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Timber Resources in Areas Developed for Nonforest Use in Western Washington

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Abstract

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A summary is presented of a timber resource inventory in western Washington conducted to determine the extent of timberland and timber resources in three forest zones, each defined by its proximity to developed nonforest areas. The methods used are explained, and tables of timberland area and timber volume by forest zone are presented.

Keywords: Timber resources, resources (forest), forest surveys, survey methods/planning, Washington (western), western Washington.

Summary

Western Washington's timber resources were inventoried by using a sampling approach that provided estimates of timber resources by forest zones which were defined by degree of proximity to developed nonforest areas. The inventory data indicated that most forests intermingled with non-forest development are in the non-industrial private owner group, and they account for 40 percent of the timberland in this owner group. Forests in the intermingled zones tend to be of lower productive potential, have more hardwoods, and have fewer seedling-sapling stands than do the more remote forests. The data from these inventories will provide an improved basis for analyses of timber supply in western Washington.

Introduction

Much of western Washington's forested area intermingles with areas developed for nonforest use. This pattern of forests and developed areas is a consequence of farm, urban, and industrial development in areas that were once forested. Because of location, current and potential future use, and parcel size, these intermingled forests have different prospects for timber production than do the more remote, primarily forested areas. Current uses and objectives of owners may limit the present output of timber as well as investments in long-term production.

In spite of the apparent differences in availability and use of the intermingled and the remote forests, past inventories of western Washington forests were not designed to differentiate between them. As a consequence, all forested land in western Washington has been treated as being equally available for current and future timber production in analyses of timber supply.

To develop more useful information on western Washington's forest resources for those interested in timber supply prospects for the area, a sample-based inventory was designed to provide the information on the timber resources that are adjacent to or intermingled with developed, non-forest areas. In this report, I describe the approach used to develop estimates of timber volume and timberland^{1/} area for three forest zones in western Washington. Each zone is defined by the degree of nonforest development in or around the forested area. Results of the inventory, summarized by the three forest zones, are presented.

^{1/} Timberland is unreserved forest land producing or capable of producing 20 cubic feet of growing stock per acre per year (1.4 m³/(ha·year) under natural conditions.

Method

The forest inventories conducted by the Forest Inventory and Analysis Research Work Unit, Pacific Northwest Forest and Range Experiment Station, in western Washington in 1978-79 were organized into three geographic inventory units (fig. 1). In each unit, lands **other than National Forest** were sampled using double sampling for stratification (Cochran 1963). A total of 22,000 aerial photo plots distributed in a systematic square grid were classified to estimate area by owner group, major land class (timberland, other forest, and non-forest), stand volume class, and forest zone. The second phase of the sample consisted of 1,400 field plots—a subset of the photo plots—located on a 3.4-mile (5.5-km) square grid. Each field plot was visited to adjust estimates of area by major land class, and to determine detailed characteristics such as forest type, stand volume, stand growth, and stand condition. The inventory procedure for each inventory unit and the summarized results of the inventories are reported by Bassett and Oswald (1981a, 1981b, 1982).

The main departure from previous inventories was a change in sampling design to provide estimates of forest area and quantity of timber by forest zones. These forest zones were selected to differentiate between forested areas that will likely have different futures in terms of forest management and timber output.

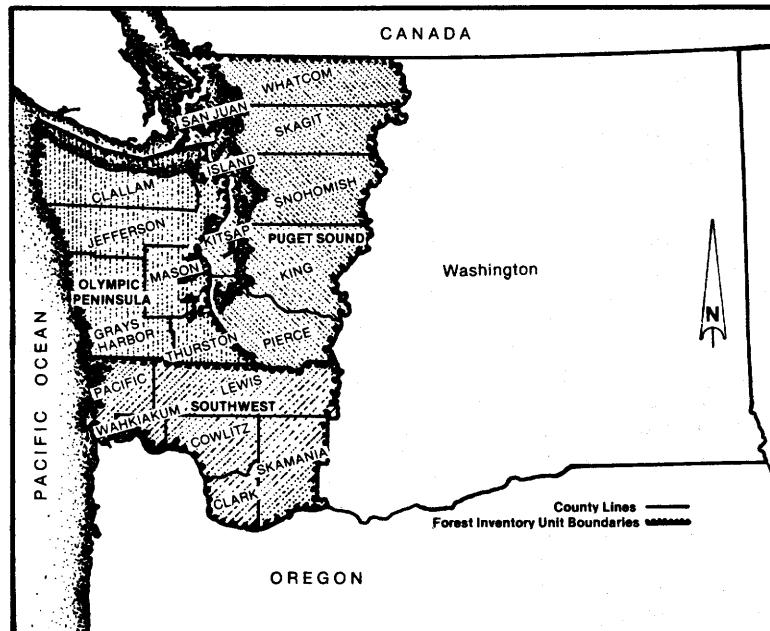


Figure 1.—Forest inventory units in western Washington.

The forest zones are:

Primary forest zone. This zone is characterized by large continuous tracts of forested land with little if any area devoted to nonforest development, such as farms or housing (fig. 2).

Low-density suburban or farming zone. This zone is characterized by a pattern of forests intermingled with parcels of nonforest development and use, such as cultivated farmland, pastures, and scattered or isolated housing subdivisions. The road pattern in this zone has 1/4-mile (0.4 km) or greater separation (fig. 3).

Urban-residential-industrial zone. This zone includes all forest land within legal boundaries of incorporated cities and towns as determined by boundaries shown on quadrangle maps or orthophotos. It also includes all forest land within areas developed for residential or industrial use as evidenced by roads, developed building sites, and structures. The road pattern (distance between parallel roads) in this zone is less than 1/4 mile (0.4 km). The primary land use is residential or commercial and industrial. Presence of structures or prepared building sites associated with the road pattern are key elements for classification (fig. 4).

Each photo plot, located at a grid intersection superimposed on an aerial photograph, was assigned to a forest zone based on the above definitions. The photo plots were also identified as to ownership and major land use class. An area "weight"—approximately 460 acres (186 ha)—was assigned to each photo plot based on the spacing of the grid intersections. The estimate of area of timberland for each owner group-forest zone combination was determined by summing the area weights of the photo plots assigned to each combination (stratum).



Figure 2.—Forests in the primary forest zone.



Figure 3.—Forests in the low density suburban-farm zone.

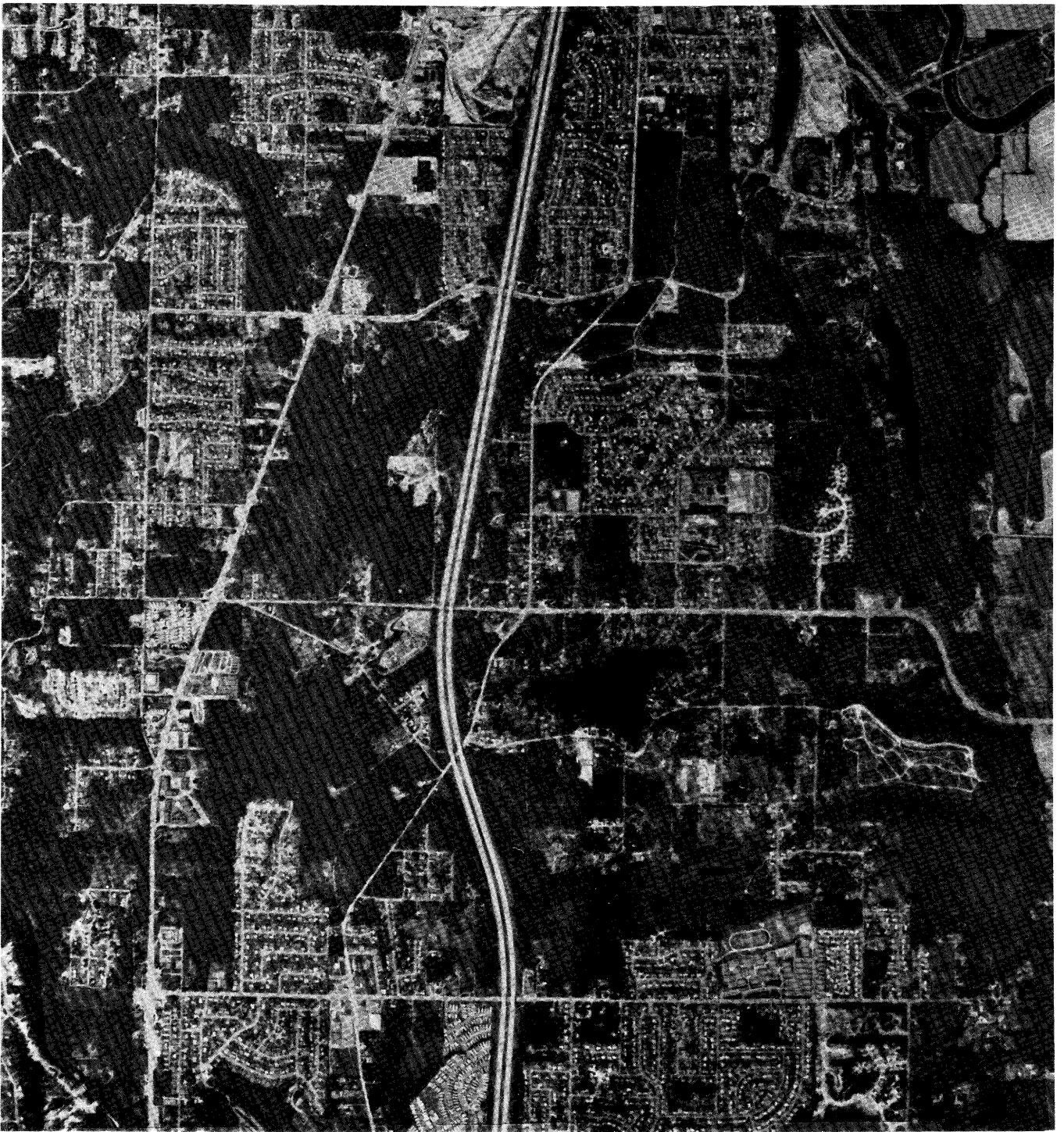


Figure 4.—Forests in the urban-residential-industrial zone.

Results

Area Stratification by Owner and Zone

Each of the three inventory units (see fig. 1) is an independent sampling unit. This study brings together the results of the inventories that were conducted for each of these three units. Within each inventory, photo and field plots were classified into three owner groups: public (other than National Forest), forest industry, and non-industrial private. Within each owner group, one of the three zones detailed above was designated for each photo plot; this was based on the degree and proximity of nonforest development.

Some of the owner group-zone strata were so small in area that there were no field samples. The strata with no field samples were combined with other forest zone strata within the same owner group. Strata were combined to obtain adequate field plot representation in each surviving stratum. The strata or classes lost through combination with larger strata, and the acreage involved, are detailed in footnotes to table 4, appendix.

National Forest inventories were conducted as part of the management planning process on the individual National Forests and were independent of the effort by Forest Inventory and Analysis. They were not therefore, part of the forest zone study. Because of their remote upland locations, the National Forests were placed in the primary forest zone for purposes of this study.

The inventories for the three inventory units were compiled by owner group and forest zone. Detailed summaries of the data are in the appendix.

Ownership of Timberland by Forest Zones

The distribution of timberland by forest zone for each of the major owner groups is summarized in table 1.

As stated earlier, National Forest land was not included as part of the study, but was placed in the primary forest zone because of its location. The potential error from this arbitrary placement is small because these National Forests are not in areas where forests and nonforest development intermingle. Timberland administered by other public agencies is almost entirely in the primary forest zone, but nonindustrial private timberlands are found in abundance in all three zones. The data indicate that the distribution of timberland in western Washington among forest zones is of immediate import only in the nonindustrial private

owner group. The remainder of this paper and most of the data in the appendices therefore focus on the resource characteristics of nonindustrial private timber by forest zone.

Distribution of Nonindustrial Private Timberland by Forest Zone

Although western Washington was originally divided into three geographic units for inventory purposes, those units are also useful in analyses because they approximate the major timber-producing regions of western Washington (Bergvall et al. 1977). Table 2 summarizes the distribution of nonindustrial private timberlands by inventory unit in western Washington.

Although each unit has considerable acreage in the primary forest zone, substantial portions of the Southwest and Puget Sound units are in the low density zone. In Puget Sound, 9 percent of the nonindustrial private timberland is in the highly developed urban zone.

Table 1—Area of timberland by owner group and forest zone, western Washington

Owner group	Forest zone		
	Primary	Low density	Urban
	Thousand acres		
National Forests	2,454	--	--
Other public	1,740	74	--
Forest industry	3,682	25	--
Nonindustrial private	1,333	793	103
All owners	9,209	892	103

Table 2—Area of nonindustrial private timberland, by inventory unit and forest zone, western Washington

Unit	Forest zone		
	Primary	Low density	Urban
	Thousand acres		
Southwest	410	238	--
Olympic Peninsula	472	96	12
Puget Sound	451	459	91
All units	1,333	793	103

Productivity of the Nonindustrial Timberlands

The low density and urban zone forests in western Washington are located in the lowlands, which are also the most highly developed and settled areas. In some regions, lowland forest areas are more productive for forest growth than are the upland areas. But in western Washington's nonindustrial private forests, the average site potential^{2/} is higher in the primary forest zone (142 cubic feet per acre per year (9.9 m³/ha)) than in the low density and urban forest zones (134 cubic feet per acre per year (9.4 m³/ha)). Figure 5 shows the relative distribution by site class of nonindustrial forest land for each of the forest zones.

^{2/} Site potential is stated in terms of capacity for cubic foot annual growth in fully stocked natural stands.

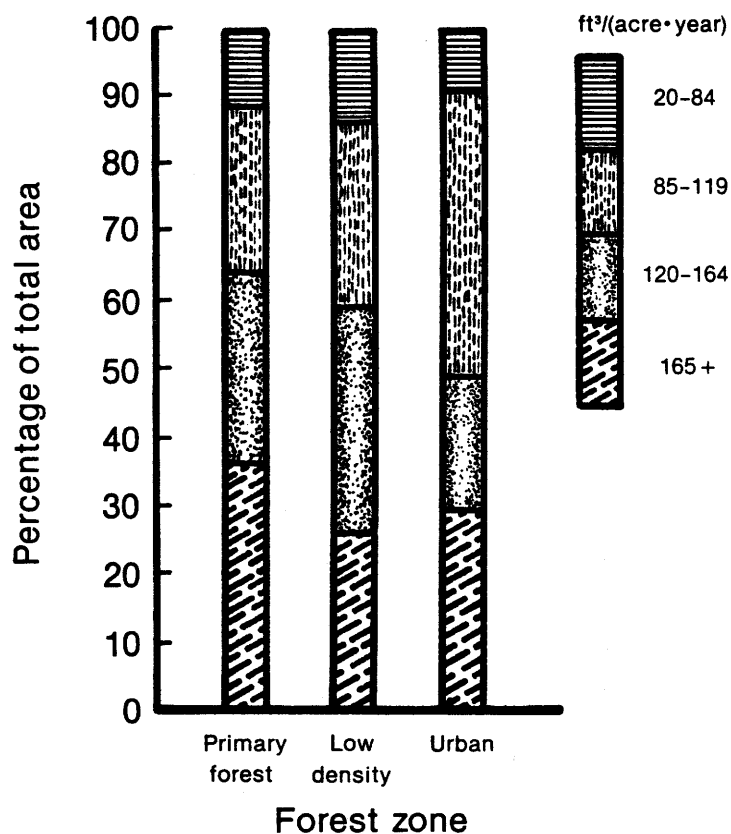


Figure 5.—Distribution of nonindustrial private timberland by site class and forest zone, western Washington.

Distribution of Forest Types by Forest Zone

Most of western Washington's forest lands have the potential to grow coniferous species, commonly called softwoods. Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) and western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) are the most abundant softwoods in this region. Hardwoods—primarily red alder (*Alnus rubra* Bong.)—are found exclusively on few sites, but grow well on coniferous sites and often aggressively occupy such areas following disturbances such as fire or logging. In the low density and urban forest zones, more area is forested with hardwoods than with softwoods, possibly as a result of logging and land clearing of the original forests in these areas. In contrast, the nonindustrial private forests in the primary forest zone are 57 percent softwood types (fig. 6).

Partial harvest and other operations in existing forest stands appear to be related to the proximity of the forests to developed areas. The proportion of undisturbed forest was found to be highest in the primary forest zone and lowest in the urban zone; partial harvest activities increased with proximity to urban development (fig. 7).

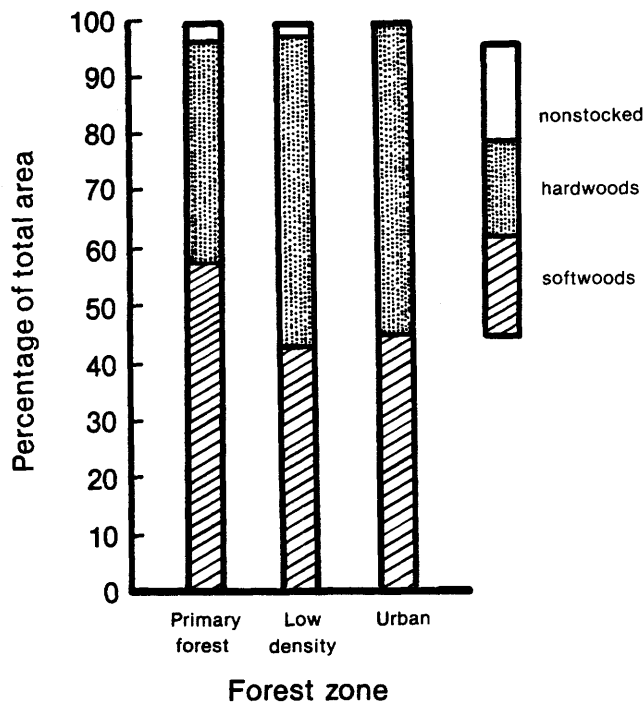


Figure 6.—Distribution of nonindustrial private timberland by forest type group and forest zone, western Washington.

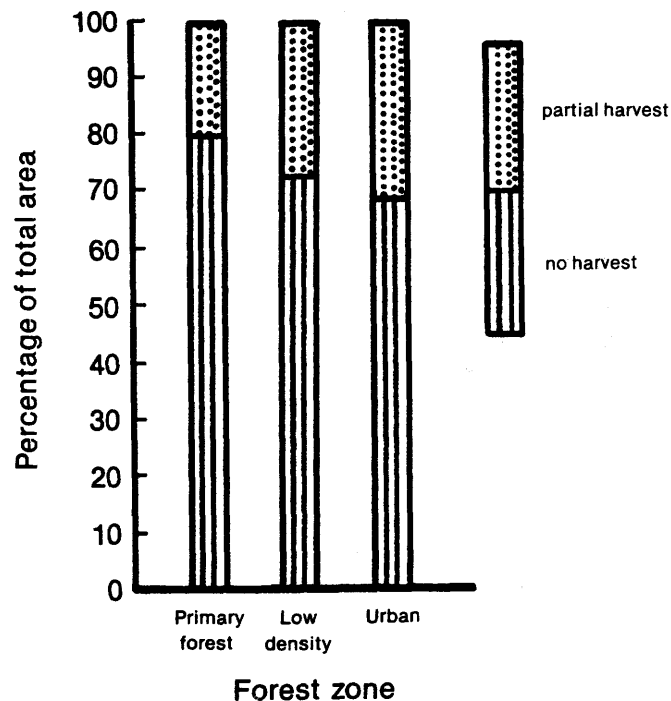


Figure 7.—Distribution of partial harvest by forest zone on nonindustrial private timberlands, western Washington.

Stage of Development of Nonindustrial Private Forests

The distribution of forest acreage by stand size varies with forest zone (fig. 8). The primary forest zone has substantial acreage in seedling and sapling stages, and some in nonstocked areas. These stages are usually found when timber is harvested and regenerated on a continuing basis. The relative lack of stands of small trees or of nonstocked areas in the urban forest zone is to be expected where harvest of existing stands is frequently part of the process of conversion to non-forest uses.

Distribution of Timber Volume Among Forest Zones

Timber stocks on nonindustrial private timberlands in western Washington are distributed among the forest zones approximately in proportion to the distribution of timberland area. Sixty-three percent of the growing stock volume is in the primary forest zone, 32 percent in the low density zone, and 5 percent in the urban zone (table 3). But the distribution of volume does vary by species group, as does the distribution of area by species type groups. The primary forest zone, where softwood forest types predominate, contains 69 percent of all of the softwood growing stock volume, but only 52 percent of the hardwood volume. The other two zones combined account for 31 percent of the softwood growing stock volume and 48 percent of the hardwood volume.

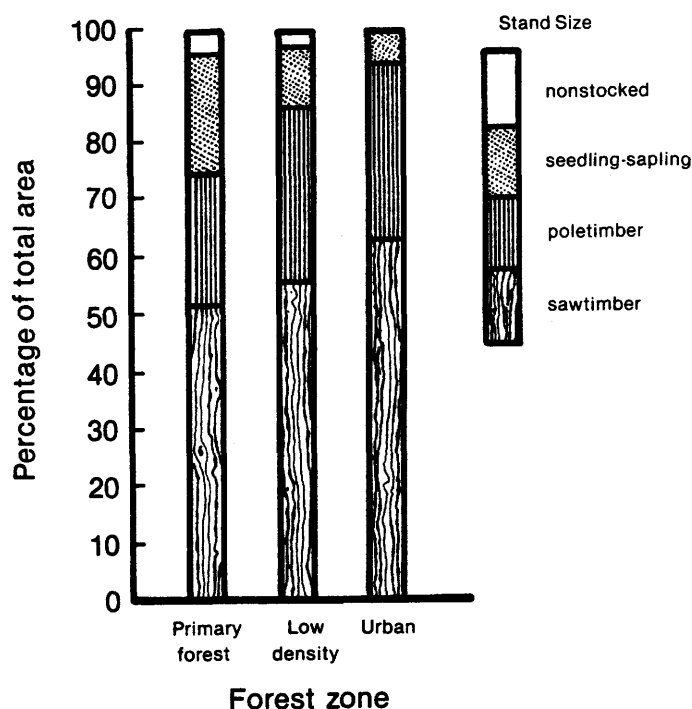


Figure 8.—Distribution of nonindustrial private timberland by stand size and forest zone, western Washington.

Table 3—Volume of growing stock on nonindustrial private timberland, by species group and forest zone, western Washington

Species	Forest zone		
	Primary	Low density	Urban
Million cubic feet			
Softwoods	1,472	1,358	221
Hardwoods	1,313	1,044	183
All species	4,785	2,402	404

Discussion

The highest volume per acre (3,922 cubic feet (274 m³/ha)) occurs in the urban forest zone; the lowest (3,029 cubic feet (212 m³/ha)) in the low density zone (fig. 9). The high average volume in the urban zone is due in large part to the high per acre average of hardwood volume in this zone, as well as to the lack of low volume seedling-sapling and nonstocked areas. The primary forest zone has the highest per acre softwood volume and the lowest per acre hardwood volume.

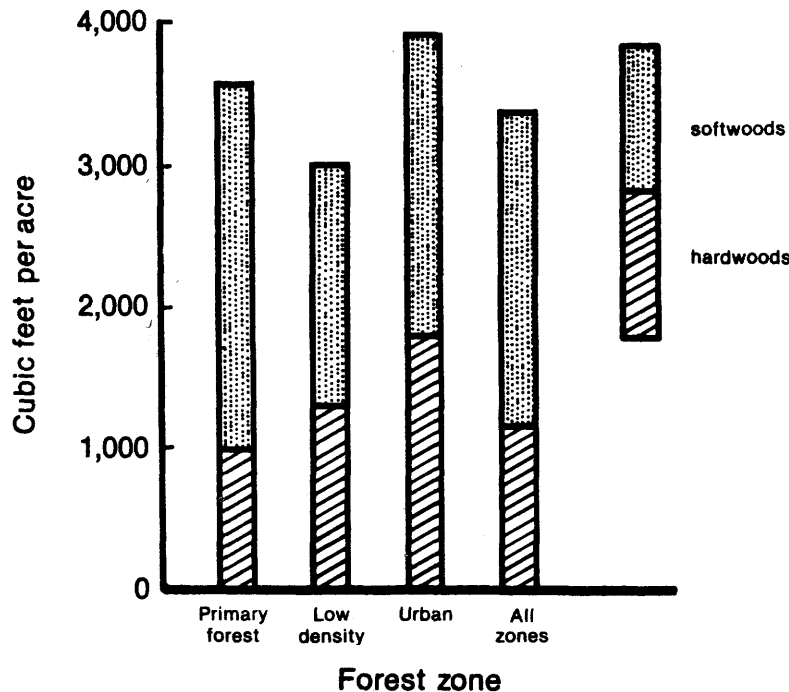


Figure 9.—Average volume of growing stock on nonindustrial private timberland by forest zone, western Washington.

This study demonstrated that within the framework of the commonly used double sampling for stratification (Cochran 1963), forest inventories can be designed to estimate the extent and condition of forest resources in zones defined by proximity of forest land to urban or other nonforest development.

This inventory provided answers to questions about the amount of western Washington's forest resources located in urban areas or intermingled with nonforest development of less than urban density. It also provided information on the characteristics of the forest resources in each forest zone. The low density and urban forests are largely in nonindustrial private ownership. Although these forests are found in each of the inventory units, the largest concentration is in the Puget Sound unit.

The inventory indicated that the forests differ in significant ways from zone to zone. The stands in the primary forest zone tend to have higher productive potential, and a majority of their area and volume is in softwood species. The forests in this zone have a balanced representation of stands of all sizes.

In contrast, the low density and urban forests occupy lands of relatively lower productive potential; these forests are more likely to have a substantial or dominant hardwood component than are the primary zone forests. In the low density and urban zones, little of the area is in seedling and sapling stands; most of the area supports stands of poletimber or sawtimber size.

The differences in forest resource characteristics between the zones are due to a combination of factors. Nonforest development has not been random in location; it has taken place near tide water and in the relatively flat lowlands and stream plains. The proximity of development and population to some of the forests has had an impact on the use of those areas and will likely affect their future use. Whatever the reasons, the forests in each zone are different.

Application

The information provided by this inventory is a better basis for estimation of currently available timber resources than any previously available. It should provide an improved basis for predicting future timber availability in western Washington because assessment of timber by forest zone will be possible.

The urban zone forests are not likely to be managed for timber production, but some of the current stocks might become available as these lands are converted to nonforest use. Some of the low density zone forest lands are also being converted to nonforest use. Lands in this zone that remain forested are not likely candidates for intensive forest management because of their location and parcel size, and objectives of the owners. Nonindustrial private forests in this zone are not likely targets for acquisition by forest industry. Forests in this zone **do** produce periodic but unpredictable harvests.

Primary zone forests are and will continue to be the most important and dependable source of timber. Most forest industry and public forest land is in this zone. Nonindustrial forest land in this zone is intermingled with industry and public forest land, and in the past some of these intermingled lands have been acquired by forest industry. The forests in this zone are less likely to be converted to nonforest use than are forests in the other zones, and they are more likely to be managed—perhaps intensively—for the production of timber.

The forest zone concept I've described appears to provide useful information for western Washington, an area that was once almost entirely forested. Washington's growing population and related urban, industrial, and agricultural development are claiming forested land for nonforest use. Forests that are close to or intermingled with nonforest development are likely candidates for change to nonforest status. Stratifying by forest zone in sample-based forest inventories might prove useful in other regions where similar conditions prevail.

Metric Equivalents

1,000 acres = 404.7 hectares (ha)
1,000 cubic feet = 28.3 cubic meters (m³)
1 cubic foot per acre = 0.07 cubic meter per hectare (m³/ha)
1 foot = 0.3048 meter (m)
1 inch = 2.54 centimeters (cm)
1 mile = 1.609 kilometers (km)

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Appendix

Table 4—Area of timberland by inventory unit, owner group, and forest zone, western Washington, 1979-80

Inventory unit and owner group	Forest zone			All zones
	Primary	Low density	Urban	
<u>Thousand acres</u>				
Southwest Washington:				
National Forest <u>1/</u>	1,081	--	--	1,081
Other public	<u>2/</u> 427	--	--	427
Forest industry	<u>3/</u> 1,495	--	--	1,495
Nonindustrial private	410	<u>4/</u> 238	--	648
All owners	3,413	238	--	3,651
Olympic Peninsula:				
National Forest <u>1/</u>	538	--	--	538
Other public	<u>5/</u> 759	--	--	759
Forest industry	<u>6/</u> 1,215	--	--	1,215
Nonindustrial private	472	96	12	580
All owners	2,984	96	12	3,092
Puget Sound:				
National Forest <u>1/</u>	835	--	--	835
Other public	554	<u>7/</u> 74	--	628
Forest industry	972	<u>8/</u> 25	--	997
Nonindustrial private	451	459	91	1,001
All owners	2,812	558	91	3,461
Western Washington:				
National Forest <u>1/</u>	2,454	--	--	2,454
Other public	1,740	74	--	1,814
Forest industry	3,682	25	--	3,707
Nonindustrial private	1,333	793	103	2,229
All owners	9,209	892	103	10,204

1/ Zones were not classified on National Forest lands; these lands are assumed to be in zone 1 because of their location.

2/ Includes 14,000 acres of zone 2 land.

3/ Includes 23,000 acres of zone 2 land.

4/ Includes 6,000 acres of zone 3 land.

5/ Includes 5,000 acres of zone 2 land and 2,000 acres of zone 3 land.

6/ Includes 3,000 acres of zone 2 land and 1,000 acres of zone 3 land.

7/ Includes 18,000 acres of zone 3 land.

8/ Includes 1,000 acres of zone 3 land.

Table 5—Confidence intervals (68-percent probability level) for sampled strata, estimated area of timberland by inventory unit, owner group, and forest zone, western Washington

Inventory unit and owner group	Forest zone		
	Primary	Low density	Urban
<u>Thousand acres</u>			
Southwest Washington:			
Other public	427±18	--	--
Forest industry	1,495±23	--	--
Nonindustrial private	410±13	238±13	--
Olympic Peninsula:			
Other public	759±19	--	--
Forest industry	1,215±20	--	--
Nonindustrial private	472±20	98±10	12±8
Puget Sound:			
Other public	554±18	74±9	--
Forest industry	972±25	25±4	--
Nonindustrial private	451±21	459±22	91±20

Table 6—Area of nonindustrial private timberland by inventory unit, site class, and forest zone, western Washington, 1979-80

Inventory unit and site class <u>1/</u>	Forest zone			All zones
	Primary	Low density	Urban	
<u>Cubic feet</u>	<u>Thousand acres</u>			
Southwest Washington:				
225 and more	25	11	--	36
165 to 224	131	70	--	201
120 to 164	110	90	--	200
85 to 119	92	27	--	119
50 to 84	42	40	--	82
20 to 49	10	--	--	10
All classes	410	238	--	648
Olympic Peninsula:				
225 and more	28	10	--	38
165 to 224	157	10	12	179
120 to 164	93	38	--	131
85 to 119	147	34	--	181
50 to 84	33	4	--	37
20 to 49	14	--	--	14
All classes	472	96	12	580
Puget Sound:				
225 and more	8	14	--	22
165 to 224	126	89	18	233
120 to 164	169	132	20	321
85 to 119	99	158	44	301
50 to 84	36	45	9	90
20 to 49	13	21	--	34
All classes	451	459	91	1,001
Western Washington:				
225 and more	61	35	--	96
165 to 224	414	169	30	613
120 to 164	372	260	20	652
85 to 119	338	219	44	601
50 to 84	111	89	9	209
20 to 49	37	21	--	58
All classes	1,333	793	103	2,229

1/ Capacity for cubic-foot annual growth per acre at culmination of mean annual growth in fully stocked natural stands.

Table 7—Area of nonindustrial private timberland by inventory unit, forest type group, and forest zone, western Washington, 1979-80

Inventory unit and forest type group	Forest zone			All zones
	Primary	Low density	Urban	
	<u>Thousand acres</u>			
Southwest Washington:				
Softwood types	227	111	--	338
Hardwood types	160	119	--	279
Nonstocked areas	23	8	--	31
All species	410	238	--	648
Olympic Peninsula:				
Softwood types	291	29	6	326
Hardwood types	155	67	6	228
Nonstocked areas	26	--	--	26
All species	472	96	12	580
Puget Sound:				
Softwood types	241	200	40	481
Hardwood types	201	245	51	497
Nonstocked areas	9	14	--	23
All species	451	459	91	1,001
Western Washington:				
Softwood types	759	340	46	1,145
Hardwood types	516	431	57	1,004
Nonstocked areas	58	22	--	80
All types	1,333	793	103	2,229

Table 8—Area of nonindustrial private timberland by inventory unit, stand size class, and forest zone, western Washington, 1979-80

Inventory unit and stand size class	Forest zone			All zones
	Primary	Low density	Urban	
<u>Thousand acres</u>				
Southwest Washington:				
Sawtimber	211	144	--	355
Poletimber	93	59	--	152
Seedlings-saplings	83	27	--	110
Nonstocked areas	23	8	--	31
All classes	410	238	--	648
Olympic Peninsula:				
Sawtimber	234	46	12	292
Poletimber	77	23	--	100
Seedlings-saplings	135	27	--	162
Nonstocked areas	26	--	--	26
All classes	472	96	12	580
Puget Sound:				
Sawtimber	239	254	52	545
Poletimber	138	164	33	335
Seedlings-saplings	65	27	6	98
Nonstocked areas	9	14	--	23
All classes	451	459	91	1,001
Western Washington:				
Sawtimber	684	444	64	1,192
Poletimber	308	246	33	587
Seedlings-saplings	283	81	6	370
Nonstocked areas	58	22	--	80
All classes	1,333	793	103	2,229

Table 9—Area of nonindustrial private timberland by inventory unit, recent treatment, and forest zone, western Washington, 1979-80

Inventory unit and recent treatment	Forest zone			
	Primary	Low density	Urban	All zones
Thousand acres				
Southwest Washington:				
No operations	351	179	--	530
Precommercial thinning	17	15	--	32
Other cultural operations ^{1/}	--	8	--	8
Commercial thinning	8	--	--	8
Other partial harvests	34	36	--	70
All treatments	410	238	--	648
Olympic Peninsula:				
No operations	255	46	6	307
Precommercial thinning	8	--	--	8
Other cultural operations ^{1/}	57	10	6	73
Commercial thinning	6	10	--	16
Other partial harvests	146	30	--	176
All treatments	472	96	12	580
Puget Sound:				
No operations	367	316	53	736
Precommercial thinning	9	--	--	9
Other cultural operations ^{1/}	--	--	6	6
Commercial thinning	8	8	6	22
Other partial harvests	67	135	26	228
All treatments	451	459	91	1,001
Western Washington:				
No operations	973	541	59	1,573
Precommercial thinning	34	15	--	49
Other cultural operations ^{1/}	57	18	12	87
Commercial thinning	22	18	6	46
Other partial harvests	247	201	26	474
All treatments	1,333	793	103	2,229

^{1/} Other cultural operations include herbicide spraying, selective weeding, site preparation, and unclassified operations.

Table 10—Area of nonindustrial private timberland by forest type group, stand volume class, and forest zone, western Washington, 1979-80

Forest type group and stand volume class	Forest zone			All zones
	Primary	Low density	Urban	
<u>Cubic feet per acre</u>	<u>Thousand acres</u>			
Softwood types:				
0-999	149	47	--	196
1000-1999	55	35	--	90
2000-3999	239	133	6	378
4000-5999	109	79	29	217
6000-7999	107	31	11	149
8000-9999	48	15	--	63
10000+	52	--	--	52
All classes	759	340	46	1,145
Hardwood types:				
0-999	55	53	--	108
1000-1999	104	128	--	232
2000-3999	202	148	12	362
4000-5999	99	90	45	234
6000-7999	39	12	--	51
8000-9999	17	--	--	17
10000+	--	--	--	--
All classes	516	431	57	1,004
Nonstocked areas:				
0-999	58	22	--	80

Table 11—Volume of growing stock on nonindustrial private timberland by inventory unit, species, and forest zone, western Washington, 1979-80

Inventory unit and species	Forest zone			
	Primary	Low density	Urban	All zones
Million cubic feet				
Southwest Washington:				
Softwoods--				
Douglas-fir	504	336	--	840
Western hemlock	269	79	--	348
Western redcedar	75	42	--	117
Other softwoods	133	3	--	136
Total	981	460	--	1,441
Hardwoods--				
Red alder	247	165	--	412
Bigleaf maple	96	55	--	151
Other hardwoods	18	33	--	51
Total	361	253	--	614
All species	1,342	713	--	2,055
Olympic Peninsula:				
Softwoods--				
Douglas-fir	488	56	22	566
Western hemlock	315	3	--	318
Western redcedar	226	12	3	241
Other softwoods	70	11	--	81
Total	1,099	82	25	1,206
Hardwoods:				
Red alder	327	141	9	477
Bigleaf maple	72	6	1	79
Other hardwoods	21	6	1	28
Total	420	153	11	584
All species	1,519	235	36	1,790
Puget Sound:				
Softwoods--				
Douglas-fir	862	504	168	1,534
Western hemlock	372	84	20	476
Western redcedar	131	164	3	298
Other softwoods	27	64	5	96
Total	1,392	816	195	2,404
Hardwoods--				
Red alder	368	442	113	923
Bigleaf maple	104	80	58	242
Other hardwoods	60	116	1	177
Total	532	638	172	1,342
All species	1,924	1,454	368	3,746
Western Washington:				
Softwoods--				
Douglas-fir	1,854	896	190	2,940
Western hemlock	956	166	20	1,142
Western redcedar	432	218	6	656
Other softwoods	230	78	5	313
Total	3,472	1,358	221	5,051
Hardwoods--				
Red alder	942	748	122	1,812
Bigleaf maple	272	141	59	472
Other hardwoods	99	155	2	256
Total	1,313	1,044	183	2,540
All species	4,785	2,402	404	7,591

Table 12—Confidence intervals (68-percent probability level) for sampled strata, estimated growing stock volume by inventory unit, owner group, and forest zone, western Washington

Inventory unit and owner group	Forest zone		
	Primary	Low density	Urban
<u>Million cubic feet</u>			
Southwest Washington:			
Other public	1,834±213	--	--
Forest industry	5,092±344	--	--
Nonindustrial private	1,342±127	713±136	--
Olympic Peninsula:			
Other public	3,960±303	--	--
Forest industry	5,893±354	--	--
Nonindustrial private	1,519±162	235±57	36±29
Puget Sound:			
Other public	2,660±291	304±49	--
Forest industry	3,589±248	97±45	--
Nonindustrial private	1,924±183	1,454±119	368±82

Table 13—Net annual growth of growing stock on nonindustrial private timberland, by inventory unit, species group, and forest zone, western Washington, 1979-80

Inventory unit and species group	Forest zone			All zones
	Primary	Low density	Urban	
<u>Thousand cubic feet</u>				
Southwest Washington:				
Softwoods	37,533	21,407	--	58,940
Hardwoods	14,966	11,572	--	26,538
All species	52,499	32,979	--	85,478
Olympic Peninsula:				
Softwoods	41,554	2,944	1,191	45,689
Hardwoods	17,095	4,227	292	21,614
All species	58,649	7,171	1,483	67,303
Puget Sound:				
Softwoods	55,274	34,780	7,230	97,284
Hardwoods	21,894	25,196	5,806	52,896
All species	77,168	59,976	13,036	150,180
Western Washington:				
Softwoods	134,361	59,131	8,421	201,913
Hardwoods	53,955	40,995	6,098	101,048
All types	188,316	100,126	14,519	302,961

Oswald, Daniel D. Timber resources in areas developed for nonforest uses in western Washington. Resour. Bull. PNW-112. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; **1984**. 20 p.

A summary is presented of a timber resource inventory in western Washington conducted to determine the extent of timberland and timber resources in three forest zones, each defined by its proximity to developed nonforest areas. The methods used are explained, and tables of timberland area and timber volume by forest zone are presented.

Keywords: Timber resources, resources (forest), forest surveys, survey methods/planning, Washington (western), western Washington.

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.

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