletimber	--	--	87.0	83.7		170.7
Sapling and seedling	--	--	8.7	2.8		11.5
Nonstocked	--	--	13.8	36.9		50.7
Total	--	7.2	356.8	366.5	118.6	730.5 <sup>1</sup>
Ponderosa pine:						
Sawtimber	--	--	69.1	463.2		532.3
Poletimber	--	--	18.0	82.6		100.6
Sapling and seedling	--	--	0.4	10.3		10.7
Nonstocked	--	--	22.5	286.1		308.6
Total	--	--	110.0	842.2	192.0	952.2 <sup>1</sup>
Lodgepole pine:						
Sawtimber	--	9.1	75.8	520.5		605.4
Poletimber	--	--	27.5	409.5		437.0
Sapling and seedling	--	--	13.3	176.3		189.6
Nonstocked	--	--	--	38.1		38.1
Total	--	9.1	116.6	1,144.4	236.9	1,270.1 <sup>1</sup>
Limber pine:						
Sawtimber	--	--	--	19.4		19.4
Poletimber	--	--	--	--		--
Sapling and seedling	--	--	--	1.2		1.2
Nonstocked	--	--	--	--		--
Total	--	--	--	20.6	6.3	20.6 <sup>1</sup>
Spruce-subalpine fir:						
Sawtimber	--	--	--	--		--
Poletimber	--	--	--	--		--
Sapling and seedling	--	--	--	--		--
Nonstocked	--	--	--	--		--
Total	--	--	--	--	--	--

(con.)

Table 17--(con.)

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
White fir:						
Sawtimber	--	--	0.1	0.1		0.2
Poletimber	--	--	2.7	3.6		6.3
Sapling and seedling	--	--	--	--		--
Nonstocked	--	--	--	--		--
Total	--	--	2.8	3.7	--	6.5 <sup>1</sup>
Spruce:						
Sawtimber	2.3	177.4	953.6	776.6		1,909.9
Poletimber	--	0.4	119.4	139.3		259.1
Sapling and seedling	--	24.9	112.6	91.2		228.7
Nonstocked	--	14.0	57.6	115.5		187.1
Total	2.3	216.7	1,243.2	1,122.6	517.1	2,584.8 <sup>1</sup>
Aspen:						
Sawtimber	--	38.7	203.5	336.9		579.1
Poletimber	--	11.0	241.9	491.5		744.4
Sapling and seedling	--	--	53.5	201.3		254.8
Nonstocked	--	2.2	64.1	296.5		362.8
Total	--	51.9	563.0	1,326.2	376.6	1,941.1 <sup>1</sup>
Cottonwood:						
Sawtimber	--	--	--	--		--
Poletimber	--	--	--	--		--
Sapling and seedling	--	--	--	--		--
Nonstocked	--	--	--	--		--
Total	--	--	--	--	--	--
All types:						
Sawtimber	2.3	232.4	1,549.4	2,359.8		4,143.9
Poletimber	--	11.4	496.5	1,210.2		1,718.1
Sapling and seedling	--	24.9	188.5	483.1		696.5
Nonstocked	--	16.2	158.0	773.1		947.3
Total	2.3	284.9	2,392.4	4,826.2	1,447.5	7,505.8 <sup>1</sup>

<sup>1</sup>Does not include the 0-19 productivity class totals as this information was not available by stand-size class for this report.

Table 18--Area of other publicly owned timberland by forest type, stand-size class, and productivity class, Colorado, 1983

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
Douglas-fir:						
Sawtimber	--	17.2	88.6	218.5	3.9	328.2
Poletimber	--	--	2.9	36.2	--	39.1
Sapling and seedling	--	--	5.7	20.7	--	26.4
Nonstocked	--	--	4.7	44.6	5.7	55.0
Total	--	17.2	101.9	320.0	9.6	448.7
Ponderosa pine:						
Sawtimber	5.8	0.7	28.4	166.2	5.2	206.3
Poletimber	--	--	0.7	14.8	--	15.5
Sapling and seedling	--	--	--	1.9	5.8	7.7
Nonstocked	--	--	0.5	53.3	19.5	73.3
Total	5.8	0.7	29.6	236.2	30.5	302.8
Lodgepole pine:						
Sawtimber	--	2.2	27.5	45.9	--	75.6
Poletimber	--	0.7	7.8	86.0	8.8	103.3
Sapling and seedling	--	--	--	10.2	--	10.2
Nonstocked	--	--	--	1.4	--	1.4
Total	--	2.9	35.3	143.5	8.8	190.5
Limber pine:						
Sawtimber	--	--	--	1.8	2.0	3.8
Poletimber	--	--	--	1.4	--	1.4
Sapling and seedling	--	--	--	--	--	--
Nonstocked	--	--	--	--	1.0	1.0
Total	--	--	--	3.2	3.0	6.2
Spruce-subalpine fir:						
Sawtimber	--	11.4	33.4	17.3	4.5	66.6
Poletimber	--	--	17.5	10.1	--	27.6
Sapling and seedling	--	5.8	2.5	14.2	--	22.5
Nonstocked	--	--	1.4	5.8	0.6	7.8
Total	--	17.2	54.8	47.4	5.1	124.5

(con.)

Table 18--(con.)

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
White fir:						
Sawtimber	1.4	2.2	3.5	6.5	--	13.6
Poletimber	--	--	(1)	2.5	--	2.5
Sapling and seedling	--	0.4	0.4	2.8	--	3.6
Nonstocked	--	0.3	--	--	--	0.3
Total	1.4	2.9	3.9	11.8	--	20.0
Spruce:						
Sawtimber	--	3.0	23.4	46.0	2.2	74.6
Poletimber	--	--	0.7	11.1	--	11.8
Sapling and seedling	--	--	--	3.7	--	3.7
Nonstocked	--	--	--	--	--	--
Total	--	3.0	24.1	60.8	2.2	90.1
Aspen:						
Sawtimber	--	13.7	40.5	18.2	7.6	80.0
Poletimber	--	8.4	54.8	87.8	21.8	172.8
Sapling and seedling	--	1.0	6.8	18.9	19.8	46.5
Nonstocked	--	--	2.9	12.3	10.8	26.0
Total	--	23.1	105.0	137.2	60.0	325.3
Cottonwood.						
Sawtimber	--	--	3.4	1.3	--	4.7
Poletimber	--	--	2.2	--	--	2.2
Sapling and seedling	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--
Total	--	--	5.6	1.3	--	6.9
All types:						
Sawtimber	7.2	50.4	248.7	521.7	25.4	853.4
Poletimber	--	9.1	86.6	249.9	30.6	376.2
Sapling and seedling	--	7.2	15.4	72.4	25.6	120.6
Nonstocked	--	0.3	9.5	117.4	37.6	164.8
Total	7.2	67.0	360.2	961.4	119.2	1,515.0

<sup>1</sup>Less than 0.05 thousand acres.

Table 19--Area of nonindustrial privately owned timberland by forest type, stand-size class, and productivity class, Colorado, 1983

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
Douglas-fir:						
Sawtimber	--	--	102.5	199.6	6.8	308.9
Poletimber	--	--	7.1	94.4	--	101.5
Sapling and seedling	--	--	--	3.8	--	3.8
Nonstocked	--	--	3.9	12.8	--	16.7
Total	--	--	113.5	310.6	6.8	430.9
Ponderosa pine:						
Sawtimber	--	18.0	174.8	742.3	3.8	938.9
Poletimber	--	--	11.4	145.7	--	157.1
Sapling and seedling	--	--	--	13.0	--	13.0
Nonstocked	--	--	18.8	145.6	--	164.4
Total	--	18.0	205.0	1,046.6	3.8	1,273.4
Lodgepole pine:						
Sawtimber	--	5.0	59.7	59.3	--	124.0
Poletimber	--	7.5	5.4	124.5	11.9	149.3
Sapling and seedling	--	--	--	11.6	--	11.6
Nonstocked	--	--	--	--	--	--
Total	--	12.5	65.1	195.4	11.9	284.9
Limber pine:						
Sawtimber	--	--	--	16.4	14.9	31.3
Poletimber	--	--	--	--	--	--
Sapling and seedling	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--
Total	--	--	--	16.4	14.9	31.3
Spruce-subalpine fir:						
Sawtimber	--	--	33.6	58.5	--	92.1
Poletimber	--	--	11.0	5.0	--	16.0
Sapling and seedling	--	--	12.4	9.7	--	22.1
Nonstocked	--	--	--	--	6.9	6.9
Total	--	--	57.0	73.2	6.9	137.1

(con.)

Table 19--(con.)

Forest type and stand-size class	Productivity class					Total acres
	120-164	85-119	50-84	20-49	0-19	
----- Thousand acres -----						
White fir:						
Sawtimber	--	6.6	24.7	27.1	--	58.4
Poletimber	--	--	8.6	--	--	8.6
Sapling and seedling	--	9.9	8.8	3.5	--	22.2
Nonstocked	--	3.5	--	--	--	3.5
Total	--	20.0	42.1	30.6	--	92.7
Spruce:						
Sawtimber	--	18.1	138.7	51.2	5.0	213.0
Poletimber	--	4.7	--	8.2	--	12.9
Sapling and seedling	--	--	--	4.8	--	4.8
Nonstocked	--	--	--	--	--	--
Total	--	22.8	138.7	64.2	5.0	230.7
Aspen:						
Sawtimber	--	41.8	51.0	61.9	--	154.7
Poletimber	--	10.3	189.6	276.4	14.9	491.2
Sapling and seedling	--	--	33.9	73.2	26.6	133.7
Nonstocked	--	--	5.8	--	--	5.8
Total	--	52.1	280.3	411.5	41.5	785.4
Cottonwood:						
Sawtimber	--	--	67.5	9.3	--	76.8
Poletimber	--	--	22.0	--	--	22.0
Sapling and seedling	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--
Total	--	--	89.5	9.3	--	98.8
All types:						
Sawtimber	--	89.5	652.5	1,225.6	30.5	1,998.1
Poletimber	--	22.5	255.1	654.2	26.8	958.6
Sapling and seedling	--	9.9	55.1	119.6	26.6	211.2
Nonstocked	--	3.5	28.5	158.4	6.9	197.3
Total	--	125.4	991.2	2,157.8	90.8	3,365.2

Table 20--Number of growing-stock trees on timberland by species and diameter class, Colorado, 1983

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	61,354	66,208	52,673	41,400	24,250	15,422	8,640	5,969	3,323	1,918	1,163	551	381	205	299	283,756	
Ponderosa pine	31,963	48,108	47,087	41,439	27,778	22,049	14,833	8,325	4,096	2,003	1,177	841	424	394	460	250,977	
Lodgepole pine	136,721	172,636	164,411	103,710	55,490	27,440	12,739	4,260	1,714	468	97	47	6	7	--	679,746	
Limber pine	3,649	5,309	2,817	2,079	727	879	294	210	112	93	12	1	11	19	10	16,322	
Subalpine fir	200,292	134,730	82,272	53,943	32,827	15,435	7,999	4,999	2,748	1,296	619	351	123	48	17	537,899	
White fir	30,464	14,951	11,585	6,818	4,016	2,752	1,600	1,042	462	375	282	234	103	171	140	74,995	
Engelmann spruce	229,843	132,627	96,429	78,262	57,666	40,489	25,620	16,674	10,708	6,388	4,114	2,540	1,468	776	721	704,325	
Other softwoods	4,530	3,785	3,883	2,517	2,521	1,181	824	489	129	31	50	6	7	5	--	19,958	
Total softwoods	698,816	578,354	461,157	330,168	205,275	125,647	72,549	41,968	23,392	12,572	7,514	4,571	2,523	1,625	1,647	2,567,778	
Aspen	302,806	287,026	241,040	129,008	73,237	27,880	11,570	4,535	1,774	571	201	97	--	4	--	1,079,749	
Cottonwood	9,593	--	4,640	2,699	2,511	881	178	581	273	161	122	--	8	9	174	21,830	
Other hardwoods	191	--	73	36	39	1	--	--	--	--	--	--	--	--	--	340	
Total hardwoods	312,590	287,026	245,753	131,743	75,787	28,762	11,748	5,116	2,047	732	323	97	8	13	174	1,101,919	
All species	1,011,405	865,380	706,910	461,911	281,062	154,409	84,297	47,084	25,439	13,304	7,837	4,668	2,531	1,638	1,821	3,669,697	

Table 21--Net volume of sawtimber (Scribner rule) on timberland by ownership class and species, Colorado, 1983

Species	Ownership class				Total
	National Forest	Other public	Nonindustrial private		
	- - - - - Million board feet, Scribner rule - - - - -				
Douglas-fir	1,906.7	1,455.7	1,727.6		5,090.0
Ponderosa pine	1,815.5	630.7	3,359.0		5,805.2
Lodgepole pine	6,339.6	638.7	1,067.8		8,046.1
Limber pine	26.5	21.9	105.3		153.7
Subalpine fir	4,548.2	320.3	372.4		5,240.9
White fir	822.6	61.7	254.2		1,138.5
Engelmann spruce	19,527.9	744.8	2,189.9		22,462.6
Other softwoods	155.2	17.8	69.3		242.3
Total softwoods	35,142.2	3,891.6	9,145.5		48,179.3
Aspen	2,660.2	342.1	1,279.1		4,281.4
Cottonwood	27.8	11.8	216.2		255.8
Other hardwoods	0.2	--	--		0.2
Total hardwoods	2,688.2	353.9	1,495.3		4,537.4
All species	37,830.4	4,245.5	10,640.8		52,716.7

Table 22--Net volume of sawtimber (International 1/4-inch rule) on timberland by species and diameter class, Colorado, 1983

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+	
	----- Million board feet, International 1/4-inch rule -----											
Douglas-fir	743.1	928.9	912.8	879.5	664.7	520.2	406.6	231.6	198.2	138.4	279.1	5,903.1
Ponderosa pine	547.9	990.1	1,327.5	1,090.2	724.7	515.6	328.2	308.4	203.2	239.7	459.2	6,734.7
Lodgepole pine	3,148.2	2,628.2	1,814.4	839.6	460.3	172.3	32.8	20.0	2.4	4.8	--	9,123.0
Limber pine	27.6	47.0	23.9	22.1	26.4	13.0	3.2	0.3	5.2	5.4	5.1	179.2
Subalpine fir	1,506.4	1,247.2	932.5	831.8	608.3	370.5	208.1	134.0	55.3	23.1	9.8	5,927.0
White fir	106.0	158.4	174.5	163.2	102.8	107.7	94.5	107.7	59.7	99.6	122.6	1,296.7
Engelmann spruce	3,100.0	3,800.5	3,671.5	3,472.6	3,023.0	2,343.0	1,993.4	1,491.1	1,024.9	648.1	834.8	25,402.9
Other softwoods	74.2	57.4	61.0	50.5	17.8	5.8	7.6	1.4	1.4	1.5	--	278.6
Total softwoods	9,253.4	9,857.7	8,918.1	7,349.5	5,628.0	4,048.1	3,074.4	2,294.5	1,550.3	1,160.6	1,710.6	54,845.2
Aspen	XXXX	2,173.1	1,366.5	714.3	384.5	162.3	56.3	37.6	--	2.0	--	4,896.6
Cottonwood	XXXX	56.3	14.4	58.4	28.9	28.3	23.6	--	2.5	4.6	80.4	297.4
Other hardwoods	XXXX	0.1	--	--	--	0.1	--	--	--	--	--	0.2
Total hardwoods	XXXX	2,229.5	1,380.9	772.7	413.4	190.7	79.9	37.6	2.5	6.6	80.4	5,194.2
All species	9,253.4	12,087.2	10,299.0	8,122.2	6,041.4	4,238.8	3,154.3	2,332.1	1,552.8	1,167.2	1,791.0	60,039.4

Table 23--Net volume of sawtimber (Scribner rule) on timberland by species and diameter class, Colorado, 1983

Species	Diameter class (inches at breast height)											29.0+ classes	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+		
	----- Million board feet, Scribner rule -----												
Douglas-fir	659.2	806.6	772.3	739.9	559.3	446.0	354.4	204.7	176.1	173.1	248.4	5,090.0	
Ponderosa pine	418.9	827.2	1,146.1	952.0	637.2	456.5	291.2	273.9	180.6	213.1	408.5	5,805.2	
Lodgepole pine	2,787.9	2,311.2	1,592.8	740.6	406.9	153.3	29.2	17.8	2.1	4.3	--	8,046.1	
Limber pine	23.7	40.6	20.5	18.7	22.3	11.0	2.7	0.3	4.6	4.7	4.6	153.7	
Subalpine fir	1,336.9	1,100.5	823.5	732.5	537.1	328.5	184.1	119.2	49.3	20.6	8.7	5,240.9	
White fir	93.6	139.1	151.0	140.9	90.4	93.4	83.3	95.8	53.1	88.7	109.2	1,138.5	
Engelmann spruce	2,755.4	3,352.5	3,231.8	3,056.3	2,663.2	2,072.3	1,773.1	1,326.1	912.1	576.9	742.9	22,462.6	
Other softwoods	63.6	50.5	53.5	43.7	15.5	5.0	6.8	1.2	1.2	1.3	--	242.3	
Total softwoods	8,139.2	8,628.2	7,791.5	6,424.6	4,931.9	3,566.0	2,724.8	2,039.0	1,379.1	1,032.7	1,522.3	48,179.3	
Aspen	XXXX	1,905.2	1,187.2	623.1	337.7	143.8	49.2	33.4	--	1.8	--	4,281.4	
Cottonwood	XXXX	45.3	12.2	49.9	24.9	24.8	20.9	--	2.2	4.1	71.5	255.8	
Other hardwoods	XXXX	0.1	--	--	--	0.1	--	--	--	--	--	0.2	
Total hardwoods	XXXX	1,950.6	1,199.4	673.0	362.6	168.7	70.1	33.4	2.2	5.9	71.5	4,537.4	
All species	8,139.2	10,578.8	8,990.9	7,097.6	5,294.5	3,734.7	2,794.9	2,072.4	1,381.3	1,038.6	1,593.8	52,716.7	

Table 24--Net annual growth of growing stock on timberland by ownership class and species, Colorado, 1982

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
- - - - - Thousand cubic feet - - - - -				
Douglas-fir	5,236	6,405	10,512	22,153
Ponderosa pine	5,654	1,775	19,678	27,107
Lodgepole pine	32,572	7,219	14,858	54,649
Limber pine	77	163	588	828
Subalpine fir	18,679	982	2,818	22,479
White fir	2,507	262	1,074	3,843
Engelmann spruce	49,091	3,432	11,563	64,086
Other softwoods	1,325	143	330	1,798
<b>Total softwoods</b>	<b>115,141</b>	<b>20,381</b>	<b>61,421</b>	<b>196,943</b>
Aspen	47,146	7,283	18,610	73,039
Cottonwood	103	197	2,551	2,851
Other hardwoods	11	--	--	11
<b>Total hardwoods</b>	<b>47,260</b>	<b>7,480</b>	<b>21,161</b>	<b>75,901</b>
<b>All species</b>	<b>162,401</b>	<b>27,861</b>	<b>82,582</b>	<b>272,844</b>

Table 25--Net annual growth of sawtimber (International 4-inch rule) on timberland by ownership class and species, Colorado, 1982

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
- - - Thousand board feet, International 4-inch rule - - -				
Douglas-fir	33,079	24,413	47,289	104,781
Ponderosa pine	31,995	10,498	107,781	150,274
Lodgepole pine	162,490	18,644	19,312	200,446
Limber pine	429	576	1,570	2,575
Subalpine fir	110,368	5,572	16,454	132,394
White fir	10,432	3,003	7,551	20,986
Engelmann spruce	306,301	14,629	51,638	372,568
Other softwoods	5,850	506	966	7,322
<b>Total softwoods</b>	<b>660,944</b>	<b>77,841</b>	<b>252,561</b>	<b>991,346</b>
Aspen	144,055	19,918	90,781	254,754
Cottonwood	513	446	12,367	13,326
Other hardwoods	12	--	--	12
<b>Total hardwoods</b>	<b>144,580</b>	<b>20,364</b>	<b>103,148</b>	<b>268,092</b>
<b>All species</b>	<b>805,524</b>	<b>98,205</b>	<b>355,709</b>	<b>1,259,438</b>

Table 26--Net annual growth of sawtimber (Scribner rule) on timberland by ownership class and species, Colorado, 1982

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
- - - - - Thousand board feet, Scribner rule - - - - -				
Douglas-fir	29,441	20,654	39,952	90,047
Ponderosa pine	28,477	8,504	91,097	128,078
Lodgepole pine	144,617	16,315	16,813	177,745
Limber pine	381	492	1,298	2,171
Subalpine fir	98,227	4,797	14,467	117,491
White fir	9,284	2,548	6,234	18,066
Engelmann spruce	272,607	12,090	42,680	327,377
Other softwoods	5,207	458	863	6,528
<b>Total softwoods</b>	<b>588,241</b>	<b>65,858</b>	<b>213,404</b>	<b>867,503</b>
Aspen	128,210	17,149	78,310	223,669
Cottonwood	457	376	10,126	10,959
Other hardwoods	10	--	--	10
<b>Total hardwoods</b>	<b>128,677</b>	<b>17,525</b>	<b>88,436</b>	<b>234,638</b>
<b>All species</b>	<b>716,918</b>	<b>83,383</b>	<b>301,840</b>	<b>1,102,141</b>

Table 27--Net annual growth of growing stock on timberland by species and diameter class, Colorado, 1982

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	5,768	4,493	3,145	3,197	1,569	1,469	1,162	423	372	55	201	104	195	22,153
Ponderosa pine	3,406	4,121	4,098	4,900	4,566	2,437	1,525	800	520	477	317	143	-203	27,107
Lodgepole pine	28,265	13,718	8,270	3,505	853	257	-296	8	42	20	2	5	--	54,649
Limber pine	222	187	86	134	72	44	46	15	2	1	6	9	4	828
Subalpine fir	13,273	3,637	3,234	2,010	-294	512	91	-101	-28	144	-35	27	9	22,479
White fir	1,212	829	113	468	430	380	235	166	183	134	-64	-6	-237	3,843
Engelmann spruce	14,736	8,718	9,779	9,354	6,543	5,136	2,978	2,170	2,059	907	584	581	541	64,086
Other softwoods	1,206	172	219	141	103	-84	16	10	10	1	1	3	--	1,798
Total softwoods	68,088	35,875	28,944	23,709	13,842	10,151	5,757	3,491	3,160	1,739	1,012	866	309	196,943
Aspen	35,177	15,292	12,474	6,176	2,515	719	386	207	76	16	--	1	--	73,039
Cottonwood	861	376	688	325	83	291	68	180	43	-263	11	2	186	2,851
Other hardwoods	--	4	6	1	--	--	--	(1)	--	--	--	--	--	11
Total hardwoods	36,038	15,672	13,168	6,502	2,598	1,010	454	387	119	-247	11	3	186	75,901
All species	104,126	51,547	42,112	30,211	16,440	11,161	6,211	3,878	3,279	1,492	1,023	869	495	272,844

<sup>1</sup>Less than 0.05 thousand cubic feet.

Table 28--Net annual growth of sawtimber (International 4-inch rule) on timberland by species and diameter class, Colorado, 1982

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 4-inch rule -----												
Douglas-fir	52,276	18,902	9,515	8,658	6,790	2,689	2,457	377	1,242	645	1,230	104,781	
Ponderosa pine	54,324	30,381	27,487	14,789	9,023	4,826	3,895	3,117	2,118	1,111	-797	150,274	
Lodgepole pine	173,266	20,690	5,812	1,804	-1,494	2	228	103	11	24	--	200,446	
Limber pine	695	730	414	265	265	90	2	3	34	53	24	2,575	
Subalpine fir	116,496	12,363	-602	3,267	879	-628	-199	829	-221	152	58	132,394	
White fir	11,046	3,111	2,688	2,057	1,378	784	1,001	777	-376	-90	-1,390	20,986	
Engelmann spruce	190,739	53,962	37,503	28,833	16,864	12,305	14,019	6,536	4,208	3,948	3,651	372,568	
Other softwoods	6,201	735	545	-372	85	53	49	7	6	13	--	7,322	
<b>Total softwoods</b>	<b>605,043</b>	<b>140,874</b>	<b>83,362</b>	<b>59,301</b>	<b>33,790</b>	<b>20,121</b>	<b>21,452</b>	<b>11,749</b>	<b>7,022</b>	<b>5,856</b>	<b>2,776</b>	<b>991,346</b>	
Aspen	XXXX	232,092	14,461	4,508	2,024	1,196	369	96	--	8	--	254,754	
Cottonwood	XXXX	10,590	412	1,334	293	735	181	-1,175	50	9	897	13,326	
Other hardwoods	XXXX	7	--	--	--	5	--	--	--	--	--	12	
<b>Total hardwoods</b>	<b>XXXX</b>	<b>242,689</b>	<b>14,873</b>	<b>5,842</b>	<b>2,317</b>	<b>1,936</b>	<b>550</b>	<b>-1,079</b>	<b>50</b>	<b>17</b>	<b>897</b>	<b>268,092</b>	
<b>All species</b>	<b>605,043</b>	<b>383,563</b>	<b>98,235</b>	<b>65,143</b>	<b>36,107</b>	<b>22,057</b>	<b>22,002</b>	<b>10,670</b>	<b>7,072</b>	<b>5,873</b>	<b>3,673</b>	<b>1,259,438</b>	

Table 29--Net annual growth of sawtimber (Scribner rule) on timberland by species and diameter class, Colorado, 1982

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	46,361	15,589	7,577	6,981	5,655	2,409	2,312	378	1,113	577	1,095	90,047
Ponderosa pine	42,113	27,321	24,579	13,258	8,073	4,311	3,473	2,779	1,887	992	-708	128,078
Lodgepole pine	153,881	18,079	5,015	1,638	-1,198	3	204	92	10	21	--	177,745
Limber pine	584	614	347	223	221	77	2	3	30	49	21	2,171
Subalpine fir	103,406	10,604	-383	2,863	1,001	-547	-182	738	-196	135	52	117,491
White fir	9,543	2,701	2,272	1,727	1,212	653	905	701	-334	-77	-1,237	18,066
Engelmann spruce	169,065	46,252	32,354	25,048	14,745	10,959	12,543	5,891	3,757	3,513	3,250	327,377
Other softwoods	5,570	644	468	-343	76	46	44	6	5	12	--	6,528
Total softwoods	530,523	121,804	72,229	51,395	29,785	17,911	19,301	10,588	6,272	5,222	2,473	867,503
Aspen	XXXX	203,516	12,754	4,133	1,786	1,063	325	85	--	7	--	223,669
Cottonwood	XXXX	8,433	377	1,228	271	674	165	-1,040	45	8	798	10,959
Other hardwoods	XXXX	6	--	--	--	4	--	--	--	--	--	10
Total hardwoods	XXXX	211,955	13,131	5,361	2,057	1,741	490	-955	45	15	798	234,638
All species	530,523	333,759	85,360	56,756	31,842	19,652	19,791	9,633	6,317	5,237	3,271	1,102,141

Table 30--Annual mortality of growing stock on timberland by ownership class and species, Colorado, 1982

Species	Ownership class				Total
	National Forest	Other public	Nonindustrial private		
	----- Thousand cubic feet -----				
Douglas-fir	1,995	292	1,144		3,431
Ponderosa pine	2,609	688	929		4,226
Lodgepole pine	9,252	1,126	1,402		11,780
Limber pine	20	--	--		20
Subalpine fir	17,105	786	1,174		19,065
White fir	1,034	128	1,037		2,199
Engelmann spruce	17,711	730	1,100		19,541
Other softwoods	147	12	--		159
<b>Total softwoods</b>	<b>49,873</b>	<b>3,762</b>	<b>6,786</b>		<b>60,421</b>
Aspen	7,368	857	8,722		16,947
Cottonwood	--	--	263		263
Other hardwoods	2	--	--		2
<b>Total hardwoods</b>	<b>7,370</b>	<b>857</b>	<b>8,985</b>		<b>17,212</b>
<b>All species</b>	<b>57,243</b>	<b>4,619</b>	<b>15,771</b>		<b>77,633</b>

Table 31--Annual mortality of sawtimber (International 4-inch rule) on timberland by ownership class and species, Colorado, 1982

Species	Ownership class				Total
	National Forest	Other public	Nonindustrial private		
	-- - - Thousand board feet, International 4-inch rule - - -				
Douglas-fir	9,527	1,256	3,597		14,380
Ponderosa pine	10,210	3,626	2,677		16,513
Lodgepole pine	36,123	2,656	6,162		44,941
Limber pine	147	--	--		147
Subalpine fir	60,374	2,308	5,457		68,139
White fir	5,229	386	3,288		8,903
Engelmann spruce	89,966	2,837	5,131		97,934
Other softwoods	722	--	--		722
<b>Total softwoods</b>	<b>212,298</b>	<b>13,069</b>	<b>26,312</b>		<b>251,679</b>
Aspen	12,238	402	9,516		22,156
Cottonwood	--	--	1,175		1,175
Other hardwoods	--	--	--		--
<b>Total hardwoods</b>	<b>12,238</b>	<b>402</b>	<b>10,691</b>		<b>23,331</b>
<b>All species</b>	<b>224,536</b>	<b>13,471</b>	<b>37,003</b>		<b>275,010</b>

Table 32--Annual mortality of sawtimber (Scribner rule) on timberland by ownership class and species, Colorado, 1982

Species	Ownership class			Total
	National Forest	Other public	Nonindustrial private	
	- - - - Thousand board feet, Scribner rule - - - -			
Douglas-fir	8,479	1,032	3,101	12,612
Ponderosa pine	9,086	3,212	2,322	14,620
Lodgepole pine	32,150	2,264	5,243	39,657
Limber pine	131	--	--	131
Subalpine fir	53,733	1,950	4,419	60,102
White fir	4,653	336	2,871	7,860
Engelmann spruce	80,070	2,389	4,325	86,784
Other softwoods	643	--	--	643
Total softwoods	188,945	11,183	22,281	222,409
Aspen	10,892	340	8,038	19,270
Cottonwood	--	--	1,040	1,040
Other hardwoods	--	--	--	--
Total hardwoods	10,892	340	9,078	20,310
All species	199,837	11,523	31,359	242,719

Table 33--Annual mortality of growing stock on timberland by species and diameter class, Colorado, 1982

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	91	343	857	149	594	345	78	421	187	255	1	49	61	3,431
Ponderosa pine	124	434	694	508	286	661	355	173	178	32	1	157	603	4,226
Lodgepole pine	1,008	1,919	2,354	2,287	2,190	1,025	843	154	--	(1)	--	--	--	11,780
Limber pine	2	3	7	3	2	1	1	1	(1)	--	--	(1)	--	20
Subalpine fir	2,635	3,169	3,527	2,356	3,136	1,608	1,258	1,000	276	--	100	--	--	19,065
White fir	228	111	603	248	182	99	1	95	1	--	128	141	362	2,199
Engelmann spruce	901	1,182	2,120	2,529	2,670	2,826	2,986	1,862	515	991	611	196	152	19,541
Other softwoods	12	--	--	--	--	147	--	--	--	--	--	--	--	159
Total softwoods	5,001	7,161	10,162	8,080	9,060	6,712	5,522	3,706	1,157	1,298	841	543	1,178	60,421
Aspen	5,699	4,027	3,036	1,592	1,100	946	404	106	--	37	--	--	--	16,947
Cottonwood	--	--	--	--	--	--	--	--	--	263	--	--	--	263
Other hardwoods	--	1	1	--	--	--	--	--	--	--	--	--	--	2
Total hardwoods	5,699	4,028	3,037	1,592	1,100	946	404	106	--	300	--	--	--	17,212
All species	10,700	11,189	13,199	9,672	10,160	7,658	5,926	3,812	1,157	1,598	841	543	1,178	77,633

<sup>1</sup>Less than 0.05 thousand cubic feet.

Table 34--Annual mortality of sawtimber (International 1/4-inch rule) on timberland by species and diameter class, Colorado, 1982

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	2,841	677	3,079	1,864	426	2,307	1,025	1,507	5	292	357	14,380	
Ponderosa pine	1,701	1,900	1,298	3,411	1,965	989	714	285	9	825	3,416	16,513	
Lodgepole pine	11,617	11,063	11,473	5,339	4,528	920	--	1	--	--	--	44,941	
Limber pine	65	27	21	12	9	6	5	--	--	2	--	147	
Subalpine fir	16,706	12,018	16,469	8,544	6,645	5,552	1,619	--	586	--	--	68,139	
White fir	2,182	1,116	786	544	5	557	7	--	753	834	2,119	8,903	
Engelmann spruce	11,274	13,606	14,696	16,117	16,906	10,681	2,963	5,881	3,670	1,189	951	97,934	
Other softwoods	--	--	--	722	--	--	--	--	--	--	--	722	
Total softwoods	46,386	40,407	47,822	36,553	30,484	21,012	6,333	7,674	5,023	3,142	6,843	251,679	
Aspen	XXXX	8,071	6,014	4,817	2,428	632	--	194	--	--	--	22,156	
Cottonwood	XXXX	--	--	--	--	--	--	1,175	--	--	--	1,175	
Other hardwoods	XXXX	--	--	--	--	--	--	--	--	--	--	--	
Total hardwoods	XXXX	8,071	6,014	4,817	2,428	632	--	1,369	--	--	--	23,331	
All species	46,386	48,478	53,836	41,370	32,912	21,644	6,333	9,043	5,023	3,142	6,843	275,010	

Table 35--Annual mortality of sawtimber (Scribner rule) on timberland by species and diameter class, Colorado, 1982

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	2,528	603	2,728	1,658	361	1,937	879	1,336	4	260	318	12,612
Ponderosa pine	1,509	1,650	1,155	3,011	1,747	878	635	254	8	733	3,040	14,620
Lodgepole pine	10,322	9,664	10,173	4,744	3,934	819	--	1	--	--	--	39,657
Limber pine	--	24	19	11	8	5	4	--	--	2	--	131
Subalpine fir	14,864	10,691	14,407	7,590	5,651	4,936	1,441	--	522	--	--	60,102
White fir	1,942	957	673	484	4	496	6	--	670	742	1,886	7,860
Engelmann spruce	10,025	11,999	12,970	14,256	15,000	9,495	2,634	5,234	3,267	1,058	846	86,784
Other softwoods	--	--	--	643	--	--	--	--	--	--	--	643
Total softwoods	41,248	35,588	42,125	32,397	26,705	18,566	5,599	6,825	4,471	2,795	6,090	222,409
Aspen	XXXX	6,967	5,280	4,127	2,161	562	--	173	--	--	--	19,270
Cottonwood	XXXX	--	--	--	--	--	--	1,040	--	--	--	1,040
Other hardwoods	XXXX	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	XXXX	6,967	5,280	4,127	2,161	562	--	1,213	--	--	--	20,310
All species	41,248	42,555	47,405	36,524	28,866	19,128	5,599	8,038	4,471	2,795	6,090	242,719

Table 36--Annual mortality of growing stock on timberland by cause of death and species, Colorado, 1982

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Logging	Unknown	
	----- Thousand cubic feet -----								
Douglas-fir	206	554	26	--	2,595	--	--	50	3,431
Ponderosa pine	1,302	659	--	--	2,038	--	--	227	4,226
Lodgepole pine	1,612	3,164	611	1,025	1,831	56	1,100	2,381	11,780
Limber pine	--	--	--	--	--	--	--	20	20
Subalpine fir	11,692	4,863	146	--	370	934	--	1,060	19,065
White fir	1,059	--	--	--	581	108	111	340	2,199
Engelmann spruce	3,342	4,431	139	--	801	150	--	10,678	19,541
Other softwoods	--	--	--	12	--	--	--	147	159
Total softwoods	19,213	13,671	922	1,037	8,216	1,248	1,211	14,903	60,421
Aspen	62	5,642	247	439	692	--	--	9,865	16,947
Cottonwood	--	--	--	--	--	--	--	263	263
Other hardwoods	--	--	--	--	--	--	--	2	2
Total hardwoods	62	5,642	247	439	692	--	--	10,130	17,212
All species	19,275	19,313	1,169	1,476	8,908	1,248	1,211	25,033	77,633



Table 38--Annual mortality of sawtimber (Scribner rule) on timberland by cause of death and species, Colorado, 1982

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Logging	Unknown	
	----- Thousand board feet, Scribner rule -----								
Douglas-fir	961	2,011	134	--	9,243	--	--	263	12,612
Ponderosa pine	2,951	1,773	--	--	9,479	--	--	417	14,620
Lodgepole pine	4,538	10,307	1,595	3,851	8,183	--	792	10,391	39,657
Limber pine	--	--	--	--	--	--	--	131	131
Subalpine fir	40,729	16,892	--	--	1,038	--	--	1,443	60,102
White fir	3,909	--	--	--	2,316	--	--	1,635	7,860
Engelmann spruce	13,146	20,074	439	--	2,908	--	--	50,217	86,784
Other softwoods	--	--	--	--	--	--	--	643	643
Total softwoods	66,234	51,057	2,168	3,851	33,167	--	792	65,140	222,409
Aspen	--	1,651	--	--	849	--	--	16,770	19,270
Cottonwood	--	--	--	--	--	--	--	1,040	1,040
Other hardwoods	--	--	--	--	--	--	--	--	--
Total hardwoods	--	1,651	--	--	849	--	--	17,810	20,310
All species	66,234	52,708	2,168	3,851	34,016	--	792	82,950	242,719

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Presents highlights of the forest resources of Colorado as of 1983. Describes the forest resources, their extent, condition, and location. Includes statistical tables: area by land classes, ownership, growing-stock and sawtimber volumes, growth, mortality, roundwood products output, and utilization.

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KEYWORDS: timberland, timber volume, sawlog volume, harvest

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