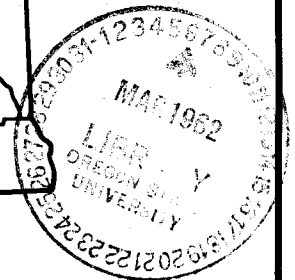
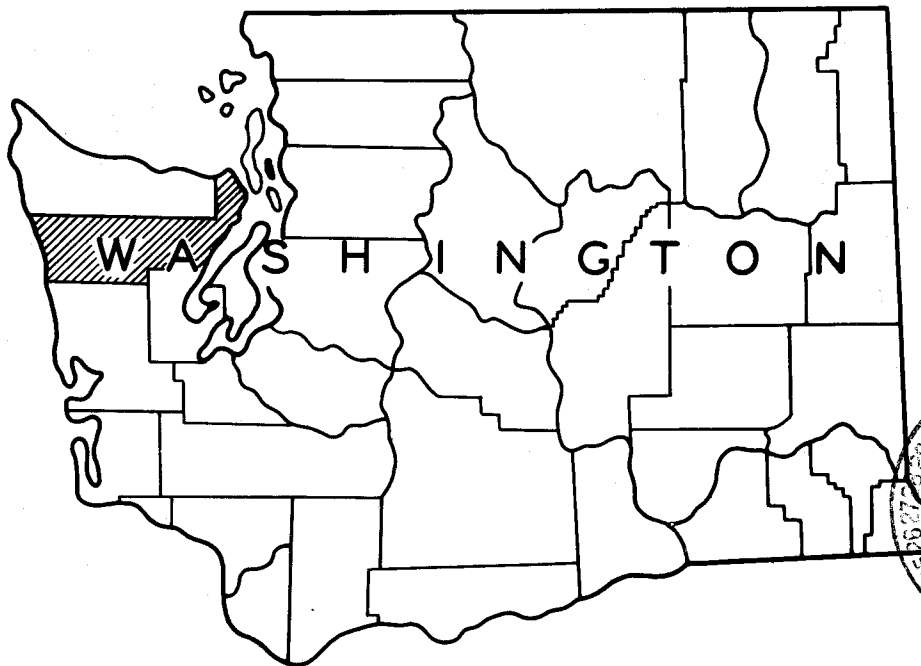


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# FOREST STATISTICS FOR JEFFERSON COUNTY, WASHINGTON

FROM THE FOREST SURVEY INVENTORY REVISED IN 1940  
FOREST SURVEY REPORT NO. 84



U.S. DEPARTMENT OF AGRICULTURE      FOREST SERVICE  
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## FOREWORD

The forest survey, a Nation-wide project authorized by Congress in 1928, consists of a detailed investigation of the country's present and future forest resources in five major phases: (1) An inventory of 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-over forest lands; (2) a study of the depletion of the forest 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 to public and private agencies basic facts and guiding principles necessary to plan for sound management and use of forest resources.

The Pacific Northwest Forest and Range Experiment Station, the agency designated to conduct the forest survey in Oregon and Washington, began the project in the Douglas-fir region of these States in 1930.\* The inventory phase of the survey was conducted in Jefferson County, Washington, in 1932, and a statistical report Forest Statistics for Jefferson County, Washington, summarizing the results was issued in 1934. In 1939 and 1940 a reinventory of the county's forests was made to adjust the forest statistics to comply with changes in forest type areas and timber volumes resulting from cutting and fires, restocking of deforested cut-over and burned-over areas, and changes in land ownership since the original survey. The results of the reinventory are summarized in this report which supersedes the issue of 1934.

\*Washington and Oregon 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 JEFFERSON COUNTY, WASHINGTON

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# FOREST STATISTICS FOR JEFFERSON COUNTY, WASHINGTON<sup>1/</sup>

By M. J. Lauridsen<sup>2/</sup>

The profound influence of the forest upon the economic development of an area in which this resource is the principal form of natural wealth is clearly exemplified in Jefferson County. Since the date of the first permanent settlement the forest has been the dominating influence in the economics of the county, and the principal contributing factor in its development and social welfare. Other major resources of economic importance lacking, it is probable that the forest, although reduced in volume by fire and cutting, will retain its position as the leading source of income. To retain past social and economic standards and provide for improved future standards within the county, it is only logical that consideration be given to the forest, its present condition, and its problems.

This report presents statistics based upon data collected by the forest survey which show the present condition of the forest and the trends in depletion and growth. From these figures conclusions may be drawn relative to future forest conditions and the possible effect of the forests of the future upon the county's social and economic welfare.

## General Description of County

Jefferson County lies on the Olympic Peninsula of northwestern Washington and includes the principal peaks of the Olympic Mountains. This range roughly divides the county into two distinct geographical units, the east side, which slopes towards Hood Canal and Puget Sound, and the west side, which drains directly into the Pacific Ocean (fig. 1). The numerous river canyons and mountain peaks form a rough topography over most of the county that has hindered development of farm and forest resources. Only the readily accessible areas at the lower elevations near tidewater have been developed, the remainder existing in an almost virgin state.

Rivers of notable size are frequent, nearly every important stream of the Olympic Mountains having its source within the county.

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

<sup>2/</sup> Field work of the revised inventory of the county's forest resources was done by M. J. Lauridsen and B. C. Baker; compilation of data was done by M. J. Lauridsen, E. D. Buell, Edna L. Hunt, B. C. Baker, T. J. Rowe, and W. E. Zeuthen.

The eastern portion is drained principally by the Quilcene, Dosewallips, and Duckabush Rivers which flow directly into Hood Canal while the major drainage of the western slopes of the mountains are the Hoh, Clearwater, and Queets Rivers. The main northern and southern drainages are the Elwha and Quinault Rivers, respectively. Mount Olympus, with an elevation of approximately 8,000 feet, is the highest peak of the Olympic Mountains and is within the county. Other peaks exceeding 6,000 feet in elevation are frequent and occupy a spacious area in the county's interior.

The topography of the west is characterized by a long gentle slope broken only by rounded hills and river valleys that extends from the ocean eastward a distance of thirty miles or more before culminating in the peaks of the Olympic Mountains. To the east, however, there is an abrupt rise from the narrow bench bordering Hood Canal of the southeastern portion to the elevations of the mountains. The northeastern portion is marked by numerous peninsulas of undulating topography extending into Hood Canal and the Straits of Juan de Fuca.

The location of the mountains has resulted in a remarkable difference in the climate between the two geographical units of the county. The mean annual precipitation on the western slope of the mountains exceeds 100 inches, the rainfall of the eastern slope varying from approximately 18 to 40 inches annually. This climatic difference has also influenced the character of the forest types in the two units. The humid, fog-swept western part is covered by dense stands of spruce and hemlock, the fog-belt types that commonly occur on the lower western slopes of the Coast range. The drier eastern slopes of the county are covered with forests that are characteristically Douglas-fir in composition, a type associated with well-drained sites.

The accessibility of the Douglas-fir stands and the profusion of sheltered harbors that offered outlets by tidewater to the nearby markets of Puget Sound led to the early development of a road system in the eastern portion of the county. The shoreline of the west side, however, is exposed and shallow and does not offer ready access to the timber adjacent to it and it was not until 1932, when a state highway was constructed the length of it, that this end of the county was made accessible. The road system on this side is still relatively meager and few lateral roads have been built other than those along the main rivers. The northeastern corner of the county is served by a branch line of the Chicago, Milwaukie, St. Paul, and Pacific Railroad which is connected with the main line of the railroad at Seattle by ferry from Port Townsend. This railroad also serves Clallam County but since water and truck transportation are more readily available the railroad handles only small quantities of freight and operates on a part-time schedule.

Port Townsend, the county seat and principal town, has a population of 4,683 and contains 52 percent of the county's entire population

of 8,918 persons. Fort Worden, Fort Flagler, a United States Coast Guard Station, and other naval and military establishments are located at or near the town. A number of years ago Port Townsend was the principal port of entry for the Puget Sound area and was the headquarters for the associated Federal agencies but these offices were removed as other Sound ports came into importance. The towns of Quilcene, Chimacum, and Port Ludlow are local trading centers within the county but their combined population is small.

### The Forest Resource

A rough division of the county into three major forest zones may be made upon the basis of the prevailing cover types. The zone lying between the shores of the Pacific Ocean and the upper limits of commercial tree growth on the western slopes of the mountains is forested with dense pure and mixed stands composed of western hemlock, Sitka spruce, western redcedar, Pacific silver fir and minor associated species. This zone, commonly called the spruce-hemlock zone or fog belt, is a portion of the humid coastal plain that extends along the coast of Oregon and Washington.

Lying east of the fog belt and including the major peaks and ridges of the Olympic Mountains is the mountain zone which contains the alpine and subalpine forests and the barrens and grassy slopes that lie above the limits of commercial tree growth. This zone lies within the boundaries of the national park and national forest at elevations usually exceeding 5,000 feet.

The drier eastern slopes of the mountains and the northeastern peninsulas of the county form the Douglas-fir zone which lies between the mountain zone and Hood Canal. The major portion of the sawlog production of the county has come from this zone, leaving the area depleted of the greater part of its accessible saw-timber volume.

According to the statistics compiled by the forest survey, the county has a total land area of 1,148,133 acres, of which 1,020,439 acres, or 89 percent, is classified as forest land. The remaining 127 thousand acres is principally barrens and grassy slopes at the upper elevations of the mountain zone although 14 thousand acres was classified as farm land. Subsistence farms are scattered widely over the eastern and northeastern portions of the county with the principal agricultural districts located in the vicinity of Chimacum and Quilcene. Agricultural developments in the fog belt are few but may be expected in the future as roads increase the accessibility of the fertile river valleys.

Commercial forest types occupy 833 thousand acres or 82 percent of the total forest area, the remainder being noncommercial forest lands consisting of areas too steep, rocky or sterile to support commercial forest, areas at the upper altitudinal limits of tree growth, and small areas of lodgepole pine stands.

The acreage of the cover types of the county, by ownership classes, is presented in table 1, and in generalized form in table 2. Figure 2 shows the generalized forest cover types by ownership class.

### Conifer Saw-Timber Stands

Through the depleting agencies of cutting, fire, wind, and insects, the total area of saw-timber stands has been reduced to 607 thousand acres, or 59 percent of the total forest area. The area of large old-growth Douglas-fir, the type in which cutting has been concentrated in the past, has been reduced to 29 thousand acres, or approximately 5 percent of the total area of saw-timber types. These remaining Douglas-fir stands are principally located on the benches above the river bottoms in the western portion of the county, since the saw-timber stands of the eastern part of the county have largely been depleted. The most extensive stands are located along the Quinault and Hoh Rivers where they occur on the drier and more favorable sites. Scattered stands of relatively small size remain in the valleys of the principal streams of the eastern slopes of the county and are indicative of the excellent stand of large old-growth Douglas-fir that once covered most of the area.

Small old-growth Douglas-fir is the most abundant of the Douglas-fir saw-timber types and is the largest of the saw-timber types east of the summit of the mountains. With a total of 55 thousand acres it accounts for 59 percent of the total area of saw-timber types of this species. The type occurs in broad strips along the main drainage systems of the eastern slope of the county generally occupying the relatively steep and rocky slopes where the site is not of sufficient quality for the optimum growth of the species. This type is also found in the fog belt but here it occurs only in small scattered stands at elevations above that of the large old-growth type.

Small scattered stands of large second-growth Douglas-fir are found dispersed over the eastern portion of the county and have a combined area of 9 thousand acres. These stands have restocked old burns and in many cases, veteran trees of the original forest that have survived the fire have been logged leaving the younger stand intact.

Stands of the western hemlock saw-timber type cover 291 thousand acres, or 48 percent of the total area of saw-timber stands. The associated saw-timber types, or those found in the same general habitat, are the redcedar type with 56 thousand acres, the spruce type with 28 thousand acres, and the silver fir type with 139 thousand acres. These types are all commonly found in the fog belt of the western slope and together occupy 515 thousand acres, or 85 percent of the total area of saw-timber types.



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

Type no.	Type	Private	State available <sup>1/</sup>	County	Indian	Federal				Total
						National forest Available	National forest Reserved	National park	Other <sup>2/</sup>	
6	Douglas-fir Large old growth	670	1,475			911	15	25,468		28,539
7	Small old growth	810		325		21,560	1,995	30,043	40	54,773
8	Large second growth	4,700	360	2,215		205		1,086	650	9,216
9	Small second growth	43,990	4,365	23,705		7,610	800	1,215	2,855	84,540
10	Seedlings and saplings	12,965	2,500	13,770		15,315		2,184	1,390	48,124
11	Sitka spruce, large	9,320	5,205	15	855	1,072		11,926	25	28,418
14	Western hemlock Large	59,983	89,890	2,865	2,790	47,126	905	87,372	125	291,056
15	Small	2,860	680	70		1,274	320	4,873		10,077
16	Seedlings and saplings	16,165	8,165	1,150		410		112	45	26,047
17	Western redcedar Large	22,330	25,350	280	395	1,652		5,983		55,990
19	Small	510	15							525
23	Fir-Mt. hemlock, large	2,385	44,190	40	865	13,924	120	77,577		139,101
26	Lodgepole pine, small							175		175
31.5	Hardwood Large	4,625	610	380	65	200		370		6,250
31	Small	4,139	550	535	635	481		813	135	7,288
33	Subalpine	95				6,271	14,325	140,940		161,631
35	Nonrestocked cutover Cut prior to 1920	5,325	910	5,170					60	11,465
35A	Cut from 1920-29, incl.	7,495	825	2,195		245				10,760
36	Recent cutover, since 1930	12,965	265	940		1,590				15,760
37	Deforested burn	2,090	270	435		2,100	120	730	50	5,795
38	Noncommercial rocky area	965	180	125	440	15,630	665	6,864	40	24,909
	Total forest types	214,387	185,805	54,215	6,045	137,576	19,265	397,731	5,415	1,020,439
3	Nonforest land Cultivated	13,855	20	345		25			245	14,490
2	Other	3,590	245	75		1,376	7,975	99,223	720	113,204
	Total	231,832	186,070	54,635	6,045	138,977	27,240	496,954	6,380	1,148,133

1/ Includes 10 acres in a State park and 310 acres in a municipal watershed; timber on both areas reserved from cutting.

2/ Includes 5,610 acres in military reserves and 770 acres in public domain.

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

Type definition	Private	State available <sup>1/</sup>	County	Indian	Federal				Total
					National forest		National park	Other <sup>2/</sup>	
					Available	Reserved			
Conifer saw timber Types 6, 7, 8, 11, 14, 17, & 23	100,198	166,470	5,740	4,905	86,450	3,035	239,455	840	607,093
Conifer second growth Types 9 and 15									
On cut-over areas	39,410	2,525	17,950		641			2,375	62,901
On old burns <sup>3/</sup>	7,440	2,520	5,825		8,243	1,120	6,088	480	31,716
Total	46,850	5,045	23,775		8,884	1,120	6,088	2,855	94,617
Conifer seedlings and saplings Types 10 and 16									
On cut-over areas	12,600	2,155	13,520		8,555			1,340	38,170
On old burns <sup>3/</sup>	16,530	8,510	1,400		7,170		2,296	95	36,001
Total	29,130	10,665	14,920		15,725		2,296	1,435	74,171
Other conifer second growth Type 19									
On cut-over areas	190	15							205
On old burns <sup>3/</sup>	320								320
Total	510	15							525
Recent cut-over areas Type 36	12,965	265	940		1,590				15,760
Nonrestocked cut-over and burned areas Types 35, 35A, and 37	14,910	2,005	7,800		2,345	120	730	110	28,020
Hardwoods Types 31 and 31.5	8,764	1,160	915	700	681		1,183	135	13,538
Noncommercial areas Types 26, 33, and 38	1,060	180	125	440	21,901	14,990	147,979	40	186,715
Total forest types	214,387	185,805	54,215	6,045	137,576	19,265	397,731	5,415	1,020,439
Nonforest land Types 2 and 3	17,445	265	420		1,401	7,975	99,223	965	127,694
Total	231,832	186,070	54,635	6,045	138,977	27,240	496,954	6,380	1,148,133

<sup>1/</sup> Includes 10 acres in a State park and 310 acres in a municipal watershed; timber on both areas reserved from cutting.

<sup>2/</sup> Includes 5,610 acres in military reserves and 770 acres in public domain.

<sup>3/</sup> Includes restocked areas from which the original stand was wind thrown.

Immature Stands

Stands in which the average diameter of the trees is less than 20 to 24 inches occupy a total of 169 thousand acres, or 17 percent of the total forest area. Sixty percent of this area, or 101 thousand acres, is naturally or artificially regenerated cut-over land, the re-

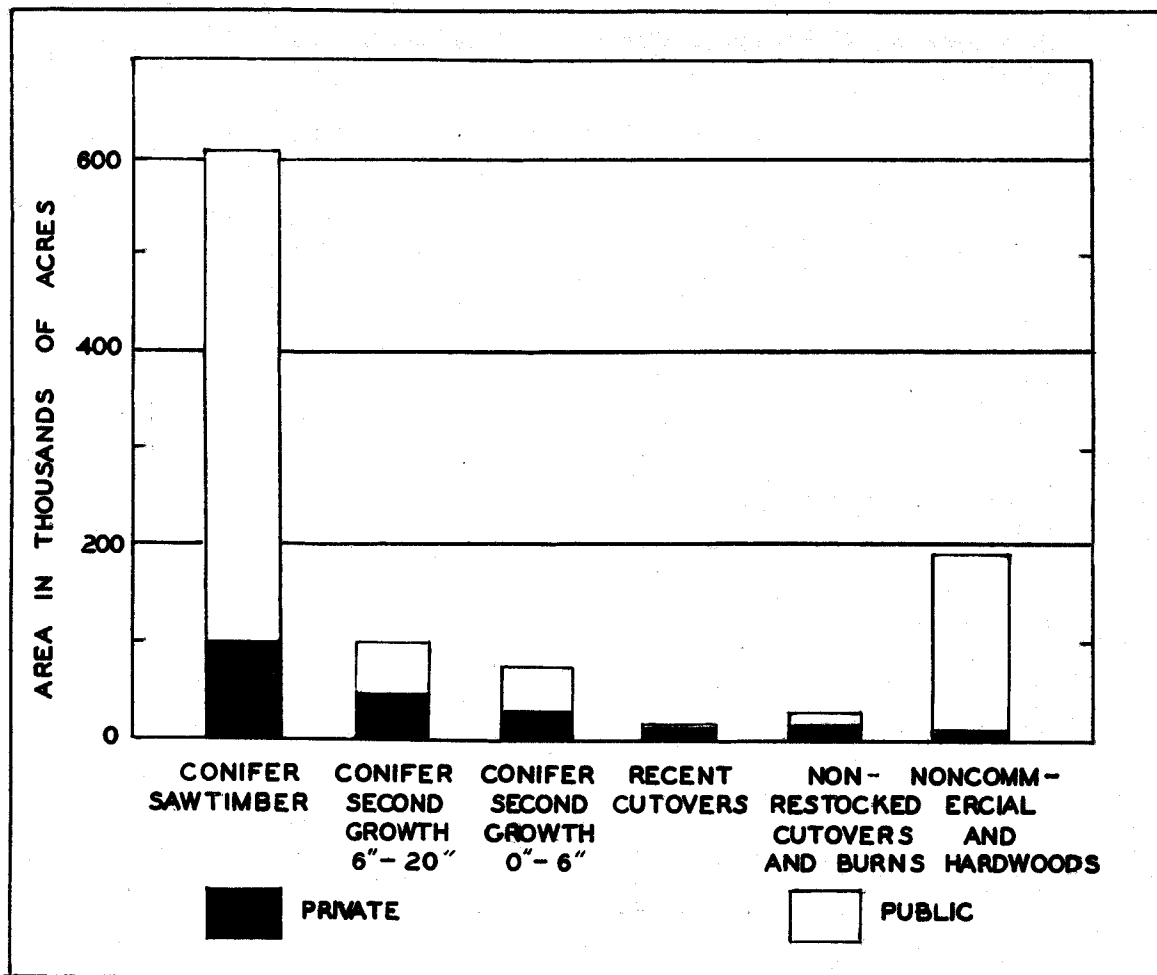


Figure 2. Generalized forest types by ownership class (from table 2).

maining 68 thousand acres being largely restocked burns and blowdown areas. As the major areas of cut-over land and the largest burns are on the eastern slope of the mountains the principal proportion of the immature stands are of the Douglas-fir types which include 133 thousand acres, or 78 percent of the total area of all immature stands. The remaining 36 thousand acres are largely of the western hemlock types and are concentrated in the fog-belt of the west side of the county where they have become established on areas where the old-growth forest was destroyed by the Olympic hurricane of 1921.

Stands consisting of trees ranging in diameter from 6 to 20 inches occupy 95 thousand acres, or 56 percent of the area of immature types and are composed largely of the Douglas-fir type. Seedling and sapling stands, trees less than 6 inches in diameter, are found on 74 thousand acres, approximately two-thirds of the area stocked with Douglas-fir.

Table 3 gives the area of the immature conifer types by age classes and degree of stocking. This tabulation shows that 94 thousand acres, or 55 percent of the area of immature types, is of a good degree of stocking. Medium and poorly stocked areas follow with 55 thousand and 21 thousand acres, respectively. This table also indicates that the 10- and 40-year age classes are the most abundant, and, when combined, form nearly one-half of the total area of all immature age classes.

### Hardwoods

Hardwood stands, although found throughout the county, are located principally along the moist river bottoms of the western slope where they attain a merchantable size. Red alder is the predominant species, northern black cottonwood and bigleaf maple of lesser quantities usually occurring in association with it. A total of 6 thousand acres supports trees of saw-timber size and 7 thousand acres supports stands of trees less than saw-timber size.

No extensive utilization of hardwoods is practiced in the county.

### Deforested and Recent Cut-Over Land

Nonrestocked forest lands that had been logged prior to 1930 and all burns that had not restocked satisfactorily were classified by the survey as deforested lands. Survey figures show that 22 thousand acres of forest land had not restocked satisfactorily with coniferous species and that one-half of this was logged prior to 1920 but repeated fires and the lack of a source of seed had prevented the establishment of a new crop. These nonrestocked areas are located almost entirely in the Douglas-fir zone and are largely in private and recently acquired county ownerships although much of the former is tax-delinquent and probably will, in time, revert to the county.

Deforested burns were found to cover 6 thousand acres, all within the Douglas-fir zone. Disastrous fires of 1938 and 1939 in the vicinity southwest of Port Ludlow were responsible for the majority of the deforested burns upon privately owned lands while the Green Mountain, Corrigenda, and Interrorem fires resulted in the principal areas of deforested burns within the Federal ownerships. The active planting program within the national forest is rapidly reducing the area of deforested burns and cut-over lands.

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

Age class (years)	Degree of stocking	Type number and name					Total
		10 Douglas-fir seedlings and saplings	16 Western hemlock seedlings and saplings	9 Douglas-fir small second growth	15 Western hemlock small second growth	19 Western redcedar second growth	
10	Good	9,075	21,985				31,060
	Medium	10,824	240			130	11,194
	Poor	8,145	155			75	8,375
	Total	28,044	22,380			205	50,629
20	Good	7,415	3,308	340		320	11,383
	Medium	8,275	115				8,390
	Poor	4,065					4,065
	Total	19,755	3,423	340		320	23,838
30	Good	45	149	2,405	450		3,049
	Medium	205		6,955			7,160
	Poor		95	740			835
	Total	250	244	10,100	450		11,044
40	Good	15		16,385	1,895		18,295
	Medium	60		8,205	278		8,543
	Poor			2,345	315		2,660
	Total	75		26,935	2,488		29,498
50	Good			13,650	502		14,152
	Medium			5,005	18		5,023
	Poor			2,045			2,045
	Total			20,700	520		21,220
60	Good			10,980	24		11,004
	Medium			2,295	1,385		3,680
	Poor			365	140		505
	Total			13,640	1,549		15,189
70	Good			2,260			2,260
	Medium			2,725			2,725
	Poor			175			175
	Total			5,160			5,160
80	Good			2,285			2,285
	Medium			1,540	70		1,610
	Poor			1,120	110		1,230
	Total			4,945	180		5,125
90+	Good			195	35		230
	Medium			1,715	4,825		6,540
	Poor			810	30		840
	Total			2,720	4,890		7,610
Total all ages	Good	16,550	25,442	48,500	2,906	320	93,718
	Medium	19,364	355	28,440	6,576	130	54,865
	Poor	12,210	250	7,600	595	75	20,730
	Total	48,124	26,047	84,540	10,077	525	169,313

Recent cut-over lands, or those clear-cut since 1930, have a total area of 16 thousand acres, of which 13 thousand acres is privately owned. This acreage is largely concentrated in the area southwest of Port Ludlow and east of Quilcene where the main body of uncut old-growth Douglas-fir stood until a few years ago. Other areas of this type that were logged early in the decade are located northwest of Quilcene on privately owned lands.

#### Noncommercial Forest Lands

Subalpine areas at the upper limits of tree growth and forested areas that are too steep or rocky to permit logging have been classified by the survey as noncommercial forest lands. These types are common on the summits and steep rocky slopes of the Olympic Mountains. Subalpine forests have a total area of 162 thousand acres, 141 thousand acres being within the national park and the remainder within the national forest. These stands are composed of trees of no commercial value because of their inaccessibility and poor form and are important primarily for their protective and aesthetic values. Noncommercial rocky areas have a combined acreage of 25 thousand acres, chiefly in Federal ownerships.

#### Productive Capacity of Forest Lands

As a part of the forest survey, determinations were made of the site quality, or relative productive capacity, of the commercial forest area. The forest types were divided into two groups, spruce-hemlock and Douglas-fir, and within each group five site quality classes were recognized. The spruce-hemlock group included the western hemlock, Sitka spruce, and upper-slope types, or those that commonly occur in the fog belt, while the Douglas-fir sites included all of the Douglas-fir and its closely associated types. Areas of deforested burns and cut-over lands were classified upon the basis of the forest type which occupied the site before depletion. Table 4 presents a summarization of the site data by class.

Two-thirds of the total area of commercial forest land, or 545 thousand acres, was classified as spruce-hemlock site and 51 percent of this is of site quality class II, 25 percent in class III, 14 percent in class IV, and the remaining 10 percent in class V, the lowest recognized.

Douglas-fir sites occupy 275 thousand acres and are principally of the medium site classes. Class III is the most abundant and contains 64 percent of the total area of Douglas-fir sites, classes I, II, IV, and V containing 1, 6, 20, and 9 percents, respectively.

#### Saw-Timber Volumes

The total log scale volume, Scribner rule, of the merchantable timber within the county is 24,070 million board feet which includes 67 million board feet of hardwood saw timber. Table 5 presents the saw-timber volume by species and ownership class and should be referred to

Table 4.-Land areas, forest land areas, and commercial conifer areas,  
by site quality class<sup>1/</sup>  
Data corrected to July 1, 1940

Kind of forest land and site quality class	Total area		Area in forest land	Area in commercial conifers
	<u>Acres</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Commercial conifer				
Douglas-fir				
Class I	2,256	0.2	0.2	0.3
Class II	15,639	1.4	1.5	1.9
Class III	176,125	15.3	17.3	21.5
Class IV	56,769	4.9	5.5	6.9
Class V	24,075	2.1	2.4	2.9
Total	274,864	23.9	26.9	33.5
Spruce-hemlock				
Class II	275,332	24.0	27.0	33.6
Class III	136,706	11.9	13.4	16.7
Class IV	77,583	6.8	7.6	9.5
Class V	54,971	4.8	5.4	6.7
Total	544,592	47.5	53.4	66.5
Total commercial conifer	819,456	71.4	80.3	100.0
Lodgepole pine	175			
Subalpine <sup>2/</sup>	162,361	14.1	15.9	
Noncommercial rocky	24,909	2.2	2.5	
Hardwood	13,538	1.2	1.3	
Total other	200,983	17.5	19.7	
All forest land	1,020,439	88.9	100.0	
Nonforest land	127,694	11.1		
Grand total	1,148,133	100.0		

<sup>1/</sup> 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 both Douglas-fir and spruce-hemlock types, class I being the highest. In the survey Douglas-fir classifications were used for Douglas-fir and western redcedar types; spruce-hemlock classifications were used for Sitka spruce, western hemlock, and upper-slope types.

<sup>2/</sup> Includes 730 acres of type 37.

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

Trees 16" and more d.b.h.<sup>1/</sup>  
Thousands of board feet, log scale, Scribner rule

Species	Private	State avail- able <sup>2/</sup>	County	Indian	Federal			Other <sup>3/</sup>	Total
					National forest Available	Reserved	National park		
Douglas-fir									
Large old growth	34,819	100,183	1,447	378	62,527		1,809,812	153	2,009,319
Small old growth	11,834	39,736	1,989	149	651,897	53,078	1,090,001	357	1,849,041
Large second growth	65,490	16,455	22,496	23	6,966		33,107	5,000	149,537
Small second growth	79,652	20,452	48,178	23	23,517		24,902	12,632	209,356
Sitka spruce									
Large	416,654	395,192	7,850	38,419	44,850		631,601	1,321	1,535,887
Small	3,761	2,786	55	271	316		4,452	9	11,650
Western hemlock									
Large	1,974,423	2,555,797	92,368	53,164	1,460,701	30,377	3,199,935	2,448	9,369,213
Small	198,325	281,850	10,831	5,907	121,934		289,731	272	908,850
Mountain hemlock							74,882		74,882
Western redcedar									
Live	553,615	932,572	12,735	21,632	137,366	2,294	690,186	210	2,350,610
Dead	13,763	28,069	235		2,723		7,882	70	52,742
Alaska yellow-cedar		505			1,135	219	35,145		37,004
Western white pine	930	840	10		8,147	1,153	46,136		57,216
Pacific silver fir	252,389	1,957,894	10,490	23,774	760,564	6,674	2,367,382		5,379,167
Grand fir	15		20		2,640		5,570		8,245
Red alder	23,612	11,103	2,010	4,839	3,312		3,545	58	48,479
Bigleaf maple	2,329	2,461	301	73	929		653	2	6,748
Black cottonwood	6,926	1,889		490	215		2,123	2	11,645
Total	3,638,537	6,347,784	211,015	149,142	3,289,739	93,795	10,317,045	22,534	24,069,591

<sup>1/</sup> Trees of hardwood species taken from 12" and more d.b.h.

<sup>2/</sup> Includes 181 thousand board feet in a State park and 27 thousand board feet in a municipal watershed; timber on both areas reserved from cutting.

<sup>3/</sup> Includes 16,703 thousand board feet in military reserves and 5,831 thousand board feet in public domain.



for more detailed information. Figure 3 shows volume of saw timber by species group, and figure 4 volume of saw timber by broad ownership class.

Western hemlock, the most abundant species in the county, contains 10,278 million board feet or 43 percent of the total coniferous saw-timber volume. Approximately 91 percent of this is found in trees 20 inches or more in diameter while the remainder is contained in smaller trees. The quality of the hemlock varies from fair to good, the better trees occurring on the upper slopes where trees with diameters of 40 inches or more are of common occurrence.

Pacific silver fir ranks second to hemlock in volume with a total of 5,379 million board feet. A variation in quality similar to that found in the hemlock is also found in silver fir although this species is probably more susceptible to disease than the hemlock. Silver fir is little used for lumber but is extensively used in the manufacture of paper and although logging operations have not yet reached the larger unreserved stands of the species it appears that they have a great potential value.

Rapid depletion in the Douglas-fir stands has reduced the volume of this species to 4,217 million board feet or 18 percent of the total saw-timber volume. Ninety-one percent of the volume is in old-growth trees and is approximately equally divided between trees of relatively large and small diameters. Seventy percent of its volume is not available for cutting but has been reserved within the Federal ownerships for other values.

Western redcedar has a total volume of 2,355 million board feet or approximately 10 percent of the total conifer volume. The quality of the redcedar is generally good although decay in the veteran trees is quite common. Redcedar stands in swampy areas along the coast consist of trees of large diameters but with relatively short heights and only fair quality. These stands are of value principally as a source of shingle bolts and not for the production of sawlogs.

Six percent of the conifer volume, or 1,548 million board feet, is of Sitka spruce. This volume lies wholly upon the western slope of the county and includes trees of the highest quality.

Other species of minor importance that occur in the county are Alaska yellow-cedar, western white pine, lodgepole pine, and grand fir, but the combined volume of these is negligible.

#### Ownership of the Resource

Jefferson County presents an interesting condition in the status of land ownership. A total of 20 percent of the land area of the county is privately owned, a portion of which is tax-delinquent and will shortly

become county property. Federal lands, on the other hand, constitute 58 percent of the total area, the national park being the largest with 43 percent, and the national forest with 14 percent.

The percentages of land ownership made upon the basis of the area of commercial forest land is, perhaps, more indicative of the true forest ownership situation since it eliminates all unproductive areas. One-fourth of the area of commercial forest land is privately owned, the re-

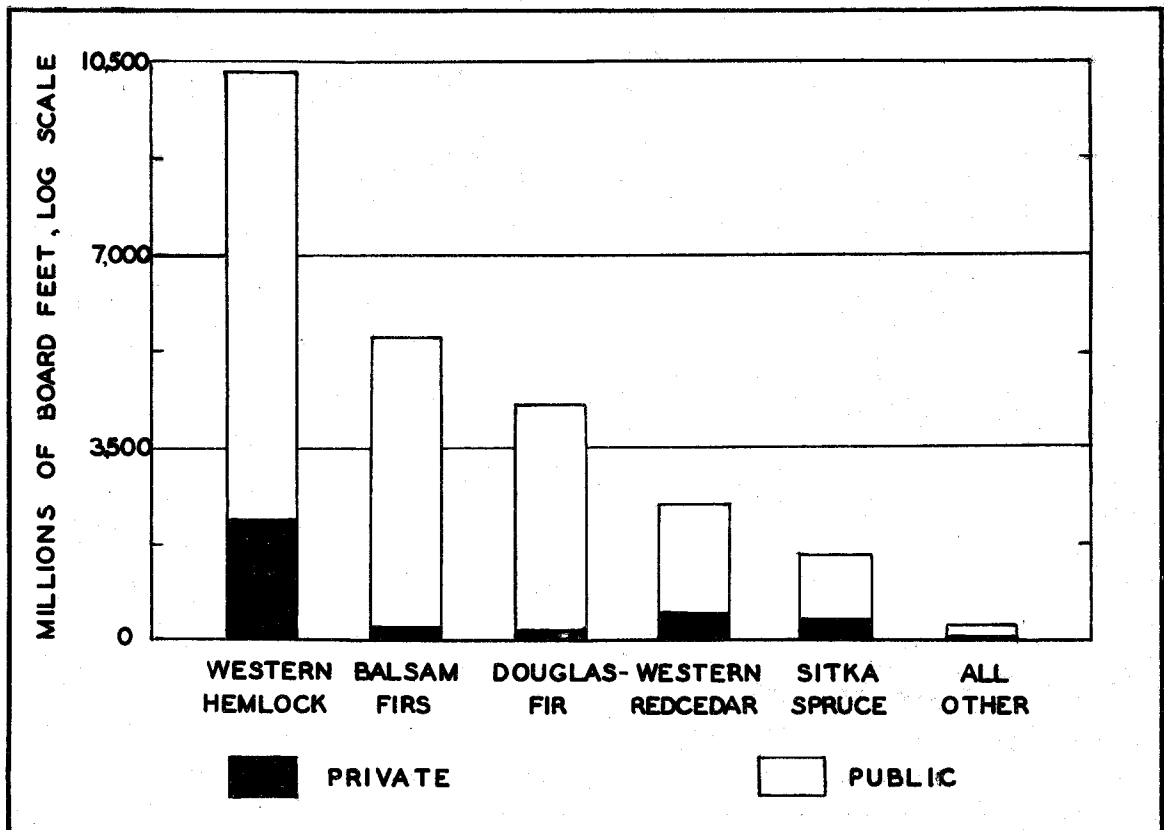


Figure 3. Distribution of saw-timber volume by species group (from table 5).

maining 75 percent being distributed among the various public agencies. Federally owned or managed commercial forest land includes 30 percent in the national park, 16 percent in the national forest, 1 percent in public domain and military reservations, and 1 percent in Indian lands. Twenty-two percent of the commercial forest area is owned by the State of Washington which is largely grant lands of the State exchange area in the fog belt. The county owns 5 percent of the area and is increasing its holdings by foreclosing tax-delinquent lands.

Calculations of merchantable volume by ownership class indicate that only 15 percent of the total volume is privately owned and that

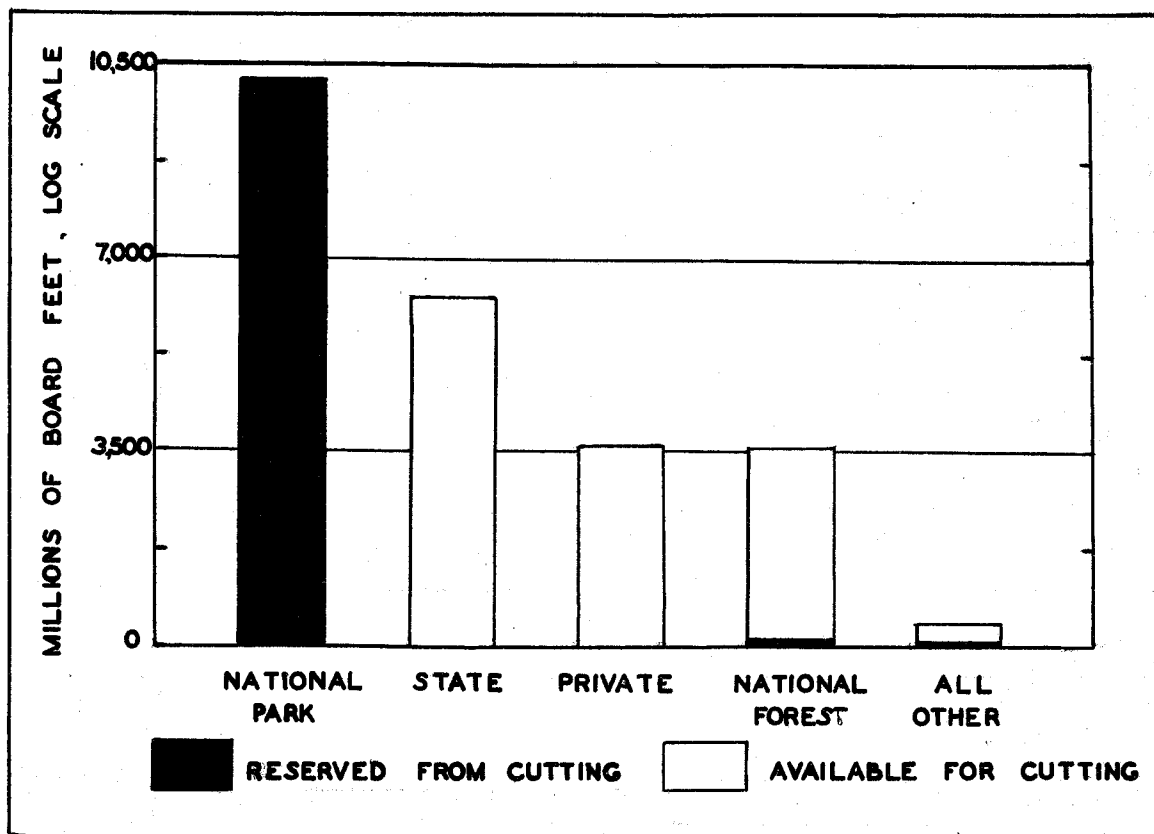


Figure 4. Distribution of saw-timber volume by broad ownership class (from table 5).

practically all of this is found in the forest of the fog belt. The national park includes 43 percent of the saw-timber volume of the county and 74 percent of all old-growth Douglas-fir. The State ownership contains 26 percent of the timber volume and the national forest 14 percent.

#### Depletion

Depletion of the forest resource has occurred in the form of cutting, fire, wind throw, and insects although the latter of these is of little consequence. Depletion through cutting has, until recent years, been confined to the Douglas-fir stands of the eastern slope where private timber holdings have been in the process of liquidation since cutting began. The sawlog production of this area reached its peak during the period between 1925 and 1929 and then dropped rapidly until 1937 when it again raised. Production dropped in 1938 but climbed again in 1939 when salvage operations were engaged in logging the timber killed in the Port Ludlow fires of 1938 and 1939. During the 7-year period between 1933 and 1939, which are considered to be years of normal lumber activity, the average annual sawlog production of the county was 62 million board feet, of which 73 percent was Douglas-fir.

Following 1940 production of Douglas-fir sawlogs will undoubtedly show a marked decline since the last large stands of privately-owned old-growth Douglas-fir have been exhausted. The sawlog production of the future probably will be chiefly obtained from the stands of the fog belt and will consist principally of hemlock.

Fire depletion of saw timber upon national forest lands in very recent years has been negligible although the results of fires of the past are still in evidence. Fires near Port Ludlow in 1938 and 1939 killed the principal portion of the remaining old-growth Douglas-fir stand on privately-owned land forcing an immediate salvage of the timber. Efficient fire detection and suppression organizations developed by private, State and Federal action have, however, kept the fire losses in merchantable timber relatively low.

The average annual loss sustained from wind throw has been low since the hurricane of 1921 although small scattered areas of saw timber have been depleted by wind in recent years. In several cases these areas have been accessible and salvage has been possible.

#### Forest Growth

The data concerning current annual forest growth that are presented are made upon the basis of the statistics compiled at the time of the inventory of 1932. At that time there were 114 thousand acres of growing conifer types and 2 thousand acres of hardwood types on the eastern portion of the county while the western part supported 34 thousand acres of growing conifers and 10 thousand acres of hardwoods.

The current annual growth on conifer trees 5.1 inches or more in diameter was computed to be 11 million board feet, 73 percent of this taking place on the east side of the county where a high percentage of the area of the forest was stocked with the growing age classes (less than 170 years). Seventy-seven percent of the total current annual growth was occurring in Douglas-fir stands while most of the remainder was increment in hemlock stands. Small amounts were also occurring in the spruce, redcedar, and silver fir stands. Current annual increment in conifers 5.1 inches or more in diameter was 13 million cubic feet. The current annual growth in hardwood stands was 202 thousand cubic feet and 783 thousand board feet.

In computing potential annual growth data obtained in the 1940 inventory were used. Assuming that all of the commercial conifer forest land in the county, which totals 819 thousand acres, was managed under good forest practice and that the stands were 75 percent stocked, the potential annual conifer growth was computed to be 385 million board feet in trees 5.1 inches or more in diameter and 95 million cubic feet in trees 5.1 inches or more in diameter. These estimates include the growth on commercial forest lands that have been reserved from cutting; therefore, the actual potential annual yield of available timber would be much less than given above.

### Comparison of Inventories

Comparison of results of the 1932 inventory and the revision of 1940 will reveal significant information on the trends in the forest situation. The following tabulation gives such a comparison:

	<u>1932 inventory</u>	<u>1940 inventory</u>	<u>Change</u>
Saw-timber stands	631 M acres	607 M acres	-4%
Saw-timber volume (total)	24,896 million bd.ft.	24,070 million bd.ft.	-3%
Saw-timber volume available for cutting	24,895 million bd.ft.	13,659 million bd.ft.	-45%
Saw-timber volume reserved from cutting	1 million bd.ft.	10,411 million bd.ft.	
Douglas-fir saw-timber volume available for cutting	4,584 million bd.ft.	1,206 million bd.ft.	-74%
Douglas-fir saw-timber volume reserved from cutting		3,011 million bd.ft.	
Conifer second-growth timber 6-20" d.b.h.	75 M acres	95 M acres	+27%
Conifer second-growth timber less than 6" d.b.h.	68 M acres	74 M acres	+9%

During the period the area of coniferous saw-timber types has been reduced 24 thousand acres, almost entirely within private ownership. There has been a reduction of 12 thousand acres in the area of the privately owned old-growth Douglas-fir types alone. A similar situation is revealed in a comparison of saw-timber volumes. Since 1932 the volume of saw timber has been reduced 826 million board feet, largely on private timber holdings.

A substantial decrease in the area of deforested burns, nonrestocked cut-over lands, and recent cut-over areas bears witness of the increased fire protection of the forest lands and of the planting activity of the Forest Service. The total decrease in area of these types since 1932 has been 25 thousand acres.

During the past 7 years there has been a conspicuous change in the ownership status of land within the county. The cutting of private timber holdings with the subsequent high percentage of tax-delinquency and ultimate forfeiture to the county has reduced the area of privately

owned land by 26 thousand acres. A further reduction in private holdings was made with the establishment of the Olympic National Park which now includes 5 thousand acres of land formerly in private ownership. The park, which has an area of 497 thousand acres, also received 492 thousand acres from the Olympic National Forest. State ownership has remained relatively stable since 1932.

Since the reinventory an additional area of approximately 25,000 acres has been acquired by the Federal Government which it is presumed will be added to the Olympic National Park. Approximately 18,000 acres of this total supports saw-timber stands. The bulk of this land was acquired from private owners although a substantial acreage of State-owned land was acquired and a small acreage of county-owned lands.

### Analysis of Forest Problems

There is sufficient evidence to indicate that a critical situation has developed on the east side of the county and that solution to the problem lies in sound management of the forest lands. This portion of the county, which is largely dependent upon the forest, once supported several large logging operations, a sizable sawmill, a pulp mill, and numerous small saw and shingle mills. As complete depletion of the old-growth stands of private timber and cutting of all the national forest timber available under sustained-yield plans has been reached, these concerns have ceased operations within the county until only the pulp mill and several small shingle mills remain. The pulp mill, however, obtains its raw material from other localities and has never been dependent upon this portion of the county for pulpwood. In 1935 the last large logging concern and sawmill ceased operations because of lack of timber and as a result Port Ludlow has lost most of its inhabitants.

Cutting in the Douglas-fir zone has long been far in excess of the sustained yield capacity of the area as is illustrated by the fact that although the current annual growth for the area in 1932 was calculated at only 8 million board feet, the average annual cut of Douglas-fir alone from 1933 to 1939 was 45 million board feet. As the result, the forest industries of this zone are largely dormant, social problems have arisen in dependent communities, and tax delinquency on private forest lands is threatening to create a new public domain that will be a burden to the county. Furthermore, considerable time must pass before a second timber harvest may be made in this zone or before any substantial economic development can be expected.

Second-growth stands now approaching maturity are present but are small in area and badly scattered and will not prove to be of material importance in providing a timber supply during the interim between the first and second harvest. Cutting in second-growth stands is not a common practice in the Douglas-fir zone but it is possible that increased demands for small sawlogs will eventually result in the cutting of these stands within private ownerships. Second-growth stands on State

and national forest lands, which are under forest management, will not be logged until maturity and will form the basis of the first portion of the next harvest.

The recreational value of the forests of the county is widely recognized, a major portion being reserved expressly to preserve this value. Additional recreational areas are found along the shore of Hood Canal where summer home sites have become popular. The combination of water and forest afforded by these sites appeals to the urban population of the larger Puget Sound cities who desire the natural beauty and restful surroundings that are offered.

The solution of the forest problem in the Douglas-fir zone of Jefferson County lies in a farsighted timber management program. Such a program should insure a continuous supply of timber which would stabilize the forest industries, create permanent communities, and establish a sound ownership pattern. Furthermore, it should consider the other values of the forest such as watershed protection, erosion control, and recreation.

The present forest situation in this zone is not favorable but through sound forest management practices a situation can be created that will eventually be of benefit to the county.

An entirely different and more favorable forest situation is presented in the spruce-hemlock zone of the county. Only a minor portion of the stand has been cut leaving a vast area of virgin timber as the future foundation of the present forest industries. Several large companies, the State, and the Federal Government are the principal owners making it possible to create sustained-yield units that should insure a perpetual supply of timber. Conditions here are extremely favorable for permanent forestry since the site is better than average, the species of trees is prolific and restocking of cut-over lands can be accomplished under proper cutting practice, the fire hazard is low, and the terrain is favorable to selective logging. Under sustained-yield forestry this area can be developed into a stable wood-producing unit.

Jefferson County illustrates two widely divergent forest situations; one in which forest depletion has run its course, and the other in which an ideal opportunity for immediate sustained-yield forest management is presented. Only a long-term and farsighted forestry program can correct the first while the second may be perpetuated by a sound management at the present time. It appears, therefore, that prompt action should be instigated toward the establishment of sound forestry practices to insure future social welfare and economic development within the county.