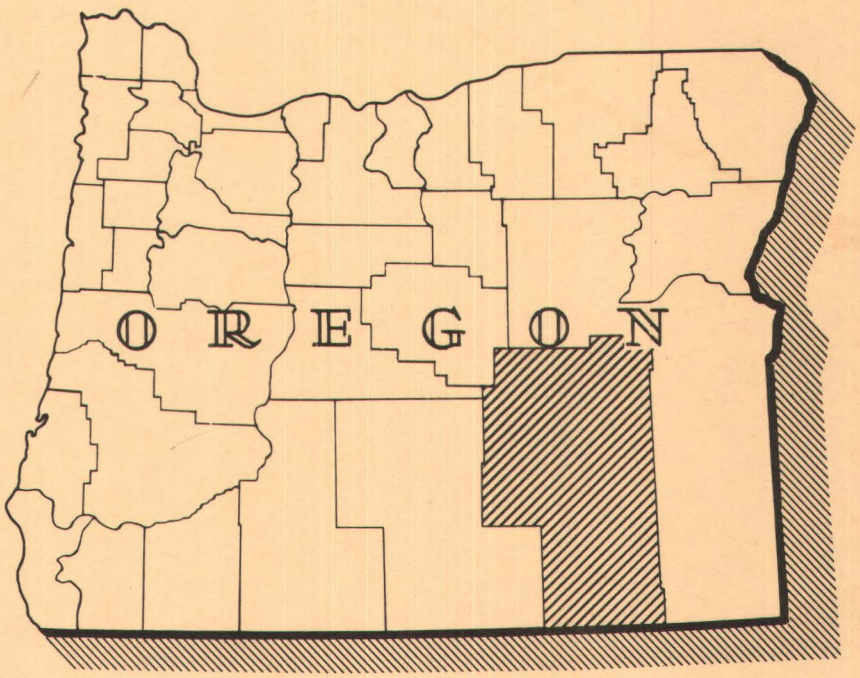
FOREST STATISTICS FOR HARNEY CO., OREGON

FOREST SURVEY REPORT NO. 118



U. S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
R. W. COWLIN, DIRECTOR

PORTLAND, OREGON NOVEMBER 1954

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1/ Acknowledgment is made of the use of type information shown on an existing forest type map of the commercial forest zone, resulting from a cooperative extensive survey in 1949 by the Forest Service and the Edward Hines Lumber Company. Cooperation was also provided by public and private agencies in furnishing cutting and ownership records.

FOREST STATISTICS

FOR

HARNEY COUNTY, OREGON

Forest Survey Report No. 118

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F. L. Moravets

U. S. Department of Agriculture Forest Service
Pacific Northwest Forest and Range Experiment Station

R. W. Cowlin, Director
November 1954

FOREWORD

This publication summarizes in statistical form the results of a reinventory of the forests of Harney County, Oregon, conducted in 1953. The reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928 and amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and to analyze and make available in reports survey information needed in the formulation of forest policies and programs.

The Forest Survey is conducted in the various forest regions of the Nation by the regional forest experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oregon.

Under the initial phase of the Forest Survey the forests of Harney County were inventoried in 1935. A statistical report, "Forest Statistics for Harney County, Oregon" and a detailed forest type map--scale 1 inch to the mile--were released. The reinventory was conducted during the months of September and October 1953. Another result of the reinventory is a revised forest type map of the county, on a scale of either 1 or 2 inches to the mile. 1/

1/ A print of the forest type map is available at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oregon.

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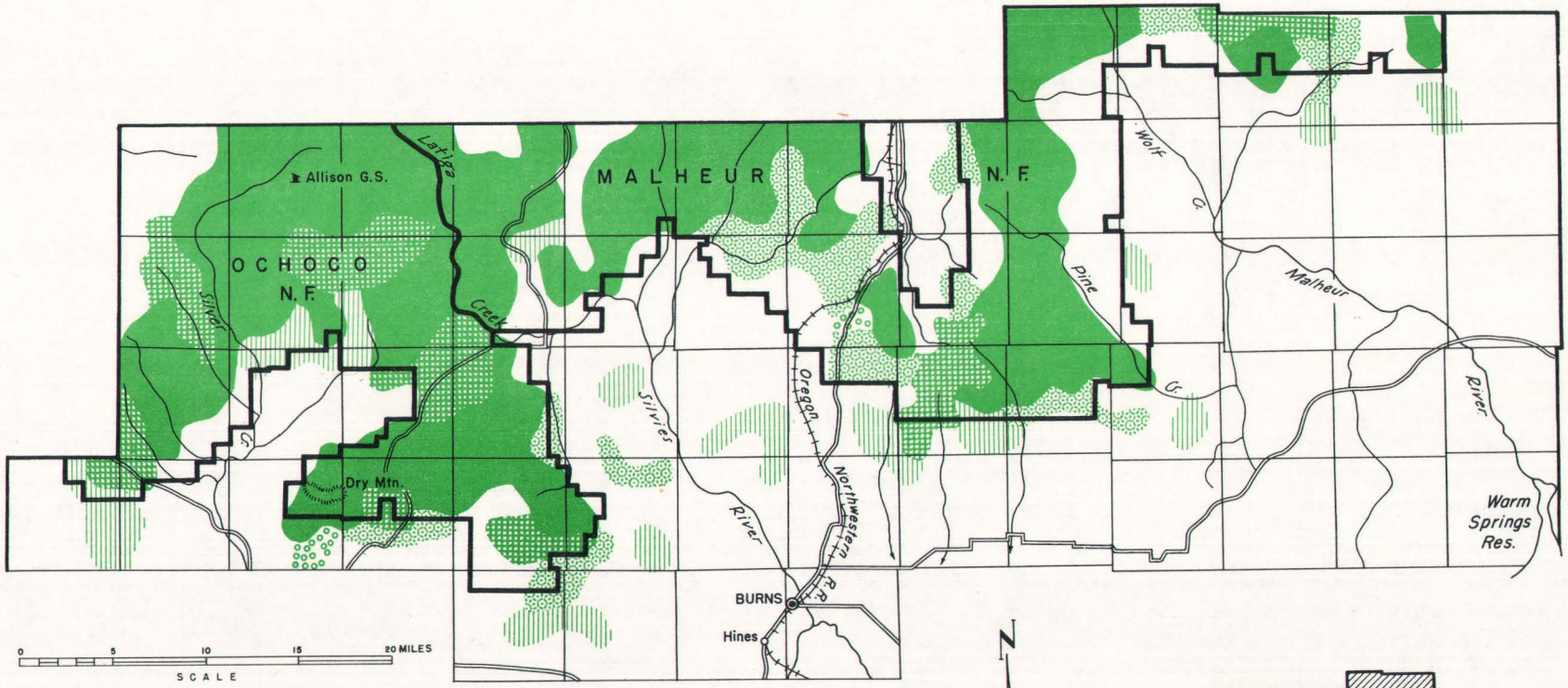


FIGURE I

FOREST STAND-SIZE AND CONDITION CLASSES

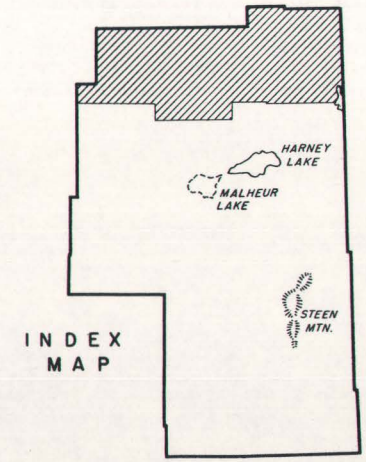
HARNEY COUNTY, OREGON

1953

LEGEND

- Uncut sawtimber stands
- Selectively cut sawtimber stands
- Young-growth stands
- Nonstocked burns
- Noncommercial forest area
- Nonforest land

NOTE: There are additional areas of noncommercial forest land (Western juniper woodland) not shown on this map.

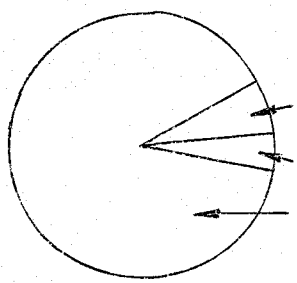


SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

LAND CLASSIFICATION

Harney County, situated in southeastern Oregon, extends some 140 miles northward from the Nevada State boundary and varies from 60 to 85 miles in width. With a land area of nearly 6.5 million acres it is the largest county in the State. The county lies in the northern portion of the arid Great Basin province of the western States. Much of its surface is of plateau-like character and marked by interior drainage; short, intermittent streams drain toward two large shallow lakes near the center of the county (fig. 1). Broad, level tablelands and narrow, alluvial valley floors comprise the central portion lying at elevations from 4,000 to 4,500 feet; near the county's northern boundary the level lands give way to foothills and moderate mountainous slopes whose elevations vary from 4,500 to 5,000 feet. The plateau is also broken in the southern portion; here, a long gradual slope rises to a height of 9,354 feet, the crest of Steens Mountain; and two ranges of lesser height, the Pueblo and Trout Creek Mountains, lead southward out of the county.

Scanty precipitation, which varies from 5 to 15 inches annually, has limited the growth of forests of commercial character to the higher elevations in the northern part of the county. Here, stands very largely of ponderosa pine, cover a zone from 2 to 25 miles in width and 70 miles in length.



Land Use

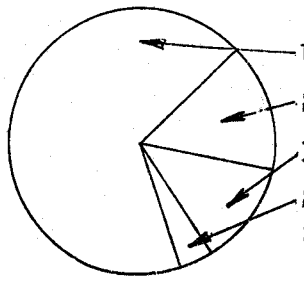
Class	Thousand acres	Percent
Commercial forest	411	6
Noncom'l. forest	220	4
Nonforest	5,853	90
Total	6,484	100

Sparsely stocked stands of a short, bushy growth of western juniper (Juniperus occidentalis) are scattered throughout most of the county. In a few locations, on the foothills and slopes in the northern portion and on slopes of buttes and Steens Mountain to the south, these stands are of sufficient size and density to form a woodland type. The juniper stands cover 214 thousand acres and are classed as noncommercial forest land because of low merchantability. Also classed as noncommercial are 6 thousand acres of poor-quality quaking aspen (Populus tremuloides) on Steens Mountain.

Originally, nearly all of the nonforest area was covered with a sagebrush-grass type of vegetation in which the grasses were predominant. However, heavy and unregulated grazing by cattle, sheep, and horses during several decades of early white settlement, and subsequent wind and water erosion, practically eliminated the grasses. A dense cover of sagebrush now prevails over a very large part of this area. In more recent years irrigation of some of the valley lands has made possible the growing of grain and specialized crops. In 1949, according to the Bureau of the Census, land under cultivation totaled 154 thousand acres.

Commercial Forest Land by Stand-Size and Condition Class

The character of the forest stands on about a third of the commercial forest area has been materially altered in the past by either timber cutting, forest insects, or fire. Stands on the other two-thirds of the area—those not appreciably altered—are of sawtimber size and were classed as "uncut" in the 1953 inventory. Some 74 thousand acres has been logged, largely in recent years, under varying intensities of selective cutting. Residual stands on 62 thousand of the logged acreage contain sufficient volume—1,500 board feet per acre—to qualify as selectively cut sawtimber; those on 12 thousand qualify as either poletimber or seedling and sapling stands. On an additional 56 thousand acres of young stands it is probable that the overstory trees were killed by epidemic outbreaks of bark beetles. Two thousand acres deforested by fire is currently nonstocked.



Stand Size or Condition

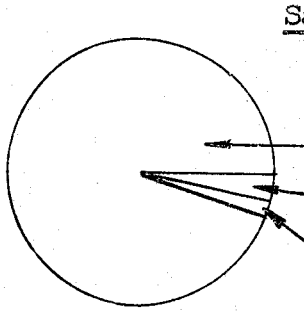
Class	Thousand acres	Percent
Uncut sawtimber	278	68
Sel. cut sawtbr.	62	15
Poletimber	53	13
Seed. & sap. and nonstocked	18	4
Total	411	100

TIMBER VOLUME

Estimated net volume of live sawtimber trees on the commercial forest land totals 4,256 million board feet, log scale, Scribner rule, or 4,641 million board feet, International ¼-inch rule. Ninety percent of the volume is in uncut sawtimber stands, 9 percent in selectively cut sawtimber stands, and 1 percent in scattered sawtimber trees in stands of small young growth.

Volume of Sawtimber by Species

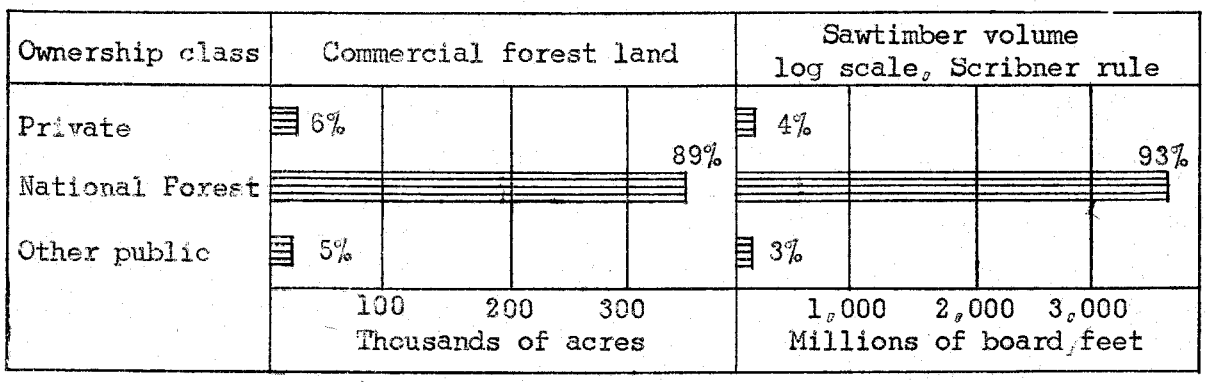
Ponderosa pine is predominant in nearly all commercial stands in the county. On a very large part of the acreage of both uncut and selectively cut sawtimber this species forms pure stands; on a few thousand acres white fir or Douglas-fir are minority associates of the pine; and on a few hundred acres pine is an associate in stands in which either white fir or Douglas-fir is the key species. The mixed stands are found only on the more moist sites on upper slopes, on northern exposures and along streams.



Sawtimber Volume

Species	Million bd. ft.	Percent
Ponderosa pine	4,043	95
Douglas-fir	110	3
White fir	103	2
Total	4,256	100

FOREST OWNERSHIP



Commercial Forest Land

Of the 411 thousand acres of commercial forest land, 27 thousand is privately owned, 365 thousand is federally owned national-forest land, and 19 thousand is in "other public" ownerships, chiefly Federal land managed by the Bureau of Land Management, with a small acreage each in State and county ownerships.

The national-forest acreage is divided between two national forests: 52 percent in the Malheur and 48 percent in the Ochoco (fig. 1). The private acreage consists of a large number of small tracts, from 40 to 640 acres in extent, scattered throughout the two national forests, and small areas of timber along the lower margin of the commercial forest zone. The Bureau of Land Management lands in general lie just outside the national-forest boundaries. State and county lands are in small scattered tracts.

Sawtimber Volume

Of the estimated total sawtimber volume of 4,256 million board feet, log scale, Scribner rule, 159 million is in stands on private land; 3,982 million is on national-forest land--2,002 million on the Ochoco and 1,980 million on the Malheur; and 115 million is on "other public" lands.

FOREST UTILIZATION

Only in recent years has the forest resource of the county been utilized to any appreciable extent for timber products. During the period 1925-46 the volume of live timber cut annually averaged about three-fourths of a million board feet, log scale, Scribner rule. In the 7-year period 1947-53, however, the annual cut averaged 35 million board feet, nearly all in the form of sawlogs; there was a small volume of poles, fence posts, and fuelwood. In recent years about 95 percent of the timber cut has been taken out of the woods in the form of timber products and 5 percent has been left in the form of logging residue (table 11). Seventy percent of the volume cut during the 7 recent years was national-forest timber; nearly all the remainder was private timber.

Table 1.--Land area by major classes of land, 1953

Class of land	Area
	Acres
Forest:	
Commercial	410,930
Noncommercial:	
Productive-reserved	---
Unproductive	220,330
Total	631,260
Nonforest	5,853,220
Total, all classes	6,484,480

Table 2.--Area of commercial forest land by ownership and stand-size class, 1953

Ownership class	Total	Saw-timber stands	Pole-timber stands	Seedling and sapling stands	Nonstocked areas
	Acres	Acres	Acres	Acres	Acres
Private	26,520	14,970	6,610	4,900	40
State	1,400	680	720		
County	240	240			
Federal:					
Bureau of Land Mgt.	17,930	7,680	8,980	1,150	120
National Forest	364,840	316,800	36,380	9,780	1,880
Total Federal	382,770	324,480	45,360	10,930	2,000
All ownerships	410,930	340,370	52,690	15,830	2,040

Table 3.---Area of commercial forest land by major forest type and stand-size class, 1953

Forest type	Total	Sawtimber stands		Pole-timber stands	Seedling and sapling stands	Non-stocked areas
		Large 1/	Small 2/			
	Acres	Acres	Acres	Acres	Acres	Acres
Ponderosa pine	408,610	324,670	15,460	52,650	15,830	
Douglas-fir	80	40		40		
White fir	200		200			
Nonstocked	2,040					2,040
Total	410,930	324,710	15,660	52,690	15,830	2,040

1/ 21 inches d.b.h. and larger.

2/ 11 to 21 inches d.b.h.

Table 4.--Area of commercial and noncommercial forest land and nonforest land by cover type and ownership class, 1953

(Acres)

Species type symbol	Cover type	Unreserved						
		Total	Private	State	County	Federal		
						Indian	Bureau of Land Mgt.	National forest
	ALL LANDS							
	Forest land	631,260	67,890	9,840	440	120	162,770	390,200
	Nonforest land	5,853,220	5,728,560 acres of nonforest land unclassified as to ownership					124,660
	Total	1/ 6,484,480						514,860
	COMMERCIAL FOREST LAND							
P4	Ponderosa pine large sawtimber	324,670	11,360	680	240		6,740	305,650
P3	Ponderosa pine small sawtimber	15,460	3,610				940	10,910
P2	Ponderosa pine poletimber	52,650	6,610	720			8,980	36,340
P1	Ponderosa pine seedlings and saplings	15,830	4,900				1,150	9,780
D4	Douglas-fir small old-growth and large young-growth sawtimber (red fir)	40						40
D2	Douglas-fir poletimber	40						40
WF3	White fir small sawtimber	200						200
F	Deforested by fire, nonstocked	2,040	40				120	1,880
	Total	410,930	26,520	1,400	240		17,930	364,840
	NONCOMMERCIAL FOREST LAND							
J	Juniper	214,670	38,450	8,440	200	120	142,100	25,360
NR	Noncommercial rocky	5,660	2,920				2,740	
	Total	220,330	41,370	8,440	200	120	144,840	25,360
	NONFOREST LAND							
A&G	Agriculture, grass and brush	5,853,220	5,728,560 acres of nonforest land unclassified as to ownership					124,620
O	Open--nonvegetative							40
	Total	5,853,220	5,728,560					124,660

1/ The total area of the county, according to the Bureau of the Census (1950), is 6,484,480 acres. Of this total, 755,920 acres was classified as to ownership in the Forest Survey reinventory; this area included all of the forest land in the county plus nonforest land in national-forest ownership.

Table 5.--Area of commercial forest land by generalized forest type and ownership class, 1953

(Acres)

Generalized forest type		Unreserved					
		Total	Private	State	County	Federal	
						Bureau of Land Mgt.	National Forest
Conifer large sawtimber							
Types P4 and D4	Uncut	269,240	7,200	600	200	5,520	255,720
	Selectively cut	55,470	4,160	80	40	1,220	49,970
	Total	324,710	11,360	680	240	6,740	305,690
Conifer small sawtimber							
Types P3 and WF3	Uncut	8,940	640			780	7,520
	Selectively cut	6,720	2,970			160	3,590
	Total	15,660	3,610			940	11,110
Conifer poletimber							
Types P2 and D2	On cutovers	8,560	3,840	160		1,570	2,990
	Other	44,130	2,770	560		7,410	33,390
	Total	52,690	6,610	720		8,980	36,380
Conifer seedlings and saplings							
Type P1	On cutovers	3,700	2,670			190	840
	Other	12,130	2,230			960	8,940
	Total	15,830	4,900			1,150	9,780
Deforested by fire, nonstocked							
Type F		2,040	40			120	1,880
	Total	410,930	26,520	1,400	240	17,930	364,840

Table 6.--Net volume of live sawtimber[1/] and growing stock[2/] on commercial forest land by ownership class, 1953

Ownership class	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Private	159	174	33
State	9	10	2
County	3	3	1
Federal:			
Bureau of Land Mgt.	103	112	24
National Forest	3,982	4,342	747
Total Federal	4,085	4,454	771
All ownerships	4,256	4,641	807

1/ Includes live trees 11.0 inches diameter breast height and larger measured in board feet.

2/ Includes live trees 5.0 inches diameter breast height and larger measured in cubic feet.

Table 7.--Net volume of live sawtimber and growing stock on commercial forest land by stand-size class, 1953

Stand-size class	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Sawtimber stands:			
Uncut	3,810	4,152	691
Selectively cut	404	440	76
Total sawtimber	4,214	4,592	767
Poletimber stands	42	49	40
Seedling and sapling stands	*	*	*
Nonstocked areas	*	*	*
Total	4,256	4,641	807

* Less than 500 thousand.

Table 8.--Net volume of live sawtimber and growing stock on commercial forest land, by species, 1953

Species	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Softwoods:			
Ponderosa pine	4,043	4,407	748
Douglas-fir	110	122	28
White fir	103	112	31
Total	4,256	4,641	807
Hardwoods	---	---	---
All species	4,256	4,641	807

1/ In addition to the species listed, lodgepole pine and western larch are known to occur in the county but in negligible quantities.

Table 9.--Net volume of live sawtimber on commercial forest land by diameter-class group, species group, and log rule, 1953

Diameter class and log rule	Total	Ponderosa pine	Douglas-fir	White fir
	- - Million board feet - -			
11.0" to 20.9" d.b.h.				
Scribner rule	889	825	35	29
International ¼-inch rule	1,029	957	40	32
21.0" to 30.9" d.b.h.				
Scribner rule	2,133	2,016	75	42
International ¼-inch rule	2,305	2,177	82	46
31.0" to 40.9" d.b.h.				
Scribner rule	1,195	1,163		32
International ¼-inch rule	1,267	1,233		34
41.0" d.b.h. and larger				
Scribner rule	39	39		
International ¼-inch rule	40	40		
All diameter classes				
Scribner rule	4,256	4,043	110	103
International ¼-inch rule	4,641	4,407	122	112

Table 10.—Net volume of all timber on commercial forest land by class of material and species group, 1953

Class of material	Total	Softwoods	Hardwoods
	Million cubic feet	Million cubic feet	Million cubic feet
Growing stock:			
Sawtimber trees:			
Sawlog portion	713	713	
Upper stem portion	54	54	
Total	767	767	
Poletimber trees	40	40	
Total growing stock	807	807	
Other material:			
Sound cull trees	*	*	
Rotten cull trees	2	2	
Salvable dead trees	28	28	
Total other material	30	30	
Total, all timber	837	837	—

* Less than 500 thousand.

Table 11.--Average annual timber cut from live sawtimber and growing stock on commercial forest land by species group for the period 1947-53 incl.

Species group	Live sawtimber						Growing stock		
	Timber products	Logging residues	Timber cut 1/	Timber products	Logging residues	Timber cut 1/	Timber products	Logging residues	Timber cut 1/
	Thousand board feet, log scale, Scribner rule			Thousand board feet, International ¼-inch rule			Thousand cubic feet		
Softwoods	33,436	1,846	35,282	36,441	2,012	38,453	5,716	690	6,406
Hardwoods 2/									
Total	33,436	1,846	35,282	36,441	2,012	38,453	5,716	690	6,406

1/ Total of timber products and logging residues. Timber products is the portion of the inventory volume removed from the forest; logging residues is the portion cut or killed in logging and not removed from the forest.

2/ Hardwood cut insignificant.

FOREST SURVEY PROCEDURE

The procedures used in the reinventory of Harney County were materially different from the procedures used in the initial inventory. This change in procedures accounts for some significant differences in both the forest-area and timber-volume statistics obtained. Therefore, a brief description of the procedures used in each inventory seems desirable.

Initial Inventory

The initial inventory of the county was conducted in 1935 by what was known as the "compilation method." In this method existing information on forest types, timber cruises, logging records, and other pertinent data, were collected from private timber owners and various public agencies. These data were checked in the field for reliability, and were adjusted to the then existing specifications and standards of Forest Survey. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance.

All land in the county was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and in case of young growth, by stocking class. All such types and classes were mapped in place on 1-inch-to-the-mile base maps of each forested township. These township type maps were then superimposed over current ownership-status plats and dot counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were traced to a base map of the county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest-productive capacity.

In-place, timber-volume estimates were based on existing cruises collected and adjusted to the Forest Survey standard, on field samples, and on ocular estimates. Cruises made by commercial cruisers were obtained for practically all of the privately owned timber; some of these cruises had been made for the county and some for private timber owners. Forest Service cruises were available for nearly all of the sawtimber on national forest lands. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory do not permit a determination of accuracy of estimate.

Reinventory

As part of the reinventory in 1953 a completely new forest type map of the county's commercial forest zone was made. It was based

largely on an existing forest type map, based on type interpretation and mapping on aerial photos, and made cooperatively in 1949 by the Forest Service and Edward Hines Lumber Company as part of an extensive survey of the forests in this county and in a portion of Grant County to the north. Type classifications and delineations on the 1949 map were adjusted, where necessary, to bring them up to date; they were also generalized to Forest Survey specifications. The adjustment was made through interpretation and mapping on aerial photos and through field inspection. The types, stand-size classes, and stocking classes in the reinventory were similar to those recognized in the initial inventory. The new type map was prepared by tracing the type delineations on the adjusted 1949 type map to a 2-inch county planimetric base map. It was then superimposed over the current ownership status map and a dot count made of forest type areas by ownership class.

Estimates of net volumes of live sawtimber, growing stock, sound cull, and salvable-dead material were calculated by applying average per-acre volumes to the appropriate forest-type acreages. The per-acre volumes for sawtimber and poletimber stands were obtained through a sampling procedure in which the stands were measured on randomly selected plots. Per-acre volumes of sawtimber and poletimber trees in seedling and sapling stands and on nonstocked areas were based on empirical estimates. In the random selection of samples each individual sawtimber or poletimber stand in the county had an equal chance of being selected. A sample consisted of a series of three one-fifth-acre circular plots spaced at 6-chain intervals. Intensity of the sampling was designed to produce a total estimated volume with a specified sampling accuracy.

ACCURACY OF REINVENTORY DATA

Forest Area

In the reinventory of the county, in-place mapping of the forests and their classification by forest type, stand-size class, or condition class, were on the basis of 100-percent coverage. Thus no error due to sampling was involved. Errors due to techniques or judgment in the field and in office computation of data were possible, but difficult to evaluate. Throughout all phases of the work close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

Timber Volume

The probabilities are about 19 out of 20 that the actual board-foot volume of live sawtimber, if measured by a 100-percent tree cruise, would be within plus or minus 17.1 percent of the estimated total of 4,256 million board feet, log scale, Scribner rule. On this basis the actual volume would be somewhere between 3,528 and 4,984 million board feet. The same probabilities exist for the estimated cubic feet of

growing stock with a range of plus or minus 15.1 percent. The volume estimates by species, stand-size class, or other subdivision, have greater sampling errors than the county totals because smaller volumes are involved.

DIFFERENCE IN RESULTS OF INVENTORIES

Some of the differences in forest-type and timber-volume statistics resulting from the 1935 and 1953 inventories are due to actual physical change. Other differences are due to variations in procedures used, in interpretation and classification of forest conditions, and in standards of utilization. Because of these differences direct comparison of the statistics is not possible.

Forest Area

Forest-area statistics resulting from the two inventories are shown in the following table:

Inventory	Total forest land	Commercial forest land						Noncommercial forest land
		Total	Sawtimber		Pole-timber	Seedlings and saplings	Nonstocked area	
			Uncut	Selectively cut				
	Thousands of acres							
1935	631	444	391	10	12	29	2	187
1953	631	411	278	62	53	16	2	220

The area classed as forest land was the same in the two inventories—631 thousand acres. However, there was a difference in the classification of some of the forest land as to forest type and commercial quality. In 1935 areas of marginal forest land, sparsely stocked with ponderosa pine and an understory of western juniper, were mapped as pine types and classed as commercial forest land. In 1953 some of these areas, where probably the pine had been either cut or killed by forest insects during the interval between inventories, were mapped as western juniper woodland and classed as noncommercial forest land. Also, 6 thousand acres of poor-form quaking aspen on Steens Mountain, classed as commercial forest land in 1935, was classed as noncommercial in 1953.

The total area of western juniper mapped as noncommercial forest land was 27 thousand acres larger in 1953 than in 1935. This acreage plus the 6 thousand acres of aspen which was reclassified in 1953, increased the noncommercial area by 33 thousand acres. An equal offsetting decrease occurred in the commercial forest land area.

Differences in the respective acreages of the various stand-size classes may be attributed to selective logging operations of varying

intensity of cut, to the ingrowth of the young stands--poletimber, and seedling and sapling--into the next older stand-size class, and to variations in forest type classifications and in mapping procedures. Some sawtimber stands cut under heavy selection, which removed nearly all of the trees of sawtimber size, moved to a seedling and sapling or poletimber class, depending on the size of the advance growth of young timber. Other sawtimber stands cut under light selection, with a resulting residual stand of sawtimber trees, satisfying the minimum requirements of 1,500 board feet per acre, moved into the selectively cut sawtimber class.

Timber Volume

The respective estimates of total sawtimber volume, by species group, obtained in the two inventories, are shown in the tabulation below:

Inventory	Live sawtimber volume		
	All species	Ponderosa pine	Other species 1/
	Million board feet, log scale, Scribner rule		
Initial, 1935	3,073	3,001	72
Reinventory, 1953	4,256	4,043	213

1/ Includes Douglas-fir, white fir, and western larch.

It is probable that several factors influenced the two respective estimates of timber volumes in the county. Possibly the factor of greatest influence was the variation, between inventories, in the procedures used and in the specifications upon which the two estimates were based. The 1935 estimate was based on county cruises covering the privately owned timber adjusted to the then current Forest Survey standards; on Forest Service cruises covering national-forest land; and on field ocular appraisals of timber volume on the uncruised sawtimber areas. The 1953 estimate was based on a sampling procedure in which volume data were obtained on randomly selected plots, as described on page 15.

The influence of difference in procedures cannot be closely evaluated. The 1953 volume estimate has a calculated sampling error (see page 15 under "Accuracy of Reinventory Data, Timber Volume"). However, no statistical evaluation of the accuracy of the 1935 estimate can be made. Technique errors, likewise not subject to evaluation, may have affected either one or both of the estimates.

A second factor was the difference in standards of utilization between inventories. The standards were materially intensified in the 1953 inventory in order to account for the more complete utilization of timber of all species during recent years. This intensification was accomplished by: (1) using volume tables in 1953 that gave a considerably

greater volume for a tree of a given size than did the tables used during the 1920's in making the cruises upon which the 1935 estimate was largely based; (2) the minimum top diameter of merchantable length of a sawtimber tree was lowered, resulting in an average of from one-half to one 16-foot log more per tree; and (3) the minimum requirement of net sound volume of a sawtimber tree was reduced from 33-1/3 to 25 percent of gross volume.

Another factor, one that increased the board-foot volume of sawtimber during the 18 years between inventories, was forest growth—net growth in sawtimber trees and the ingrowth of poletimber trees into the sawtimber class.

An offsetting factor, one that reduced the sawtimber inventory since 1935, was drain due to timber cutting and to the various natural depleting agencies, such as forest insects, diseases, windthrow, and fire. Prior to 1947 the volume of timber cut annually was very small, averaging about three-fourths of a million board feet; since then the cut has averaged about 35 million board feet.

Because of the influence of these, and possibly other, factors the two estimates are not on a comparable basis and do not reflect a trend in the county's total volume of sawtimber.

DEFINITION OF TERMS USED

Land Area

Total Land

Includes dry land and unmeandered water surface.

Forest Land

Includes (a) land which is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10-percent stocking and which has not been developed for other use. Minimum area of forest land recognized in reinventory of the county was 10 acres.

Nonforest Land

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the county was 10 acres.

Forest Land Classes

Commercial Forest Land

Forest land which is producing, or is physically capable of producing, usable crops of wood, economically available now or prospectively, and not withdrawn from timber utilization.

Noncommercial Forest Land

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land and (b) incapable of yielding usable wood products (usually sawtimber) because of the adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

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

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Forest Types

Forest Type

A forest stand characterized by the predominance of certain key species--in terms of cubic volume for sawtimber and poletimber stands, and in number of trees for seedling and sapling stands--or a forest condition such as nonstocked cutover or burned-over land. In classifying forest land by type the minimum area recognized was 40 acres. The major forest types listed in table 3 are of the following composition:

Ponderosa pine. Stands comprised of 20 percent or more of ponderosa pine by cubic volume or number of trees.

Douglas-fir. Stands comprised of 50 percent or more of Douglas-fir by cubic volume or number of trees.

Fir-spruce. Stands comprised of 50 percent or more of one or more of the true firs (Abies spp.), Engelmann spruce, or mountain hemlock by cubic volume or number of trees. In this county this type is composed of white fir (Abies concolor) with Douglas-fir as a minor associate over a portion of the type's area.

Nonstocked areas. Cutover or burned-over areas on which the restocking, if any, is less than 10 percent density and which does not support a residual stand meeting minimum sawtimber requirements. In Harney County this type is all burned-over land.

Tree Classes

Sawtimber Tree

Softwood or hardwood tree 11.0 inches d.b.h. or larger containing at least one 16-foot log to a variable top diameter inside bark approximating 40 percent of diameter breast height, but never less than 8 inches, and in which 25 percent or more of the gross board-foot volume is free from rot and defect.

Poletimber Tree

Softwood or hardwood tree 5.0 to 10.9 inches d.b.h. in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable, now or prospectively, because of defect or rot.

Sound cull tree. Live tree of sawtimber or poletimber size which contains 25 percent or more of sound volume but will not make at least one merchantable log, now or prospectively, because of roughness or poor form.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing dead or down tree which contains 25 percent or more of sound volume and at least one merchantable log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum net volume of 1,500 board feet, log scale, Scribner rule.

Large sawtimber stand. Stand in which the majority of the volume is in trees more than 21.0" d.b.h.

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

Poletimber Stand

Stand failing to meet sawtimber-stand specifications but of at least 10-percent stocking of trees 5.0 inches d.b.h. and larger, with at least one-half the minimum stocking in poletimber trees (5.0 inches to 10.9 inches d.b.h.).

Seedling and Sapling Stand

Stand not qualifying as either sawtimber or poletimber stand but having at least 10-percent stocking of trees and with at least one-half the minimum stocking in seedlings and saplings (0-inch to 4.9 inches d.b.h.).

Uncut Sawtimber Stand

Stand that is essentially undisturbed by cutting.

Selectively Cut Sawtimber Stand

Stand in which a partial harvest has been made, and in which the residual volume amounts to 1,500 board feet per acre or more.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees:

Scribner rule. The common board-foot rule used in determining log-scale volume of sawtimber in this region. This rule underestimates, particularly in case of timber of the smaller diameters, the volume of lumber that could be produced from the timber.

International $\frac{1}{4}$-inch rule. The standard board-foot rule adopted by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

Sawtimber Volume

Net volume in board feet of live and salvable dead sawtimber trees to a merchantable top.

All-Timber Volume

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

Tree Species

Tree species commonly found in Harney County include:

Softwoods:

Ponderosa pine (Pinus ponderosa)
Lodgepole pine (Pinus contorta)
Douglas-fir (Pseudotsuga menziesii)
White fir (Abies concolor)
Western larch (Larix occidentalis)
Western juniper (Juniperus occidentalis)

Hardwoods:

Quaking aspen (Populus tremuloides)

Western juniper and quaking aspen are not considered of commercial quality in this county.

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The net cubic-foot volume of growing stock cut or killed by logging on commercial forest land and not converted to timber products.

Accuracy of Data

Sampling Error

A measure of the reliability of timber volume estimates based on the variability shown by sample measurements of the volume.