

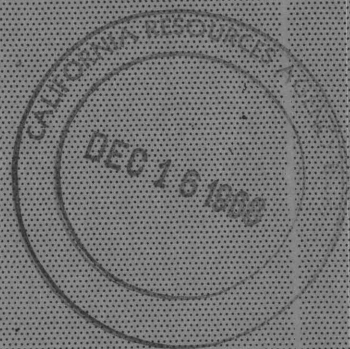
M. S. Forest Service Pacific NW Forest Range Experiment Station

The Timber Resources

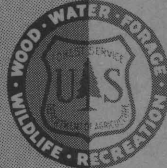
of

HUMBOLDT COUNTY

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PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE



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PREPARED BY
FOREST SURVEY PROJECT

Melvin E. Metcalf, Project Leader

Field and Office Work in Humboldt County, California, by

Field Supervisor, Charles L. Bolsinger

Assistant Field Supervisor, Gerhard F. Muerle

Gerald A. Allen	David W. Jones	John Schilling VI
Allen B. Casamajor	Robert W. Michaels	Craig A. Sinclair
Robert W. Hart	Ronald A. Otrin	Roger L. Smeds
Barry L. Hilt	William B. Sampson	Forrest Ruppert

Office Compilation Supervisor, John M. Berger

Programmers:	Statistical Clerks:
David M. Jacobs	Margaret C. O'Mara
Mary Anne Mei	Barbara C. Pearlman
	Marian E. Simons

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THE TIMBER RESOURCES OF HUMBOLDT COUNTY, CALIFORNIA

by

Daniel D. Oswald 7

PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION 7

Philip A. Briegleb, Director

Portland, Oregon

U.S. FOREST SERVICE 7

U.S. DEPARTMENT OF AGRICULTURE

PREFACE

This report presents the first complete inventory of Humboldt County's timber resources. Past Forest Survey inventories have included Humboldt County, but they were not designed to obtain volume estimates for an individual county. Humboldt County is part of a survey unit which also includes Del Norte County.^{1/} There are eight such inventory units in California; and each unit, composed of a group of counties, will be reinventoried and reported upon at 10-year intervals.

The field data for this Humboldt County inventory were collected for all lands during the summer of 1966 and are presented as of January 1, 1967. Data for the Six Rivers National Forest were collected by National Forest personnel. Field data for all other ownerships of forest lands in the county were collected by Forest Survey personnel.

This inventory is a function of the Forest Survey--a nationwide project of the Forest Service, U.S. Department of Agriculture, authorized by the McSweeney-McNary Forest Research Act of 1928 and subsequent amendments. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the amount and kind of timber on them, to determine rates of forest growth and depletion, to estimate timber cut and probable future trends in timber requirements, and to analyze and make available survey information needed in the formulation of forest policies and programs. Resurveys are made to update basic information.

The Forest Survey is conducted in the various forest regions of the Nation by the Experiment Stations of the Forest Service. In the States of California, Oregon, Washington, Alaska, and Hawaii, it is the responsibility of the Pacific Northwest Forest and Range Experiment Station at Portland, Oregon.

Daniel D. Oswald is the Pacific Northwest Station's Forest Survey representative in California, located at the Pacific Southwest Forest and Range Experiment Station, 1960 Addison Street, Berkeley, California 94701.

^{1/} Oswald, Daniel D., and Walton, Gerald S. Forest statistics for Del Norte County, California, 1965. Pacific Southwest Forest & Range Exp. Sta. U.S.D.A. Forest Serv. Resource Bull. PSW-5, 12 pp. 1968.

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INTRODUCTION

Humboldt County has been an important source of raw material for wood products for over 100 years. This county, which has the largest sawtimber inventory and second largest commercial forest area of all California counties, is largely responsible for California's position as a leading State in production of wood products. Since 1920, Humboldt County's forests have yielded over 33 billion board feet of roundwood for manufacture of wood products, 20 billion board feet of it in the last 15 years. In 37 of the last 47 years, Humboldt County has led all other California counties in roundwood harvest and lumber production and has never ranked lower than third during the remaining 10 years.

Humboldt County today leads the State in the production of lumber, softwood veneer and plywood, and woodpulp. It accounts for one-quarter of the State's annual timber harvest, and its sawmills provide more residue for pulping than any other county.

However, of more importance than the contribution of Humboldt's forest resource to the large and diversified California economy is its contribution to the economic well-being of the county itself and the local area. Seventy-four percent of the county's land resources are currently committed to timber production as a primary use. The timber resource and the forest industry make up much of the tax base upon which local government and public services are dependent. Over 90 percent of the value added by manufacture derives from wood products, and over 40 percent of all employment is directly involved in wood and wood products manufacture. In addition, a majority of the employment in service industries depends on the employment and income generated by forest industries.

Humboldt County's long reign as a major primary product manufacturing center for wood products has been supported by the large old-growth stands of redwood and, since the mid-1940's, Douglas-fir. After over 100 years of logging, the available old-growth resource has been reduced to the level where the transition to young-growth harvesting operations is on the horizon.

Currently, resource planners from both industry and government are studying alternative routes through the transition period and their probable impacts on the wood products industry and the local economy. The findings of the 1966 inventory, the first in which the entire Humboldt County timber resource has been reported, provide valuable background and a concrete starting point from which to evaluate those alternatives.^{2/}

^{2/} Area statistics for Humboldt County were first reported in the report titled "Area and Ownership of Forest Land in Humboldt County, California," California Forest & Range Exp. Sta. Forest Surv. Release No. 16, November 1952.

THE TIMBER RESOURCE

Commercial Forests Occupy Three-Fourths of Humboldt County's Land Area

Humboldt County has a total land area of 2,287,000 acres, of which 1,701,000 acres or 74 percent is commercial forest land. The commercial forest area contains 32.6 billion board feet of sawtimber, International 1/4-inch rule. Productive-reserved forest lands in State parks total 47,000 acres. Unproductive forest lands, incapable of producing commercial timber crops, total 102,000 acres.

Three-Fourths of Commercial Forest Area Is in Private Ownership

In Humboldt County, three-fourths of the productive forest land is in private ownership, and management of this land will largely determine the county's future timber-oriented economic activity. Almost 60 percent of the 1,283,000 acres of privately owned commercial forest land and 7.2 billion board feet of sawtimber--22 percent of the county's total--is controlled by the farmer and miscellaneous private owner group. This ownership group is characterized by small, fragmented ownership tracts. Many of these owners have little interest in long-term timber management objectives.^{3/} But regardless of the reason for these individuals' ownership of forest land, much of this land has contributed significantly to the county's large annual timber harvest. The harvesting of timber from these lands resulted in immediate income, tax relief, and in many cases, offered the possibility of increasing an alternative use, primarily grazing.

These farmer and miscellaneous private owners, comprising the largest ownership category in terms of numbers of owners as well as acreage controlled, represent an important and unpredictable element in Humboldt County's future levels of wood products-based economic activity.

The lands owned by forest industry are managed with timber production as the primary objective. These lands have contributed greatly to the large annual timber harvest, and can be expected to do so in the future. Although this owner class represents the smaller part of the private sector in terms of acreage, it contains over 14 billion board feet of sawtimber--44 percent of the county total--and the most productive forest lands in the county.

National Forests account for 292,000 acres of commercial forest, and other public ownerships, primarily Indian trust lands and public domain, account for the remaining 126,000 acres. The public lands combined contain

^{3/} Poli, Adon, and Baker, Harold L. Ownership and use of forest land in the redwood--Douglas-fir subregion of California. U.S.D.A. Forest Serv. Calif. Forest & Range Exp. Sta. Tech. Pap. No. 7, 76 pp., illus. 1954.

11.2 billion board feet of sawtimber, over one-third of the county total. Public lands, due to lack of redwood, have a brief logging history, but are becoming increasingly important, partly because of the relatively recent importance of Douglas-fir in the county's timber economy. Although the Douglas-fir type is well distributed across all ownerships, it comprises a majority of all coniferous types on National Forest and other public lands, as well as on farmer and miscellaneous private lands. The public lands, managed under the multiple use concept, have made significant contributions to the county's annual timber harvest in recent years, and will continue to provide a flow of raw material that is compatible with competing uses for the land.

Forest Industry and Public Lands Will Be Increasingly Important in Future

Seventy percent of the public lands and 52 percent of the forest industry lands have stands of timber exceeding 10,000 board feet per acre. Only 27 percent of the commercial forest area in farmer and miscellaneous private ownership is in stands of more than 10,000 board feet per acre. This distribution of volume in industrial and public ownerships indicates that timber harvesting in the near future will be concentrated on the public lands and those in forest industry ownership. The largest ownership category, farmer and miscellaneous private, which has made a large contribution to the country's timber harvest in past years, will play a decreasing role in the near future.

Douglas-fir Is Most Important Forest Type

Of Humboldt County's commercial forest area, 469,000 acres or 28 percent is in Douglas-fir type, making Douglas-fir the county's most abundant softwood type and most important timber species--in recent years accounting for almost two-thirds of the annual timber harvest. Its importance is further enhanced by its distribution among all ownerships, across a wide range of site conditions.

Redwood Forest Type Is Privately Owned

The other important softwood forest type, coast redwood, comprises 312,000 acres or 18 percent of the commercial forest area. All of the redwood type acreage is on private land, primarily in forest industry ownership. Historically, coast redwood supported the wood products industry in Humboldt County from its inception in the 1840's until the mid-1940's, when Douglas-fir became a large factor in the timber harvest.

Hardwood Forest Type Is Almost Half of Commercial Forest Area

Hardwood forest types occupy 721,000 acres or 42 percent of Humboldt County's commercial forest area. Tanoak, the most abundant species,

occupies 458,000 acres, and Pacific madrone is second in importance, comprising 76,000 acres. The hardwood forest type is concentrated on private land, primarily in farmer and miscellaneous private ownerships.

Cutting Is Largely Responsible for Hardwood Acreage

Where hardwoods are present in coniferous stands, they frequently become the dominant stand component when the conifers are removed by cutting or fire. Inventory data related to cutting history indicate that cutting has been a major factor affecting type succession; and where cutting is not followed by prompt restocking of conifers, hardwoods are the most likely successors. Hardwood forest types now occupy 53 percent of the cutover commercial forest area, but only 28 percent of areas where no previous cutting has occurred. Most of the hardwood type area is inherently capable of supporting softwood types. Over 90 percent of the area now in hardwood type is classified as capable of growing merchantable stands of coniferous timber.

Information on cutting history in Humboldt County, gathered during the 1966 inventory, indicates that over half of the area clearcut in the previous 5 years has successfully restocked with coniferous species through both natural and artificial regeneration. Hardwoods occupy only 11 percent of the recently clearcut area, and almost 40 percent is still nonstocked. The data also show that most of the area that fails to restock with conifers during this initial period eventually restocks with hardwoods. In areas that were clearcut more than 5 years before the inventory, 41 percent of the area is now softwood type, 53 percent is in hardwood types, and 6 percent is nonstocked.

Partially cut areas are about one-third conifer types, almost 60 percent hardwood types, and less than 10 percent nonstocked. In many of these areas, the timber removed was that which was marketable at the time of harvest. This practice has, in many instances, resulted in the removal of one or more species from the stand composition. What is left in partially cut stands becomes the dominant factor in stocking of an area, in terms of both presence of mature trees and seed source for regeneration. Prior to the 1940's, when Douglas-fir first became a major marketable commodity in the north coastal area, it became the successor to redwood in some forest stands. Now that both redwood and Douglas-fir are major merchantable species, hardwoods are frequently the principal species left on many areas formerly stocked with coniferous species.

The intrusion of hardwoods is most pronounced in the farmer and miscellaneous private ownerships--59 percent of the commercial forest area in this class is in hardwood forest types. This is the result of two important characteristics of these ownerships: (1) generally lower sites and associated higher proportions of hardwoods in the original conifer stands, and (2) a history of cutting on most of the area.

Two-Thirds of Sawtimber Is on Private Land

Humboldt County's commercial forests contain 32.6 billion board feet of sawtimber, 11 percent of the State's total. Two-thirds of this sawtimber volume is in private ownership, 14 billion board feet on forest industry lands and 7 billion board feet on farmer and miscellaneous private lands. Public owners hold the remaining 34 percent, 26 percent on National Forest lands and 8 percent on other public lands.

Sawtimber Volume Per Acre Is Low on Farmer and Miscellaneous Private Lands

The following tabulation shows the average board-foot volume per acre (International 1/4-inch rule) in stands of large and small sawtimber in Humboldt County:

Ownership:	Small sawtimber stands	Large sawtimber stands
National Forest	18,700	35,000
Other public	13,100	29,400
Forest industry	11,400	42,200
Farmer and miscellaneous private	7,000	18,600

The low average stand volumes in farmer and miscellaneous private sawtimber stands are due to the high proportion of hardwood type (68 percent) in these stands.

Volumes Are Low in Hardwood Types

Although the hardwood types occupy 42 percent of the commercial forest land in Humboldt County, they contain only 14 percent of the total sawtimber volume. The 4.6 billion board feet of sawtimber on 721,000 acres of hardwood type represent an average of only 6,400 board feet per acre. By contrast, softwood types, which comprise 52 percent of the commercial forest area, have an average sawtimber volume per acre of 31,000 board feet.

The hardwood forest types in Humboldt County are characterized by a mixture of hardwoods and softwoods. Most of the hardwoods tend to be small, resulting in small contributions to sawtimber volume but significant contributions to cubic-foot volume of growing stock. Consequently, 71 percent of the sawtimber volume in hardwood types is in conifer species, but 52 percent of the cubic-foot growing-stock volume in these stands is in hardwood species.

Sawtimber Volume Is Concentrated in Softwood Species

Softwoods account for 30.7 billion board feet or 94 percent of the sawtimber volume in Humboldt County. This softwood volume is largely concentrated in two species, Douglas-fir and redwood, which comprise 54 and 34 percent of the total, respectively. The Douglas-fir volume is almost evenly divided between public and private ownerships. Coast redwood, the other softwood species of major importance, has a sawtimber volume of 10.3 billion board feet, virtually all in private ownership.

Hardwoods, which dominate stocking on 42 percent of the commercial forest area total only 1.8 billion board feet or 6 percent of the sawtimber volume. Sixty-one percent of the total hardwood sawtimber volume is on farmer and miscellaneous private lands.

Volume Is Concentrated in Large Softwood Trees

The distribution of growing-stock volume, which includes all trees 5 inches and larger in diameter and is expressed in cubic feet, illustrates that Humboldt County's timber resource is concentrated in sawtimber-size trees. Of the 5.4 billion cubic feet in softwoods, half is in trees 39 inches or larger in diameter, and 47 percent is in trees from 11 to 39 inches in diameter. Of the 893 million cubic feet of hardwoods, 23 percent is in trees from 5 to 11 inches in diameter, and 72 percent is in trees from 11 to 39 inches in diameter. In a growing export market for small softwood sawtimber, almost all of the softwood volume is of marketable size.

Tanoak Is Most Abundant Hardwood Species

Tanoak, the most abundant hardwood in Humboldt County, totals 939 million board feet, 52 percent of the hardwood sawtimber volume. Pacific madrone, next in abundance, totals 406 million board feet or 22 percent of the hardwood volume. Ten other hardwood species account for the remaining 478 million board feet of hardwood sawtimber volume

GROWTH AND CUT

Average Net Annual Growth Is 390 Million Board Feet

Average net annual growth of sawtimber on commercial forest land in Humboldt County totaled 390 million board feet, International 1/4-inch rule, in 1966. Average annual mortality for the period 1961-66 totaled 160 million board feet, 54 percent--primarily in blowdown--attributed to weather and 20 percent to fire.

The growth of growing stock totaled 86 million cubic feet, 72 percent in softwood species and 28 percent in hardwood species. With relatively little volume in poletimber, softwood sawtimber and growing stock are both growing at the same rate of 1.1 percent of inventory volume. On the other hand, the growth rate of hardwood growing stock is 2.7 percent of inventory volume; that of hardwood sawtimber is 2.3 percent. The difference in these two growth rates is indicative of the substantial hardwood volume in poletimber-size trees. Although the growth rate of hardwoods is significantly greater than that of the softwoods, the contribution of hardwoods to total growth is relatively low because of the low hardwood volumes per acre in the hardwood types.

Forest Industry Lands Have Highest Growth Per Acre

Net annual growth of sawtimber on forest industry lands averages 371 board feet per acre. Growth per acre on farmer and miscellaneous private lands averages 168 board feet; on National Forest land, 262 board feet; and on other public land net growth is negative because of a high mortality rate. The high net growth on forest industry land is due mainly to well-stocked young redwood stands which occur on high-site lands. Redwood has an average growth per acre of 519 board feet and accounts for 47 percent of all softwood sawtimber growth. The net growth in young redwood stands approaches 5 percent of current inventory volume, but is negligible in old-growth redwood stands.

Annual Cut Exceeds Growth

The annual cut in Humboldt County in recent years has been in excess of 1,300 million board feet, International 1/4-inch rule. The cut has been entirely from softwood species and exceeds the current net annual growth of softwoods by 270 percent. However, most of the cut is still concentrated in old stands containing large sawtimber which contribute little net growth. As these stands are replaced by young stands, total net growth in the county will increase.

Fifteen-Year Private Supply of Large Sawtimber Is Available at Current Cutting Levels

Large softwood sawtimber stands have been the center of harvesting activities in Humboldt County for over 100 years. Though the area and volume of such stands have been greatly reduced, harvesting activities continue to be concentrated in them, with the present cutting level not much below alltime highs. In the north coastal area of California in recent years, well over 70 percent of the sawtimber harvest has come from softwood trees greater than 39 inches in diameter. In Humboldt County, where private cut accounts for almost 90 percent of the county's annual cut, current cutting levels of large sawtimber trees can continue for about 15 years, at which time essentially all

of the current inventory of these large softwood sawtimber trees on private lands will have been cut. Although levels and distribution of cut will probably change from the current ones, it is evident that the transition to an industry based on younger and smaller timber is no longer in the distant future. The conversion from old-growth to young-growth stands has spanned more than 100 years in Humboldt County. On private lands, where such cutting has been centered, that conversion is reaching a conclusion, and the harvest of young sawtimber stands has begun.

CONCLUSION

What Does the Future Hold?

Although detailed projections of the forest resource and the level of cut it will support are not within the scope of this publication, some general observations can be made based upon the findings of the recent Humboldt County inventory. The county's sawtimber inventory will continue to decline as it has for many years, until the time when essentially all of the old-growth reserves on private lands have been removed. That time is in the near and foreseeable future. If present cutting levels continue, the county's annual cut can be maintained at current levels for about 15 years, followed by an abrupt decrease to levels based upon the allowable cut on public forests and sustainable levels of cut on privately owned young-growth forests. Or the cut might gradually decrease over a longer period to sustainable levels based upon a young-growth timber resource. The sustainable level of cut, based upon growth in the young stands, will depend upon the management objectives and resultant actions of the owners of the county's commercial forest lands.

Coast redwood currently accounts for about one-third of the Humboldt County annual cut; Douglas-fir, most of the other two-thirds. However, redwood occupies the most highly productive forest areas in the county, primarily on forest industry lands managed for timber production. Redwood currently accounts for almost half of the softwood sawtimber growth. And since a century of cutting was concentrated in the redwood type, many of the mature young softwood sawtimber stands are redwood. So, although the total harvest of redwood will decline, its relative contribution to the total cut should increase with the transition of cutting activities to young stands of timber.

Humboldt County's hardwood type seems to pose the biggest question for the future. There is little present demand for hardwoods and the value for hardwoods will probably always be less than for softwoods. Hardwood stands are characterized by low volumes per acre and hardwoods occupying those sites capable of growing softwoods are not producing the volume of wood such sites are capable of producing.

Eventually, such lands often revert to softwoods as the hardwoods are overtopped. This process could be accelerated if markets for hardwoods would expand. This could create an economic opportunity for reestablishment

of softwood stands by means of cutting and conversion to softwoods. The natural progression to softwood stands is slow, effectively removing these lands from production for a long time. The softwood stands resulting from this slow evolution may well be poorly stocked, and it is not likely that their level of cut will approach their productive potential within the foreseeable future.

The hardwood problem is closely tied to land ownership. The farmer and miscellaneous private owner group owns 61 percent of the hardwood type area and that area in turn accounts for 59 percent of the commercial forest land within the owner group. Management objectives of this group are often not oriented toward timber production. The eventual contribution of this area to future levels of cut is difficult to forecast but is probably of diminishing importance.

For the near future, and perhaps in the long run, timber harvesting activities and the resultant economic activities in Humboldt County will depend primarily on the timber resources on the forest industry and publicly owned lands.

Table 1.--Area by land class, Humboldt County,January 1, 1967

(In thousand acres)

Land class	Area
Forest land:	
Commercial	1,701
Productive-reserved	47
Unproductive	102
Total forest	1,850
Nonforest land ^{1/}	437
Total area ^{2/}	2,287

^{1/} Includes swampland, industrial and urban areas, other nonforest land, and 18,000 acres classed as water by Forest Survey standards but defined by the U.S. Bureau of the Census as land.

^{2/} Source: United States Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2.--Area of commercial forest land, by ownership class,Humboldt County, January 1, 1967

(In thousand acres)

Ownership class	Area
National Forest	292
Other public: ^{1/}	
Bureau of Land Management	53
Indian	72
State, county, and municipal	1
Total other public	126
Private:	
Forest industry	531
Farmer owned	389
Miscellaneous private	363
Total private	1,283
All ownerships	1,701

^{1/} Estimates of commercial forest land in specific ownerships are derived by sampling methods. Consequently, they may not agree with the official estimates of the individual agencies.

Table 3.--Area of commercial forest land, by stand-size class and ownership class, Humboldt County, January 1, 1967

(In thousand acres)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Sawtimber stands:					
Old-growth	522	168	60	179	115
Young-growth	743	87	41	232	383
Total	1,265	255	101	411	498
Poletimber stands	66	10	4	5	47
Sapling and seedling stands	276	21	15	82	158
Nonstocked areas	94	6	6	33	49
All classes	1,701	292	126	531	752

Table 4.--Area of commercial forest land, by stand volume and ownership class, Humboldt County, January 1, 1967

(In thousand acres)

Stand volume per acre ^{1/}	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Less than 1,500 board feet	333	21	13	71	228
1,500 to 5,000 board feet	313	8	17	111	177
5,000 to 10,000 board feet	282	47	18	75	142
10,000 to 20,000 board feet	236	47	29	78	82
20,000 to 30,000 board feet	196	53	30	53	60
30,000 to 40,000 board feet	99	42	--	27	30
40,000 to 50,000 board feet	51	19	2	18	12
50,000 to 60,000 board feet	61	23	3	25	10
60,000 to 70,000 board feet	42	9	8	20	5
70,000 to 80,000 board feet	28	12	--	10	6
80,000 to 90,000 board feet	22	6	6	10	--
90,000 board feet or more	38	5	--	33	--
All classes	1,701	292	126	531	752

^{1/} Net volume, International 1/4-inch rule.

Table 5.--Area of commercial forest land, by stocking class of growing-stock trees and by

stand-size class and ownership group, Humboldt County, January 1, 1967

(In thousand acres)

Stocking class	All stands		Nonstocked		Seedling and sapling stands		Poletimber stands		Small sawtimber, stands		Large sawtimber stands	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Overstocked (133 percent or more)	22	114	--	--	--	21	--	5	--	15	22	73
Fully stocked (100 to 132 percent)	145	285	--	--	10	26	5	21	23	99	107	139
Medium stocked (60 to 99 percent)	194	436	--	--	18	93	6	21	27	110	143	212
Poorly stocked (16.7 to 59 percent)	45	366	--	--	8	100	3	5	5	90	29	171
Nonstocked (less than 16.7 percent)	12	82	12	82	--	--	--	--	--	--	--	--
All stocking classes	418	1,283	12	82	36	240	14	52	55	314	301	595

Table 6.--Area of commercial forest land, by cubic-foot site class, forest-type group, and ownership, Humboldt County, January 1, 1967
(In thousand acres)

Site class ^{1/} and forest-type group	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
225 cubic feet per acre or more:					
Softwood	207	--	1	171	35
Hardwood	16	--	--	5	11
Nonstocked	6	--	--	6	--
Total	229	--	1	182	46
165 to 224 cubic feet per acre:					
Softwood	194	51	3	86	54
Hardwood	59	2	2	24	31
Nonstocked	17	--	--	5	12
Total	270	53	5	115	97
120 to 164 cubic feet per acre:					
Softwood	220	64	23	69	64
Hardwood	243	17	15	50	161
Nonstocked	35	3	--	22	10
Total	498	84	38	141	235
85 to 119 cubic feet per acre:					
Softwood	151	53	16	11	71
Hardwood	260	31	20	44	165
Nonstocked	25	3	6	--	16
Total	436	87	42	55	252
50 to 84 cubic feet per acre:					
Softwood	111	49	9	15	38
Hardwood	143	16	31	23	73
Nonstocked	11	--	--	--	11
Total	265	65	40	38	122
20 to 49 cubic feet per acre:					
Softwood	3	3	--	--	--
Hardwood	--	--	--	--	--
Nonstocked	--	--	--	--	--
Total	3	3	--	--	--
All classes and groups	1,701	292	126	531	752

^{1/} A classification of forest land based on culmination of mean annual increment of fully stocked natural stands. Yields may be substantially higher under intensive management.

Table 7.--Area of commercial forest land, by forest type and ownership class, Humboldt County, January 1, 1967

(In thousand acres)

Type	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Douglas-fir	469	155	48	87	179
Redwood	312	--	1	249	62
True firs	70	51	3	5	11
Pines	19	14	--	5	--
Sitka spruce	16	--	--	5	11
Tanoak	458	48	44	111	255
Pacific madrone	76	11	--	5	60
Other hardwoods	187	7	24	31	125
Nonstocked	94	6	6	33	49
All types	1,701	292	126	531	752

Table 8.--Area of commercial forest land, by stand age, ownership class, and forest-type group, Humboldt County, January 1, 1967

(In thousand acres)

Stand age (years)	All ownerships		National Forest		Other public		Forest industry		Farmer and miscellaneous private	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
1 - 9	66	149	8	8	--	3	30	45	28	93
10 - 19	17	63	--	--	1	15	5	16	11	32
20 - 29	42	20	--	--	--	4	31	6	11	10
30 - 39	47	17	--	5	--	--	35	--	12	12
40 - 49	52	10	5	--	--	--	31	--	16	10
50 - 59	31	13	--	2	5	--	10	--	16	11
60 - 69	15	25	--	--	--	--	10	--	5	25
70 - 79	13	24	3	2	--	--	--	--	10	22
80 - 89	--	5	--	--	--	--	--	--	--	5
90 - 99	--	8	--	3	--	--	--	--	--	5
100 - 199	16	6	3	--	13	1	--	5	--	--
200 - 299	38	8	24	3	3	--	11	--	--	5
300 and more	113	12	--	--	6	--	91	7	16	5
Uneven, under rotation age ^{1/}	223	244	53	28	10	22	65	35	95	159
Uneven, over rotation age	213	117	124	15	14	23	32	33	43	46
Total, all ages	886	721	220	66	52	68	351	147	263	440
Nonstocked	94		6		6		33		49	

^{1/} Rotation age is defined as 50 years in hardwood stands, 100 years in conifer stands.

Table 9.--Area of commercial forest land, by area condition and
ownership classes, Humboldt County, January 1, 1967
(In thousand acres)

Area condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
<u>Class 10</u> Areas fully stocked with desirable trees and not overstocked.	5	--	--	5	--
<u>Class 20</u> Areas fully stocked with desirable trees, but overstocked with all live trees.	40	--	--	12	28
<u>Class 30</u> Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by de- sirable trees.	10	5	--	5	--
<u>Class 40</u> Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by de- sirable trees.	217	13	27	119	58
<u>Class 50</u> Areas poorly stocked with desirable trees, but fully stocked with grow- ing-stock trees.	264	49	16	75	124
<u>Class 60</u> Areas poorly stocked with desirable trees, but with medium to full stocking of growing stock trees.	399	52	39	140	168
<u>Class 70</u> Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.	436	34	7	111	284
<u>Class 80</u> Stands over rotation age and with 40 percent or more of the stocking in desirable trees.	87	39	14	11	23
<u>Class 90</u> Stands over rotation age with less than 40 percent of the stocking in desirable trees.	243	100	23	53	67
All classes	1,701	292	126	531	752

Table 10.--Area of commercial forest land, by cutting treatment and forest-type group, and by ownership, Humboldt County, January 1, 1967

(In thousand acres)

Cutting treatment and forest-type group	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Uncut:					
Softwood	520	211	52	143	114
Hardwood	207	58	47	11	91
Nonstocked	5	--	--	--	5
Total	732	269	99	154	210
Clearcut, 0 to 5 years:					
Softwood	28	3	--	19	6
Hardwood	6	6	--	--	--
Nonstocked	21	6	--	15	--
Total	55	15	--	34	6
Clearcut, over 5 years:					
Softwood	130	5	--	84	41
Hardwood	167	--	1	56	110
Nonstocked	17	--	--	6	11
Total	314	5	1	146	162
Partial cut, 0 to 5 years:					
Softwood	68	--	--	40	28
Hardwood	107	--	10	31	66
Nonstocked	17	--	--	--	17
Total	192	--	10	71	111
Partial cut, over 5 years:					
Softwood	140	1	--	65	74
Hardwood	234	2	10	49	173
Nonstocked	34	--	6	12	16
Total	408	3	16	126	263
All treatments and groups	1,701	292	126	531	752

Table 11.--Area of noncommercial forest land, by forest type,Humboldt County, January 1, 1967

(In thousand acres)

Type	All areas	Productive- reserved areas	Unproductive areas
Douglas-fir	11	11	--
Redwood	35	35	--
Hardwoods	1	1	--
Noncommercial rocky	13	--	13
Noncommercial low site	19	--	19
Noncommercial oak-madrone	25	--	25
Noncommercial chaparral	26	--	26
Noncommercial other ^{1/}	19	--	19
All types	149	47	102

^{1/} Primarily noncommercial because of adverse location.

Table 12.--Volume of all growing stock and sawtimber on commercial forest
land, by timber and ownership class and by softwoods and
hardwoods, Humboldt County, January 1, 1967

Timber and ownership class	Volume per acre	Total volume		
		All species	Softwoods	Hardwoods
	<u>Cubic feet</u>	-----	<u>Million cubic feet</u>	-----
All growing stock:				
National Forest	5,014	1,464	1,346	118
Other public	4,000	504	396	108
Forest industry	5,068	2,691	2,534	157
Farmer and miscellaneous private	2,162	1,626	1,116	510
All ownerships	3,695	6,285	5,392	893
	<u>Board feet</u>	-----	<u>Million board feet</u>	-----
Sawtimber (International 1/4-inch rule):				
National Forest	29,106	8,499	8,318	181
Other public	21,397	2,696	2,473	223
Forest industry	26,586	14,117	13,805	312
Farmer and miscellaneous private	9,640	7,249	6,142	1,107
All ownerships	19,142	32,561	30,738	1,823
Sawtimber (Scribner rule):				
National Forest	27,490	8,027	7,850	177
Other public	20,317	2,560	2,342	218
Forest industry	25,262	13,414	13,108	306
Farmer and miscellaneous private	9,088	6,834	5,748	1,086
All ownerships	18,128	30,835	29,048	1,787

Table 13.--Net volume of growing stock on commercial forest land by species
and ownership class, Humboldt County, January 1, 1967

(In million cubic feet)

Species	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Softwoods:					
Douglas-fir	2,708	915	373	596	824
Redwood	2,015	--	1	1,800	214
White fir	331	286	13	15	17
Grand fir	92	--	--	48	44
Red fir	41	41	--	--	--
Sugar pine	78	70	8	--	--
Ponderosa and Jeffrey pines ^{1/}	27	20	--	4	3
Sitka spruce	38	--	--	27	11
Western hemlock	40	--	--	40	--
Cedars ^{2/}	22	14	1	4	3
Total softwoods	5,392	1,346	396	2,534	1,116
Hardwoods:					
Bigleaf maple	11	2	2	1	6
Red alder	27	--	--	6	21
Pacific madrone	215	26	36	23	130
Golden chinkapin	16	7	1	5	3
Tanoak	462	64	45	103	250
California live oak	15	2	6	2	5
Canyon live oak	25	5	4	3	13
Oregon white oak	34	(^{3/})	3	4	27
California black oak	48	9	9	5	25
California white oak	10	3	--	--	7
Interior live oak	6	(^{3/})	--	3	3
California laurel	24	--	2	2	20
Total hardwoods	893	118	108	157	510
Total all species	6,285	1,464	504	2,691	1,626

^{1/} Includes a small amount of knobcone pine.

^{2/} Primarily incense-cedar.

^{3/} Less than 500,000 cubic feet.

Table 14.--Volume of sawtimber on commercial forest land, by species and ownership class, Humboldt County, January 1, 1967
(International 1/4-inch rule)

(In million board feet)

Species	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Softwoods:					
Douglas-fir	16,555	5,814	2,318	3,701	4,722
Redwood	10,317	--	2	9,320	995
White fir	1,893	1,647	90	62	94
Grand fir	582	--	--	328	254
Red fir	259	259	--	--	--
Sugar pine	478	417	61	--	--
Ponderosa and Jeffrey pines ^{1/}	125	101	--	11	13
Sitka spruce	208	--	--	154	54
Western hemlock	208	--	--	208	--
Cedars ^{2/}	113	80	2	21	10
Total softwoods	30,738	8,318	2,473	13,805	6,142
Hardwoods:					
Bigleaf maple	26	4	5	6	11
Red alder	90	--	--	8	82
Pacific madrone	406	42	65	47	252
Golden chinkapin	53	20	2	19	12
Tanoak	939	89	100	182	568
California live oak	10	3	--	2	5
Canyon live oak	61	5	17	9	30
Oregon white oak	48	1	9	8	30
California black oak	99	14	18	11	56
California white oak	10	3	--	--	7
Interior live oak	27	--	--	14	13
California laurel	54	--	7	6	41
Total hardwoods	1,823	181	223	312	1,107
Total all species	32,561	8,499	2,696	14,117	7,249

^{1/} Includes small amount of knobcone pine.

^{2/} Primarily incense-cedar.

Table 15.--Average sawtimber volume per acre, by stand-size class
and ownership class, Humboldt County, January 1, 1967
(International 1/4-inch rule)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
----- Board feet -----					
Nonstocked	3,500	0	5,700	3,400	3,700
Seedlings and saplings	1,600	4,000	1,100	2,200	1,000
Poletimber	2,800	5,800	0	2,600	2,500
Small sawtimber	9,800	18,700	13,100	11,400	7,000
Large sawtimber	31,400	35,000	29,400	42,200	18,600
All stands	19,100	29,100	21,400	26,600	9,600

Table 16.--Volume of timber on commercial forest land, by class
of timber and by softwoods and hardwoods, Humboldt
County, January 1, 1967

(In million cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Saw-log portion	5,212	4,527	685
Upper-stem portion	676	676	--
Total	5,888	5,203	685
Poletimber trees	397	189	208
All growing-stock trees	6,285	5,392	893
Sound cull trees	140	25	115
Rotten cull trees	374	307	67
Salvable dead trees:			
Sawtimber-size	164	156	8
Total all timber	6,963	5,880	1,083

Table 17.--Number of growing-stock trees on commercial forest land, by species and

diameter class, Humboldt County, January 1, 1967

(Thousand trees)

Species	Diameter class (Inches at breast height)											
	All classes	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0- 38.9	39.0 and larger
Softwoods:												
Douglas-fir	33,298	6,368	5,899	3,283	2,379	2,067	2,350	1,867	1,695	3,278	2,167	1,945
Redwood	26,204	3,991	3,398	3,975	2,603	2,751	1,946	1,586	1,323	2,499	819	1,313
White fir	7,448	1,652	1,472	853	666	571	507	353	219	618	394	143
Grand fir	753	--	136	--	127	--	41	23	76	192	105	53
Red fir	648	398	70	--	31	19	--	12	10	30	36	42
Sugar pine	1,462	258	630	40	75	106	32	48	73	81	65	54
Ponderosa and Jeffrey pines ^{1/}	1,349	453	279	336	56	20	30	47	21	88	11	8
Sitka spruce	553	--	--	217	--	--	57	45	89	124	15	6
Western hemlock	832	154	112	76	--	207	36	23	--	161	59	4
Cedars ^{2/}	1,144	450	279	42	135	--	60	12	--	73	68	25
Total softwoods	73,691	13,724	12,275	8,822	6,072	5,741	5,059	4,016	3,506	7,144	3,739	3,593
Hardwoods:												
Bigleaf maple	1,336	439	417	90	139	16	174	--	20	32	9	--
Red alder	1,142	--	475	200	116	114	60	52	38	66	11	10
Pacific madrone	10,419	1,675	2,861	1,588	1,445	890	712	364	218	471	137	58
Golden chinkapin	1,109	556	206	69	27	20	32	50	64	58	27	--
Tanoak	45,257	17,717	11,073	5,451	3,173	1,964	1,990	1,144	853	1,512	342	38
California live oak	3,209	1,675	918	343	112	112	29	11	9	--	--	--
Canyon live oak	2,490	634	787	355	237	78	164	93	47	76	4	15
Oregon white oak	6,176	2,904	1,712	759	398	81	154	24	19	109	16	--
California black oak	3,796	469	1,092	746	614	383	166	79	62	158	27	--
California white oak	2,220	1,047	917	122	112	--	--	--	--	7	15	--
Interior live oak	284	172	--	--	--	44	--	27	--	20	11	10
California laurel	3,039	662	618	636	686	107	82	95	42	98	8	5
Total hardwoods	80,477	27,950	21,076	10,359	7,059	3,809	3,563	1,939	1,372	2,607	607	136
Total all species	154,168	41,674	33,351	19,181	13,131	9,550	8,622	5,955	4,878	9,751	4,346	3,729

^{1/} Includes small amount of knobcone pine.^{2/} Primarily incense-cedar.

Table 18.--Volume of growing stock on commercial forest land, by species

and diameter class, Humboldt County, January 1, 1967

(In million cubic feet)

Species	Diameter class (Inches at breast height)											
	All classes	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0- 38.9	39.0 and larger
Softwoods:												
Douglas-fir	2,708	19	43	44	54	67	102	106	120	386	527	1,240
Redwood	2,015	5	13	29	32	54	60	72	80	241	163	1,266
White fir	331	4	7	8	9	14	16	16	13	70	101	73
Grand fir	92	--	1	--	2	--	1	1	5	24	27	31
Red fir	41	(1/)	(1/)	--	1	--	--	1	1	4	10	24
Sugar pine	78	1	3	(1/)	1	2	1	2	4	11	16	37
Ponderosa and Jeffrey pines ^{2/}	27	1	1	4	1	(1/)	1	2	1	8	3	5
Sitka spruce	38	--	--	3	--	--	3	3	7	15	3	4
Western hemlock	40	(1/)	(1/)	1	--	4	1	1	--	17	14	2
Cedars ^{3/}	22	1	1	(1/)	1	--	2	(1/)	--	4	9	4
Total softwoods	5,392	31	69	89	101	141	187	204	231	780	873	2,686
Hardwoods:												
Bigleaf maple	11	1	2	1	1	(1/)	3	--	1	1	1	--
Red alder	27	--	3	2	2	3	2	2	2	6	2	3
Pacific madrone	215	4	15	15	22	20	22	15	12	41	24	25
Golden chinkapin	16	1	1	1	(1/)	(1/)	1	2	3	4	3	--
Tanoak	462	28	38	35	34	33	49	38	37	114	47	9
California live oak	15	4	4	3	1	2	1	(1/)	(1/)	--	--	--
Canyon live oak	25	1	4	3	3	1	3	2	1	4	(1/)	3
Oregon white oak	34	5	6	5	4	1	3	(1/)	1	7	2	--
California black oak	48	1	4	5	7	7	4	3	2	12	3	--
California white oak	10	2	4	1	1	--	--	--	--	(1/)	2	--
Interior live oak	6	1	--	--	--	(1/)	--	1	--	1	1	2
California laurel	24	1	3	4	6	1	1	1	1	5	(1/)	1
Total hardwoods	893	49	84	75	81	68	89	64	60	195	85	43
Total all species	6,285	80	153	164	182	209	276	268	291	975	958	2,729

^{1/} Less than 500,000 cubic feet.^{2/} Includes small amount of knobcone pine.^{3/} Primarily incense-cedar.

Table 19.--Volume of sawtimber on commercial forest land, by species and diameter class,

Humboldt County, January 1, 1967 (International 1/4-inch rule)

(In million board feet)

Species	Diameter class (Inches at breast height)								
	All classes	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0- 38.9	39.0 and larger
Softwoods:									
Douglas-fir	16,555	142	240	433	510	628	2,308	3,484	8,810
Redwood	10,317	64	211	276	343	397	1,251	852	6,923
White fir	1,893	36	64	80	82	72	413	659	487
Grand fir	582	5	--	2	5	26	142	172	230
Red fir	259	2	2	--	4	5	23	67	156
Sugar pine	478	3	8	4	11	21	64	106	261
Ponderosa and Jeffrey pines ^{1/}	125	2	2	4	10	5	48	19	35
Sitka spruce	208	--	--	12	15	38	93	22	28
Western hemlock	208	--	18	6	4	--	88	83	9
Cedars ^{2/}	113	8	--	5	1	--	22	52	25
Total softwoods	30,738	262	545	822	985	1,192	4,452	5,516	16,964
Hardwoods:									
Bigleaf maple	26	3	1	10	--	2	7	3	--
Red alder	90	4	9	7	7	10	26	10	17
Pacific madrone	406	46	43	51	36	29	103	57	41
Golden chinkapin	53	1	1	2	5	12	18	14	--
Tanoak	939	60	73	121	100	100	319	136	30
California live oak	10	2	4	2	1	1	--	--	--
Canyon live oak	61	6	3	9	7	5	16	2	13
Oregon white oak	48	11	3	8	1	2	18	5	--
California black oak	99	13	14	10	7	7	36	12	--
California white oak	10	3	--	--	--	--	1	6	--
Interior live oak	27	--	1	--	2	--	5	7	12
California laurel	54	14	3	3	4	3	21	3	3
Total hardwoods	1,823	163	155	223	170	171	570	255	116
Total all species	32,561	425	700	1,045	1,155	1,363	5,022	5,771	17,080

^{1/} Includes small amount of knobcone pine.^{2/} Primarily incense-cedar.

Table 20.--Volume of sawtimber on commercial forest land, by species and diameter class.

Humboldt County, January 1, 1967 (Scribner rule)

(In million board feet)

Species	Diameter class (Inches at breast height)								
	All classes	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0- 38.9	39.0 and larger
Softwoods:									
Douglas-fir	15,643	119	205	381	458	568	2,135	3,293	8,484
Redwood	9,796	56	185	246	310	362	1,151	796	6,690
White fir	1,758	30	56	70	73	65	380	622	462
Grand fir	548	4	--	3	4	24	131	162	220
Red fir	246	2	2	--	3	5	21	63	150
Sugar pine	452	2	7	4	10	19	59	100	251
Ponderosa and Jeffrey pines ^{1/}	116	2	1	3	9	4	45	18	34
Sitka spruce	192	--	--	10	13	34	87	21	27
Western hemlock	193	--	15	5	4	--	81	78	10
Cedars ^{2/}	104	6	--	4	1	--	19	49	25
Total softwoods	29,048	221	471	726	885	1,081	4,109	5,202	16,353
Hardwoods:									
Bigleaf maple	26	4	1	10	--	2	6	3	--
Red alder	88	4	8	6	7	10	26	10	17
Pacific madrone	398	44	42	50	35	28	102	57	40
Golden chinkapin	52	1	1	2	5	11	18	14	--
Tanoak	920	58	71	118	97	98	314	135	29
California live oak	10	2	4	2	1	1	--	--	--
Canyon live oak	60	5	3	9	7	5	16	2	13
Oregon white oak	47	11	3	8	2	2	17	4	--
California black oak	97	13	14	9	6	7	36	12	--
California white oak	9	2	--	--	--	--	1	6	--
Interior live oak	27	--	1	--	2	--	5	7	12
California laurel	53	13	3	3	4	3	21	3	3
Total hardwoods	1,787	157	151	217	166	167	562	253	114
Total all species	30,835	378	622	943	1,051	1,248	4,671	5,455	16,467

^{1/} Includes a small amount of knobcone pine.^{2/} Primarily incense-cedar.

Table 21.--Net annual growth of all growing stock on commercial forest
land, by species and ownership class, Humboldt County, 1966

Species	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
----- <u>Thousand cubic feet</u> -----					
Softwoods:					
Douglas-fir	22,356	5,878	<u>1</u> / <u>-1,385</u>	7,850	10,013
Redwood	30,531	--	37	22,627	7,867
True firs	5,299	4,501	<u>1</u> / <u>-746</u>	968	576
Sugar pine	507	472	35	--	--
Ponderosa and Jeffrey pines	91	187	--	140	<u>1</u> / <u>-236</u>
Sitka spruce	1,732	--	--	1,126	606
Western hemlock	733	--	--	733	--
Other softwoods	10	148	3	55	<u>1</u> / <u>-196</u>
Total softwoods	<u>61,259</u>	<u>11,186</u>	<u>1</u> / <u>-2,056</u>	<u>33,499</u>	<u>18,630</u>
Hardwoods:					
Pacific madrone	4,896	344	703	659	3,190
Tanoak	14,328	930	1,607	4,829	6,962
Other hardwoods	5,169	293	472	717	3,687
Total hardwoods	<u>24,393</u>	<u>1,567</u>	<u>2,782</u>	<u>6,205</u>	<u>13,839</u>
Total all species	85,652	12,753	726	39,704	32,469

1/ Negative growth is the result of annual mortality exceeding annual growth.

Table 22.--Net annual growth of sawtimber on commercial forest land,
by species and ownership class, Humboldt County, 1966

Species	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
----- <u>Thousand board feet, International 1/4-inch rule</u> -----					
Softwoods:					
Douglas-fir	131,182	43,409	<u>1/-</u> 12,082	45,638	54,217
Redwood	162,464	--	138	125,863	36,463
True firs	36,030	25,971	<u>1/-</u> 3,544	7,768	5,835
Sugar pine	3,234	2,973	261	--	--
Ponderosa and Jeffrey pines	212	985	--	273	<u>1/-</u> 1,046
Sitka spruce	11,487	--	--	7,687	3,800
Western hemlock	4,033	--	--	4,033	--
Other softwoods	178	648	17	299	<u>1/-</u> 786
Total softwoods	<u>348,820</u>	<u>73,986</u>	<u>1/-15,210</u>	<u>191,561</u>	<u>98,483</u>
Hardwoods:					
Pacific madrone	7,953	485	1,695	1,014	4,759
Tanoak	21,539	1,413	2,032	4,086	14,008
Other hardwoods	11,951	553	842	1,333	9,223
Total hardwoods	<u>41,443</u>	<u>2,451</u>	<u>4,569</u>	<u>6,433</u>	<u>27,990</u>
Total all species	<u>390,263</u>	<u>76,437</u>	<u>1/-10,641</u>	<u>197,994</u>	<u>126,473</u>

1/ Negative growth is the result of annual mortality exceeding annual growth.

Table 23.--Net annual growth of sawtimber on commercial forest land,
by species and ownership class, Humboldt County, 1966

Species	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
----- <u>Thousand board feet, Scribner rule</u> -----					
Softwoods:					
Douglas-fir	124,090	40,730	<u>1/-</u> 11,067	42,744	51,683
Redwood	150,210	--	124	116,219	33,867
True firs	35,105	26,192	<u>1/-</u> 3,377	7,031	5,259
Sugar pine	3,117	2,863	254	--	--
Ponderosa and Jeffrey pines	219	936	--	236	-953
Sitka spruce	10,833	--	--	7,254	3,579
Western hemlock	3,775	--	--	3,775	--
Other softwoods	200	630	16	297	<u>1/-</u> 743
Total softwoods	<u>327,549</u>	<u>71,351</u>	<u>1/-</u> 14,050	<u>177,556</u>	<u>92,692</u>
Hardwoods:					
Pacific madrone	7,775	478	1,654	992	4,651
Tanoak	21,173	1,412	2,003	3,957	13,801
Other hardwoods	11,765	547	835	1,327	9,056
Total hardwoods	<u>40,713</u>	<u>2,437</u>	<u>4,492</u>	<u>6,276</u>	<u>27,508</u>
Total all species	368,262	73,788	<u>1/-</u> 9,558	183,832	120,200

1/ Negative growth is the result of annual mortality exceeding annual growth.

Table 24.--Average annual mortality of growing stock and sawtimber
on commercial forest land, by ownership class and by
softwoods and hardwoods, Humboldt County, 1961-66

Species	Total	National Forest	Other public	Forest industry	Farmer and miscellaneous private
----- <u>Thousand cubic feet</u> -----					
Growing stock:					
Softwoods	26,656	3,716	5,970	8,594	8,376
Hardwoods	2,116	252	278	1,060	526
Total	28,772	3,968	6,248	9,654	8,902
----- <u>Thousand board feet, International 1/4-inch rule</u> -----					
Sawtimber:					
Softwoods	154,732	21,521	38,405	45,512	49,294
Hardwoods	5,495	543	798	3,475	679
Total	160,227	22,064	39,203	48,987	49,973
----- <u>Thousand board feet, Scribner rule</u> -----					
Sawtimber:					
Softwoods	146,817	20,440	36,302	43,865	46,210
Hardwoods	5,404	531	778	3,425	670
Total	152,221	20,971	37,080	47,290	46,880

Table 25.--Average annual mortality of all growing stock and sawtimber on commercial forest land, by species, Humboldt County, 1961-66

Species	All growing stock	Sawtimber	
		International 1/4-inch rule	Scribner rule
-- <u>Thousand cubic feet</u> - ----- <u>Thousand board feet</u> -----			
Softwoods:			
Douglas-fir	16,795	103,264	97,231
Redwood	6,965	36,215	35,141
True firs	1,788	10,255	9,740
Sugar pine	319	1,845	1,752
Ponderosa and Jeffrey pines	278	1,316	1,205
Other softwoods	511	1,837	1,748
Total softwoods	26,656	154,732	146,817
Hardwoods:			
Pacific madrone	445	464	460
Tanoak	1,495	4,430	4,359
Other hardwoods	176	601	585
Total hardwoods	2,116	5,495	5,404
Total all species	28,772	160,227	152,221

Table 26.--Average annual mortality of growing stock and sawtimber on commercial forest land, by cause of death and by softwoods and hardwoods, Humboldt County, 1961-66

Species	Cause of death							
	Fire	Insects	Disease	Weather ^{1/}	Suppression	Logging ^{2/}	Miscellaneous and unknown	All causes
----- <u>Thousand cubic feet</u> -----								
Growing stock:								
Softwoods	5,342	1,349	1,776	14,106	113	1,236	2,734	26,656
Hardwoods	--	--	--	1,364	35	--	717	2,116
Total	5,342	1,349	1,776	15,470	148	1,236	3,451	28,772
----- <u>Thousand board feet, International 1/4-inch rule</u> -----								
Sawtimber:								
Softwoods	36,288	6,813	11,139	81,572	--	5,956	12,964	154,732
Hardwoods	--	--	--	4,241	--	--	1,254	5,495
Total	36,288	6,813	11,139	85,813	--	5,956	14,218	160,227
----- <u>Thousand board feet, Scribner rule</u> -----								
Sawtimber:								
Softwoods	34,283	6,454	10,499	77,946	--	5,439	12,196	146,817
Hardwoods	--	--	--	4,172	--	--	1,232	5,404
Total	34,283	6,454	10,499	82,118	--	5,439	13,428	152,221

^{1/} Mainly wind damage.

^{2/} Trees dying more than 1 year after logging.

ACCURACY OF THE CURRENT INVENTORY DATA

Forest-Land Area and Timber Volume

The estimates of forest-land area and timber volume in Humboldt County were derived by sampling and consequently have sampling errors. Sampling errors have been computed for the estimates of commercial forest-land area, noncommercial forest-land area, net cubic-foot volume of growing stock, and net board-foot volume (International 1/4-inch rule) of sawtimber. These are presented in table 27 as a percent of the estimated total at the 68-percent and 95-percent probability levels. They may be interpreted as meaning that the odds are two out of three for 68-percent probability or 19 out of 20 for 95-percent probability, that if a 100-percent inventory had been taken, using the same methods, the results would have been within the ranges shown. For example, the estimate of total commercial forest-land area from a 100-percent inventory would be expected to fall within plus or minus 1.4 percent of 1,701,000 acres, unless a one in three chance of sampling has occurred.

Table 27.--Sampling errors of estimates of forest area and timber volume

Item	Estimated total	Sampling error in percent	
		68-percent probability	95-percent probability
Commercial forest land	1,701,000 acres	±1.4	±2.7
Noncommercial forest land	102,000 acres	±17.0	±33.3
Volume:			
Growing stock	6,285 million cubic feet	±6.1	±12.0
Sawtimber (International 1/4-inch rule)	32,561 million board feet	±6.7	±13.1

In addition to measurable sampling errors, there may be other nonsampling errors due to mistakes in judgment, measurement, and compilation. The magnitude of errors from these sources cannot be determined. However, such errors are kept to a minimum through training, supervision, field checking, and complete editing and machine verification in compiling the data.

The sampling error of any breakdown of these totals will be substantially greater than for the total. The smaller the breakdown, the larger the sampling error. An approximation of the increasing sampling error can be obtained from table 28, which shows the sampling error associated with smaller estimates.

Table 28.--Approximate sampling error by size of estimate

Commercial Forest Land		Growing Stock		Sawtimber	
Area	Sampling error ^{1/}	Volume	Sampling error ^{1/}	Volume	Sampling error ^{1/}
<u>M acres</u>	<u>Percent</u>	<u>MM cu. ft.</u>	<u>Percent</u>	<u>MM bd. ft., International 1/4-inch rule</u>	<u>Percent</u>
1,701	1.4				
833	2.0				
370	3.0				
208	4.0				
133	5.0	6,285	6.1	32,561	6.7
33	10.0	2,339	10.0	14,617	10.0
15	15.0	1,039	15.0	6,496	15.0
8	20.0	585	20.0	3,654	20.0
5	25.0	374	25.0	2,339	25.0
4	30.0	260	30.0	1,624	30.0
		146	40.0	9,135	40.0
		94	50.0	5,846	50.0
		23	100.0	1,462	100.0

^{1/} By random sampling formula; 68-percent probability.

COMPARISON WITH PREVIOUS INVENTORIES

An earlier inventory of Humboldt County's forest resource was completed in 1948 and published in 1952. The report included information on area and ownership but not volume. Some of the differences in the area statistics between the original and the new inventory are undoubtedly due to real change such as the shift of forest land to other uses and to different ownerships. Some differences are due to sampling and technique errors and some to changes in definitions and standards of utilization. These differences complicate direct comparisons of the statistics.

Acreage figures during the first reinventory were obtained from type maps with a minimum type acreage of 40 acres. Thus a type island of commercial forest, 40 acres or larger in size could contain a large number of 1-acre non-commercial or nonforest areas. The area figures for the 1967 inventory, on the other hand, are based on a minimum area of 1 acre. The differences between inventories thus should not be used to determine exact magnitude of change, but these differences when reinforced with study of present inventory data can be used to indicate direction of change.

Between 1948 and 1967, the commercial forest area decreased slightly. This was due to conversions to nonforest uses and withdrawals into productive-reserved status resulting from forest-land purchases for expansion of parks,

primarily the Humboldt and Prairie Creek Redwood State parks. These withdrawals and conversions to nonforest uses have been on private holdings. During this same period of time, substantial shifts in ownership were occurring in the private and other public sectors of forest-land ownership. Forest industry ownership increased at the same time the acreage in farmer and miscellaneous private commercial forest land decreased. Other public ownerships, mainly State and Indian lands, decreased in size through disposition of some of their holdings to private ownership. The acreage of commercial forest on National Forest land remained unchanged during the period.

The early cover type definitions recognized only commercially valuable conifer species and assigned unequal weights among these species in the determination of forest cover type for a given area. Redwood was the favored species, and its occurrence as 20 percent or more of the commercial conifer cover resulted in an area being classified as redwood type. Unstocked areas and areas covered with hardwoods were assigned to a conifer type based upon an evaluation of potential species composition.

Under the present Forest Survey definitions, as used in the current Humboldt County inventory, forest cover type is determined on the basis of the species plurality of stocking by all live trees considering both size and spacing. This definition treats all species, including hardwoods, equally, regardless of relative economic values. As a result, the forest cover type information presented in this report reflects the species that actually occupy the forest lands of Humboldt County.

Although the magnitudes of type changes cannot be determined due to the differences in sampling techniques and type definitions, study of the inventory data indicates that, since 1948, there have been large decreases in the acreages of redwood and Douglas-fir types and a substantial increase in the acreage of hardwood types.

The planned 1977 reinventory of Humboldt County with remeasurement of 1967 inventory plots and standardized definitions should provide a firm basis for quantitatively evaluating changes in forest-land use, ownership, and forest cover types.

FOREST SURVEY PROCEDURES

This inventory of Humboldt County combines data from the Six Rivers National Forest inventory project and the Forest Survey inventory project. Field data for both inventory projects were collected during the summer of 1966. The same sampling design and field procedure were used throughout the county.

A systematic grid of photo points was printed on a set of aerial photographs covering the entire county. Each photo point was classified by major land use -- commercial forest land, noncommercial forest land, and nonforest land.

The commercial forest-land photo points were further classified into stand volume classes.

A stratified random sample of field plots, proportional to stratum area, was then selected from the photo points. This sample of photo points was visited in the field, and the accuracy of the photo classification of land use and ownership was checked. At each location falling on commercial forest land, an inventory plot was established.

The inventory plot consisted of 10 sample points distributed systematically over an acre. The variable-radius-plot sampling principle was used at each sample point to select the trees to be tallied. The summation of the 10-point tally expressed the resources and conditions for that acre and were used with the photo sample to provide area, volume, growth, and mortality statistics.

DEFINITION OF TERMS

Land Area

Total Land Area

Includes dry land and land temporarily or partially covered by water; such as marshes, swamps, and river flood plains; streams, sloughs, and canals less than one-eighth mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

Forest-Land Area

Land at least 10 percent stocked by trees of any size, or formerly having such tree cover, and not currently developed for nonforest use. Minimum area of forest land recognized is 1 acre.

Nonforest-Land Area

Land that does not qualify as forest land.

Forest-Land Classes

Commercial Forest-Land Area

Forest land which is producing or capable of producing industrial wood and not withdrawn from timber utilization.

Noncommercial Forest-Land Area

Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and productive public forest land withdrawn from commercial timber use through statute or administrative regulation.

Productive-reserved. Public forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land.

Unproductive. Forest land incapable of yielding crops of industrial wood products (usually sawtimber) because of adverse site conditions.

Unproductive forest land is divided into the following classes:

Noncommercial rocky. Forested areas within the commercial forest zone so steep and rocky that they are incapable of producing usable wood products.

Noncommercial low site. Forest lands of such low site quality that they are incapable of producing 20 cubic feet per acre per year of usable wood products.

Noncommercial oak-madrone. Areas currently stocked with low quality oaks and madrone and which are not now, nor show any evidence of ever having been, stocked with trees of commercial species and quality. Trees on these sites are usually poorly formed and suitable only for fuelwood.

Noncommercial chaparral. Areas covered with heavily branched, usually evergreen, dwarfed trees or shrubs, that at maturity form a crown canopy covering more than 50 percent of the ground.

Noncommercial adverse location. Generally inaccessible areas of productive forest land, often containing stands of merchantable timber but, because of physical location, cannot be harvested. Timber-bearing ledges are an example of such locations.

Types

Forest types are determined on the basis of species plurality of all live trees that contribute to stocking, considering both size and spacing.

Tree Classes

Growing-Stock Trees

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

Acceptable trees. Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Desirable trees. Growing-stock trees of commercial species (a) having no serious defects in quality limiting present or prospective use for timber products, (b) of relatively high vigor, and (c) containing no pathogens that may result in death or serious deterioration before rotation age.

Sawtimber trees (11.0 inches d.b.h. and larger) Live trees of commercial species that contain at least one 12-foot coniferous sawlog with a top diameter not less than 6 inches inside bark, or one 8-foot hardwood saw log with a top diameter not less than 8 inches inside bark and with not less than 25 percent of the board-foot volume in the tree free of defect for either conifer or hardwood.

Poletimber trees (5.0 to 10.9 inches d.b.h.). Live trees of commercial species not less than 50 percent sound on a cubic-foot basis and with no disease, defects, or deformities which are likely to prevent them from becoming growing-stock sawtimber trees.

Sapling and seedling trees (less than 5.0 inches d.b.h.). Live trees of commercial species with no disease, defects, or deformities which are likely to prevent them from becoming growing-stock poletimber trees.

Nongrowing-Stock Trees

Cull trees. Trees of noncommercial species and trees of commercial species which are too defective or which are unlikely to become growing-stock trees due to deformity, disease, low vigor, etc.

Sound cull trees. Trees of noncommercial species, or with excessive defect due to form, roughness, etc.

Rotten cull trees. Trees with excessive defect due primarily to rot.

Mortality trees. Trees of commercial species which died from natural causes and which were not cull trees at the time of death.

Salvable dead trees. Standing or down dead trees of commercial species 11.0 inches or more in diameter that contain 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood saw log.

Stand-Size Classes

Sawtimber Stand

Stand at least 16.7 percent stocked with growing-stock trees, with half or

more of this stocking in sawtimber and poletimber trees, and with sawtimber stocking equal to or greater than poletimber stocking.

Large sawtimber stand. Stand in which the majority of the sawtimber stocking is in trees 21.0 inches d.b.h. and larger.

Small sawtimber stand. Stand in which the majority of the sawtimber stocking is in trees from 11.0 to 20.9 inches d.b.h.

Poletimber Stand

Stand at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber and poletimber trees, and with poletimber stocking exceeding sawtimber stocking.

Sapling and Seedling Stand

Stand at least 16.7 percent stocked with growing-stock trees, with more than half of this stocking in saplings and/or seedlings.

Nonstocked Area

An area of commercial forest land less than 16.7 percent stocked with growing-stock trees.

Stocking

Stocking is a means of expressing the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Percent of stocking" is synonymous with "percentage of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Basal area is used as a basis for measuring stocking.

"Stocking percentages" express current area occupancy in relation to specified standards for full stocking based on number, size, and spacing of trees considered necessary to fully utilize the forest land.

Full utilization of the site is assumed to occur over a range of basal area. As an interim guide, 60 percent of the normal yield table values has been used to establish the lower limit of this range which represents full site occupancy. This is called 100-percent stocking. The upper limit to full stocking has been set at 132 percent. Sites with less than 100-percent stocking represent understocking with less than full site occupancy. Overstocking is characterized by sites that have over 132-percent stocking.

Stand Age

Stand age. Stand age is based upon growing-stock stocking. In order for a stand to be even-aged, a majority of the growing-stock stocking must be in two adjacent age classes. Stands that do not meet this criterion are classified as uneven-aged, under or over rotation age.

Rotation age. The period of years between establishment of a stand of timber and the time when it is considered ready for cutting and regeneration. Rotation age in softwood stands is 100 years; in hardwood stands, it is 50 years.

Old-growth sawtimber stand. Sawtimber stand in which 50 percent or more of the growing-stock stocking is in trees at least 100 years old.

Young-growth sawtimber stand. Sawtimber stand in which more than 50 percent of the growing-stock stocking is in trees less than 100 years old.

Area Condition Classes

Area condition classes represent a classification of the current condition of commercial forest land in terms of stocking by desirable trees and conditions affecting the establishment and development of these trees.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees of commercial species. Net volume equals gross volume less deduction for rot, sweep, crook, and other defects that affect use for lumber.

Scribner rule. The common board-foot log rule used in determining volume of sawtimber in California. Scribner volume in Humboldt County is measured in terms of 16-foot logs.

International 1/4-inch rule. The standard board-foot log rule adopted nationally by the Forest Service for the presentation of Forest Survey volume statistics.

Growing-Stock Volume

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) outside bark. Net volume equals gross volume less deduction for rot and missing bole sections.

All Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top outside bark.

Industrial Wood

All roundwood products, except fuelwood.

Growth

Net Annual Growth

The increase in volume of a specified size class for a specific year. (Components of net annual growth include the increment in net volume of trees at the beginning of the specific year surviving to the year's end plus volume of trees reaching the size class during the year minus the volume of trees that died during the year minus the net volume of trees that became culls during the year.)

Ownership Classes

National Forest Lands

Federal lands which have been designated by Executive order or statute as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones title III lands.

Other Public Lands

Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and miscellaneous Federal agencies, and lands owned by States, counties, and local public agencies, or lands leased by these governmental units for more than 50 years.

Forest Industry Lands

Lands owned by companies or individuals operating wood-using plants.

Farmer-Owned Lands

Lands owned by operators of farms.

Miscellaneous Private Lands

Privately owned lands other than forest industry or farmer-owned lands.

TREE SPECIES

Principal tree species found on the commercial forest land in Humboldt County include:

Softwoods:

California red fir (*Abies magnifica* var. *magnifica*)
Douglas-fir (*Pseudotsuga menziesii*)
Grand fir (*Abies grandis*)
Incense-cedar (*Libocedrus decurrens*)
Jeffrey pine (*Pinus jeffreyi*)
Knobcone pine (*Pinus attenuata*)
Ponderosa pine (*Pinus ponderosa*)
Port-Orford-cedar (*Chamaecyparis lawsoniana*)
Redwood (*Sequoia sempervirens*)
Shasta red fir (*Abies magnifica* var. *shastensis*)
Sitka spruce (*Picea sitchensis*)
Sugar pine (*Pinus lambertiana*)
Western hemlock (*Tsuga heterophylla*)
Western redcedar (*Thuja plicata*)
White fir (*Abies concolor*)

Hardwoods:

Bigleaf maple (*Acer macrophyllum*)
California black oak (*Quercus kelloggii*)
California-laurel (*Umbellularia californica*)
California live oak (*Quercus agrifolia*)
California white oak (*Quercus lobata*)
Canyon live oak (*Quercus chrysolepis*)
Golden chinkapin (*Castanopsis chrysophylla*)
Interior live oak (*Quercus wislizenii*)
Oregon white oak (*Quercus garryana*)
Pacific madrone (*Arbutus menziesii*)
Red alder (*Alnus rubra*)
Tanoak (*Lithocarpus densiflorus*)

Oswald, Daniel D.

1968. The timber resources of Humboldt County, California. U.S.D.A. Forest Serv. Resource Bull. PNW-26, 42 pp. Pacific Northwest Forest & Range Experiment Station, Portland, Ore.

This report presents the first complete inventory of Humboldt County's timber resources. The field data were collected in 1966. Accompanying the 28 tables of detailed forest area, volume, and ownership statistics for Humboldt County is an analysis of the present timber resource and the problems that affect present and future timber production.

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RECENT FOREST SURVEY PUBLICATIONS

<u>Number</u>	<u>Title</u>	<u>Date</u>
Resource Bulletins:		
PNW-25	1967 Washington Timber Harvest	Aug. 1968
PNW-24	Timber Resource Statistics for Central Oregon	1968
PNW-23	Preliminary Timber Resource Statistics for Humboldt County, California, January 1, 1967	1968
PNW-22	1966 Oregon Timber Harvest	Dec. 1967
PNW-21	1966 Washington Timber Harvest	Oct. 1967
PNW-18	1965 Washington Timber Harvest	Dec. 1966
PNW-17	Forest Industries of Eastern Washington	1966
PNW-16	1965 Oregon Timber Harvest	June 1966
PNW-15	Timber Resource Statistics for Southwest Washington	1965
PNW-14	1964 Washington Timber Harvest	Dec. 1965
PNW-13	1964 Oregon Log Production	Sept. 1965
PNW-12	The Timber Situation and Outlook for Northwest Oregon	1965
PNW-11	Hardwood Timber Resources of the Douglas-fir Subregion	1965
PNW-10	Forest Statistics for West-Central Oregon	1965
PNW-9	Timber Resource Statistics for the Pacific Northwest	1965
PNW-8	Forest Statistics for Southwest Oregon	Aug. 1964
PNW-7	Forest Statistics for Northwest Oregon	July 1964
PNW-6	1962 Washington Log Production	Dec. 1963
PNW-5	Forest Statistics for Chelan and Douglas Counties, Washington	May 1963
PNW-4	Forest Statistics for Northeast Washington	May 1963
PNW-3	Toward Complete Use of Eastern Oregon's Forest Resources	May 1963
PNW-2	1962 Oregon Log Production	Apr. 1963
PNW-1	1961 Washington Log Production	Jan. 1963

Research Papers:

PNW-28	Manpower Use in the Wood-Products Industries of Oregon and Washington 1950-63	1965
PNW-5	Timber Trends in Western Oregon and Western Washington	Oct. 1963

Available from:

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

