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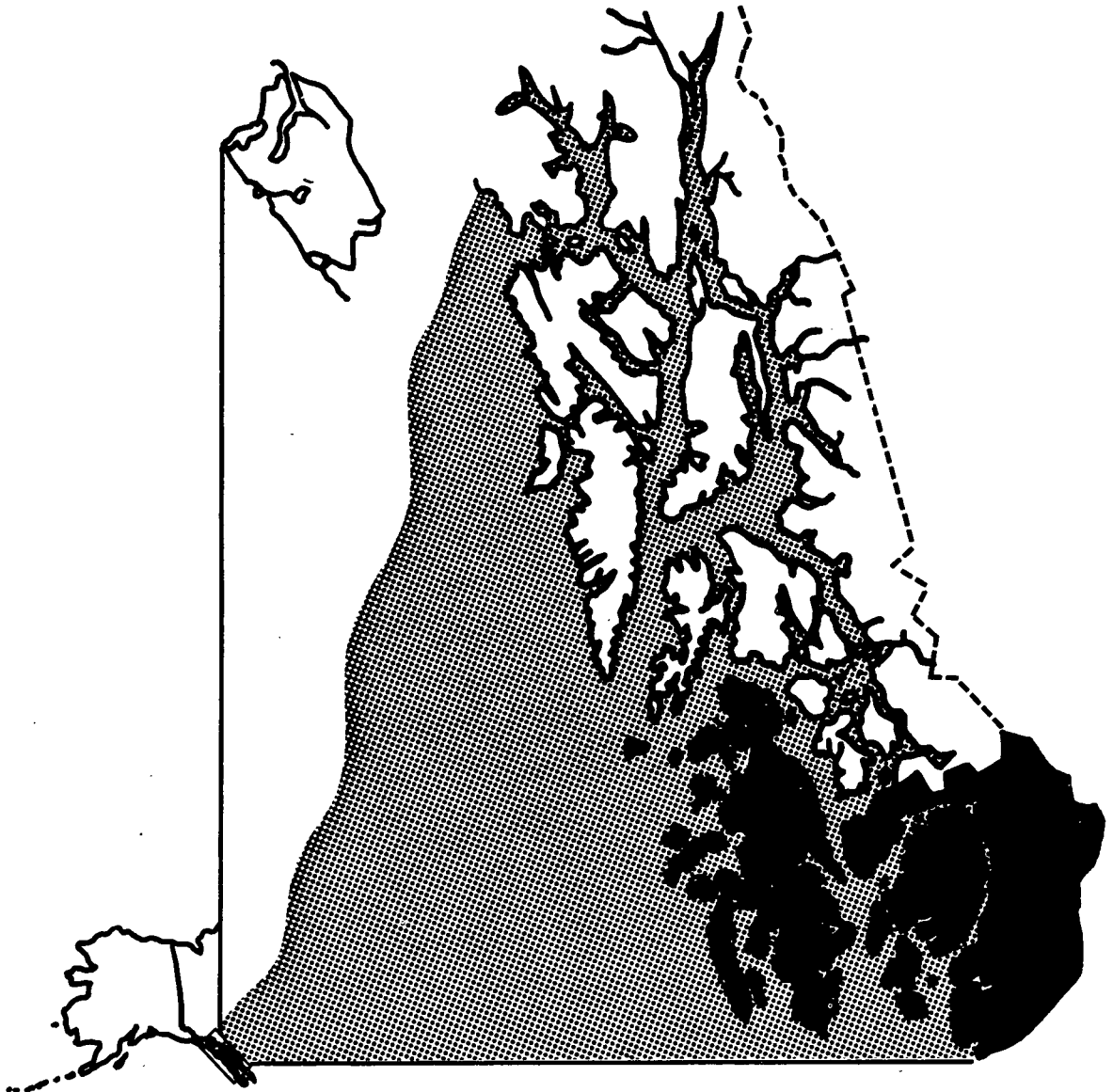
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Timber Resource Statistics for the Ketchikan Area of the Tongass National Forest, Alaska, 1985

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Abstract

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Statistics on forest area, total gross and net volumes, and annual net growth and mortality are presented from the 1984-85 timber inventory of the Ketchikan Area, Tongass National Forest, Alaska. Available timberland area is estimated at 1.5 million acres, net growing stock volume at 8.2 billion cubic feet, and annual net growth and mortality at 24.8 and 65.6 million cubic feet, respectively.

Keywords: Forest surveys, timber inventory, statistics (forest), Alaska (southeast).

Summary

This report for the 5.2-million-acre Ketchikan Area timber inventory unit is one in a series of three reports for southeast Alaska. The Ketchikan Area is in the panhandle of southeast Alaska, and includes Prince of Wales, Coronation, Noyes, Baker, Lulu, San Fernando, Suemez, Revillagigedo, and Dall Islands and other small islands plus a portion of the mainland. It is bounded on the north by Sumner Strait and the Bradfield Canal, on the east by the United States-Canadian border, on the south by Dixon Entrance, and on the west by the Pacific Ocean.

This is the second general reinventory of the forests in the Ketchikan Area unit, which was first inventoried in 1957 and subsequently in 1974. Remeasurement of the growth and mortality plots established in the first inventory was accomplished in 1968 and again in 1974. This set of growth and mortality plots was not considered representative by 1985 and was not remeasured a third time. The plots upon which estimates in this report are based were established, however, as permanent plots for remeasurement in the future. Growth and mortality figures in this report therefore are derived from temporary plots.

Estimates of forest area, total gross and net timber volumes, and annual net growth and mortality are presented from the 1984-85 inventory (hereafter referred to as the 1985 inventory) of the Ketchikan Area unit. Additional detailed breakdowns of these estimates are provided in tabular form.

Preface

The USDA Forest Service, under authority of the McSweeney-McNary Forest Research Act of 1928, the Renewable Resources Planning Act of 1974, and the Renewable Resources Research Act of 1976, conducts periodic inventories of all states. In Alaska, personnel of the Tongass National Forest, the Chugach National Forest, and the Pacific Northwest Research Stations's Forest Inventory and Analysis (FIA) unit in Anchorage, Alaska, have shared this responsibility.

Personnel of the Tongass National Forest were responsible for collection and compilation of necessary data; FIA personnel assisted with presentation of results shown in this series of reports.

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Highlights

	Available	Reserved	Total
	<i>Thousand acres</i>		
Total Ketchikan Area			
Inventory unit:	2,956	2,269	5,225
Forest land	2,555	1,424	3,979
Nonforest land	345	796	1,142
Census and noncensus water	55	48	104
Forested Area:			
Timberland	1,533	628	2,160
Other forest land	1,023	796	1,818
Timberland stand-size composition:			
Old-growth sawtimber	1,336	610	1,946
Young-growth sawtimber	10	4	14
Poletimber	11	7	18
Seedlings and saplings, and nonstocked	175	7	182
Timberland forest type composition:			
Black cottonwood	0 ^a	4	5
Cedar ^b	29	6	35
Hemlock ^c	931	469	1,400
Hemlock-spruce	551	145	696
Lodgepole pine	—	—	—
Red alder	2	1	3
Sitka spruce	17	3	20
Nonstocked	2	0	2
	All growing stock	Sawtimber growing stock	
	<i>Million cubic feet^d</i>	<i>Million board feet Scribner rule^e</i>	
Volume on available timberland:			
Gross volume	9,436	48,746	
Net volume	8,202	37,417	
Net annual growth	25	121	
Annual mortality	66	288	
Volume on reserved timberland:			
Gross volume	4,087	20,454	
Net volume	3,533	15,505	
Net annual growth	11	50	
Annual mortality	28	118	

	All growing stock	Sawtimber growing stock
	<i>Million cubic feet^d</i>	<i>Million board feet Scribner rule^e</i>
Volume on available other forest land:		
Gross volume	1,912	7,255
Net volume	1,636	5,261
Net annual growth	14	68
Annual mortality	8	17
Volume on reserved other forest land:		
Gross volume	1,490	5,652
Net volume	1,275	4,099
Net annual growth	11	54
Annual mortality	6	13

— = no data were collected.

^a 0 = less than 500 acres.

^b Includes western redcedar and Alaska-cedar.

^c Includes western and mountain hemlock.

^d Volume of roundwood for growing stock trees 5.0 inches in d.b.h. (diameter at breast height) and larger.

^e Volume, Scribner rule (16-foot logs), for softwood trees 9.0 inches in d.b.h. and larger and for hardwood trees 11.0 inches in d.b.h. and larger.

Introduction

The Ketchikan Area unit is located between 130.00° and 134.20° W. longitude and between 54.44° and 56.23° N. latitude in the panhandle of southeast Alaska (fig. 1).

The climate of the Ketchikan Area is maritime. Temperatures range from about 20 °F in the winter to around 75 °F in the summer. Precipitation is moderate to heavy throughout the area, and winter snowfall can exceed 60 inches.

The topography of the Ketchikan Area unit is typical of southeast Alaska. It is characterized by tall peaks, fjords, narrow valleys, and numerous islands. This physical character affects community development and resource use. The steepness of the land limits community development to narrow, coastal benches. Resource use is tempered by accessibility and site-integrity considerations.

Inventory Procedures

The sampling design used to derive area and volume estimates from the 1984-85 Ketchikan Area timber inventory used a 100-percent vegetation and land type map as a base on which to proportionately allocate 248 ground plots. The map (completed in 1978) polygons are classified by land type, forest type, stand-size class, and volume class. They also were updated to 1984 to reflect changes in harvest, ownership, and reserved status. Tree measurements taken within the ground plots served as the basis for the volume expansion to map strata.

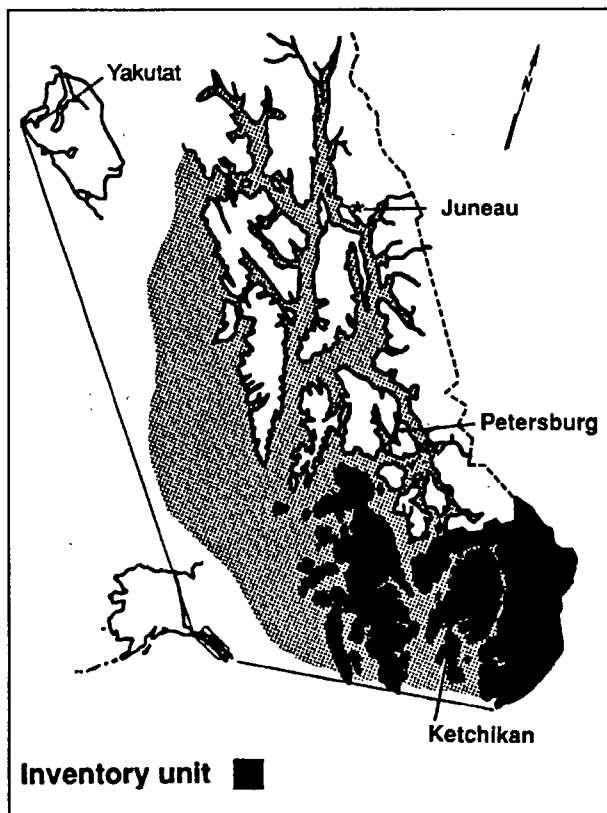


Figure 1—Ketchikan Area forest inventory unit, 1985

Ownership Statistics

In 1974, ownership of land other than that administered by the USDA Forest Service was incidental. Since that time, Federal legislation has effected significant land status changes associated with Alaska Native and State of Alaska selections and wilderness withdrawals. These land status changes are the result of the Alaska Statehood Act of 1958 (Public Law 85-508), the Alaska Native Claims Settlement Act (ANCSA) of 1971 (Public Law 92-203), and the Alaska National Interest Lands Conservation Act (ANILCA; Public Law 96-487). As of 1985, the following acres have been removed since 1974 from National Forest status on the Ketchikan Area unit:

Change in Status	Acres
Native selections	333,099
State selections	64,332
Wilderness withdrawals	2,268,661

Change In Standards And Methods Influences Inventory Estimates

Results obtained from resource inventories conducted at different times often are compared to examine the data for any trend information that may be present. Many factors influence comparability of estimates derived from two or more resource inventories that did not measure the sample by the same methods. For timber resource inventories, estimates of wood volume are important. An analyst making such a comparison must be aware not only of inventory design changes but also of volume computation changes. Several changes were made to the volume computation procedures in the current inventory relative to the previous inventory. Changes were made in tree merchantability standards, cull tree determinations, and volume tables.

Merchantability standards changed between inventories in that the minimum breast-height diameter for sawtimber trees was lowered, and the top diameters and stump heights were changed. Under the previous scheme, the break between poletimber-sized and sawtimber-sized trees was made at 11 inches for both softwoods and hardwoods, top diameters were at 40 percent of breast-height diameter for softwoods and 8 inches for hardwoods, and stump heights were variable. Under the current scheme, the break between poletimber and sawtimber is at 9 inches for softwoods and 11 inches for hardwoods. Current top diameters (inside bark) are 6 inches for softwoods and 8 inches for hardwoods, and stump height is 1 foot. Previously, for a live tree to be classified as merchantable (noncull), it had to have one merchantable saw log; for softwood sawtimber, the tree had to be greater than 25 percent sound, board-foot measure (bfm), and for hardwoods, greater than 50 percent sound, bfm. Poletimber trees, hardwood and softwood, had to be greater than 50 percent sound, cubic-foot measure. Currently, the requirements are simplified; any tree with at least one merchantable saw log is not cull.

Volume tables used to compute gross tree volumes also have changed. In the previous inventories, several equations were used. These were developed by Embry and Haack (1965), Bones (1968), and Farr and LaBau (1971). Currently, equations developed by Bruce (1984) are used for all Sitka spruce and hemlock. The magnitude of the differences due to use of these equations is difficult to estimate without total recompilation of the previous inventory.

Table 1 presents differences in available timberland area and cubic-foot volume estimates (in trees greater than 5.0 inches in diameter at breast height and larger) that result from different inventories and methods of area expansion. Data are presented from inventories (hereafter referred to as "the 1970s inventories") done with consistent methods that were conducted in 1973 (van Hees and Labau 1983), and 1974 (van Hees 1984) on all lands in the Ketchikan Area (not just National Forest lands); the data are adjusted to reflect National Forest area only. Also presented are two sets of data from the current (1985) inventory. The 1985 estimates of per-acre volume are about 2-3 percent higher than the 1970s estimate.

Table 1—Comparison of available timberland area and cubic-foot volume in trees 5.0 inches in diameter at breast height and larger by stand-size class, sawtimber-volume class, and type of inventory, Ketchikan Area unit, southeast coastal Alaska

Stand-size and sawtimber-volume classes	Inventory					
	Plot '70s		Map '85		Plot '85	
	<i>Acres</i>	<i>MMcf^a</i>	<i>Acres</i>	<i>MMcf</i>	<i>Acres</i>	<i>MMcf</i>
Seedling and saplings, and nonstocked	105,675	15	175,369	47	153,460	45
Poletimber	19,263	45	11,165	6	17,314	24
Sawtimber-volume class. ^b						
Less than 8,000 board feet per acre	—	—	3,018	—	81,110	197
8,000-20,000	767,453	3,011	540,486	2,649	348,343	1,339
20,000-30,000	383,066	2,169	558,367	3,957	414,626	2,420
30,000-50,000	267,377	2,347	177,105	1,085	449,791	3,528
Greater than 50,000	86,365	998	67,123	457	67,989	734
Total	1,634,219	8,584	1,532,633	8,202	1,532,633	8,288
(Average volume per acre	5,253		5,352		5,408)	

^a MMcf = million cubic feet.

^b Net board feet, inventory Scribner volume, except base volume of 8,000 board feet, which is Intertional 1/4-inch rule.

Area estimates from the 1970s inventories were developed through a double-sampling technique involving area expansion of plot-level information (Bickford 1952). Estimates in the column labeled "Map '85" (in table 1) were developed by summation of mapped polygon areas, whereas estimates in the column labeled "Plot '85" were developed via a proportional area expansion technique. Estimates presented in this report, other than those in table 1 that are labeled "Plot '70s" or "Plot '85," were developed through mapped-polygon summation.

Although faults (such as poor correlation between photo-interpreted map classification and ground-sample classification) have been found with the 100-percent timber type map as an in-place resource information source, it is considered an adequate tool for separating productive from unproductive forest land and seedlings, saplings, poletimber, and low-volume young-growth from the group of old-growth volume classes. Even though there is low reliability in locating a particular volume class on a polygon-by-polygon basis, the 100-percent timber type map has proven highly reliable in predicting volumes by sale or drainage. The acreages derived by plot expansion, rather than directly from the map, are considered more accurate. These acres cannot be tied to the entire map though.

Old Growth

Nearly 89 percent of the timberland sample plots in the Ketchikan Area unit were in uncut timber. In southeast Alaska, uncut implies old growth because of the dearth of extensive, historical logging activity. Recent efforts to develop accurate characterizations of old-growth forests point to many difficulties in creating consistent definitions, however. For this timber inventory, a definition was used that focuses only on the timber component of the forest.

Stands of trees 150 years old or older are designated as old growth. Rationale for this breakpoint derives from the natural course of wood fiber productivity over the life of the stand. As stands age, the average amount of wood grown annually (the mean annual increment [MAI]) changes. In the early stages of stand growth, the increment is larger than at later stages. In southeast Alaska, the culmination of MAI, for sawtimber-sized material, typically occurs at age 150 or earlier. At this point the stand is no longer "youthful." Thus, the designation of age 150 as the delineation between young growth and old growth.

Stand age is based on plurality of tree stocking per acre. If, for example, a stand has two age groups that are numerically adjacent, and that comprise more than 50 percent of the growing stock stocking of the stand, stand age is assigned to the age group of the pair having the greater stocking, and the stand is designated even-aged. Stands can be classified as even-aged beyond 300 years old, although 200 years is the upper age limit most commonly found. The few old, even-aged stands that are found during sampling generally resulted from fire, windthrow, or small village clearings.

Timber inventory crews generally do not attempt to age trees beyond 300 years. Farr and others (1976) examined 1,234 trees 11.0 inches and larger at breast height. They found average age at breast height to be 282 years in mixed hemlock and spruce stands. Three trees were more than 600 years old. The oldest tree in the study was 775 years old. The study by Farr and others (1976) indicates trees greater than 500 years old are not at all common.

Reliability of Inventory Data

All volume statistics reported here are estimates based on sampling and are subject to sampling error. Sampling errors for all estimates presented in the tables are available from the authors. The reliability of the inventory is expressed as relative sampling error at the 68-percent confidence level. Area statistics are generated directly from a vegetation-land type map and therefore are expressed without sampling error.

	Design sampling error	Sampling error achieved	Sampling error of the total estimate
<i>Percent</i>			
Net growing stock volume on available timberland:			
Per billion cubic feet	10.0	10.7	
For the total 8,202,200,000 cubic feet			3.8
Net growing stock volume on available other forest land:			
Per billion cubic feet	15.0	22.2	
For the total 1,636,000,000 cubic feet			13.5
Net growth of growing stock on available timberland:			
Per billion cubic feet	10.0	4.4	
For the total 24,800,000 cubic feet			27.8
Net growth of growing stock on available other forest land:			
Per billion cubic feet	15.0	3.1	
For the total 14,400,000 cubic feet			25.4

For the Ketchikan Area inventory unit, growing stock volume on available timberland was estimated at 8.202 billion cubic feet, \pm 3.8 percent, with 68-percent confidence limits of 8.514 and 7.890 billion cubic feet. A 68-percent confidence level means that if repeated samples were taken of this population, the estimate of total volume would be between 8.514 and 7.890 billion cubic feet 68 percent of the time.

Goals for the design sampling error were slightly exceeded for net volume on available timberland. Area estimates are derived from vegetation-land type maps, which are assumed to have no error.

Terminology¹

Available timberland—Timberland not withdrawn from use in production of timber products as a result of administrative statute or regulation.

Census water—Streams, sloughs, estuaries, and canals more than one-eighth of a mile wide; and lakes, reservoirs, and ponds more than 40 acres in area. (*Also see noncensus water.*)

Forest land—Land at least 10.0 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use.

Forest types—A classification of forest land based on the species forming a plurality of the live-tree stocking.

Black cottonwood—Forests in which a plurality of the stand is black cottonwood. Black cottonwood is found south of the Alaska Range in pure stands along the major rivers.

Cedar—Forests in which a plurality of the stand is Alaska-cedar or western redcedar, either in combination or individually. Associates include mountain or western hemlock, lodgepole pine, and occasionally Sitka spruce, red alder, and cottonwood.

Hemlock-spruce—Forests in which 50 percent or more of the stand is western or mountain hemlock and where Sitka spruce comprises 30-49 percent of the stocking.

Lodgepole pine—Forests in which a plurality of the stand is lodgepole pine. Common associates are mountain and western hemlock and Alaska-cedar.

Mountain hemlock—Forests in which a plurality of the stand is mountain hemlock. An associated species is western hemlock.

Paper birch—Forests in which a plurality of the stand is paper birch. Paper birch can occur in pure stands but is more often mixed with white spruce, quaking aspen, or black spruce.

Red alder—Forests in which a plurality of the stand is red alder. Common associates are black cottonwood, Sitka spruce, western hemlock, and occasionally western redcedar and Alaska-cedar, or both.

Sitka spruce—Forests in which a plurality of the stand is Sitka spruce. An associated species is western hemlock.

Western hemlock—Forests in which a plurality of the stand is western hemlock. Common associates include Sitka spruce, Alaska-cedar, western redcedar, mountain hemlock, and occasionally cottonwood, red alder, or lodgepole pine.

Growing stock trees—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except cull trees.

¹ Terminology is from USDA Forest Service, Forest Service Handbook, Title 4813.1, 1967; and the manual of field instructions for the forest survey of the Ketchikan Area unit.

Growing stock volume—The net volume of sound wood in the bole of growing stock trees 5.0 inches and larger in d.b.h. (diameter at breast height), from stump to a minimum 4.0-inch top, outside bark, or to the point where the central stem breaks into limbs.

Hardwoods—Broad-leaved trees that are usually deciduous. "Commercial" Alaska hardwood species are balsam poplar, black cottonwood, paper birch, quaking aspen, and occasionally red alder.

Land area—The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 120 feet wide; and lakes, reservoirs, and ponds less than 5 acres in area.

Land class—A classification of land by major use, such as timberland, other forest, and nonforest. The minimum-size area for classification is 5 acres.

Mean annual increment (MAI)—A measure of the volume of wood, in cubic feet, produced on 1 acre during 1 year. Forest Inventory and Analysis minimum standard for timberland is the ability to produce 20 cubic feet per acre per year.

Merchantable tree—A merchantable tree must be producing or be capable of producing at least one merchantable saw log that is at least 50 percent sound for hardwoods or 33 percent sound for softwoods, board-foot measure. All poletimber less than 50 percent sound, cubic-foot measure, and all saplings with any sign of rot are not considered merchantable trees but rotten culls. Trees of such poor form that they will never produce a merchantable saw log are not classified as merchantable trees but as sound culls or rough trees.

Mortality—Number or sound wood volume of live trees dying from natural causes during a specified period.

Net annual growth of growing stock—The annual change in net volume of sound wood in live sawtimber and poletimber trees.

Net annual growth of sawtimber—The annual change in net board-foot volume of live sawtimber trees.

Net volume—The gross volume of a tree less deductions for rot, sweep, or other defect affecting product use.

Noncensus water—Streams, sloughs, estuaries, and canals between 120 feet and one-eighth of a mile wide; and lakes, reservoirs, and ponds between 5 and 40 acres in area. (*Also see census water.*)

Nonforest land—Land not qualifying as forest land. Includes land that never has supported forests and lands formerly forested where forest use is precluded by development for nonforest uses such as crops, improved pasture, residential areas, and city parks. Also includes improved roads and certain areas of water classified by the Bureau of the Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 5 acres in size to qualify as nonforest land.

Nonstocked areas—Timberland less than 10.0 percent stocked with growing stock trees.

Other forest land—Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions (producing less than 20 cubic feet MAI). This includes sterile or poorly drained forest land, subalpine forests, and steep rocky areas where topographic conditions are likely to prevent indefinitely management for timber production.

Poletimber-sized tree—Softwood tree 5.0 to 8.9 inches in d.b.h.; hardwood tree from 5.0 to 10.9 inches in d.b.h.

Poletimber stands—Stands at least 10.0 percent stocked with growing stock trees of which half or more are in poletimber- and sawtimber-sized trees, with poletimber stocking exceeding that of sawtimber.

Rough trees—Live trees 5.0 inches and larger in d.b.h. that do not contain a saw log, now or prospectively, primarily because of roughness or poor form, or because they are a noncommercial species.

Rotten trees—Live trees 5.0 inches and larger in d.b.h. that do not contain a saw log, now or prospectively, primarily because of rot.

Salvable dead trees—Standing or down dead trees currently considered merchantable by regional standards. A poletimber tree must be more than one-half sound; a sawtimber tree more than one-third sound (board measure).

Sapling-sized tree—A tree 1.0 to 4.9 inches in d.b.h.

Saw log—A log meeting minimum standards of diameter, length, and defect, including logs at least 12 feet long for softwoods (8 feet for hardwoods), sound and straight, and with a minimum small-end diameter inside bark of 6 inches for softwoods (8 inches for hardwoods).

Saw-log portion—That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. (diameter outside bark) for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber-sized tree—Softwood tree 9.0 inches d.b.h. and larger; hardwood tree 11.0 inches in d.b.h. and larger.

Sawtimber stands—Stands at least 10.0 percent stocked with growing stock trees, with half or more of total stocking in sawtimber- or poletimber-sized trees, and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber volume—Net volume of sawtimber trees measured in board feet.

Scribner rule—The common board-foot timber scaling rule used locally in determining volume of sawtimber. Standing inventory volume is based on 16-foot logs.

Seedling-sapling stands—Stands at least 10.0 percent stocked with growing stock trees of which more than half of the stocking is saplings and seedling-sized trees.

Seedling-sized tree—An established tree less than 1.0 inch d.b.h.

Site productivity class—A classification of forest land based on capacity to grow crops of industrial wood.

Stand size class—A classification of forest land based on size of the growing stock present; that is, sawtimber, poletimber, or seedlings and saplings.

Stocking—The degree of occupancy of land by trees, measured either by basal area or by the number of trees in a stand by size or age and spacing, compared with the basal area or number of trees required to fully use the growth potential of the land; that is, the stocking standard.

Timberland—Forest land producing or capable of producing crops of industrial wood. Areas qualifying as timberland can produce 20 cubic feet per acre per year of industrial wood at culmination of mean annual increment.

Tree size class—A classification based on the diameter of the tree at breast height (4-1/2 feet above the ground on the uphill side of the tree).

Unclassified land—Locations that could not be classified on aerial photography for a number of reasons including cloud cover or shadow.

Upper stem portion—That part of the main stem or fork of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into branches.

Names of Trees²

Common name	Scientific name
Softwoods:	
Alaska-cedar	<i>Chamaecyparis nootkatensis</i> (D. Don) Spach
Lodgepole pine	<i>Pinus contorta</i> Dougl.
Mountain hemlock	<i>Tsuga mertensiana</i> (Bong.) Carr.
Sitka spruce	<i>Picea sitchensis</i> (Bong.) Carr.
Western hemlock	<i>Tsuga heterophylla</i> (Raf.) Sarg.
Western redcedar	<i>Thuja plicata</i> Donn
Hardwoods:	
Black cottonwood	<i>Populus trichocarpa</i> Torr. & Gray
Red alder	<i>Alnus rubra</i> Bong.

² Scientific names are according to Viereck and Little (1972).

Tables

Estimates in this report were developed from statistically based samples and therefore are subject to sampling error. Sampling errors for estimates of various resource quantities are presented in the section, "Reliability of Inventory Data."

Table 2—Area of forest land by forest type and land class, Ketchikan Area unit, southeast coastal Alaska, 1985

Forest type	Land class				All classes
	Timberland		Other forest land		
	Available	Reserved	Available	Reserved	
<i>Thousand acres</i>					
Softwoods:					
Cedar ^a	29	6	659	513	1,207
Hemlock ^b	931	469	273	212	1,885
Hemlock-spruce	551	145	—	—	696
Lodgepole pine	—	—	68	53	121
Sitka spruce	17	3	—	—	20
Total	1,528	623	1,000	778	3,929
Hardwoods:					
Black cottonwood	0 ^c	4	—	—	4
Red alder	2	1	—	—	3
Total	2	5	—	—	7
Nonstocked	2	0	23	18	43
All types	1,533	628	1,023	796	3,978

— = no data were collected.

Totals may be off because of rounding.

^a Includes western redcedar and Alaska-cedar.

^b Includes mountain and western hemlock.

^c 0 = less than 500 acres.

Table 3—Number of growing stock trees on available timberland by species and diameter class, Ketchikan Area unit, southeast coastal Alaska, 1985

Species	Diameter class (inches)								All classes
	Seedlings less than 1.0	1.0- 4.9	5.0- 8.9	9.0- 12.9	13.0- 16.9	17.0- 20.9	21.0- 28.9	29.0+	
<i>Thousand trees</i>									
Softwoods:									
Alaska-cedar	216,298	25,839	9,961	6,568	4,165	3,100	2,440	529	268,974
Lodgepole pine	33,985	2,162	1,243	811	108	162	54	—	38,579
Mountain hemlock	396,382	35,791	11,358	5,767	2,951	1,785	1,641	529	462,414
Western hemlock	7,716,911	307,254	60,994	26,039	17,879	9,452	10,606	4,730	8,154,776
Sitka spruce	828,012	114,023	6,426	2,749	1,909	1,817	2,188	2,719	895,050
Western redcedar	434,400	20,421	11,232	5,920	9,162	3,755	4,278	3,043	488,716
Total	9,627,736	445,171	101,233	48,575	32,751	20,281	21,165	11,534	10,308,930
Hardwoods:									
Black cottonwood	—	—	—	—	—	—	216	—	216
Red alder	4,876	8,711	1,606	26	110	—	—	—	15,311
Total	4,876	8,711	1,606	26	110	—	216	—	15,527
All species	9,632,612	453,882	102,838	48,600	32,861	20,281	21,381	11,534	10,324,457

— = no data were collected.

Totals may be off because of rounding.

Table 4—Net volume of timber on available timberland by class of timber and by softwoods and hardwoods, Ketchikan Area unit, southeast coastal Alaska, 1985

Class of timber	Softwoods	Hardwoods	All classes
<i>Million cubic feet</i>			
Sawtimber trees:			
Saw-log portion	7,859	26	7,886
Poletimber trees	314	3	317
All growing stock	8,173	29	8,202
Cull trees	92	—	92
Salvable dead trees	773	—	773
All timber	9,038	29	9,067

Totals may be off because of rounding.

Table 5—Net volume of sawtimber, Scribner rule, on available timberland by species and diameter class, Ketchikan Area unit, southeast coastal Alaska, 1985

Species	Diameter class (inches)					All classes
	9.0-12.9	13.0-16.9	17.0-20.9	21.0-28.9	29+	
<i>Million board feet</i>						
Softwoods:						
Alaska-cedar	234	352	465	669	282	2,002
Lodgepole pine	36	10	21	16	—	83
Mountain hemlock	344	335	412	703	499	2,292
Western hemlock	1,182	2,561	2,787	6,299	6,499	19,329
Sitka spruce	138	295	629	1,515	6,674	9,252
Western redcedar	236	492	570	1,158	1,885	4,341
Total	2,170	4,046	4,883	10,360	15,838	37,298
Hardwoods:						
Black cottonwood	—	—	—	105	—	104
Red alder	0 ^a	11	—	3	—	15
Total	0	11	—	108	—	119
All species	2,170	4,058	4,883	10,468	15,838	37,417

— = no data were collected.

Totals may be off because of rounding.

^a 0 = less than 500,000 board feet.

Table 6—Net volume of growing stock on available timberland by species and diameter class, Ketchikan Area unit, southeast coastal Alaska, 1985

Species	Diameter class (inches)						All classes
	5.0-8.9	9.0-12.9	13.0-16.9	17.0-20.9	21.0-28.9	29+	
<i>Million cubic feet</i>							
Softwoods:							
Alaska-cedar	29	75	98	125	174	71	573
Lodgepole pine	4	11	3	7	3	—	28
Mountain hemlock	26	74	87	98	161	109	553
Western hemlock	196	393	614	601	1,269	1,263	4,335
Sitka spruce	21	36	56	130	284	1,087	1,612
Western redcedar	40	68	132	145	276	412	1,072
Total	314	657	989	1,106	2,166	2,941	8,173
Hardwoods:							
Black cottonwood	—	—	—	—	23	—	23
Red alder	2	0 ^a	3	—	1	—	6
Total	2	0	3	—	24	—	29
All species	316	657	992	1,106	2,190	2,941	8,202

— = no data were collected.

Totals may be off because of rounding.

^a 0 = less than 500,000 cubic feet.

Table 7—Net annual growth of growing stock on available timberland by species and type of volume, Ketchikan Area unit, southeast coastal Alaska, 1985

Species	Type of volume	
	Cubic-foot	Board-foot ^a
<i>Thousand feet</i>		
Softwoods:		
Alaska-cedar	3,081	12,670
Lodgepole pine	144	750
Mountain hemlock	1,071	4,701
Western hemlock	14,982	73,338
Sitka spruce	4,464	24,265
Western redcedar	1,091	5,168
Total	24,833	120,892
Hardwoods:		
Black cottonwood	—	—
Red alder	—	—
Total	—	—
All species	24,833	120,892

— = no data were collected.

Totals may be off because of rounding.

^a Scribner volume based on 16-foot logs.

Table 8—Average annual mortality of timber, on available timberland by species and type of volume, Ketchikan Area unit, southeast coastal Alaska, 1985

Species	Type of volume	
	Cubic foot	Board foot ^a
<i>Thousand feet</i>		
Softwoods:		
Alaska-cedar	8,148	30,183
Lodgepole pine	378	1,784
Mountain hemlock	2,835	11,194
Western redcedar	2,886	12,307
Sitka spruce	11,717	57,793
Western hemlock	39,619	174,640
Total	65,584	287,900
Hardwoods:		
Black cottonwood	—	—
Red alder	—	—
Total	—	—
All species	65,584	287,900

— = no data were collected.

Totals may be off because of rounding.

^a Scribner volume based on 16-foot logs.

Table 9—Average per-acre characteristics of sawtimber-volume strata (map classified) for timber 9.0 inches in diameter at breast height and larger on available timberland, Ketchikan Area unit, southeast coastal Alaska, 1985

Per-acre characteristic	Sawtimber-volume stratum ^a			
	8,000-19,999	20,000-29,999	30,000-49,999	50,000+
Number of trees	126	95	70	80
Basal area (square feet)	208	231	204	229
Quadratic-mean tree diameter (inches)	17.4	21.1	23.1	22.9
Average height of the 40 largest diameter trees (feet)	77	94	97	104
Percent volume-defect (Scribner rule)	27.0	21.8	21.1	19.2
Species distribution of total volume (Scribner rule) in percent:				
Alaska-cedar	13.4	2.7	1.6	0.2
Sitka spruce	18.2	26.0	33.3	24.0
Lodgepole pine	.8	—	—	—
Western redcedar	20.4	8.3	7.1	8.0
Western hemlock	34.2	58.9	55.1	67.8
Mountain hemlock	11.9	4.1	2.9	—
Hardwoods ^b	1.1	t ^c	—	—
Live-tree volume (Scribner rule)	19,639	33,638	31,201	35,046
Merchantable-dead tree volume (Scribner rule)	2,010	2,398	2,071	2,867

— = no data were collected.

^a Net board feet, inventory Scribner volume, except base volume of 8,000 board feet, which is International 1/4-inch rule.

^b Hardwood volume is incidental to softwood forest types; volume in hardwood types is not referenced in this table.

^c t = trace.

Table 10—Summary of timber harvest, Scribner rule, Ketchikan Area unit, southeast coastal Alaska, 1973-84^a

Year of harvest	Volume scaled, Scribner rule ^b	Inventory volume, Scribner rule ^c
<i>Thousand board feet</i>		
1973	335,245	427,672
1974	302,004	385,267
1975	205,480	262,131
1976	238,015	303,636
1977	214,668	273,852
1978	204,766	261,220
1979	223,203	284,740
1980	219,011	279,392
1981	148,157	189,004
1982	143,932	183,614
1983	146,891	187,389
1984	147,908	188,686
Total	2,529,280	3,226,603

^a Before 1977, utility volume (chippable volume in saw log-sized logs not otherwise qualifying as saw logs) was included with growing stock volume. It has been deducted (by estimate) for this table.

^b Scribner rule, Bureau scale.

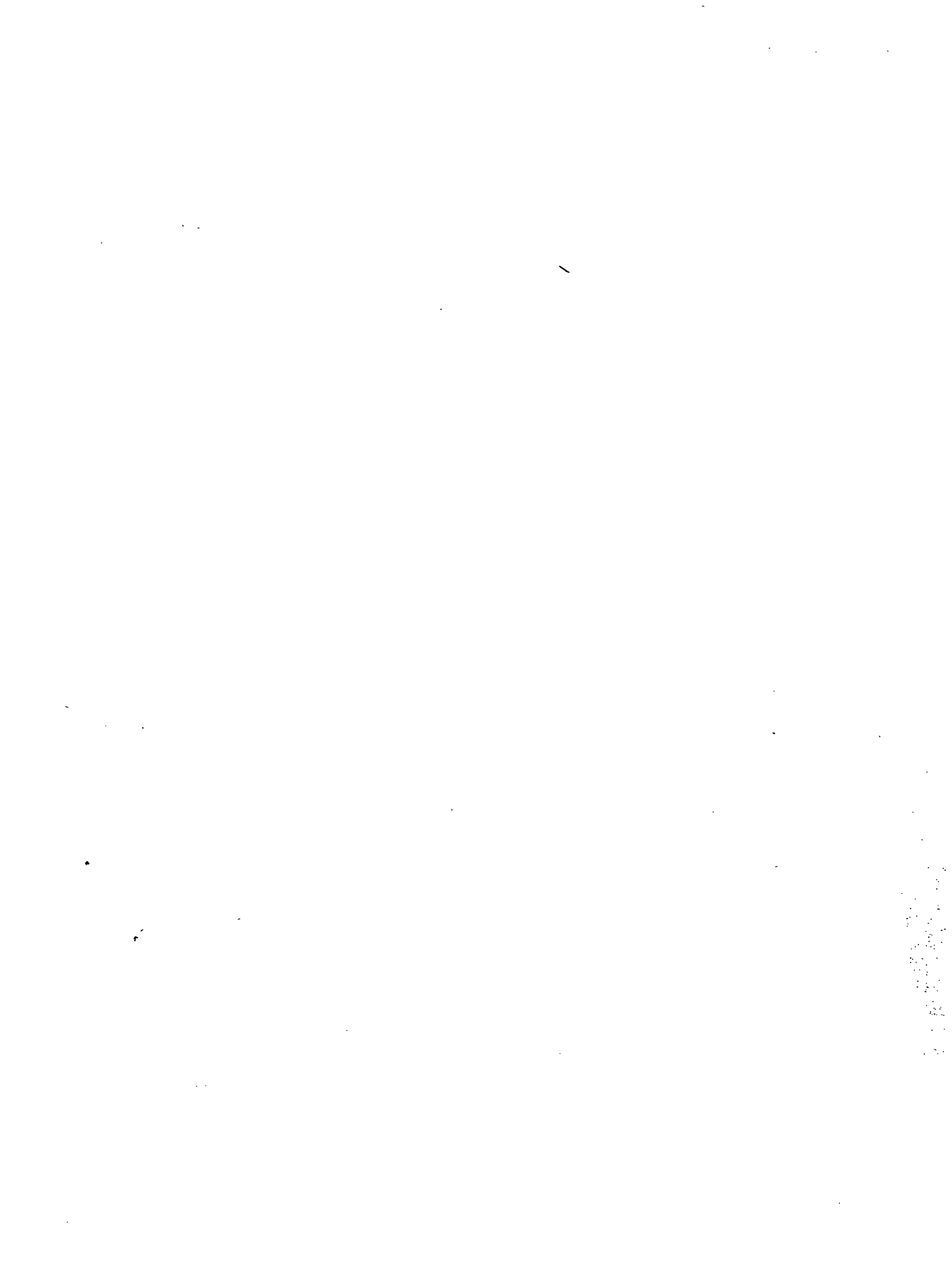
^c Inventory volume = Scribner, Bureau scale volume × 1.2757.

Metric Equivalents

- 1 inch = 2.54 centimeters
- 1 foot = 0.3048 meter
- 1 acre = 0.4047 hectare
- 1 cubic foot = 0.0283 cubic meter
- 1 cubic foot per acre = 0.07 cubic meter per hectare
- 1 mile = 1.609 kilometers

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Statistics on forest area, total gross and net volumes, and annual net growth and mortality are presented from the 1984-85 timber inventory of the Ketchikan Area, Tongass National Forest, Alaska. Available timberland area is estimated at 1.5 million acres, net growing stock volume at 8.2 billion cubic feet, and annual net growth and mortality at 24.8 and 65.6 million cubic feet, respectively.

Keywords: Forest surveys, timber inventory, statistics (forest), Alaska (southeast).

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