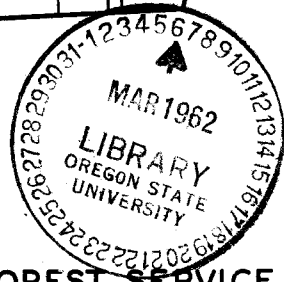


8.4

FOREST STATISTICS FOR KITSAP COUNTY, WASHINGTON

FROM THE FOREST SURVEY INVENTORY REVISED IN 1940

(FOREST SURVEY REPORT) NO. 82



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

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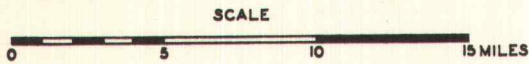
PORTLAND, OREGON

APRIL 26, 1941





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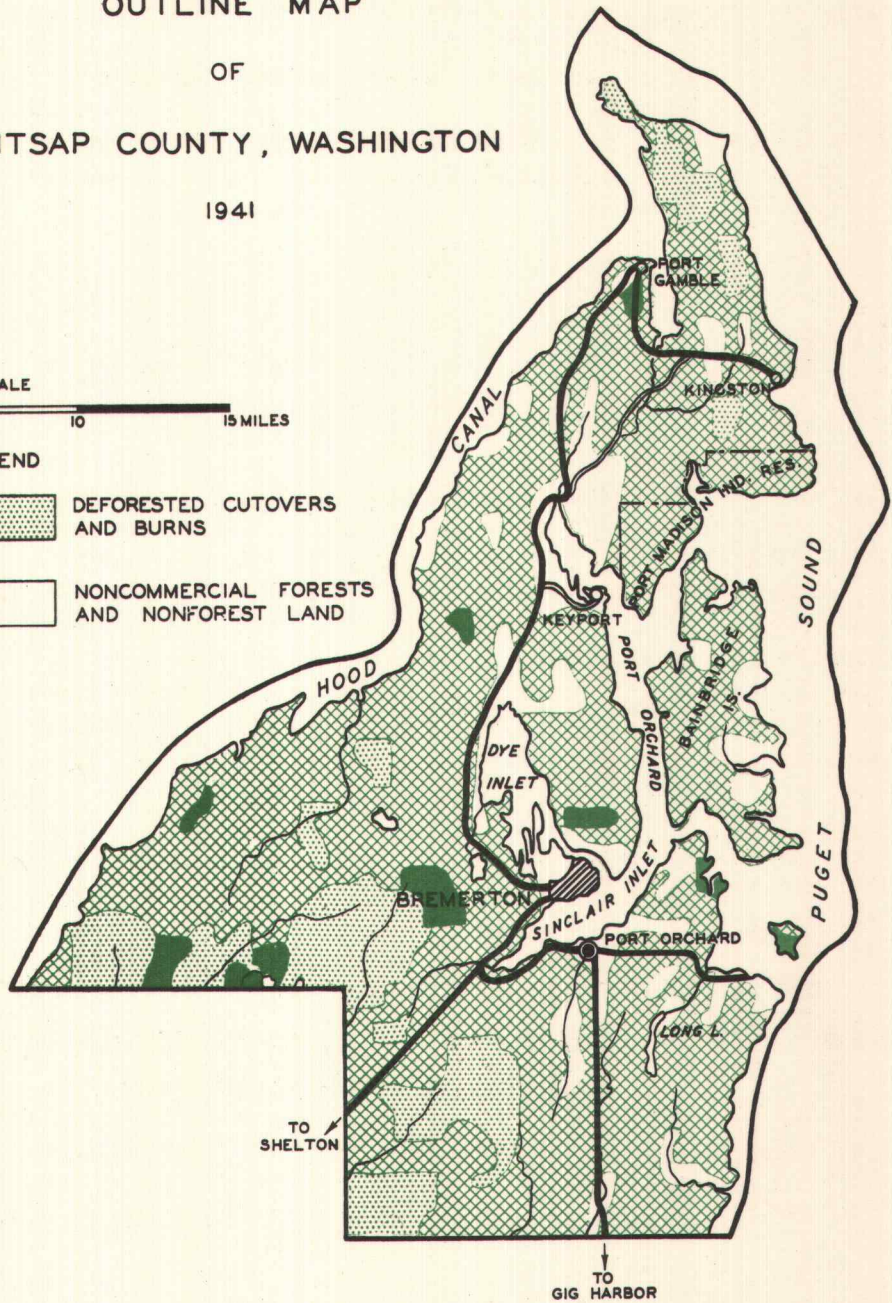


FIGURE 1.
OUTLINE MAP
OF
KITSAP COUNTY, WASHINGTON
1941



LEGEND

- | | |
|--|--|
|  SAW TIMBER |  DEFORESTED CUTOVERS AND BURNS |
|  SECOND GROWTH |  NONCOMMERCIAL FORESTS AND NONFOREST LAND |



FOREWORD

The forest survey, a Nation-wide project, consists of a detailed investigation in five major parts of present and future forest resources: (1) An inventory of the country's existing forest resources in terms of areas occupied by forest-cover types and of timber volumes, by species, in board feet and cubic feet, and a study of conditions on cut-over and on burned forest lands; (2) a study of the depletion of the forests through cutting and through loss from fire, insects, disease, and other causes; (3) a determination of the current and potential growth on forest areas; (4) an investigation of present and prospective requirements of the United States for forest products; and (5) an analysis and correlation with other economic data of findings of these studies in order to make available basic facts and guiding principles necessary to plan for sound management and use of forest resources.

The forest survey of Oregon and Washington, an activity of the Pacific Northwest Forest and Range Experiment Station, was conducted in the Douglas-fir region during the period 1930-33, inclusive.* In 1937 work of keeping the survey up to date was commenced in counties in which there had been extensive depletion since the original survey.

The original inventory of the forests of Kitsap County, Washington, was made in 1933 and a report summarizing statistics on timber volume, forest type area, and productive capacity of the forest land was issued the following year. In the summer of 1940 the survey was brought up to date through field work covering the entire county and recompilation of statistical data. In the field the reinventory consisted of examination of all cut-over areas logged prior to 1930 and all burned areas to determine the degree of regeneration, checking of location and extent of recent cut-over areas logged since January 1, 1930, as reported by cut-over records, noting of any areas cleared for agricultural use, and obtaining additional data on productive capacity of the forest land.

Results of the reinventory are given in this report which supersedes the one issued in 1934.

* Oregon and Washington were divided for survey purposes into two regions, (1) Douglas-fir region, consisting of that part of both States west of the Cascade Range summit, and (2) ponderosa pine region, that part of both States east of the Cascade Range summit. A regional report which includes an interpretation of the forest-survey data and analysis of the forest situation in the Douglas-fir region has been published and a similar report for the ponderosa pine region is now in the process of being published. Each region was divided into units--11 in the Douglas-fir region and 7 in the ponderosa pine region--for the purpose of more intensive analysis of data. It is planned to issue reports presenting findings for each unit.

FOREST STATISTICS FOR KITSAP COUNTY, WASHINGTON

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FOREST STATISTICS FOR KITSAP COUNTY, WASHINGTON^{1/}

By F. L. Moravets^{2/}

Harvesting of the virgin forests is nearer completion in Kitsap County, Washington, than in any other county in the Douglas-fir region of western Washington and western Oregon. Because of the county's location with respect to the highly-developed lumber-manufacturing centers on Puget Sound, the accessibility of all its parts to tidewater, and favorable logging conditions, logging began at an early date and has progressed until only a few small scattered parcels of the original stand remain. Of the remaining saw-timber volume of 315 million board feet in the county, less than 125 million board feet is old-growth timber.

Much of the cut-over land is fairly well restocked with second-growth stands but, because of the relatively low productive capacity of the bulk of the forest land, prospects for large yields of timber crops in the near future are not bright. Already a considerable acreage of forest land has been cleared for agricultural use, other areas have been put to resident and recreational uses, and it is probable that additional areas will be withdrawn from the commercial forest land acreage.

In the following analysis of data obtained in the two inventories--the original in 1933 and the revision in 1940--an attempt will be made to indicate the place of forests in any broad land-use program for the county.

Physical Character of County

Kitsap County, located in the central part of western Washington, occupies the major portion of a peninsula that extends into Puget Sound. It is surrounded on all but its southern boundary by the waters of straits, inlets, and bays, some of which deeply indent the shore line (fig. 1). Bainbridge Island and Blake Island lying off the eastern shore are part of the county. The former is some 18 thousand acres in extent and the latter approximately 5 hundred acres. No point on the mainland portion of the county is more than 6 miles from tidewater.

Over most of the county's land surface, the topography is gentle, varying from level stretches to gradual slopes and rounded ridge tops.

1/ Assistance in the compilation of the data contained in this report was furnished by the personnel of Works Projects Administration official project 65-2-94-144.

2/ The field work of the revised inventory of the county's forests was done by D. L. Lynch, and the compilation of the data was done by Edna L. Hunt, B. C. Baker, T. J. Rowe, and W. E. Zeuthen.

In the south-central portion, a range of hills known as the Blue Mountains form a more broken topography with steeper slopes and sharper ridges. Some of the higher points in this range extend to about 1,700 feet elevation.

The soil over a large part of the county is of a coarse sandy or gravelly structure of low moisture holding capacity; other areas are underlain with an impervious subsoil which prevents adequate drainage. In general, the soils of the northern half of the county are superior to those of the southern half. Best soils are found on the narrow bottomlands of the valleys.

A situation on the eastward or lea side of the high Olympic Mountains gives the county a moderate climate of equable temperatures and relatively low precipitation compared to a large part of western Washington.

Major Land Uses

Kitsap County's land area totals approximately 253 thousand acres. As classified in the reinventory of 1940, and shown in table 1, nearly 212 thousand acres is forest land; 36 thousand acres is in agricultural use either in cultivation or stump pastures that are a part of a farm unit; and about 5 thousand acres is in town sites, marshland, or tide flats.

However, in this county a considerable portion of the land classified by the survey as forest land is being used for purposes other than the production of forest crops. The close proximity of the county to the two centers of population, Seattle and Tacoma, and the many miles of wooded shore line on protected bays and inlets has resulted in the establishment of a large number of summer homes and recreational resorts. Also, the presence of the United States Naval Yard at Bremerton, a source of employment for a large number of workers, has created a demand for suburban home sites.

Nearly 6 thousand acres of forest land is reserved for municipal watersheds and approximately 2 thousand acres is included in several small Federal military reserves.

Clearing of land for agricultural use has been confined principally to the fertile bottomlands. Bureau of Census statistics are not yet available for 1940 but those for 1935 show a total of 1,665 farms in the county and an average size per farm of approximately 23 acres. Available crop land totaled 12,230 acres, about one-third of the total acreage included in the farms. In most of the suburban home site developments the acreage of cleared and cultivated land is small and in the creation of permanent homes, summer homes, and recreational areas along the shore line the forest cover has been disturbed very little.

Forest Cover

Soil and climatic conditions of the county are more favorable for the growth of Douglas-fir than any other conifer and this species predomi-

Table 1.-Area, in acres, of all forest cover types, by ownership class
Data corrected to August 1, 1940

Survey type no.	Type	Private	State ^{1/}	County	Municipal	Indian	Federal ^{2/}	Total
6	Douglas-fir Large old growth	860	25				220	1,105
7	Small old growth	6,220	220	670	155	180	25	7,470
8	Large second growth	1,045	70	150				1,265
9	Small second growth	73,415	3,100	9,280	855	2,825	605	90,080
10	Seedlings and saplings	43,735	3,015	8,295	2,060	1,575	115	58,795
15	Western hemlock Small		5	65			10	80
17	Western redcedar Large	275						275
26	Lodgepole pine Second growth			40				40
31.5	Hardwood Large	3,685	170	305	10	260		4,430
31	Small	8,650	400	440	520	90	30	10,130
35	Nonrestocked cutover Cut prior to 1920	910	50	70				1,030
35A	Cut from 1920-29, incl.	8,905	400	1,135	535		150	11,125
36	Recent cutover Cut since 1930	22,950	580	330	1,570		250	25,680
37	Deforested burns	25						25
	Total forest types	170,675	8,035	20,780	5,705	4,930	1,405	211,530
3	Nonforest land Cultivated	35,670	45	225	10	30	140	36,120
2	Other nonforest	5,190	40	5			325	5,560
	Total	211,535	8,120	21,010	5,715	4,960	1,870	253,210

^{1/} Available for cutting.

^{2/} Includes 1,830 acres in military reserves and 40 acres of public domain.

nates in the stands on all but about 7 percent of the forested acreage.

The predominance of Douglas-fir is shown in table 1, which gives in detail the classification of the forest cover by types.^{3/} Table 2 groups these detailed types into broad generalized classes.

Conifer Saw Timber

In the progress of logging operations through the county an occasional stand of timber was left uncut because of ownership or quality of timber, and these relict stands comprise the bulk of the remaining acreage of saw timber (trees more than about 20 inches d.b.h.). They occupy a total of approximately 10 thousand acres or roughly 4 percent of the county's forest land area. No large tracts of saw timber remain; the largest tract is only a little over 1 thousand acres in extent and the average size is about 200 acres.

Douglas-fir stocks practically all of the acreage of saw-timber stands; there is a small acreage on which western redcedar is the key tree. Most of the Douglas-fir is a small old-growth type of timber, rough in character and of relatively low quality. Stands of large old-growth Douglas-fir cover an insignificant acreage, as is true of large second-growth saw timber of this species.

Conifer Second Growth

Second-growth conifer stands of timber less than saw-timber size comprise the bulk of the forest cover in Kitsap County. They occupy a total of 28 thousand acres of burned-over areas and 121 thousand acres of cut-over lands, in all 149 thousand acres or more than 70 percent of the forest land area. Douglas-fir types stock all but 80 acres of this total area. A total of 90 thousand acres is stocked with pole stands in which the trees are from 6 to 20 inches d.b.h.; seedling and sapling stands of trees under 6 inches d.b.h. stock the remaining 59 thousand acres. Approximately 72 percent of the area of pole stands and 97 percent of the area of seedling and sapling stands is cut-over land.

Table 3, which gives the second-growth conifer types by age class and degree of stocking, shows about two-thirds of the acreage of pole stands stocked with trees from 50 to 70 years in age. Study of the distribution of the Douglas-fir second-growth stands by age class, as shown in the table, indicates a comparatively low growth rate. No acreage of pole stands (trees 6 to 20 inches d.b.h.) is shown in the 20-year age class and less than a thousand acres in the 30-year age class. On forest

^{3/} One-inch-to-the-mile county type maps and $\frac{1}{4}$ -inch-to-the-mile lithographed State type maps have been prepared to show the location and extent of the forest types. For information on them, address Director, Pacific Northwest Forest and Range Experiment Station, 423 U. S. Court House, Portland Oreg.

Table 2.-Area, in acres, of generalized forest types, by ownership class
Data corrected to August 1, 1940

Type	Private	State ^{1/}	County	Municipal	Indian	Federal ^{2/}	Total
Conifer saw timber Types 6, 7, 8, and 17	8,400	315	820	155	180	245	10,115
Conifer second growth Types 9 and 15							
On cut-over areas	53,585	1,680	5,240	840	2,635	605	64,585
On old burns	19,830	1,425	4,105	15	190	10	25,575
Total	73,415	3,105	9,345	855	2,825	615	90,160
Conifer seedlings and saplings Type 10							
On cut-over areas	41,975	2,970	8,070	2,060	1,575	115	56,765
On old burns	1,760	45	225				2,030
Total	43,735	3,015	8,295	2,060	1,575	115	58,795
Recent cut-over areas Type 36	22,950	580	330	1,570		250	25,680
Nonrestocked cut-over and burned areas Types 35, 35A, and 37	9,840	450	1,205	535		150	12,180
Hardwoods Types 31 and 31.5	12,335	570	745	530	350	30	14,560
Noncommercial areas Type 26			40				40
Total forest types	170,675	8,035	20,780	5,705	4,930	1,405	211,530
Nonforest land Types 2 and 3	40,860	85	230	10	30	465	41,680
Total	211,535	8,120	21,010	5,715	4,960	1,870	253,210

^{1/} Available for cutting.

^{2/} Includes 1,830 acres in military reserves and 40 acres of public domain.

Table 3.-Area, in acres, of certain immature conifer forest types,
by age class and degree of stocking
Data corrected to August 1, 1940

Age class (years)	Degree of stocking	Type number and name			Total
		10 Douglas-fir seedlings and saplings	9 Douglas-fir small second growth	15 Western hemlock small second growth	
10	Good	6,085			6,085
	Medium	15,605			15,605
	Poor	2,650			2,650
	Total	<u>24,340</u>			<u>24,340</u>
20	Good	6,470			6,470
	Medium	7,040			7,040
	Poor	4,140			4,140
	Total	<u>17,650</u>			<u>17,650</u>
30	Good	8,550	15		8,565
	Medium	7,185	590		7,775
	Poor	200	215		415
	Total	<u>15,935</u>	<u>820</u>		<u>16,755</u>
40	Good	505	4,120		4,625
	Medium	365	5,655		6,020
	Poor		2,360		2,360
	Total	<u>870</u>	<u>12,135</u>		<u>13,005</u>
50	Good		8,250		8,250
	Medium		13,240	80	13,320
	Poor		3,530		3,530
	Total		<u>25,020</u>	<u>80</u>	<u>25,100</u>
60	Good		2,540		2,540
	Medium		13,165		13,165
	Poor		1,875		1,875
	Total		<u>17,580</u>		<u>17,580</u>
70	Good		3,640		3,640
	Medium		11,855		11,855
	Poor		3,055		3,055
	Total		<u>18,550</u>		<u>18,550</u>
80	Good		1,240		1,240
	Medium		5,055		5,055
	Poor		2,505		2,505
	Total		<u>8,800</u>		<u>8,800</u>
90+	Good		3,990		3,990
	Medium		3,185		3,185
	Poor				
	Total		<u>7,175</u>		<u>7,175</u>
Total all ages	Good	21,610	19,805		41,415
	Medium	30,195	53,550	80	83,825
	Poor	6,990	16,725		23,715
	Total	<u>58,795</u>	<u>90,080</u>	<u>80</u>	<u>148,955</u>

sites of better than average productivity, 40 percent or more of the Douglas-fir trees in fully-stocked stands reach a diameter of 6 inches in 20 years.

The second-growth stands in the county are, on the whole, fairly well stocked; approximately 84 percent of their acreage is of medium stocking or better (40 to 100 percent).

Recent Cut-Over Areas

With the exception of a few scattered tracts, the recent cut-over lands, clear cut since January 1, 1930, are located in the southwestern part of the county; their total area of 26 thousand acres is comprised principally of 5 tracts from 3 to 5 thousand acres in extent. Because of the short time that had elapsed since they were logged, these lands were not examined to determine the degree of regeneration. They lie in a section of the county which, because of relatively rough topography and coarse gravelly soils, is better adapted for the production of forest crops than any other use.

Nonrestocked Cutovers and Burns

This group of forest types includes nonrestocked areas that were logged prior to 1930 and any deforested burn regardless of age. The cut-over areas were further classified as areas clear cut prior to 1920 and those clear cut during the decade 1920-29.

Areas clear cut prior to 1920 that are still nonrestocked total about a thousand acres. This total is made up of some dozen small scattered tracts averaging less than a hundred acres in extent. Some of these tracts adjacent to established farm units will probably be utilized for stump pastures; other of the tracts will no doubt eventually restock if given fire protection.

Nonrestocked areas clear cut during the decade 1920-29 total 11 thousand acres. As the area logged during this period was approximately 36 thousand acres, the nonrestocked acreage represents about a 30-percent failure to restock by 1940. Most of the nonrestocked area is in two tracts, one in the extreme northern part of the county and the other in the southwestern part. There are several small tracts of less than a section in extent.

A total of only 25 acres was typed as nonrestocked burns.

Hardwoods

Small areas of red alder are interspersed with the second-growth conifer stands throughout most of the county. The greatest concentration of alder stands is in the northern part and particularly near the coast. Bigleaf maple does not occur as a type, but in the understory of conifer stands.

Of the total of nearly 15 thousand acres occupied by hardwood stands, 10 thousand acres is stocked with immature trees less than about 12 inches d.b.h.

Productive Capacity of Forest Sites

Because of the coarse gravelly character of most of the soil and poor subterranean drainage over a considerable acreage, the productivity of the county's forest sites is relatively low. As seen in table 4, over three-fourths of the acreage of commercial forest land was classified by the survey as site quality classes IV and V, the least productive of the five site qualities in the Douglas-fir classification. The acreage of site quality class III occurs principally in the northern half of the county.

Saw-Timber Volume

The total saw-timber volume in trees 16 inches and larger d.b.h. was computed to be 315 million board feet, log scale, Scribner rule. The volume by species is shown in table 5.

Approximately 293 million board feet or 93 percent was Douglas-fir; the remainder was principally western redcedar and red alder. Only about 38 percent, 112 million board feet, of the Douglas-fir volume is old growth and most of this is in trees from 20 to 40 inches d.b.h. Of the second-growth volume of this species, totaling 181 million board feet, 169 million board feet is in trees from 16 to 20 inches d.b.h.

Ownership of Forest Resources

Eighty-one percent of the forest land area in the county is privately owned; 2 percent is in Indian ownership; and the remaining 16 percent is publicly owned. More than half of the publicly owned acreage is county land acquired through foreclosure because of tax delinquency. The municipal lands are reserved for watershed protection and the Federal lands are nearly all in military reserves.

A slightly smaller portion of the saw-timber volume, 78 percent, is privately owned.

Forest Depletion

Logging has caused most of the drain on the forests of the county in recent years. Fires have damaged a considerable acreage of small second-growth stands but have killed very little merchantable timber.

Statistics on sawlog production for the 15-year period 1925-39 show an average annual cut of approximately 100 million board feet. Until about 3 years ago, the cut was very stable even during the depression years 1931-33. In 1937 the volume of sawlogs dropped to approximately two-fifths of the average annual cut for the period and was even lower in 1939.

Table 4.-Land areas, forest land areas, and commercial conifer areas,
by site quality class^{1/}
Data corrected to August 1, 1940

Kind of forest and site quality class	Total area		Area in forest land	Area in commer- cial conifers
	<u>Acres</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Commercial conifer				
Douglas-fir				
Class III	48,045	19.0	22.7	24.4
Class IV	138,433	54.7	65.4	70.3
Class V	10,452	4.1	4.9	5.3
Total commercial conifer	196,930	77.8	93.0	100.0
Lodgepole pine	40	5.8	7.0	
Hardwood	14,560			
Total other than commercial conifer	14,600	5.8	7.0	
All forest types	211,530	83.6	100.0	
Nonforest types	41,680	16.4		
Grand total	253,210	100.0		

^{1/} The "site quality" of a forest area is its relative productive capacity, determined by climatic, soil, topographic, and other factors. The index of site quality is the average height of the dominant stand at the age of 100 years. Five site quality classes are recognized for Douglas-fir types, class I being the highest. In the survey Douglas-fir classifications were used not only for types in which this species is dominant, but also for other types for which no site quality classifications have been developed.

Table 5.-Volume of timber by species and ownership class
Data corrected to August 1, 1940

Trees 16" and more d.b.h.^{1/}
Thousands of board feet, log scale, Scribner rule

Species	Private	State ^{2/}	County	Municipal	Indian	Federal ^{3/}	Total
Douglas-fir							
Large old growth	28,363	797	1,251	342	541	2,573	33,867
Small old growth	68,363	1,666	3,923	1,103	1,742	1,082	77,879
Large second growth	9,336	373	2,268	12	20	156	12,165
Small second growth	121,276	5,535	21,624	570	17,673	2,405	169,083
Sitka spruce							
Large	100						100
Western hemlock							
Large	2,238						2,238
Small	560	3	43			6	612
Western redcedar							
Live	9,373		8				9,381
Western white pine	90		1				91
Grand fir	63		1				64
Red alder	5,917	56	515	6	1,235	1	7,730
Bigleaf maple	1,644	38	93	22	25	35	1,857
Total	247,323	8,468	29,727	2,055	21,236	6,258	315,067

^{1/} Trees of hardwood species taken from 12" and more d.b.h.

^{2/} Available for cutting.

^{3/} Includes 6,252 thousand board feet on land in military reserves and 6 thousand board feet on public domain land.

In addition to the material removed as sawlogs, a considerable volume has been cut into other forest products such as fuel wood, piling, shingles, and fence posts.

Forest Growth

Data obtained in the original inventory of 1933 were used to compute the growth rate of the county's forests. At that time a total of 136 thousand acres was stocked with immature stands that were putting on net volume growth.

The current annual net volume growth on trees 15.1 inches or more d.b.h. was computed to be a little over 6 million board feet and approximately 9 million cubic feet on trees 5.1 inches or more d.b.h.

If all of the county's forest land was producing to approximately 75 percent of capacity, the potential annual growth was computed to be 31 million board feet.

Comparison of Inventories

Present trends in the forest situation in Kitsap County are indicated by a comparison of results obtained in the original inventory in 1933 and the reinventory in 1940. This comparison is shown in the following tabulation:

	<u>1933 inventory</u>	<u>1940 inventory</u>	<u>Change</u>
Saw-timber stands	25 M acres	10 M acres	-60%
Saw-timber volume	627,197 M bd. ft.	315,067 M bd. ft.	-50%
Douglas-fir saw-timber volume (all sizes)	546,457 M bd. ft.	292,992 M bd. ft.	-46%
Douglas-fir saw-timber volume large old growth	170,756 M bd. ft.	33,867 M bd. ft.	-80%
Conifer second-growth timber 6"-20" d.b.h.	82 M acres	90 M acres	+10%
Conifer second-growth timber less than 6" d.b.h.	35 M acres	59 M acres	+70%

Conclusions

The forest situation in Kitsap County differs from that found in most of the other counties of the Douglas-fir region in that the growing of forest crops for timber products need not be the primary object of forest management.

Although the soils over most of the county's surface are of a gravelly character and are, on a whole, of comparatively low productivity, they produced an original stand that was marketable and if given adequate fire protection are capable of producing future crops. Likewise, the accessibility of all parts of the county to tidewater, gentle topography for the most part, and a network of highways assure low logging and transportation costs for forest crops.

However, because of a close proximity to large population centers on Puget Sound, a long picturesque shore line on protected water, and a mild equable climate, much of the county is suitable for the development of resident and recreational areas and already a considerable acreage of forest land has been so utilized. Any land-use program for the county should recognize the relation of forests to this development. The forest cover along the shorelines of tidewater and the small inland lakes, usually a mixed stand of second-growth Douglas-fir and red alder, is an integral part of the site and should be protected from excessive cutting or fire. Likewise the presence of forest cover on interior lands throughout the county greatly enhances the desirability of the county as a whole for resident and recreational use.

How long the remaining saw-timber stands will last is conjectural. Statistics on sawlog production indicate that an end of large-scale logging operations in the county was reached about 1936. Remaining areas of old-growth saw timber are of such limited extent and so scattered throughout the county that they will probably be cut by small individual operations. Most of them are highly accessible for truck-logging operations and the best of the remaining timber will probably be logged in the next few years. Approximately 53 percent of the volume of merchantable timber is in second-growth trees from 16 to 20 inches d.b.h. While these trees have some value for piling, tie logs, and fuel wood, their cutting should be postponed until they have become more mature and have a greater stumpage value. The younger second-growth stands and recent cut-over areas should be given adequate fire protection. Most of the nonrestocked cut-over areas are limited enough in extent to assure ultimate seeding-in from surrounding stands.

Although the forests of the county cannot be expected to produce a large yield of timber on a short rotation, they do have a very important place in the county's economy.