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TIMBER SUPPLY AND USE in the Haines-Skagway Area, Alaska

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Acknowledgments

The forest inventory reported here was accomplished by joint efforts of the Forestry Sciences Laboratory of the Forest Service, U.S. Department of Agriculture at Juneau, Alaska, and the State of Alaska Department of Natural Resources, through the State Forester's office at Anchorage. Without the interest and aid of the State Forester and his staff, this inventory would not have been made.

Metric Conversions

1 acre	= 0.4047 hectare
1 hectare	= 2.47 acres
1 cubic foot	= 0.0283 cubic meter
1 cubic meter	= 35.3145 cubic feet
1 cubic foot per acre	= 0.06997 cubic meter per hectare
1 cubic meter per hectare	= 14.29 cubic feet per acre
20 cubic feet per acre	= 1.3994 cubic meter per hectare
1 square foot basal area per acre	= 0.2296 square meter per hectare
1 square meter per hectare	= 4.356 square feet per acre

Cover photo: Logged area is old-growth Sitka spruce type on the glacial moraine in front of Davidson Glacier near Haines, Alaska.

TIMBER SUPPLY AND USE IN THE HAINES-SKAGWAY AREA, ALASKA

Reference Abstract

LaBau, Vernon J., and O. Keith Hutchison
1976. Timber supply and use in the Haines-Skagway area, Alaska. USDA For. Serv. Resour. Bull. PNW-67, 44 p., illus. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Discusses the results of a 1965 forest inventory of 449,300 acres in the Haines-Skagway area. Selected references are used to describe the economy of the area historically and currently. Interpretations and assessments of the timber resource in the continuing economy are made.

KEYWORDS: Forest surveys (Alaska), resources (forest), timber marketing.

RESEARCH SUMMARY

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1976

An area of 449,300 acres at the head of Lynn Canal, referred to in this report as the Haines-Skagway area, has 193,600 acres of forest land of which 111,000 acres is of commercial quality. The nonforest area, 255,700 acres, is mostly gravel bars along the rivers, muskeg, brushland along the streams, and alpine vegetation above timberline.

The State of Alaska owns 75.6 percent of the area studied, including 84,000 acres of commercial forest land. The remaining 27,000 acres of commercial forest land is in private, municipal, or Indian corporation ownerships. Of 256,694 acres of State land that have been patented and tentatively approved, 107,119 acres have been classified. At this time, it appears that approximately 75 percent of the commercial forest land in the area will be classified "resource management."

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Preface

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of 1928, as amended and supplemented, is a nationwide project of the Forest Service. The Act was amended in August 1953 to include territories and possessions. Forest inventory work began in Alaska in 1954. The purpose of the survey is to periodically inventory the area and condition of forest lands and the volume of timber on them, to determine rates of forest growth and depletion, to estimate present consumption of timber products and probable future trends in timber requirements, and to analyze and distribute information needed in the formulation of forest policies and programs.

This report summarizes the results of the first intensive forest inventory of the Haines-Skagway area and adjacent drainages.

The survey was based on a study of aerial photographs, followed by field measurements to check the accuracy of the photo interpretation and to obtain supplemental tree measurements. The sampling technique was designed to determine the commercial forest area within ±3 percent per million acres and the timber volume within ±5 percent per billion cubic feet of growing stock.

Vertical aerial photographs at 1:12,000 scale of the area to be studied were provided by the State of Alaska, Division of Lands. Systematically selected plots were interpreted on the photos, and a sample of these plots was sent to the field for examination. Three 1/5-acre plots were measured at each field location.

The hemlock-spruce type accounts for 84.6 percent of the commercial forest land and for 93 percent of the sawtimber volume. A cottonwood type found on the flood plains and gravel bars accounts for 13.8 percent of the commercial forest land and 6 percent of the sawtimber volume. A birch type accounts for the remaining area and volume.

The total net volume of sawtimber is 2,887 million board feet. The stands average 29,800 board feet per acre (gross) and 26,000 net. Of the net volume, 47 percent is Sitka spruce (*Picea sitchensis* (Bong.) Carr.) and 42.7 percent western hemlock (*Tsuga heterophylla* (Raf.) Sarg.). Of the gross volume, however, 43.9 percent is Sitka spruce and 46.0 percent western hemlock.

Gross annual growth averaged 172 cubic feet per acre for the young-growth stands measured. Growth was not measured on old-growth stands; instead, increment in these stands was assumed to be offset by losses from decay, windthrow, and other causes. For the total commercial forest area, the gross annual growth averaged 56.19 cubic feet per acre, with a net

average of 36.76 cubic feet. Mortality which is deducted from gross growth to obtain net growth was 78.6 percent Sitka spruce and 19.5 western hemlock. A predominance of mortality seems to support a theory that the spruce stands of this region are generally approaching climax conditions with the spruce giving way to hemlock stocking.

Haines has two sawmills and is an important port for export of logs and cants. Logs are exported from private land. The log volume supplied from State land from 1961 through 1973 averages 19.9 million board feet annually. If all present State forest land of the Haines-Skagway area remains available for timber production, the present average log supply should be sustained.

Introduction

At the head of Lynn Canal, bounded by British Columbia on the north and west, the North Tongass National Forest on the south and east, and Glacial Bay National Monument on the southwest, is an extensive area of former public domain now largely in State ownership (fig. 1). The main drainage of this

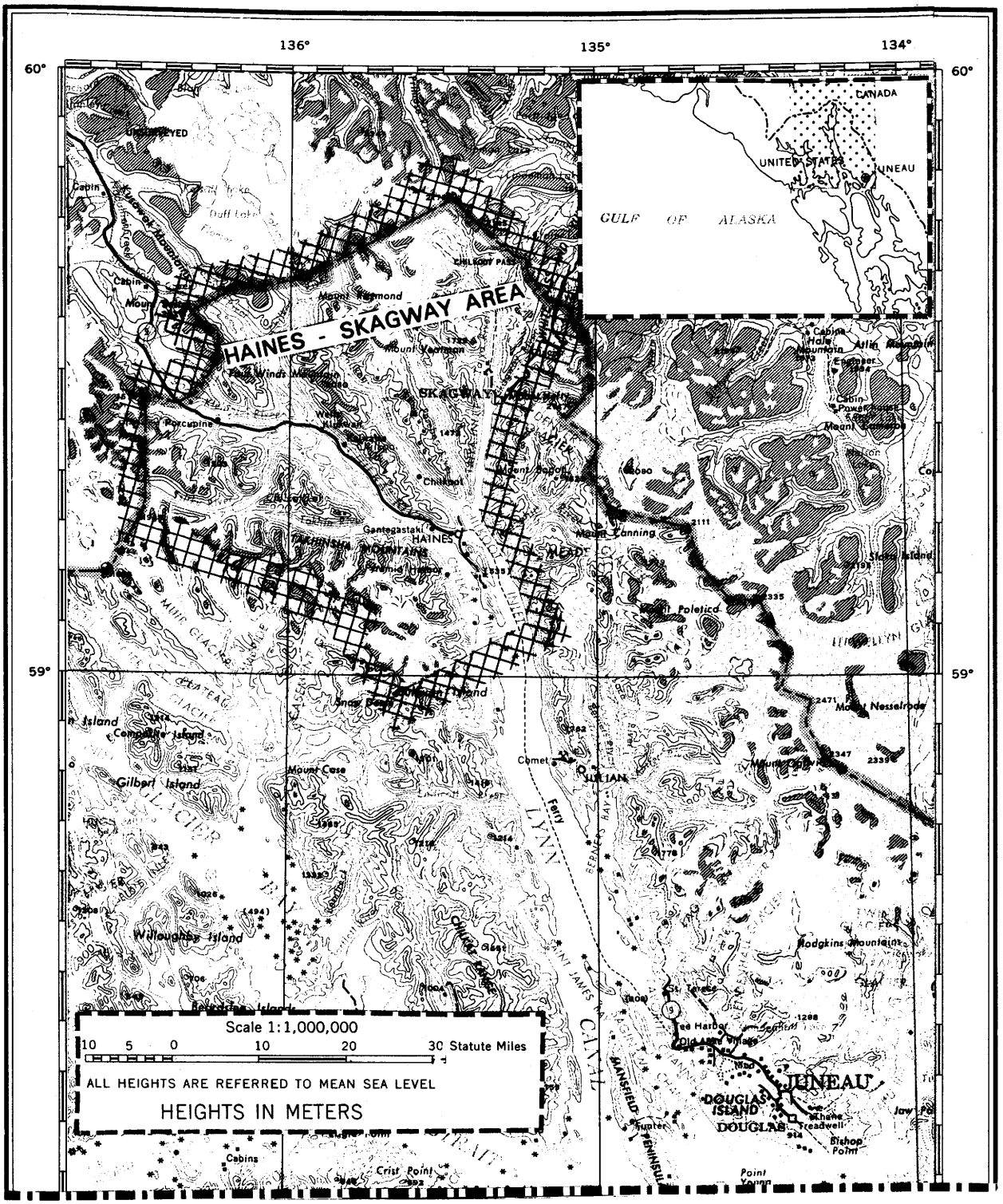

Figure 1.--The Haines-Skagway area.

area is southward into Lynn Canal which is a natural body of water affected by the Pacific Ocean tides. The Klehini, Kelsall, Chilkat (fig. 2), Chilkoot (fig. 3), Skagway, and Taiya Rivers are the most important streams; but none are navigable except by small boats. All are glacial-fed streams, and the water level fluctuates considerably.

This region is the home of the well-known Chilkat Indians, members of the Tlingit tribe. Native villages included Klukwan, Chilkat, Chilkoot, and Yindastuki. Russian, American, and other traders were familiar with this area long before settlements began at Haines, Dyea, and Skagway.

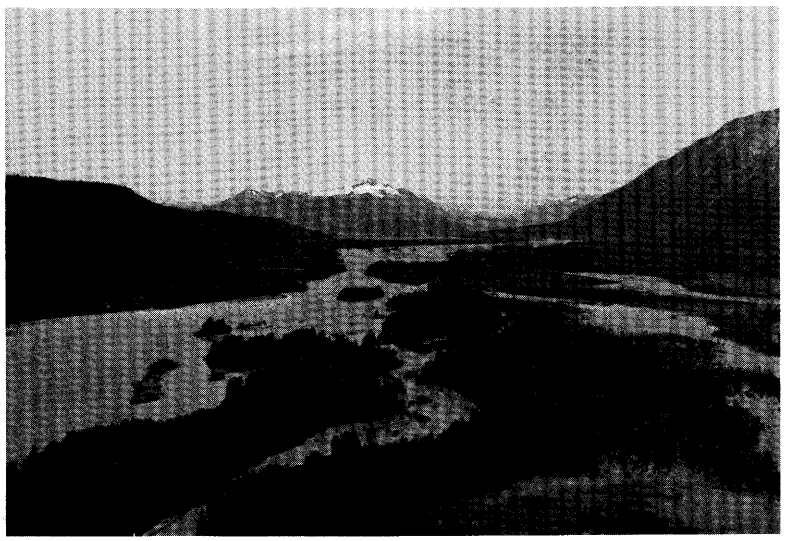

Figure 2.--The Chilkat River valley as seen from about Mile 10 on the Haines Highway.

Figure 3.--A view up the Chilkoot River valley.

Haines began in 1881 as a project of the Presbyterian Church. Reverend and Mrs. Eugene S. Willard were sent to establish a church and school known as "Haines House". This early settlement was named after Mrs. F. E. Haines who helped finance the project (Cooley 1953). About 1890, John Dalton constructed a 400-mile trail from Haines to Fort Selkirk on the Yukon River. The trail followed the Chilkat and Klehini Rivers to Chilkat Pass and was used to move freight supplies and livestock. Dyea was established a few years later as a station on the Chilkoot trail to the Klondike. In 1898, Skagway began as a tent city and became the staging area for entry to the Klondike goldfields by a shorter route over White Pass.

After the gold rush, Haines, Port Chilkoot and Skagway survived as the only business settlements in the area (fig. 4). These towns have histories of sporadic growth and recessions. Fort William H. Seward, an army post, was established adjacent to Haines in 1904 and was comprised of 85 permanent buildings with 400 officers and men (Cooley 1953). Haines developed with an economy built on retail trade and services. Both Haines and Skagway experienced a recession, however, as mining declined and lost all importance by 1920. Haines flourished again during World War II after a highway was built to connect with the newly constructed Alaska Highway. Recession hit again in 1946, however, as the war ended and the army post was closed. The economy was left with two small canneries, one small sawmill, and a few truck gardens. In 1950 the population was 645, and employment ranged from a peak of 94 in August to a low of 15 in January. The army post was sold to private enterprise and was renamed Port Chilkoot. About 1970, Port Chilkoot was annexed to become a part of the city of Haines.[1/]

[1/] Source: State of Alaska, Department of Community and Regional Affairs.

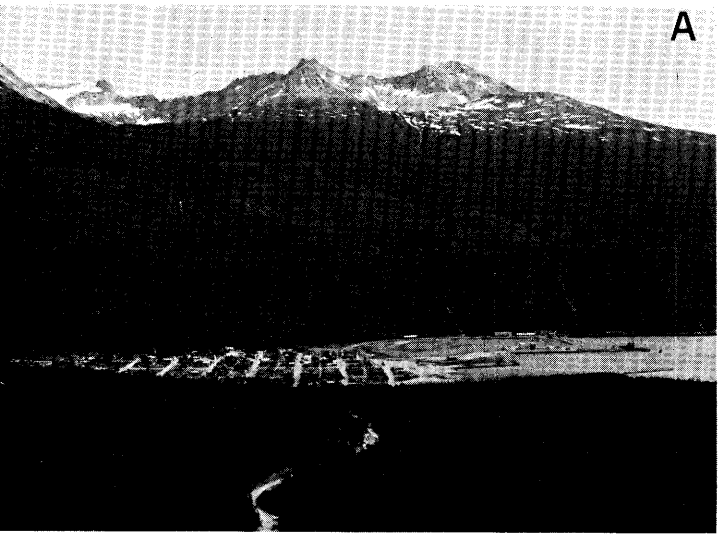

Figure 4.--A, Skagway; B, Haines and Port Chilkoot, Alaska (Port Chilkoot was annexed to Haines about 1970). (Photo, courtesy Tom Wade, State of Alaska)

Today a narrow gage railroad through the White Pass connects Skagway with Whitehorse in the Yukon. Haines is connected by highway to Canada and west Alaska. A marine highway, connecting Skagway and Haines to the rest of southeast Alaska, has brought a great increase in tourism and travel to this area. As signs of industrial development begin to show in British Columbia, the Yukon, and Alaska, these communities show promise of becoming important export points for wood and mineral products.

In 1954, a preliminary survey of forests in this area indicated a sufficient timber volume for significant sustained industrial development. At that time, these stands were largely in the public domain managed by the Bureau of Land Management, U.S. Department of the Interior. After Alaska became a State, most of the commercial forest land of this area was selected for State ownership. In 1965, the State of Alaska Division of Lands and the U.S. Forest Service undertook a new and more intensive inventory of the forests of this region (fig. 5). That inventory is the basis for this report.

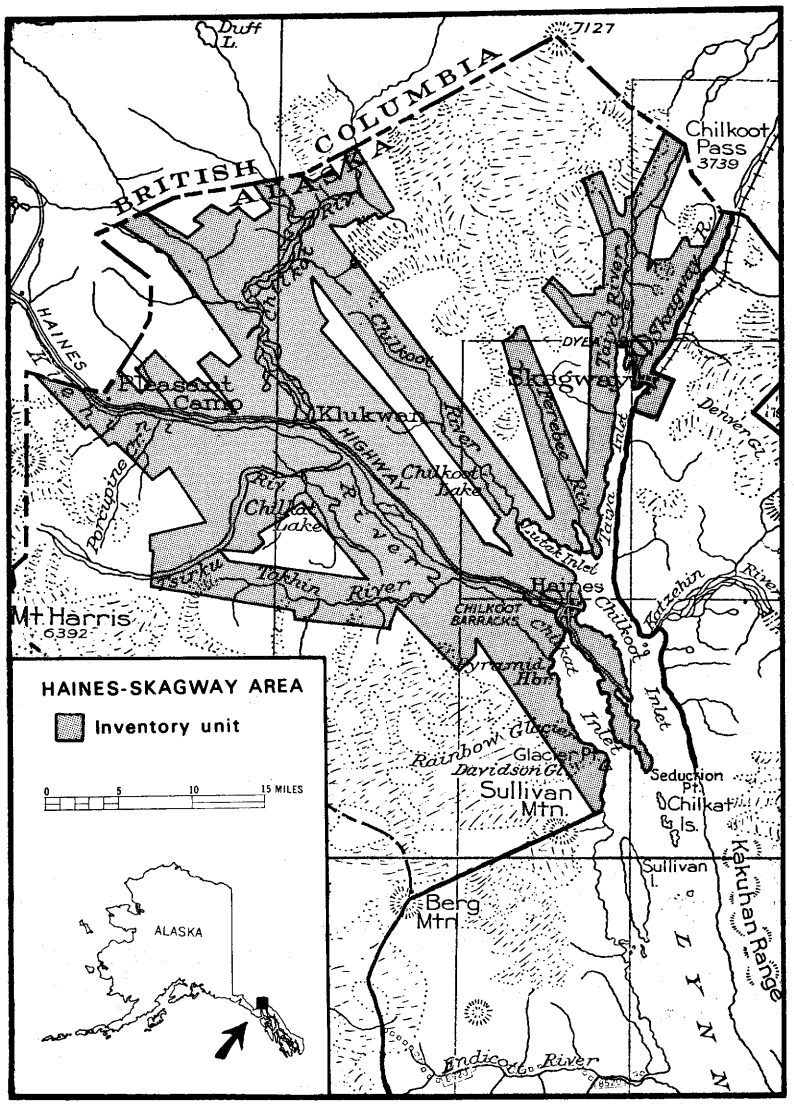

Figure 5.--The shaded portion indicates the area covered by aerial photographs; this includes most of the commercial forest land of the Haines-Skagway area.

Land and Forest Area

The total area of the Haines-Skagway region has been estimated to be 912,400 acres. The total area included in this study was 449,300 acres. This area was selected because maps, aerial photographs, and local knowledge showed that practically all the available commercial forest land was within this area. A systematic study of the aerial photographs followed by a field check showed the total forest area to be 193,600 acres, of which 111,000 acres (fig. 6) were of commercial quality.[2/] A subsequent study was made to determine the amount of forest land outside the study area but within the 912,400-acre region. About 27,500 acres of forest land are estimated to be in this "outside area," of which about 12,000 acres are of commercial quality. If this estimate of "outside" forest land is included in the totals, there are 123,000 acres of commercial forest in a total forest area of 221,100 acres.

The nonforest area of the study unit, 255,700 acres, is mostly gravel bars along the rivers, muskeg, brushland along the streams, and alpine vegetation above timberline. Little of the area is used for commercial and agricultural purposes, although Haines is noted for its strawberries. About 5,200 acres of the nonforest area are water in lakes and streams. An additional 435,600 acres of high-elevation, nonforest land in the "outside" area are not included in this study. The variety of vegetative types, beautiful lakes and streams, rugged mountains, and pleasing climate combines to make this area much in demand for recreation. Development for recreational use is already well started, and much coordinated management will be required to keep various land uses from conflicting.

2/ For definitions of terms used in this report, see page 18.

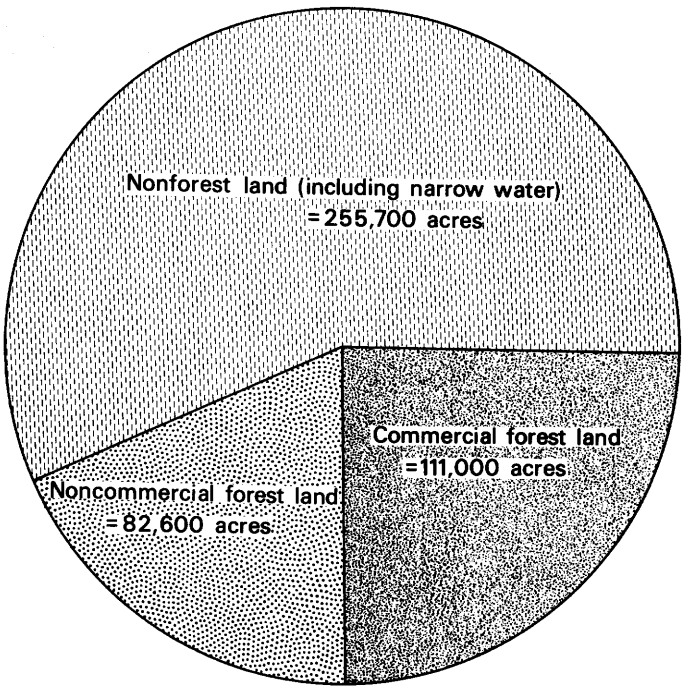

Figure 6.--Of the 449,300 acres studied, roughly 25 percent is commercial forest land. An additional 18 percent is forest land of noncommercial quality.

Forest Land Ownership

The inventory did not include a study of ownership. However, based on forest type maps prepared by the Alaska Division of Lands, the State owns 75.6 percent of the area studied, of which 84,000 acres is commercial forest land. The remaining 27,000 acres of commercial forest land are in private, municipal, or Indian corporation ownerships. None is in the Tongass National Forest which joins the study area on the south.

Further analysis by the State Department of Natural Resources, Division of Lands, shows that of the approximately 1 million acres of land comprising the Haines-Skagway area (fig. 7) the State has selected 415,000 acres under the Alaska Statehood Act of 1958. As of October 1974, the State had received patent to 169,178 acres and tentative approval for patent to an additional 87,516 acres. Since there are no Native village withdrawals[3/] or other withdrawals in the area, the State expects patent will be received to all present and future land selections. However, it should be noted that the village of Klukwan elected to obtain surface and subsurface rights to their revoked reservation.

Through the State's land planning process, State lands are placed in one of several classifications. Certain classifications, such as "resource management" and "public recreation," are used for lands to be retained in State ownership. Other classifications, such as "industrial," "private recreation," "residential," and "utility," are used for lands planned to be leased or sold. Of the 256,694 acres of patented and tentatively approved lands, 107,119 acres have been classified:

	Acres
Resource management	54,100
Timber	48,577
Utility	35
Public recreation	2,131
Reserved use	73
Residential	5
Private recreation	644
Mineral	153
Industrial	1,401
Total	107,119

Of the lands patented to the State, only 252.3 acres have been placed in other ownerships through maturing land sale contracts or transfers to local government. In 1975 there were 2,085 acres in disposal classifications, some of which will pass from State ownership when existing contracts mature. Additional lands will ultimately be transferred to local governments.

Most of the State-selected lands, however, will ultimately be classified "resource management." Resource management lands are defined by State regulation as lands containing an association of surface and subsurface resources which are especially suited to multiple-use management. State forest lands are logically placed within this classification. These lands will be retained in State (public) ownership and managed for resource use and development. Lands classified "resource management" may be leased for purposes consistent with the public interest but may not be sold or transferred to local government. Lands needed by communities for future growth and development as well as for long-range needs of public recreation will preclude all commercial forests on such lands from being managed for timber production.

At this time, it appears that approximately 75 percent of the commercial forest land in the area will be included in the resource management classification.

[3/] The Alaska Native Claims Settlement Act, 1971, P.L. 92-746 (43 U.S.C. 1601).

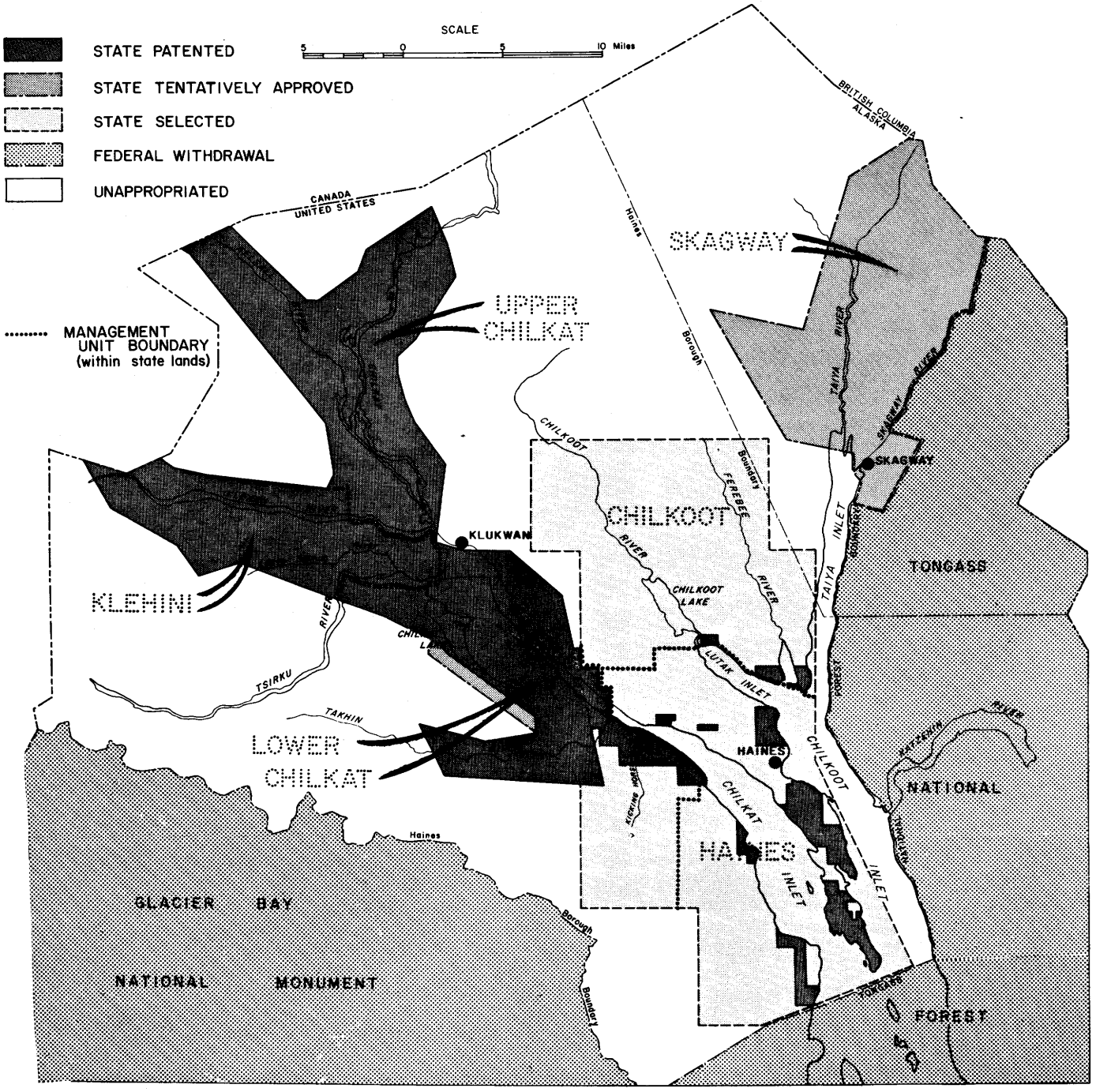

Figure 7.--Haines-Skagway ownership status and management units.

Forest Types

Several forest types can be recognized in the Haines-Skagway area, but only two are of commercial importance, the hemlock-spruce and the cottonwood types (table 6). The survey also measured the birch type, but this type is found on only 1.6 percent of the commercial forest area. The birch type and some less important types not included in our tables, such as lodgepole pine (*Pinus contorta* var. *latifolia* Engelm.) and aspen (*Populus tremuloides* Michx.), represent the southern limits of Yukon and British Columbia forests. These types are characteristic of drier climates than the coastal zone where spruce and hemlock dominate.

The hemlock-spruce type, comprising 93,900 acres, is 95-percent sawtimber. These stands are much in demand for saw logs and pulpwood. This type accounts for 84.6 percent of all commercial forest land and 93 percent of the sawtimber volume. Almost all the commercial stands occur below 2,000-foot elevation. Most of these stands are considered accessible by present logging methods.

Regeneration of these stands after logging is not expected to present serious problems; regeneration is being continuously monitored by the State Forester to recognize and correct any problem areas. A comparison of tables 25 and 28 indicates that over 9,000 acres of commercial forest land were cut over between 1964 and 1973 on State and private land. Cutover areas with less than 40-percent stocking 3 years after cutting would be inadequately stocked. Thus far, all cutover areas have been more than 46 percent stocked, with some stocked at least 90 percent.

The cottonwood type, comprising 15,300 acres, is found on the flood plains and gravel bars bordering the streams. This type accounts for 13.8 percent of all commercial forest land and 6 percent of the sawtimber volume. Most of the cottonwood type is in sawtimber stands. These stands appear thrifty and of good quality, but logging experience has shown many of them to be overmature and quite defective. Some black cottonwood (*Populus trichocarpa* Torr. & Gray) has been logged, but experience with management of these stands is too limited to show what problems may be encountered in regeneration. In other regions, cottonwood has been slow to regenerate. The cutover areas often revert to brush and weeds.

The birch type, accounting for 1.6 percent of the commercial forest land, occurs in scattered, spotty locations and is not expected to develop much commercial importance. Some specialty and novelty uses may develop for local birch (*Betula papyrifera* var. *commutata* (Reg.) Fern.).

Stand-Size Classes

Ninety-four percent of the commercial forest area is now supporting enough timber volume to be classed as sawtimber (table 2). The minimum volume in this classification is 8,000 board feet (International 1/4-inch rule).[4/] Sawtimber stands were further divided into old growth and young growth. Old-growth (trees averaging more than 150 years old) sawtimber stands accounted for 67.3 percent of the area, and young-growth sawtimber stands, 26.7 percent. For management purposes it may be desirable to harvest the old-growth stands as early as possible. On the other hand, if markets are not suitable, some stands can be held for several years without serious loss.

Poletimber stands comprise only 3.5 percent of the commercial forest area, and seedling and sapling stands

[4/] Throughout this report, unless otherwise stated, values given in board feet are based on the International 1/4-inch rule.

comprise only 2.5 percent, indicating an imbalance for easy management. For management based on strict area-control, one-fourth of the area should be in each stand-size class (not including the nonstocked class). Of course, other forms of management may be used, requiring some degree of imbalance by stand-size class.

Forest Volume

SAWTIMBER VOLUME

Commercial forests in the Haines-Skagway study area have a total net volume of 2,887 million board feet. An additional 300 million board feet of sawtimber is outside this area. Most of the outside area volume is inaccessible and will not contribute to allowable cut estimates for some time.

Net volume averages about 26,000 board feet per acre; gross volume, 29,800 board feet. Thus, allowance for defect, based on gross volume in these stands, amounted to about 12-1/2 percent. Defect increased as diameters increased (fig. 8). In western hemlock, defect increases from 11 percent in the 11- to 20-inch diameter classes to 36 percent in the >40-inch classes.

Softwoods comprise 90 percent of the net sawtimber volume--47.0-percent Sitka spruce and 42.7-percent western hemlock. Of the gross volume, however, 43.9 percent is Sitka spruce and 46.0 percent western hemlock, indicating that most defect was in western hemlock (19.1-percent loss); Sitka spruce was sounder (6.6-percent loss).

Distribution of volume by 2-inch diameter classes closely approximates the normal distribution curve (fig. 9); the volume is well distributed for management purposes. It should be possible to restrict most cutting to mature and overmature stands and expect them to be replaced by annual growth. Distribution of sawtimber volume by 10-inch d.b.h. classes shows most of the volume of the two major species to be in the 21- to 30-inch class.

Seventy-five percent of the sawtimber volume is in the old-growth sawtimber stand-size class. There are about 56,000 acres of old-growth sawtimber stands classed as well stocked, averaging 31,200 board feet per acre.

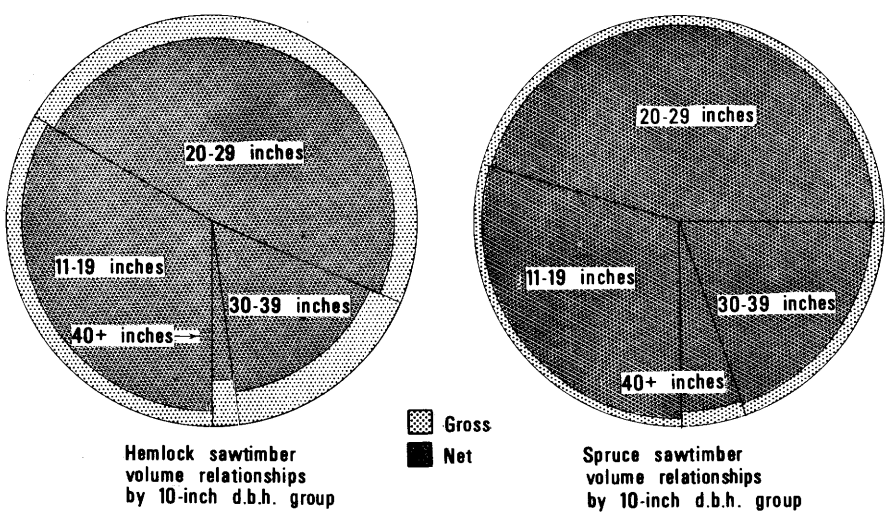

Figure 8.--Gross and net volume (International 1/4-inch rule) by species and 10-inch diameter class.

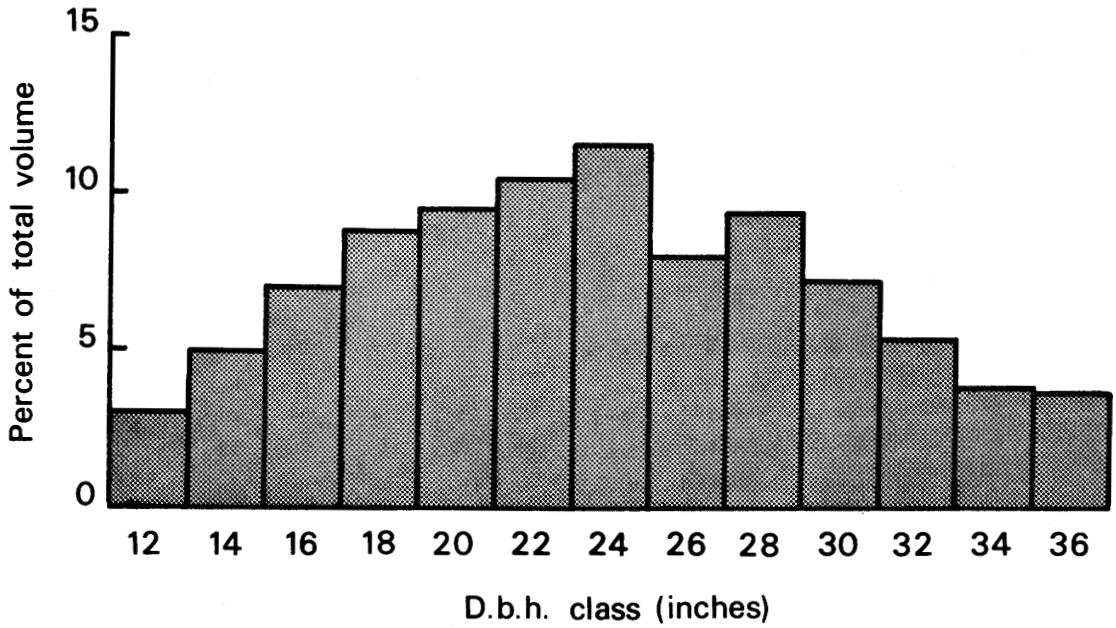

Figure 9.--Distribution of sawtimber volume by 2-inch diameter classes.

GROWING-STOCK VOLUME

The total net volume of wood in merchantable trees is 538 million cubic feet--an average of about 54 cords per acre. Old-growth sawtimber stands have 73.5 percent of the volume and average about 59 cords per acre. Young-growth sawtimber stands have 24.6 percent of the volume and average about 50 cords per acre. A 500-ton-per-day pulpmill could operate about 17 years on the total wood supply of the Haines-Skagway area without considering tree growth.

The hemlock-spruce type has 92.7 percent of the total volume. Cottonwood is the next most important type and has 6.7 percent of the total volume. Distribution of volume by species shows 45.0 percent in Sitka spruce, 44.1 percent in western hemlock, 9.6 percent in cottonwood, and 1.3 percent in other species.

Quality of Sawtimber

Of the sawtimber volume in the study area, 72 percent is estimated to be in low quality softwood logs. Only about 0.6 percent of the 2,887 million board feet is in high quality select or peeler logs. Over 20 percent of the total volume is in log grades 1 and 2, which are medium and better quality wood, mostly in softwood trees (table 17).

The hardwood volume, accounting for 8.0 percent of the total sawtimber volume, is 95-percent cottonwood. High quality, grade 1 logs comprise about 0.1 percent of the total hardwood sawtimber volume. Although birch is a minor species in this area, grade 2 or better birch logs account for about 1 percent of the high quality hardwood volume.

Current Growth

GROWTH ESTIMATES

Growth, measured in cubic feet, was estimated for all merchantable trees 5-inch d.b.h. and larger. Though trees less than 5-inch d.b.h. are important as new stands, they do not contribute to volume growth estimates.

The hardwood species are growing at a faster rate than the softwoods, although the softwoods account for 79.8 percent of the total gross annual growth. With growing-stock volume as the base, hardwoods have a 2-percent gross annual growth rate, whereas the gross annual rate for softwoods is 1 percent per year. Distributed over the total commercial forest area, the gross annual growth averages 56.19 cubic feet per acre. However, for this inventory the assumption was that old-growth sawtimber stands were not contributing to growth, i.e., that any increment in old-growth stands was offset by losses caused by decay, windthrow, and other causes. The gross annual growth amounts to 172 cubic feet per acre when distributed over just the young-growth stands on which growth was measured. On this basis, the gross growth rate is 4.4 percent.

The gross annual growth of sawtimber trees 11-inch d.b.h. and larger amounted to 27,686,000 board feet. For the area in young growth, this is an annual average of 763 board feet per acre. This is a respectable growth rate and if achieved on all 111,000 acres of commercial forest land would amount to an annual production of 84.7 million board feet.

When statistics on forest growth for the Haines-Skagway area were computed, no attempt was made to separate young- from old-growth stands. Growth was computed by a regression approach, with mean diameter growth by species group as a dependent variable and with d.b.h. and d.b.h.^{2} as independent variables. Growth for all trees was projected 10 years, and the volume change was divided by 10 for estimates of gross annual growth (table 18). Annual mortality estimates were then deducted from gross growth estimates to obtain net annual growth (table 24).

Comparison of tables 18 and 24 show that 75 percent of the gross growth of spruce is offset by mortality. Examination of the basic data showed that this probably is not due to sampling error but that stand composition is changing.

The impressions of field personnel were that the stands in the Haines-Skagway area are ecologically younger than stands of the Juneau-Sitka-Ketchikan areas. As southeast Alaska forests age and stands move toward a climax condition, the heavily stocked younger spruce stands give way to hemlock. The high rate of mortality in spruce may possibly be attributed to a change in stand composition normally associated with the transition to climax stands.

The average net annual growth for the Haines-Skagway area is 36.76 cubic feet per acre. Compared with preliminary estimates of the annual growth in the Juneau inventory unit (22.41 cubic feet), this faster growth seems to support the theory that Haines-Skagway forests are ecologically younger than the average southeast Alaska forest.

Data available from this inventory are not sufficient to formulate unqualified conclusions about growth and mortality. Additional studies of stand ecology of the area are needed.

Timber Losses and Risks

Mortality volume (2,161,000 ft^3) in the Haines-Skagway area amounted to 53.0 percent of the net annual growth (4,076,000 ft^3). This is lower than

the relationship in "Timber Trends in the United States" (USDA Forest Service 1965) for Western United States (70.5 percent) but greater than the relationship for all the United States (34.6 percent). The average annual mortality for the Haines-Skagway area was 19.5 cubic feet compared with 20.5 cubic feet for all the Western United States and 11.0 cubic feet for the Nation.

Sitka spruce mortality made up 78.6 percent of all mortality for the Haines-Skagway area (table 20), with the major part of the remaining mortality in western hemlock (19.5 percent). Spruce mortality (1,699,000 ft^3) amounted to 297 percent of the spruce net growth for the region (fig. 10). Mortality for western hemlock was 18.6 percent of net growth. The predominance of mortality in spruce seems to support the theory that the stands of this region are generally approaching climax conditions with the spruce stocking giving way to hemlock.

Mortality statistics reported here for cottonwood appear very conservative (1.2 percent of cottonwood net growth; probably the cottonwood mortality sample was inadequate, resulting in an underestimate.

The risks involved in management of the Haines-Skagway stands correlate closely with those of the Pacific Northwest forests noted in "Timber Trends" (USDA Forest Service 1965). Table 22 indicates that the greatest loss of cubic-foot volume (37.8 percent) is caused by insects killing the trees, with disease causing about 11.3 percent of the loss. Fire is an insignificant factor in loss of wood in the Haines-Skagway area. However, fire must be given more consideration as a risk factor here than for the rest of southeast Alaska because of the tendency toward less rainfall in the Haines-Skagway area. Several fires occurred during the gold-rush era that would be considered serious today.

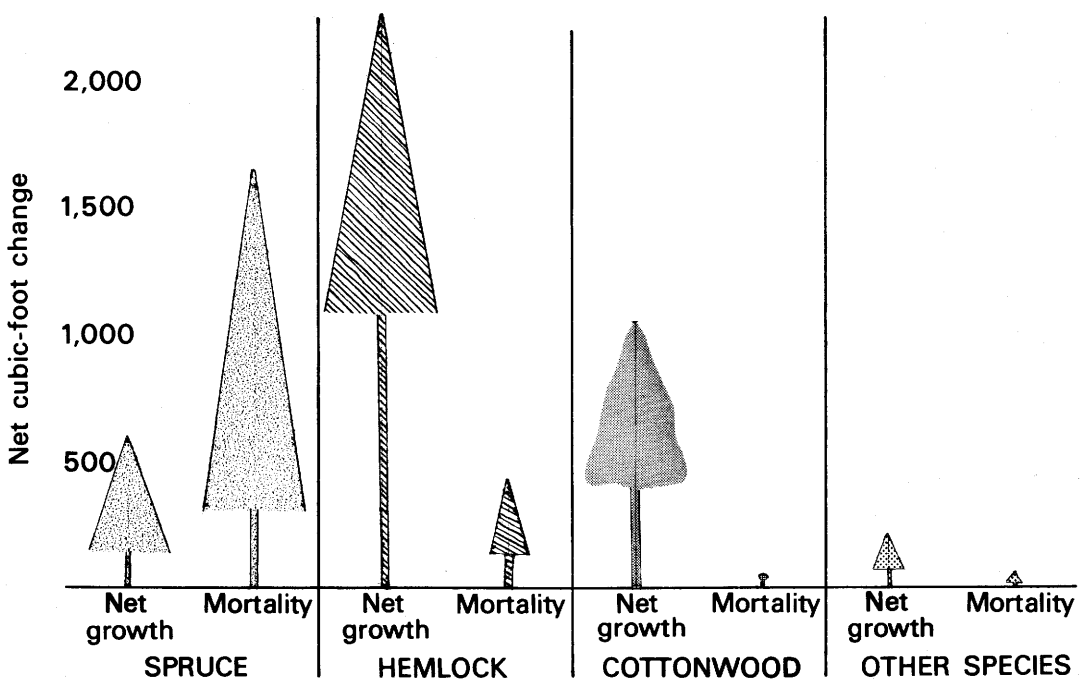

Figure 10.--Comparison of net growth and mortality by species, Haines-Skagway area.

Wind as a risk factor demands consideration. About 23 percent of the mortality volume can be attributed to wind. Although this cannot be compared with national trends, this windthrow is consistent with the rest of Alaska Panhandle where windthrow accounts for 26.3 percent of the mortality. Influence and prevailing direction of wind should be an important consideration to the forest manager when cut and leave areas are laid out in timber sales.

Other unknown or combined causes of death accounted for 27.9 percent of the loss. A few of the other factors of risk are animal damage, snow and ice breakage, flooding, and land and snow slides. All are less important risk factors, but combined they make up a substantial part of the total mortality picture.

Productivity

STOCKING CONDITION

Stand density is one good indication of site productivity. Sparse stands are generally found on sites with lower productivity; productivity usually improves as density improves. Stand density can be measured in a number of ways. An easy way of assessing stocking in the field and a method easily correlated to information obtainable from aerial photographs is crown closure. Crown closure can indicate to the forest manager stands that need some treatment to improve the stocking. Since it is related to stand volume per acre, crown closure also can indicate the extensiveness of stands suitable for harvesting.

In the Haines-Skagway area, stands on approximately 70 percent of the commercial forest land had crown closure of 70 percent or more and were classed as high density stands (table 4). Only 5 percent of the commercial forest area had low density stands with crown closure of less than 40 percent. Medium density stands, those with crown closure of from 40 to 70 percent, are found on the remaining 25 percent of the commercial forest land.

About 50 percent of all commercial forest land in the Haines-Skagway area is in old-growth sawtimber of high density. An additional 16 percent of the area is in young-growth sawtimber of high density. Thus, about two-thirds of all commercial forest land in this survey unit is in sawtimber stands that have crown closure of 70 percent or more. An additional 23 percent of the area is in sawtimber stands with from 40- to 70-percent crown closure.

VOLUME CLASSES

Another means of measuring stand productivity is to examine the volume class structure. Almost 40 percent of the commercial forest area in the Haines-Skagway area has stands averaging over 35,000 board feet per acre (table 3). On another 34 percent of the area, stands average between 15,000 and 35,000 board feet per acre; 26 percent has less than 15,000 board feet per acre.

The 15,000 board-foot class is often considered an approximation of the breaking point between operable and inoperable volume, if a given area is assumed accessible to logging equipment and is of sufficient size. Over 97 percent of the area averaging 15,000 or more board feet per acre is in hemlock-spruce forest. Cottonwood stands make up the other 3 percent. Lodgepole pine, birch, and aspen stands usually contain less than 15,000 board feet per acre.

SITE

A third means of assessing land productivity is by classification of site. Site determination reflects the wood-producing potential of the commercial forest land. The results of this report do not reflect the absolute potential productivity which might be obtained by ultimate

manipulation of environmental factors. No analysis was made of soil nutrients, moisture, available light, temperature, or topography.

Old-growth, uneven-aged stands do not lend themselves to the conventional method of site evaluation, which is the total tree height divided by its age. As an index (Godman 1951) of site quality for old-growth stands, *the average number of 16-foot logs between stump and the 6-inch top in trees above average stand diameter* was used. Over 85 percent of the old-growth stands and over 59 percent of all commercial forest sites of the Haines-Skagway area supported hemlock-spruce stands averaging four or more 16-foot logs.

Site information obtained for young-growth sawtimber (table 5) was not adequate for a conclusive analysis.

Potential productivity of the Haines-Skagway area appears to be very good, especially when the average annual increment of this area is compared with the rest of Western United States. "Timber Trends" (USDA Forest Service 1965) indicates that the average net annual growth for all of Western United States is about 29.1 cubic feet, and the average net annual growth for the Haines-Skagway area is about 36.7. There may be a higher proportion of old-growth stands throughout the Western United States than in the Haines-Skagway area, accounting for the lower growth rate in the Western United States. However, the fact that the Haines-Skagway average annual increment is above the national average of 32.0 cubic feet indicates that this area has very good potential for production of wood products.

Allowable Cut

Allowable cut (Ford-Robertson 1971) is based on management decisions aimed at a sustained yield of wood products. The allowable cut can change periodically as the resource base is altered through management and our shifting economy. Much timber is available today and included in allowable cut estimates that would not have been considered a few years ago.

Computed by the Kemp formula (Davis 1966), the annual allowable cut for the total Haines-Skagway area is about 50 million board feet. This is an upper limit and probably cannot be achieved in a management plan. Some timber certainly will be withheld from cutting to satisfy other land and timber uses. Also it is difficult to include several ownerships in one management plan. Some timber owners will not be interested in sustained yield management.

With strict area control, an assumed rotation age of 100 years, and all commercial forest land committed to timber production, 1,110 acres could be cut each year. If the land productivity is equally distributed among the four producing stand-size classes, then the annual cut would come from the old-growth sawtimber stands. These stands average 29,100 board feet per acre. On this basis, the annual allowable cut would amount to only 32 million board feet.

The assumption might be made that through good forest management practices, the average volume of the best stands could be achieved during the cutting rotation on all commercial forest land. The best class identified in this inventory averaged about 38,000 board feet per acre. Annual allowable cut based on this average would be approximately 42 million board feet.

Allowable annual cut computed by the Hanzlik formula (Davis 1966) would be about 37 million board feet. This method divides the volume of mature timber by the cutting rotation and adds the annual growth. If much of the area is currently in old-growth timber and contributing little to annual growth, then the Hanzlik formula tends to underestimate allowable cut, because annual

growth is computed at a low stage of the planned rotation.

By using different methods, we have obtained allowable annual cut estimates ranging from 32 million to 50 million board feet. Only a detailed management plan for the forest area committed to timber production in each ownership can resolve the question of allowable cut.

Most of the harvest will come from State land. Until the amount of land classified for timber production is known and a management plan prepared, the allowable cut from State land cannot be determined. However, the maximum cut that can be sustained from all State land probably does not exceed 39 million board feet.

Using a computer program called TRAS (Timber Resource Analysis System) (USDA Forest Service 1970), we projected the State-owned forest land 100 years. Current growth and mortality rates were used throughout, and actual harvest records were used from 1965 through 1973. From 1974 to the end of the projection, the annual harvest removal was set at 19.5 million board feet (inventory volume, Scribner scale). After 100 years, 38 percent of the original inventory was still available for harvest. This computation does not arrive at an allowable cut, but it does help predict what may be the result if specific management decisions are carried forward for any given period of time.

TIMBER PROCESSING AND MARKETING

Haines has become an important shipping point for the export of logs and cants (squared and partially squared timbers) (fig. 11). Japanese ships carried about 782,000 cubic feet of logs and cants from Haines in 1963. In 1967 the volume increased nearly 10½ times to a total of 8,210,000 cubic feet (table 27). Ninety percent of the volume shipped was cants (Massie and Haring 1969).

Logs are being exported from privately owned land. Logs from State and National Forest land must pass through a primary manufacturing plant before export. In recent years the Haines area has had two sawmills--one cutting cants for export and the other

Figure 11.--Sitka spruce cants decked at Haines in preparation for shipment to Japan.

converted to sawing standard lumber for a brief time. The one sawing standard lumber ceased operation in late 1975. At their peak these two mills and the supporting logging companies employed about 125 men.

Before 1963, one or two portable sawmills operated intermittently to supply local needs and to truck some construction lumber to Whitehorse and Fairbanks. In 1952, Haines had two sawmills, each with a daily production capacity of about 10,000 board feet. However, the local needs at that time were for about 150,000 board feet annually, and neither mill operated for more than about 42 days in any one year (Cooley 1953).

In the summer of 1967, the Institute of Social, Economic and Government Research, University of Alaska, made a detailed study of forest utilization in the Haines area to determine its economic significance and whether possible changes could lead to increased benefits to the community (Massie and Haring 1969). As a result of this study, Massie and Haring concluded (quoted from Massie and Haring (1969) with permission):

(1) The isolated location of the Haines community and the existence of unattractive domestic shipping costs have to date limited profitable sales of forest products from Haines to a one buyer market--Japan.

This conclusion appears to still be true. One sawmill shipped rough, green lumber to southeast and interior Alaska communities for a brief period but ceased operations in late 1965. The other mill continues to produce for the Japanese market.

(2) Present Japanese product specifications are not conducive to utilizing a large portion of the timber resource; although improvements have been noted, only selected components of the resource have been harvested and utilized.

(3) The current trend in cutting practice in the area favors the harvest of one species (Sitka spruce) and large volumes of uncut western hemlock are being left. Also, current utilization favors higher quality timber, resulting in lower quality old growth timber becoming an increasing proportion of the remaining stands.

At the time comments 2 and 3 were made, the Japanese market was only interested in Sitka spruce cants. Now, hemlock lumber and squares are produced for the Alaska and Japanese markets; and one mill produces chips from under-size and low quality logs and from mill residues. Utilization practices are much improved.

(4) During 1966-67 about 5,300 board feet per acre of sound wood was left as residue in harvesting. Some 20 percent of this volume was of a size and quality acceptable for use in manufacture under current market specifications. Approximately 16 percent of the mill log inputs used in cant manufacturing end up as slab waste. These wastes could be utilized in chipping to increase the overall economic contribution of the resource.

As a result of improved markets and installation of new processing equipment, most of the material referred to by Massie and Haring in this comment is now being used.

(5) Since the Haines cant mills do not own supplies of standing timber, and since private ownership of timber in the area is only a minor source of supply, the mills are now caught between public timber (State of Alaska) ownership policies and product buyer desires. In order to conform to market specifications, the mills are often forced to directly or indirectly oppose some public timber management policies which support sustained yield and increased resource productivity.

The conflicts referred to here have been worked out, and production from State land now conforms to sustained yield objectives. Since 1967 (see table 28), about 40 percent of the log volume required by the Haines sawmills has been obtained from the Tongass National Forest.

(6) Additional markets and new manufacturing opportunities are needed in the area to better utilize the timber resource. The manufacture of pulpchips appears to be a feasible complimentary operation to the cutting of cants. Its successful introduction would reduce the amount of timber now being wasted, and would enable utilization of lower quality timber not now being harvested.

The conditions of this comment have been met.

(7) On nearly every basis of comparison, the "better" utilization alternative economically for the Haines area is cant manufacturing, rather than lumber manufacture. This would be even more beneficial with the introduction of pulpchipping, which would utilize slab waste from cant cutting and/or logging residue.

Pulp chips are now being produced.

(8) Limited and temporary evidence indicated that round log export, where permitted in the Haines area, provided greater gross revenues per unit volume than cant manufacture in 1967.

Export of round logs is still restricted to logs produced from private land.

(9) Volume conversion factors between mill inputs and outputs are not standardized (i.e., are not commonly recognized by other than the specific trade). Outputs on a mill tally basis, when compared with standardized units of measure (i.e., actual board feet as is the case with squares or lumber), are consistently underestimated. If mill tally is assumed to be equivalent to a "Brereton" scale (i.e., actual board foot content of the cant without allowances), the underestimation of volume amounts to approximately 17 percent. In other words, if cants are considered as "lumber" type products, production has been much larger than commonly reported and selling prices effectively lower than popularly perceived.

(10) Any additional annual increase in timber harvesting and forest product manufacturing in Haines might endanger a sustained yield management program of the Haines area timber unless the timbershed is expanded. Additional timber could come from the Tongass National Forest or from the Province of British Columbia.

As noted under item 5, about 40 percent of present log requirements are now obtained from the Tongass National Forest.

(11) More than one-third of the employment in the Haines area is dependent on the export of forest products. On an annual basis, approximately 2.6 jobs result from every million board feet of logs manufactured into cants and exported. Government is the next most important employer, generating slightly less than one-quarter of all jobs in the area.

Since 1967, tourism and fishing activities have displaced government employment in importance.

(12) The Haines growth experience in employment and income are typical of that which could be forecast for other similarly remotely situated Alaskan communities, that have sufficient commercial forests and marketable species. Japanese buyers represent a firm export market, and local benefits from this type of foreign trade are substantial.

(13) Income benefits could not be fully substantiated for the community. Based on direct gross income (wages and salaries), a provisional estimate of approximately $13,500 per person employed in harvesting, handling or manufacturing a forest product (including management) was formulated.

(14) Community adjustment to a new manufacturing industry rarely represents a "cure" for local unemployment problems by itself. Manufacturers hire laborers with specific and current skills, and frequently these are imported from outside the community. Local hiring normally is a more gradual process. Well trained and skilled Alaskans must be willing to

migrate to those areas where natural resource-based manufacturing is developing, or face the prospect of lost job opportunities.

(15) Logging and milling operations represent a kind of manufacturing that is relatively stable seasonally, and in which the longer run employment opportunities are favorable. This new manufacturing represents a more broad and diversified industrial base in the community and is appropriate if employment conditions are to be improved year after year. In particular, it represents a way in which young adults now entering the labor force might be employed locally, or at least within the state.

(16) Wood products manufacturing of the type observed in Haines represents an example of a single community within the framework of longer term forestry development of national forests and state forest lands. Taken in this historical perspective, additional mills should appear in fairly rapid order at other similar locations.

As already noted, a number of important changes have taken place in harvesting and utilization practices since Massie and Haring's study. More changes can be expected with shifting markets and economic conditions. Demand for wood products is expected to increase at home and abroad. To share in new or expanding markets, the Haines industries would need new sources of logs.

The log volume supplied by the State from 1961 through 1973 (table 28) averages 19.9 million board feet (Scribner rule, Bureau scale). If all present State forest land of the Haines-Skagway area remains available for timber production, it should be possible to sustain the present average log supply. Supplies presently obtained from private land and from the Tongass National Forest may continue to be obtainable. Log supplies beyond these sources do not appear to be readily available.

Definition of Terms

LAND USE CLASSES

FOREST LAND.--Includes (a) lands that are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which trees have been removed to less than 10-percent stocking, and which has not been developed for other use. (Forested tracts and islands of less than 10 acres and isolated strips of timber less than 120 feet wide are excluded.)

Commercial.--Forest land which is (a) producing or capable of producing usable crops of industrial wood (will net a minimum of 8,000 board feet per acre, International ¼-inch rule); (b) economically accessible now or in the foreseeable future; and (c) not withdrawn from timber utilization.

Operability.--For management purposes, the commercial forest land is classified as operable (or accessible) and inoperable (or inaccessible). The inoperable class includes stands on unstable soils, slopes too steep to log without doing serious damage to the site, and stands that would not pay the cost of logging, using costs and methods current at the time of inventory. Stands that require new methods, such as helicopter or balloon logging, are not in the operable class.

Noncommercial.--Forest land incapable of producing usable industrial wood because of adverse site conditions or withdrawn for specified purposes.

Unproductive.--Noncommercial forest land which does not now support or will not produce a minimum of 8,000 board feet per acre.

Productive.--Forest land capable of producing usable crops of industrial wood, but withdrawn for specified purposes through statute, ordinance, or administrative order.

NONFOREST LAND.--All land not qualifying as forest land. Includes land which has never supported forest growth; land from which the forest has been removed to less than 10-percent stocking and has been developed for other use, such as agricultural, residential, or industrial; all land in thickly populated urban and suburban areas; and water areas under 40 acres classified by the Bureau of the Census as land. Glaciers, icefields, marshland above mean high tide, permanent brush fields, muskegs less than 10 percent stocked to trees of any size, and barren mountain tops are examples of lands which have never supported forest growth.

FOREST TYPES

Forest types are classified on the basis of the species or species group that accounts for the major portion of the stand in terms of net board-foot volume for sawtimber, cubic-foot volume for poletimber, and number of trees for seedling-sapling stands.

Sitka spruce.--Forests in which Sitka spruce is predominant.

Hemlock-Sitka spruce.--Forest in which 50 percent or more of the stand is western hemlock but in which Sitka spruce makes up 30 to 49 percent of the stand.

Hemlock.--Forests predominantly western hemlock except when Sitka spruce comprises 30 to 49 percent of the stand.

Hardwood.--Forests predominantly cottonwood or red alder, singly or in combination.

TREE AND STAND CLASSES

SAWTIMBER TREES.--Live trees of commercial species at least 11.0-inch d.b.h. with at least 25 percent of their gross board-foot volume free from rot or other defect and that contain at least one merchantable saw log.

Merchantable saw log.--For softwoods, not less than 16 feet long and containing a minimum of 20 board feet between a stump height equal to d.b.h. but not exceeding 4½ feet and a merchantable top equal to 40 percent of d.b.h., except for small trees where the minimum top is 6 inches.

For hardwoods, not less than one 8-foot log to a minimum top of 8-inch d.i.b. for small trees and 40 percent of d.b.h. for large trees. After deductions for defect, a saw log must contain a net scale of at least 33-1/3 percent of the gross.

Upper stem.--The section of the bole or main stem of a sawtimber tree from the merchantable top to a minimum top diameter of 4.0 inches inside the bark.

POLETIMBER TREES.--Live trees 5.0 inches to, but not including, 11.0 inches in d.b.h. These trees are of sufficiently good form and condition to indicate that they will grow into merchantable sawtimber trees.

SAPLING AND SEEDLING TREES.--Live trees of commercial species less than 5.0-inch d.b.h. and of sufficiently good form and vigor to indicate that they will grow into merchantable sawtimber trees.

GROWING-STOCK TREES.--All live trees, except cull trees, of commercial species.

CULL TREES.--Live trees 5.0-inch d.b.h. and over that do not qualify as sawtimber or poletimber trees due to poor form, limbiness, rot, or other defect.

Rotten cull trees contain excessive decay.

Sound cull trees have excessive crook, sweep, or large limbs.

SALVABLE DEAD TREES.--Standing, dead, sawtimber-size trees containing at least one merchantable saw log having sound volume equal to at least 50 percent of the gross volume in the tree.

MORTALITY TREES.--Trees 5.0-inch d.b.h. and larger which died of natural causes and were not cull trees at the time of death.

SAWTIMBER STAND.--Forest stands in which the minimum volume for coniferous types is 8,000 net board feet (International ¼-inch rule) per acre in growing-stock trees 11.0 inches d.b.h. and larger. For hardwood sawtimber stands the minimum volume is 4,000 net board feet (International ¼-inch rule) per acre.

Old growth.--Sawtimber stands in which the majority of volume is in sawtimber trees more than 150 years of age.

Young growth.--Sawtimber stands in which the majority of volume is in sawtimber trees less than 150 years of age.

POLETIMBER STAND.--Stands failing to meet the sawtimber stand specification, but at least 10 percent stocked with poletimber and larger growing-stock trees, and with at least half the minimum stocking in poletimber trees.

SAPLING AND SEEDLING STAND.--Stands not qualifying as either sawtimber or poletimber, but having at least 10-percent stocking of trees of commercial species and with at least half the minimum stocking in seedlings and saplings.

NONSTOCKED AND OTHER AREAS.--Commercial forest land less than 10 percent stocked with growing-stock trees.

VOLUME CLASSES

SAWTIMBER VOLUME.--The net volume in board feet, International ¼-inch rule, of merchantable saw logs in live sawtimber trees of commercial species.

GROWING-STOCK VOLUME.--The net volume in cubic feet of sound wood in live sawtimber and poletimber trees of commercial species from the stump to a minimum 4.0-inch top inside the bark.

TOTAL VOLUME.--The net volume in cubic feet of sound wood in live and salvable dead sawtimber and poletimber trees and in sound and rotten cull trees of commercial species from the stump to a minimum 4.0-inch top inside the bark. Included is the volume of hardwood limbs on sawtimber trees to a minimum diameter of 4.0 inches inside the bark.

LOG GRADES

Sample western hemlock and Sitka spruce trees were graded in 16-foot log lengths. However, when any 12- or 14-foot section of a log was better than the entire log, the grade of the shorter section was given to the entire log.

The rules used were from the January 1954 edition of Official Log Scaling and Grading Rules for the Puget Sound, Grays Harbor, Southern Oregon, and Northern California Bureaus.

ABBREVIATIONS USED

DBH OR d.b.h.--Abbreviation for diameter at breast height. This measurement is taken 4½ feet above the ground on the uphill side of the tree.

d.i.b.--Abbreviation for diameter inside the bark. This measurement may be taken at any specified location.

d.o.b.--Abbreviation for diameter outside the bark. This measurement may be taken at any specified location.

2-inch diameter class.--If the classes are expressed as 6, 8, 10 inches, etc., this means that the diameters included are from 5.0 through 6.9, 7.0 through 8.9, 9.0 through 10.9, etc.

STOCKING CLASSES

Stocking is a measure of how effectively the area is being utilized by growing stock. No stocking measure was assigned to old-growth stands. For young-growth stands, ocular estimates were made of the crown cover of sawtimber trees on the 10 acres surrounding each plot location. The stocking of poletimber, saplings, and seedlings was based on the number of stems per acre. The following classes and guides were used:

Poletimber.--

Stems per acre	Percent stocked
210 or more	70
120 to 210	40
30 to 120	10

SAPLINGS AND SEEDLINGS.--Stocking was measured on ten 4-milacre circular plots. Two or more established saplings or seedlings were required to stock a 4-milacre plot. Stocking of the area was determined by the number of milacre locations that were stocked. Thus, if six of the ten 4-milacre locations were stocked, the area was judged to be 60 percent stocked.

Area stocking classes	Percent
Nonstocked	0-9
Poorly stocked	10-39
Medium stocked	40-69
Well stocked	70-100

VOLUME MEASUREMENTS

BOARD FOOT.--A board 1 foot long, 1 foot wide, and 1 inch thick. The bark is usually eliminated from this measurement. In practice, the working unit is 1,000 board feet and may be abbreviated to M fbm.

CUBIC FOOT.--A cube 12 inches on a side. The cubic-foot volume of a log or tree is commonly computed by Smalian's formula (Bruce and Schumacher 1950).

INTERNATIONAL ¼-INCH LOG RULE.--A rule used to determine the log volume in board feet (Bruce and Schumacher 1950).

ALLOWABLE CUT

Allowable cut, or yield determination, is defined as "The calculation, more directly by volume regulation, less directly by area regulation, of the amount of forest produce that may be harvested, annually or periodically, from a specified area over a stated period, in accordance with the objects of management" (Ford-Robertson 1971).

A number of formulas are available to make this estimate. The Kemp formula (Davis 1966) is easy to apply with the kind of inventory data available. Usually this formula is applied to areas in which there is a surplus of timber beyond rotation age. The objective is to determine the cut that will achieve an approximately equal distribution of area by age or stand-size classes within a rotation.

The Kemp formula:

$$\text{Annual cut} = \frac{7A+5A_1+3A_2+A_3}{4R}(MA)$$

A = area of sawtimber stands
A_1 = area of poletimber stands
A_2 = area of seedling and sapling stands
A_3 = nonstocked area
$A+A_1+A_2+A_3$ = total commercial forest land area
4 = number of stand-size classes
R = rotation in years
MA = average volume per acre of current sawtimber stands, the A stratum.

The chief use of the Hanzlik formula (Davis 1966) is for estimation of an average annual cut by volume that serves as a starting point for an area-volume check. This area-volume check, not the formula, is the essence of the method.

The Hanzlik formula:

$$\text{Allowable cut} = \frac{V_m}{R} + I$$

V_m = volume of mature timber
R = rotation
I = mean annual increment.

RELIABILITY OF ESTIMATES

Accuracy of the estimates.--Errors which affect the accuracy of the area and volume estimates in this report may arise from two sources:

1. *Nonsampling errors.*--These are human mistakes in judgment, measurement, recording, or arithmetic. There is no practical method of finding out just how often such errors occur. These errors are kept to a minimum, however, by a diligent effort to maintain a high degree of accuracy in the collection and compilation of data and by a close check of all phases of the work.

2. *Sampling errors.*--These errors arise from using sampling procedures rather than making a 100-percent inventory. These errors can be measured. They are the only measurable errors involved in computing the reliability of the estimates.

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Tables of Reliability

Reliability of the forest-area estimates

Forest-land class	All ownerships area	Sampling error	Allowable error
	Acres	- - - *Percent* - - -	
Commercial	110,977	±6.9	±9.0
Noncommercial	82,591	±9.2	±34.8
All forest land	193,568	±1.8	--
Nonforest	250,570	±1.4	--
Water (under 40 acres)	5,184	±12.4	--
Total	449,322	±.3	--

The probability is 0.667 that the actual commercial forest land area is within ±6.9 percent of the estimated area.

Reliability of the commercial forest volume estimates

Forest type group	Total volume	Sampling error	Allowable error
	Cubic feet	- - - *Percent* - - -	
Growing stock:			
Hardwoods	57,619,242	±20.5	--
Softwoods	480,728,094	±9.9	--
Total	538,347,336	±8.9	±6.8
	Board feet, Scribner		
Sawtimber:			
Hardwoods	256,004,798	±22.2	--
Softwoods	2,400,939,100	±10.3	--
Total	2,656,943,940	±9.3	--

The probability is 0.667 that the actual cubic-foot volume of growing stock is within ±8.9 percent of the estimated total cubic-foot volume and that the actual sawtimber board-foot volume is within ±9.3 percent of the estimated total sawtimber volume.

Detailed Tables of Estimates

Table 1--*Area by land class, Haines-Skagway area, Alaska, 1965*

Land class	Thousand acres	Percent
Forest land:		
Commercial	111.0	24.7
Noncommercial	82.6	18.4
Total	193.6	43.1
Nonforest land:		
Nonforest	250.5	55.7
Water[1/]	5.2	1.2
Total	255.7	56.9
Total land area	449.3	100.0

[1/] Area classified as water by Survey standards but defined by Bureau of the Census as land.

Table 2--*Area of commercial forest land by stand-size class, Haines-Skagway area, Alaska, 1965*

Stand-size class	Thousand acres	Percent
Seedlings and saplings	2.8	2.5
Poletimber	3.9	3.5
Young-growth sawtimber	29.6	26.7
Old-growth sawtimber	74.7	67.3
Total	111.0	100.0

Table 3--*Area of commercial forest land by volume class, Haines-Skagway area, Alaska, 1965*

Stand volume (board feet per acre)[1/]	Thousand acres	Percent
Less than 1,499	4.5	4.1
1,500 - 4,999	.9	.8
5,000 - 14,999	23.7	21.4
15,000 - 24,999	16.6	14.9
25,000 - 34,999	21.4	19.3
35,000 and over	43.9	39.5
Total	111.0	100.0

[1/] Net volume, International 1/4-inch rule.

Table 4--*Area of commercial forest land by stand-size class and stocking class, Haines-Skagway area, Alaska, 1965*

Stand-size class	Well stocked	Medium stocked	Poorly stocked	All classes	Percent
	- - - - - - - *Thousand acres* - - - - - -				
Seedlings and saplings	0	1.9	0.9	2.8	2.5
Poletimber	3.4	.5	0	3.9	3.5
Young-growth sawtimber	17.9	11.7	0	29.6	26.7
Old-growth sawtimber	55.9	14.5	4.3	74.7	67.3
Total	77.2	28.6	5.2	111.0	100.0
Percent	69.5	25.8	4.7	100.0	

Table 5--*Area of commercial forest land by site and stand-size class and forest type, Haines-Skagway area, Alaska, 1965*

Site and stand-size class	Spruce-hemlock	Birch	Cottonwood	All types	Percent
	- - - - - - *Thousand acres* - - - - - -				
Young-growth sawtimber:					
Site 40	1.0	0	0	1.0	0.9
Site 50	0	0	0	0	0
Site 60	0	0	0	0	0
Site 70	.9	0	0	.9	.8
Site 80	2.6	0	0	2.6	2.3
Site 90	.4	0	0	.4	.4
Site 100	2.1	0	0	2.1	1.9
Site 110	0	0	0	0	0
Site 120	3.0	0	0	3.0	2.7
Site 130	0	0	0	0	0
Site 140	.9	0	0	.9	.8
Site 150	2.1	0	0	2.1	1.9
Unclassified	5.1	0	11.5	16.6	15.0
Total	18.1	0	11.5	29.6	26.7
Old-growth sawtimber:					
1 log site	0	0	0	0	0
2 log site	.9	.9	0	1.8	1.6
3 log site	6.5	0	.9	7.4	6.7
4 log site	34.5	0	1.4	35.9	32.3
5 log site	23.4	0	0	23.4	21.1
6 log site	6.2	0	0	6.2	5.6
Total	71.5	.9	2.3	74.7	67.3
Seedlings and saplings	1.8	0	1.0	2.8	2.5
Poletimber	2.5	.9	.5	3.9	3.5
All stand-size classes	93.9	1.8	15.3	111.0	100.0
Percent	84.6	1.6	13.8	100.0	

Table 6--*Area of commercial forest land by forest type, Haines-Skagway area, Alaska, 1965*

Forest type	Thousand acres	Percent
Hemlock-Sitka spruce	93.9	84.6
Birch	1.8	1.6
Cottonwood	15.3	13.8
Total	111.0	100.0

Table 7--*Area of noncommercial forest land by softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Type	Thousand acres	Percent
Softwoods	65.4	79.2
Hardwoods	17.2	20.8
Total	82.6	100.0

Table 8--*Number of growing stock trees on commercial forest land by diameter class and species, Haines-Skagway area, Alaska, 1965*

Diameter class[1]	Softwoods					Hardwoods				All species	Percent
	Lodgepole pine	Sitka spruce	Mountain hemlock	Western hemlock	Total	Quaking aspen	Paper birch	Black cottonwood	Total		
	Thousand trees										
1.0-2.9	--	817	--	3,935	4,752	--	478	33	511	5,263	23.0
3.0-4.9	--	521	--	2,167	2,688	--	218	257	475	3,163	13.8
5.0-6.9	12	575	41	1,894	2,522	25	86	43	154	2,676	11.7
7.0-8.9	12	516	12	1,426	1,966	12	155	88	255	2,221	9.7
9.0-10.9	12	528	--	759	1,299	74	141	85	300	1,599	7.0
11.0-12.9	5	463	6	724	1,198	42	76	128	246	1,444	6.3
13.0-14.9	4	477	5	618	1,104	9	39	145	193	1,297	5.7
15.0-16.9	6	436	5	544	991	--	8	171	179	1,170	5.1
17.0-18.9	--	399	3	448	850	--	11	93	104	954	4.2
19.0-20.9	--	301	--	382	683	--	5	75	80	763	3.3
21.0-22.9	2	271	--	271	544	--	3	83	86	630	2.7
23.0-24.9	--	221	--	268	489	--	--	67	67	556	2.4
25.0-26.9	--	101	--	163	264	--	--	44	44	308	1.3
27.0-28.9	--	135	--	129	264	--	1	32	33	297	1.3
29.0-30.9	--	82	--	109	191	--	--	12	12	203	.9
31.0-32.9	--	54	--	57	111	--	--	9	9	120	.5
33.0-34.9	--	45	--	38	83	--	--	6	6	89	.4
35.0-36.9	--	30	--	27	57	--	--	7	7	64	.3
37.0-38.9	--	5	--	21	26	--	--	3	3	29	.1
39.0-40.9	--	14	--	3	17	--	--	6	6	23	.1
41.0-42.9	--	4	--	4	8	--	--	2	2	10	2/
43.0-44.9	--	3	--	7	10	--	--	5	5	15	.1
45.0 and larger	--	10	--	--	10	--	--	2	2	12	.1
All diameters	53	6,008	72	13,994	20,127	162	1,221	1,396	2,779	22,906	100.0
Percent	0.2	26.2	0.3	61.2	87.9	0.7	5.3	6.1	12.1	100.0	

1/ Inches at breast height.

2/ Less than 0.1 percent.

Table 9--*Net volume of timber on commercial forest land by class of timber and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Class of timber	Softwoods	Hardwoods	Total	Percent
	- - - - *Thousand cubic feet* - - - -			
Sawtimber trees:				
Saw-log portion	435,091	45,513	480,604	85.0
Upper stem portion	18,134	7,409	25,543	4.5
Total	453,225	52,922	506,147	89.5
Poletimber trees	27,503	4,697	32,200	5.7
All growing-stock trees	480,728	57,619	538,347	95.2
Rough trees	488	390	878	.2
Rotten trees	8,967	1,148	10,115	1.8
Salvable dead trees	16,012	8	16,020	2.8
Total	506,195	59,165	565,360	100.0
Percent	89.5	10.5	100.0	

Table 10--*Net volume of growing stock on commercial forest land by stand-size class and forest type, Haines-Skagway area, Alaska, 1965*

Stand-size class	Hemlock-Sitka spruce	Birch	Cotton-wood	Total	Percent
	- - - - - - *Thousand cubic feet* - - - - -				
Seedlings and saplings	1,268	--	173	1,441	0.3
Poletimber	6,499	2,119	143	8,761	1.6
Young-growth sawtimber	106,575	--	25,827	132,402	24.6
Old-growth sawtimber	384,465	1,357	9,921	395,743	73.5
Total	498,807	3,476	36,064	538,347	100.0
Percent	92.7	0.6	6.7	100.0	

Table 11--*Net volume of sawtimber on commercial forest land by stand-size class and forest type, Haines-Skagway area, Alaska, 1965*

Stand-size class	Hemlock-Sitka spruce	Birch	Cotton-wood	Total	Percent
	Thousand board feet, - - - International 1/4-inch rule - - -				
Seedlings and saplings	6,633	--	146	6,779	0.2
Poletimber	14,057	7,072	380	21,509	.8
Young-growth sawtimber	569,940	--	115,217	685,157	23.7
Old-growth sawtimber	2,104,772	6,754	62,517	2,174,043	75.3
Total	2,695,402	13,826	178,260	2,887,488	100.0
Percent	93.3	0.5	6.2	100.0	
	Thousand board feet, Scribner rule				
Seedlings and saplings	6,141	--	127	6,268	0.2
Poletimber	12,974	6,393	331	19,698	.7
Young-growth sawtimber	525,041	--	101,038	626,079	23.6
Old-growth sawtimber	1,944,328	6,188	54,383	2,004,899	75.5
Total	2,488,484	12,581	155,879	2,656,944	100.0
Percent	93.7	0.5	5.8	100.0	

Table 12--*Net volume of growing stock on commercial forest land by stand-size class and stocking class, Haines-Skagway area, Alaska, 1965*

Stand-size class	Well stocked	Medium stocked	Poorly stocked	All classes	Percent
	- - - - - Thousand cubic feet - - - - -				
Seedlings and saplings	--	1,091	350	1,441	0.3
Poletimber	8,618	143	--	8,761	1.6
Young-growth sawtimber	106,774	25,628	--	132,402	24.6
Old-growth sawtimber	318,528	62,564	14,651	395,743	73.5
Total	433,920	89,426	15,001	538,347	100.0
Percent	80.6	16.6	2.8	100.0	

Table 13--*Net volume of sawtimber on commercial forest land by stand-size class and stocking class, Haines-Skagway area, Alaska, 1965*

Stand-size class	Well stocked	Medium stocked	Poorly stocked	All classes	Percent
	Thousand board feet, International 1/4-inch rule				
Seedlings and saplings	--	5,226	1,553	6,779	0.2
Poletimber	21,129	380	--	21,509	.8
Young-growth sawtimber	562,943	122,214	--	685,157	23.7
Old-growth sawtimber	1,746,385	341,640	86,018	2,174,043	75.3
Total	2,330,457	469,460	87,571	2,887,488	100.0
Percent	80.7	16.3	3.0	100.0	
	Thousand board feet, Scribner rule				
Seedlings and saplings	--	4,830	1,438	6,268	0.2
Poletimber	19,367	331	--	19,698	.7
Young-growth sawtimber	517,611	108,468	--	626,079	23.6
Old-growth sawtimber	1,614,683	312,497	77,719	2,004,899	75.5
Total	2,151,661	426,126	79,157	2,656,944	100.0
Percent	81.0	16.0	3.0	100.0	

Table 14--*Net volume of growing stock on commercial forest land by diameter class and species, Haines-Skagway area, Alaska, 1965*

Diameter class[1]	Softwoods					Hardwoods				All species	Percent
	Lodgepole pine	Sitka spruce	Mountain hemlock	Western hemlock	Total	Quaking aspen	Paper birch	Black cottonwood	Total		
	Thousand cubic feet										
5.0-6.9	33	1,146	109	3,673	4,961	63	142	85	290	5,251	1.0
7.0-8.9	56	2,684	56	6,595	9,391	87	795	486	1,368	10,759	2.0
9.0-10.9	130	5,596	--	7,425	13,151	849	1,355	835	3,039	16,190	3.0
11.0-12.9	51	7,614	99	10,195	17,959	460	846	1,586	2,892	20,851	3.9
13.0-14.9	68	12,264	104	14,931	27,367	155	556	3,063	3,774	31,141	5.8
15.0-16.9	61	16,677	148	18,667	35,553	--	122	5,551	5,673	41,226	7.7
17.0-18.9	--	21,697	169	21,754	43,620	--	317	3,952	4,269	47,889	9.0
19.0-20.9	--	21,463	--	24,488	45,951	--	172	4,088	4,260	50,211	9.3
21.0-22.9	63	25,191	--	21,561	46,815	--	149	6,138	6,287	53,102	9.9
23.0-24.9	--	24,887	--	26,410	51,297	--	--	5,848	5,848	57,145	10.6
25.0-26.9	--	14,766	--	19,044	33,810	--	--	4,861	4,861	38,671	7.2
27.0-28.9	--	23,598	--	16,927	40,525	--	94	3,586	3,680	44,205	8.2
29.0-30.9	--	15,491	--	16,290	31,781	--	--	1,726	1,726	33,507	6.2
31.0-32.9	--	12,971	--	9,945	22,916	--	--	1,431	1,431	24,347	4.5
33.0-34.9	--	10,045	--	5,993	16,038	--	--	940	940	16,978	3.1
35.0-36.9	--	9,359	--	5,109	14,468	--	--	1,307	1,307	15,775	2.9
37.0-38.9	--	1,910	--	4,546	6,456	--	--	831	831	7,287	1.3
39.0-40.9	--	5,208	--	808	6,016	--	--	1,795	1,795	7,811	1.5
41.0-42.9	--	2,001	--	969	2,970	--	--	631	631	3,601	.6
43.0-44.9	--	1,904	--	2,090	3,994	--	--	1,935	1,935	5,929	1.1
45.0 and larger	--	5,689	--	--	5,689	--	--	782	782	6,471	1.2
All diameters	462	242,161	685	237,420	480,728	1,614	4,548	51,457	57,619	538,347	100.0
Percent	0.1	45.0	0.1	44.1	89.3	0.3	0.8	9.6	10.7	100.0	

[1] Inches at breast height.

Table 15--*Net board-foot volume of sawtimber on commercial forest land by diameter class and species, Haines-Skagway area, Alaska, 1965*

Diameter class[1]	Softwoods					Hardwoods				All species	Percent
	Lodge-pole pine	Sitka spruce	Mountain hemlock	Western hemlock	Total	Quaking aspen	Paper birch	Black cotton-wood	Total		
	Thousand board feet, International 1/4-inch rule										
11.0-12.9	153	33,507	432	41,628	75,720	1,433	2,968	6,029	10,430	86,150	3.0
13.0-14.9	271	58,321	463	69,357	128,412	587	2,122	13,834	16,543	144,955	5.0
15.0-16.9	269	84,964	701	92,319	178,253	--	461	27,356	27,817	206,070	7.0
17.0-18.9	--	116,111	896	114,498	231,505	--	1,381	20,454	21,835	253,340	8.8
19.0-20.9	--	118,750	--	134,158	252,908	--	660	21,499	22,159	275,067	9.5
21.0-22.9	301	144,163	--	122,357	266,821	--	693	34,415	35,108	301,929	10.5
23.0-24.9	--	146,010	--	153,562	299,572	--	--	34,227	34,227	333,799	11.6
25.0-26.9	--	89,147	--	112,767	201,914	--	--	28,793	28,793	230,707	8.0
27.0-28.9	--	146,031	--	101,912	247,943	--	537	21,616	22,153	270,096	9.4
29.0-30.9	--	95,921	--	100,341	196,262	--	--	10,468	10,468	206,730	7.2
31.0-32.9	--	82,834	--	62,759	145,593	--	--	8,872	8,872	154,465	5.3
33.0-34.9	--	65,030	--	38,009	103,039	--	--	5,985	5,985	109,024	3.8
35.0-36.9	--	61,846	--	32,344	94,190	--	--	8,543	8,543	102,733	3.6
37.0-38.9	--	12,888	--	29,588	42,476	--	--	5,503	5,503	47,979	1.7
39.0-40.9	--	35,148	--	5,381	40,529	--	--	12,171	12,171	52,700	1.8
41.0-42.9	--	13,795	--	6,233	20,028	--	--	4,337	4,337	24,365	.8
43.0-44.9	--	13,404	--	14,541	27,945	--	--	13,830	13,830	41,775	1.4
45.0 and larger	--	39,972	--	--	39,972	--	--	5,632	5,632	45,604	1.6
All diameters	994	1,357,842	2,492	1,231,754	2,593,082	2,020	8,822	283,564	294,406	2,887,488	100.0
Percent	2/	47.0	0.1	42.7	89.8	0.1	0.3	9.8	10.2	100.0	

1/ Inches at breast height.

2/ Less than 0.1 percent.

Table 16--*Net board-foot volume of sawtimber on commercial forest land by diameter class and species, Haines-Skagway area, Alaska, 1965*

Diameter class[1]	Softwoods					Hardwoods				All species	Percent
	Lodge-pole pine	Sitka spruce	Mountain hemlock	Western hemlock	Total	Quaking aspen	Paper birch	Black cotton-wood	Total		
	Thousand board feet, Scribner rule										
11.0-12.9	132	31,025	400	38,544	70,101	1,246	2,581	5,243	9,070	79,171	3.0
13.0-14.9	234	54,001	429	64,220	118,884	511	1,844	12,029	14,384	133,268	5.0
15.0-16.9	232	78,670	649	85,480	165,031	--	401	23,788	24,189	189,220	7.1
17.0-18.9	--	107,510	830	106,017	214,357	--	1,201	17,786	18,987	233,344	8.8
19.0-20.9	--	109,954	--	124,221	234,175	--	574	18,695	19,269	253,444	9.5
21.0-22.9	259	133,485	--	113,293	247,037	--	603	29,926	30,529	277,566	10.4
23.0-24.9	--	135,194	--	142,187	277,381	--	--	29,763	29,763	307,144	11.6
25.0-26.9	--	82,543	--	104,414	186,957	--	--	25,037	25,037	211,994	8.0
27.0-28.9	--	135,214	--	94,363	229,577	--	467	18,796	19,263	248,840	9.4
29.0-30.9	--	88,816	--	92,908	181,724	--	--	9,102	9,102	190,826	7.2
31.0-32.9	--	76,698	--	58,110	134,808	--	--	7,714	7,714	142,522	5.4
33.0-34.9	--	60,213	--	35,194	95,407	--	--	5,204	5,204	100,611	3.8
35.0-36.9	--	57,265	--	29,948	87,213	--	--	7,429	7,429	94,642	3.6
37.0-38.9	--	11,933	--	27,397	39,330	--	--	4,785	4,785	44,115	1.7
39.0-40.9	--	32,544	--	4,982	37,526	--	--	10,584	10,584	48,110	1.8
41.0-42.9	--	12,773	--	5,771	18,544	--	--	3,772	3,772	22,316	.8
43.0-44.9	--	12,411	--	13,464	25,875	--	--	12,026	12,026	37,901	1.4
45.0 and larger	--	37,012	--	--	37,012	--	--	4,898	4,898	41,910	1.5
All diameters	857	1,257,261	2,308	1,140,513	2,400,939	1,757	7,671	246,577	256,005	2,656,944	100.0
Percent	2/	47.3	0.1	42.9	90.3	0.1	0.3	9.3	9.7	100.0	

1/ Inches at breast height.

2/ Less than 0.1 percent.

Table 17--*Net volume of sawtimber on commercial forest land by species and log grade, Haines-Skagway area, Alaska, 1965*

Species	Select and peelers	Log grade 1	Log grade 2	Log grade 3	Log grade 4	All grades except cull	Percent
	Thousand board feet, International 1/4-inch rule						
Softwoods:							
Lodgepole pine	--	--	--	--	3,479	3,479	0.1
Sitka spruce	10,430	8,428	259,930	1,133,662	--	1,412,450	48.9
Mountain hemlock	--	--	--	481	--	481	1/
Western hemlock	6,667	30,615	249,802	952,611	--	1,239,695	43.0
Total	17,097	39,043	509,732	2,086,754	3,479	2,656,105	92.0
Hardwoods:							
Quaking aspen	--	--	--	--	2,723	2,723	.1
Paper birch	--	--	3,201	4,194	225	7,620	.2
Black cottonwood	--	3,280	26,807	176,195	14,758	221,040	7.7
Total	--	3,280	30,008	180,389	17,706	231,383	8.0
All species	17,097	42,323	539,740	2,267,143	21,185	2,887,488	100.0
Percent	0.6	1.5	18.7	78.5	0.7	100.0	

1/ Less than 0.1 percent.

Table 18--*Gross annual growth*[1/] *of growing stock on commercial forest land by species and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Species	Thousand cubic feet	Percent of total
Softwoods:		
Lodgepole pine	10	0.2
Sitka spruce	2,271	36.4
Mountain hemlock	15	.2
Western hemlock	2,683	43.0
Total	4,979	79.8
Hardwoods:		
Quaking aspen	50	.8
Paper birch	141	2.3
Black cottonwood	1,067	17.1
Total	1,258	20.2
All species	6,237	100.0

1/ Mortality not deducted.

Table 19--*Gross annual growth of sawtimber on commercial forest land by species and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Species	Thousand board feet	Percent of total
	International 1/4-inch rule	
Softwoods:		
Lodgepole pine	10	1/
Sitka spruce	11,233	40.6
Mountain hemlock	28	.1
Western hemlock	10,760	38.9
Total	22,031	79.6
Hardwoods:		
Quaking aspen	25	.1
Paper birch	128	.4
Black cottonwood	5,502	19.9
Total	5,655	20.4
All species	27,686	100.0
	Scribner rule	
Softwoods:		
Lodgepole pine	8	1/
Sitka spruce	10,401	41.1
Mountain hemlock	26	.1
Western hemlock	9,963	39.4
Total	20,398	80.6
Hardwoods:		
Quaking aspen	21	.1
Paper birch	112	.4
Black cottonwood	4,785	18.9
Total	4,918	19.4
All species	25,316	100.0

1/ Less than 0.1 percent.

Table 20--*Annual mortality of growing stock on commercial forest land by species and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Species	Thousand cubic feet	Percent
Softwoods:		
Lodgepole pine	3	0.1
Sitka spruce	1,699	78.6
Mountain hemlock	--	--
Western hemlock	421	19.5
Total	2,123	98.2
Hardwoods:		
Quaking aspen	8	.4
Paper birch	17	.8
Black cottonwood	13	.6
Total	38	1.8
All species	2,161	100.0

Table 21--*Annual mortality of sawtimber on commercial forest land by species and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Species	Thousand board feet	Percent of total
	International 1/4-inch rule	
Softwoods:		
Lodgepole pine	--	--
Sitka spruce	10,317	81.9
Mountain hemlock	--	--
Western hemlock	2,270	18.0
Total	12,587	99.9
Hardwoods:		
Quaking aspen	--	--
Paper birch	5	.1
Black cottonwood	--	--
Total	5	.1
All species	12,592	100.0
	Scribner rule	
Softwoods:		
Lodgepole pine	--	--
Sitka spruce	9,553	81.9
Mountain hemlock	--	--
Western hemlock	2,102	18.0
Total	11,655	99.9
Hardwoods:		
Quaking aspen	--	--
Paper birch	4	.1
Black cottonwood	--	--
Total	4	.1
All species	11,659	100.0

Table 22--*Annual mortality of growing stock on commercial forest land by causes and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Cause	Softwoods	Hardwoods	Total	Percent
	- - - - - *Thousand cubic feet* - - - - -			
Insects	817	--	817	37.8
Diseases	245	--	245	11.3
Fire	--	--	--	--
Windthrow	483	14	497	23.0
Other	578	24	602	27.9
All causes	2,123	38	2,161	100.0
Percent	98.2	1.8	100.0	

Table 23--*Annual mortality of sawtimber on commercial forest land by cause and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Cause	Softwoods	Hardwoods	Total	Percent
	Thousand board feet, - - *International 1/4-inch rule* - - - -			
Insects	5,193	--	5,193	41.2
Diseases	1,425	--	1,425	11.3
Fire	--	--	--	--
Windthrow	2,807	--	2,807	22.3
Other	3,162	5	3,167	25.2
All causes	12,587	5	12,592	100.0
Percent	99.9	0.1	100.0	
	- *Thousand board feet, Scribner rule* - -			
Insects	4,808	--	4,808	41.2
Diseases	1,320	--	1,320	11.3
Fire	--	--	--	--
Windthrow	2,599	--	2,599	22.3
Other	2,928	4	2,932	25.2
All causes	11,655	4	11,659	100.0
Percent	99.9	0.1	100.0	

Table 24--*Net annual growth*[1/] *of growing stock on commercial forest land by species and softwoods and hardwoods, Haines-Skagway area, Alaska, 1965*

Species	Thousand cubic feet	Percent
Softwoods:		
Lodgepole pine	7	0.2
Sitka spruce	572	14.0
Mountain hemlock	15	.4
Western hemlock	2,262	55.5
Total	2,856	70.1
Hardwoods:		
Quaking aspen	42	1.0
Paper birch	124	3.0
Black cottonwood	1,054	25.9
Total	1,220	29.9
All species	4,076	100.0

[1/] Net annual growth is gross annual growth with annual mortality deducted.

Table 25--*Average sawtimber volume per acre by stand-size class and local type, Haines-Skagway area, Alaska, 1965*

Stand-size class	Local type			Total
	Spruce-hemlock	Birch	Black cottonwood	
	- - - Thousand board feet, Scribner rule - - -			
Seedlings and saplings	3.3	--	0.1	2.2
Poletimber	5.3	6.9	.7	5.1
Young-growth sawtimber	29.0	--	8.9	21.1
Old-growth sawtimber	27.2	6.7	23.3	26.9
All classes	26.5	6.8	10.2	23.9

Table 26--*Average sawtimber volume per acre by stand-size class and stocking class, Haines-Skagway area, Alaska, 1965*

Stand-size class	Well stocked	Medium stocked	Poorly stocked	All classes
	- - Thousand board feet, Scribner rule - -			
Seedlings and saplings	--	2.5	1.6	2.2
Poletimber	5.7	.7	--	5.1
Young-growth sawtimber	28.9	9.3	--	21.1
Old-growth sawtimber	28.9	21.5	18.1	26.9
All classes	27.9	14.9	15.2	23.9

Table 27--*Volume of wood products exported from Haines, Alaska, 1963-67*[1/]

Year	Logs	Cants	Total
	Thousand board feet[2/]	*Thousand board feet*[3/]	*Cubic feet*
1963	1,746	5,471	781,833
1964	3,406	7,479	1,213,166
1965	5,285	10,217	1,746,916
1966	6,492	30,794	3,928,250
1967	5,731	75,750	8,210,166
Total	22,660	129,711	15,880,331

1/ Summarized from table 13, Massie and Haring 1969.

2/ Scribner Decimal C log scale.

3/ Mill tally.

Table 28--*Volume of logs supplied to mills of the Haines-Skagway area, Alaska, and estimated lumber production, 1961-73*

Year	Log volume supplied and source[1/]			Lumber tally
	Tongass National Forest	State	Total	
	--Million board feet Scribner rule, Bureau scale--			*Million board feet*
1961	--	0.7	0.7	--
1962	--	6.3	6.3	--
1963	--	7.6	7.6	--
1964	--	18.6	18.6	--
1965	--	16.0	16.0	10.0
1966	--	20.1	20.1	--
1967	8.1	45.4	53.5	80.4
1968	19.9	37.6	57.5	86.4
1969	29.0	35.5	64.5	63.2
1970	17.6	28.8	46.4	54.0
1971	14.5	19.6	34.1	50.2
1972	9.1	16.8	25.9	31.6
1973	27.1	8.0	35.1	44.6

[1/] Mills of this area obtain an additional, but minor, volume of logs from private land. Logs obtained from private land are usually exported as logs.

LaBau, Vernon J., and O. Keith Hutchison.
1976. Timber supply and use in the Haines-Skagway area, Alaska. USDA For. Serv. Resour. Bull. PNW-67, 44 p., illus. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Discusses the results of a 1965 forest inventory of 449,300 acres in the Haines-Skagway area. Selected references are used to describe the economy of the area historically and currently. Interpretations and assessments of the timber resource in the continuing economy are made.

KEYWORDS: Forest surveys (Alaska), resources (forest), timber marketing.

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