

FOREST STATISTICS
OF
CENTRAL AND NORTHERN INDIANA



CENTRAL STATES
FOREST EXPERIMENT STATION
Columbus 15, Ohio
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FOREST STATISTICS OF CENTRAL AND NORTHERN INDIANA

By

THE FOREST SURVEY ORGANIZATION

of the

CENTRAL STATES FOREST EXPERIMENT STATION

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FOREWORD

The Forest Survey is a Nation-wide activity of the Forest Service. The fivefold purpose of the Forest Survey is (1) to make a field inventory of the present supply of standing timber; (2) to find out how fast this supply is being increased through growth; (3) to find out how fast it is being diminished through industrial and domestic uses, windfall, fire, disease, and other causes; (4) to determine the present consumption and the probable future trend in requirements for forest products; and (5) to interpret and correlate these findings with existing and anticipated economic conditions, as an aid in formulating both private and public policies for use of land suitable for forest production.

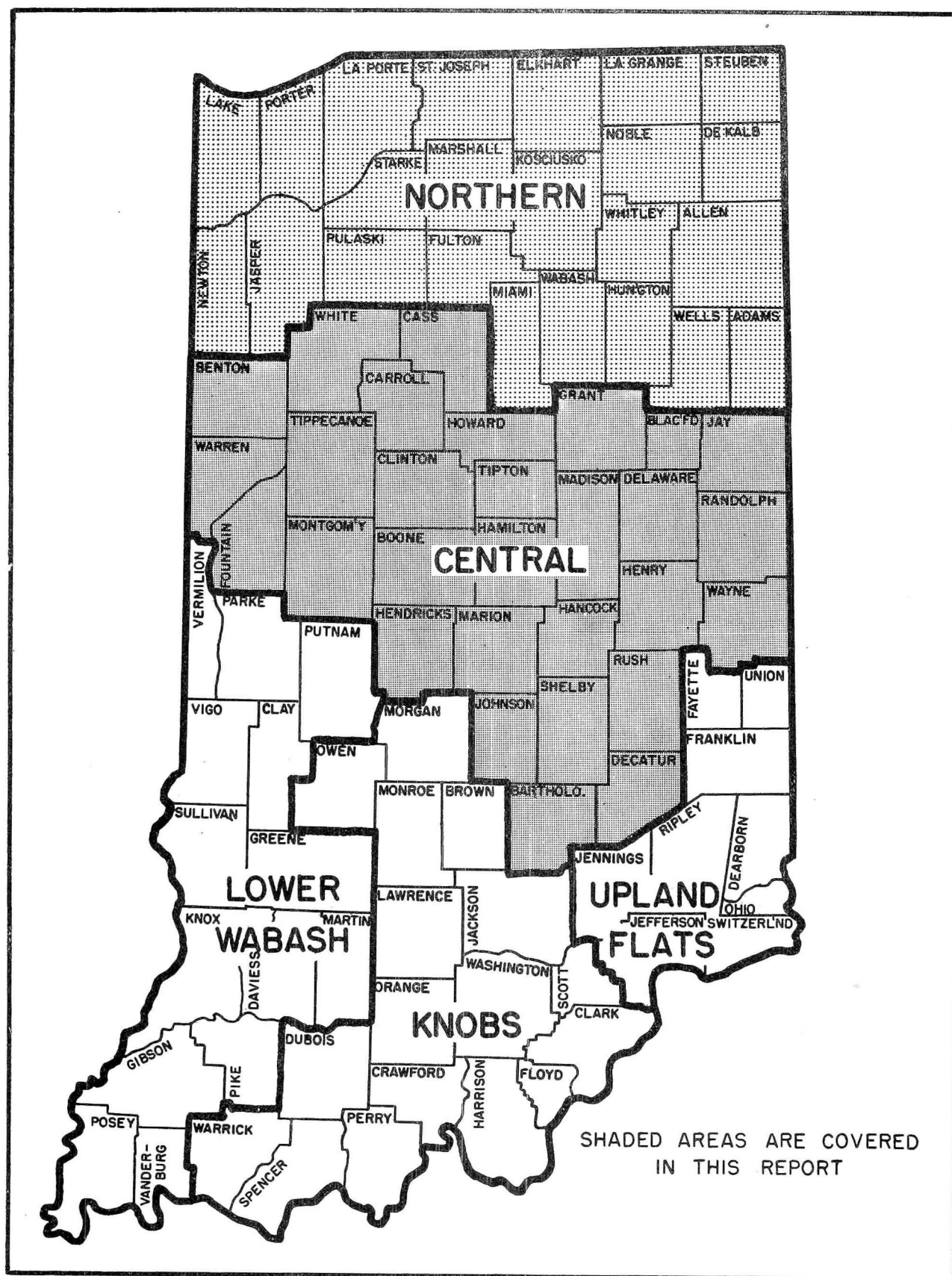
The Forest Survey is conducted in the various regions by the forest experiment stations of the Forest Service. In Indiana the project is directed by the Central States Forest Experiment Station with headquarters in Columbus, Ohio.

This Survey Release presents the more significant preliminary statistics on the forest area and timber volume for Central and Northern Indiana. A similar report was published for the three regions of Southern Indiana in October 1951. A single statistical release for the State, including growth and drain estimates, is being prepared. Later, an analytical report for the State will be published which will interpret statistics on forest area, timber volume, growth, and drain in the light of existing and anticipated economic conditions.

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SHADED AREAS ARE COVERED
IN THIS REPORT

LOCATION OF FOREST SURVEY REGIONS IN INDIANA

SIGNIFICANT FOREST AREA AND TIMBER VOLUME STATISTICS

FOR CENTRAL AND NORTHERN INDIANA

In this report the forest statistics for the Central and Northern Regions of Indiana are shown separately. Regional boundaries were established for the purpose of grouping counties that have similar forest, soil, and economic conditions. A brief description of each Region follows.

Central Indiana.--From the Shelbyville moraine to the northern bend of the Wabash River, Central Indiana is an almost featureless plain. The fertile soils and level topography have fostered highly productive farms, good roads, and prosperous towns and cities. Manufacturing and farming are the important activities. The residual stands of timber are small and scattered; woodland grazing is gradually converting many of them to pasture. Plantings have been made for windbreaks, fence posts, and other purposes, but timber production is a very minor use of the land.

Northern Indiana.--North from Peru and Logansport the soils and topography of Indiana are more varied. Lakes dot the countryside, especially in the northeast, a well-developed resort area. Here the remaining maple-beech forest still provides high-quality timber for local mills. Westward, the oak-hickory type is more prevalent, with swamp species appearing on poorly drained areas. Muck land, producing fine truck crops, is intermingled with blow-sand areas that will barely support the hardiest conifers. On the western border a treeless prairie begins which continues into Illinois.

The total land area of Central and Northern Indiana is 13.6 million acres, of which 1.2 million acres or 9 percent is forested.^{1/} On the average the Northern Region is 10 percent forested, the Central Region 7 percent. No definite geographical pattern of forest land distribution is evident, and the forested tracts are numerous but small in size. Benton County, with only 1 percent of its area forested, has the lowest proportion of forest land, while Starke County has the greatest with 17 percent.

Ninety-eight percent of the forest land is privately owned. State forests and parks and a few Federal institutions account for nearly all of the remaining 2 percent. Practically all of the forest land can be classified as commercial; only 11 thousand acres are reserved public lands on which timber cutting is not allowed. This area is entirely in state parks, military reservations, and similar areas. Virtually no forest area is noncommercial because of poor timber growing conditions.

^{1/} For a definition of forest land, see page 26.

The oak-hickory and mixed hardwood forest types occur on approximately 80 percent of the commercial forest area of the two Regions. The lowland hardwood type along the watercourses make up 10 percent; the remainder is in the maple-beech and pin-oak flats types.

Stands in which trees of saw-timber size predominate make up two-thirds of the commercial forest area. Pole-timber stands occupy about 22 percent, and seedling and sapling stands account for nearly all of the remaining 11 percent.

The total volume of saw timber in Central and Northern Indiana is 4.6 billion board feet. This volume is fairly evenly divided between the two Regions; 2.1 billion board feet in the Central Region and 2.5 in the Northern Region. The oaks make up about 35 percent of the total volume. Elm with 18 percent and sugar maple with 11 percent are also important from the standpoint of volume. Practically all of the saw-timber volume occurs in stands classified as saw timber. Forty-four percent of the saw-timber volume is found in trees 19 inches d.b.h. and larger, and 10 percent is in trees 27 inches d.b.h. and larger.

This estimate of saw-timber volume is somewhat higher than previous estimates. Some of this difference may be due to changes in the definitions of forest land and merchantable volume employed, and some difference is undoubtedly due to the greater intensity of the Forest Survey. The actual change in timber volume occurring within the past 10 years probably is of minor importance.

The proportion of saw-timber volume in high-quality logs is rather low. Only 18 percent of the volume is in grade 1 and 2 logs, which provide the defect-free material required by the veneer, furniture, and cooperage industries. The proportion in high-quality logs is particularly low in view of the fact that three-fourths of the saw-timber volume is in trees 15 inches d.b.h. and larger, trees that are large enough to contain grade 1 and 2 material. The general low quality of the merchantable saw timber is partly due to the practice of cutting only the best trees in the stand and leaving the lower-quality trees. In many stands that have not recently been cut prolonged grazing has largely eliminated reproduction, resulting in stands of low average density containing many limby, poorly formed trees.

The volume of the growing stock (including the present and potentially merchantable volume in saw-timber and pole-timber trees) is 0.9 billion cubic feet. Of this, 0.7 billion is in saw-timber trees and 0.2 billion in pole-timber trees. In addition to the growing stock, 0.5 billion cubic feet is in the limbs of saw-timber trees and in the sound portion of cull trees and trees of noncommercial species.

The average volume of saw timber per acre on all commercial forest land in Central and Northern Indiana is 3,952 board feet. The Central Region with 4,165 board feet has a higher average volume per acre than the Northern Region with 3,785 board feet. Large saw-timber stands averaged 6,247 board feet per acre, and small saw-timber stands averaged 3,206 board feet per acre.

The average volume per acre of growing stock on commercial forest land was 790 cubic feet.

CENTRAL REGION

CENTRAL REGION

Table 1.--Forest and nonforest area by county, 1950

County	: Total land area ^{1/}	:	Forest area	:	Nonforest area
	<u>Thousand acres</u>		<u>Thousand acres</u> <u>Percent</u>		<u>Thousand acres</u> <u>Percent</u>
Bartholomew	257		35 14		222 86
Benton	262		2 1		260 99
Blackford	107		8 7		99 93
Boone	273		15 5		258 95
Carroll	239		16 7		223 93
Cass	266		29 11		237 89
Clinton	260		11 4		249 96
Decatur	237		22 9		215 91
Delaware	256		17 7		239 93
Fountain	254		29 11		225 89
Grant	269		18 7		251 93
Hamilton	258		21 8		237 92
Hancock	195		15 8		180 92
Hendricks	267		17 6		250 94
Henry	256		19 7		237 93
Howard	188		11 6		177 94
Jay	247		17 7		230 93
Johnson	202		17 8		185 92
Madison	290		15 5		275 95
Marion	257		22 9		235 91
Montgomery	324		25 8		299 92
Randolph	292		20 7		272 93
Rush	262		11 4		251 96
Shelby	262		16 6		246 94
Tippecanoe	321		21 7		300 93
Tipton	167		10 6		157 94
Warren	236		19 8		217 92
Wayne	259		23 9		236 91
White	318		16 5		302 95
All counties	7,281		517 7		6,764 93

^{1/} Source: Area of the United States 1950, U. S. Bureau of the Census.

CENTRAL REGION

Table 2.--Commercial forest area by ownership class, 1950

Ownership class	Commercial forest area ^{1/}	
	<u>Thousand acres</u>	<u>Percent</u>
Federal:		
National forest	0	0.0
Other	11	2.1
Total	11	2.1
State	(2/)	--
County and municipal	1	.2
Private	503	97.7
All ownerships	515	100.0

- ^{1/} Does not include 2,000 acres of forest land in state ownership which are reserved from commercial timber use.
- ^{2/} Less than 500 acres.

CENTRAL REGION

Table 3.--Commercial forest area by forest type
and stand-size class, 1950

Forest type	Total	: Large: : saw- :timber: :stands:	Small: : saw- :timber: :stands:	Pole- :timber: :stands:	Seedling: : and : sapling: : stands:	Nonstocked : and : other : areas	
	<u>Thousand acres</u>	<u>Per-</u>	- - - - -	<u>Thousand acres</u>	- - - - -	- - - - -	
Oak-hickory	128	24.9	64	26	19	19	-
Maple-beech	29	5.6	24	5	-	-	-
Mixed hardwoods	322	62.5	196	41	67	12	6
Lowland hardwoods	36	7.0	22	2	9	-	3
All types	515		306	74	95	31	9
Percent		100.0	59.5	14.4	18.4	6.0	1.7

CENTRAL REGION

Table 4.--Saw-timber volume on commercial forest area
by species and stand-size class, 1950

Species	Total	Large saw- timber stands	Small saw- timber stands	Pole- timber stands	Seedling and sapling stands ^{1/}	
	<u>Million bd. ft.</u>	<u>Percent</u>	- - -	<u>Million board feet-</u>	- -	
White oak	200	9.3	166	28	6	-
Post oak group	153	7.1	138	9	1	5
Black oak	78	3.6	60	16	2	-
Northern red oak	168	7.8	159	8	1	-
Other red oaks	44	2.1	31	9	-	4
Hickory	145	6.8	122	17	4	2
Elm	318	14.8	271	34	10	3
Soft maple	90	4.2	89	1	-	-
Sugar maple	221	10.3	193	28	-	-
Sycamore	114	5.3	102	2	7	3
Ash	178	8.3	126	31	4	17
Yellow-poplar	58	2.7	48	10	-	-
Cottonwood	39	1.8	36	3	-	-
Basswood	34	1.6	28	6	-	-
Beech	128	6.0	128	-	-	-
Black walnut	66	3.1	45	15	6	-
Other hardwoods	111	5.2	81	16	11	3
All species	2,145		1,823	233	52	37
Percent		100.0	85.0	10.9	2.4	1.7

^{1/} Includes the volume on nonstocked and other areas.

CENTRAL REGION

Table 5.--Saw-timber volume on commercial forest area
by species and tree-diameter class, 1950

Species	Total	12-14 inches	16-18 inches	20-22 inches	24-26 inches	28-30 inches	32 inches and larger
- - - - - Million board feet - - - - -							
White oak	200	52	45	55	13	16	19
Post oak group	153	13	30	22	31	34	23
Black oak	78	17	25	6	26	4	-
Northern red oak	168	18	37	36	36	25	16
Other red oaks	44	15	2	3	5	15	4
Hickory	145	58	48	20	4	-	15
Elm	318	92	94	59	44	-	29
Soft maple	90	14	24	31	15	6	-
Sugar maple	221	57	73	63	15	9	4
Sycamore	114	18	44	24	12	3	13
Ash	178	59	54	17	36	12	-
Yellow-poplar	58	15	17	26	-	-	-
Cottonwood	39	2	5	8	8	6	10
Basswood	34	6	16	12	-	-	-
Beech	128	15	40	42	31	-	-
Black walnut	66	25	32	9	-	-	-
Other hardwoods	111	47	40	12	12	-	-
All species	2,145	523	626	445	288	130	133
Percent	100.0	24.4	29.2	20.7	13.4	6.1	6.2

Table 6.--Hardwood saw-timber volume by species group and
percentage distribution in log grades, 1950

Species group	Volume	Log grade 1	Log grade 2	Log grade 3
	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>		
White oaks ^{1/}	353	7.4	8.2	84.4
Red oaks ^{2/}	290	7.2	12.1	80.7
Other hardwoods	1,502	5.1	9.7	85.2
All hardwoods	2,145	5.7	9.8	84.5

^{1/} Includes white oak, chestnut oak, and post oak group.

^{2/} Includes black oak, northern red oak, and other red oaks.

CENTRAL REGION

Table 7.--Total cubic volume of sound material on commercial forest area by species and class of material, 1950

Species	:	:	Growing stock				:	Cull trees ^{3/}
	Total:	Total:	Sawlog:	Tops ^{1/} :	Pole:	Limbs ^{2/} :		
	:	:	portion:	:	trees:	:		
- - - - - Million cubic feet - - - - -								
Softwoods ^{4/}	--	--	--	--	--	--	--	
White oak	53.6	36.8	30.0	0.6	6.2	15.7	1.1	
Post oak group	37.4	25.2	22.4	.2	2.6	11.7	.5	
Black oak	22.5	14.1	11.7	.2	2.2	6.1	2.3	
Northern red oak	42.6	25.7	24.5	.2	1.0	12.8	4.1	
Other red oaks	14.9	9.1	6.6	.2	2.3	3.5	2.3	
Hickory	46.8	33.9	22.0	.6	11.3	11.5	1.4	
Elm	106.8	66.8	47.9	.9	18.0	25.1	14.9	
Soft maple	35.7	16.0	13.6	.2	2.2	7.1	12.6	
Sugar maple	69.2	39.8	33.1	.1	6.6	17.3	12.1	
Sycamore	31.1	19.1	16.8	.5	1.8	8.8	3.2	
Ash	60.2	43.0	27.4	.7	14.9	14.3	2.9	
Yellow-poplar	16.0	11.1	8.7	.3	2.1	4.5	.4	
Cottonwood	11.3	5.8	5.6	.1	.1	3.0	2.5	
Basswood	12.6	7.6	5.2	.1	2.3	2.7	2.3	
Beech	55.4	19.6	18.6	.1	.9	9.7	26.1	
Black walnut	21.8	15.5	10.2	.3	5.0	5.4	.9	
Other hardwoods	45.6	32.3	17.2	.8	14.3	9.0	4.3	
Noncommercial species	3.4	--	--	--	--	--	3.4	
All species	686.9	421.4	321.5	6.1	93.8	168.2	97.3	
Percent	100.0	61.3	46.8	0.9	13.6	24.5	14.2	

^{1/} Includes only the portion of the upper stem capable of growing into saw-timber size and quality.

^{2/} Of merchantable hardwood saw-timber trees.

^{3/} Including tops and limbs of cull trees.

^{4/} Less than 0.05 million cubic feet.

CENTRAL REGION

Table 8.--Cubic volume of growing stock on commercial forest area
by species and stand-size class, 1950

Species	Total	Large : saw- timber: stands	Small : saw- timber: stands	Pole- timber: stands	Seedling and sapling stands ^{1/}
	<u>Million cu. ft.</u>	<u>Percent</u>	- - -	<u>Million cubic feet-</u>	- - -
Softwoods ^{2/}	--	--	--	--	--
White oak	36.8	8.7	26.7	8.9	1.2
Post oak group	25.2	6.0	21.7	2.0	.7
Black oak	14.1	3.3	9.7	3.5	.9
Northern red oak	25.7	6.1	23.9	1.6	.2
Other red oaks	9.1	2.2	5.2	2.5	.8
Hickory	33.9	8.0	23.1	5.5	4.9
Elm	66.8	15.9	52.8	8.3	5.2
Soft maple	16.0	3.8	14.6	1.2	.2
Sugar maple	39.8	9.4	32.7	6.7	.4
Sycamore	19.1	4.5	16.7	.4	1.4
Ash	43.0	10.2	27.6	9.6	3.4
Yellow-poplar	11.1	2.6	9.0	1.9	.2
Cottonwood	5.8	1.4	5.2	.6	--
Basswood	7.6	1.8	5.7	1.2	.7
Beech	19.6	4.7	19.2	.4	--
Black walnut	15.5	3.7	9.2	3.3	3.0
Other hardwoods	32.3	7.7	17.8	6.9	6.9
All species	421.4		320.8	64.5	30.1
Percent		100.0	76.1	15.3	7.2

^{1/} Includes the volume on nonstocked and other areas.

^{2/} Less than 0.05 million cubic feet.

CENTRAL REGION

Table 9.--Cubic volume of growing stock on commercial forest area
by stand-size class and tree-diameter class, 1950

Stand-size class	Total	6-8 inches	10 inches	12-14 inches	16-18 inches	20-22 inches	24-26 inches	28 inches and larger
----- Million cubic feet -----								
Large saw-timber stands	320.8	24.0	22.0	54.8	84.2	62.4	37.8	35.6
Small saw-timber stands	64.5	12.1	13.7	28.5	7.6	2.2	.4	--
Pole-timber stands	30.1	15.3	6.2	4.9	1.9	.4	.6	.8
Seedling and sapling stands ^{1/}	6.0	.4	.1	.9	1.0	--	2.7	.9
All classes	421.4	51.8	42.0	89.1	94.7	65.0	41.5	37.3
Percent	100.0	12.3	10.0	21.1	22.5	15.4	9.8	8.9

^{1/} Includes volume on nonstocked and other areas.

CENTRAL REGION

Table 10.--Average volume per acre by stand-size class, 1950

Stand-size class	Average volume per acre	
	Board feet	Cubic feet ^{1/}
Large saw-timber stands	5,958	1,048.4
Small saw-timber stands	3,149	871.6
Pole-timber stands	547	316.8
Seedling and sapling stands ^{2/}	925	150.0
All classes	4,165	818.3

^{1/} Growing stock only.

^{2/} Includes the volume on nonstocked and other areas.

NORTHERN REGION

NORTHERN REGION

Table 1.--Forest and nonforest area by county, 1950

County	: Total land area ^{1/}	:	Forest area	:	Nonforest area
	<u>Thousand acres</u>		<u>Thousand acres</u> <u>Percent</u>		<u>Thousand acres</u> <u>Percent</u>
Adams	221	20	9	201	91
Allen	429	43	10	386	90
DeKalb	234	29	12	205	88
Elkhart	300	28	9	272	91
Fulton	235	17	7	218	93
Huntington	250	23	9	227	91
Jasper	360	48	13	312	87
Kosciusko	344	39	11	305	89
Lagrange	243	27	11	216	89
Lake	329	30	9	299	91
LaPorte	389	35	9	354	91
Marshall	284	28	10	256	90
Miami	243	24	10	219	90
Newton	264	27	10	237	90
Noble	262	29	11	233	89
Porter	272	33	12	239	88
Pulaski	277	32	12	245	88
St. Joseph	299	28	9	271	91
Starke	199	34	17	165	83
Steuben	198	21	11	177	89
Wabash	269	25	9	244	91
Wells	236	17	7	219	93
Whitley	215	28	13	187	87
All counties	6,352	665	10	5,687	90

^{1/} Source: Area of the United States 1950, U. S. Bureau of the Census.

NORTHERN REGION

Table 2.--Commercial forest area by ownership class, 1950

Ownership class	Commercial forest area ^{1/}	
	<u>Thousand acres</u>	<u>Percent</u>
Federal:		
National forest	0	0.0
Other	(<u>2/</u>)	--
Total	(<u>2/</u>)	0.0
State	14	2.1
County and municipal	(<u>2/</u>)	--
Private	<u>642</u>	<u>97.9</u>
All ownerships	656	100.0

^{1/} Does not include 9,000 acres of forest land reserved from commercial timber use, of which 2,000 acres are in Federal ownership, 6,000 acres in State, and 1,000 acres in county and municipal ownership.

^{2/} Less than 500 acres.

NORTHERN REGION

Table 3.--Commercial forest area by forest type
and stand-size class, 1950

Forest type	Total	: Large:	Small:	: Pole-:	Seedling:	Nonstocked	
		: saw-:	: saw-:	timber:	and :	and	
		: timber:	: timber:	stands:	sapling:	other	
		: stands:	: stands:	stands:	stands :	areas	
	<u>Thousand</u>	<u>Per-</u>	- - - - -	<u>Thousand</u>	<u>acres</u>	- - - - -	
	<u>acres</u>						
Oak-hickory	242	36.9	113	32	81	14	2
Maple-beech	45	6.9	41	2	-	-	2
Mixed							
hardwoods	267	40.7	138	16	64	49	-
Pin-oak flats	16	2.4	9	3	4	-	-
Lowland							
hardwoods	86	13.1	41	4	18	23	-
All types	656		342	57	167	86	4
Percent		100.0	52.1	8.7	25.5	13.1	0.6

NORTHERN REGION

Table 4.--Saw-timber volume on commercial forest area
by species and stand-size class, 1950

Species	Total	Large saw- timber stands	Small saw- timber stands	Pole- timber stands	Seedling and sapling stands ^{1/}
	Million bd. ft.	Percent	- - -Million board feet- - -		
White oak	203	8.2	161	38	4
Post oak group	98	3.9	94	1	3
Black oak	370	14.9	287	65	16
Northern red oak	194	7.8	189	5	-
Other red oaks	94	3.8	78	13	2
Hickory	97	3.9	79	16	2
Elm	510	20.5	470	23	17
Soft maple	151	6.1	140	1	10
Sugar maple	282	11.4	279	3	-
Sycamore	48	1.9	47	1	-
Ash	84	3.4	79	4	1
Cottonwood	46	1.9	46	-	-
Basswood	67	2.7	65	-	2
Beech	135	5.4	135	-	-
Black walnut	23	.9	18	4	1
Other hardwoods	81	3.3	58	13	10
All species	2,483		2,225	187	68
Percent		100.0	89.6	7.5	2.8
					0.1

^{1/} Includes the volume on nonstocked and other areas.

^{2/} Less than 0.5 million board feet.

NORTHERN REGION

Table 5.--Saw-timber volume on commercial forest area
by species and tree-diameter class, 1950

Species	:Total:	: 12-14:	: 16-18:	: 20-22:	: 24-26:	: 28-30:	: 32 inches
	:	: inches:	: inches:	: inches:	: inches:	: inches:	: and
	:	:	:	:	:	:	: larger
- - - - - Million board feet - - - - -							
White oak	203	72	69	35	23	4	-
Post oak group	98	19	33	24	15	7	-
Black oak	370	130	134	63	33	10	-
Northern red oak	194	47	77	33	21	8	8
Other red oaks	94	20	27	15	22	10	-
Hickory	97	49	30	8	-	-	10
Elm	510	98	127	122	108	36	19
Soft maple	151	19	41	37	40	2	12
Sugar maple	282	68	111	60	22	3	18
Sycamore	48	10	22	11	-	5	-
Ash	84	44	30	7	3	-	-
Cottonwood	46	5	12	6	5	7	11
Basswood	67	18	15	11	17	6	-
Beech	135	14	58	30	33	-	-
Black walnut	23	6	11	6	-	-	-
Other hardwoods	81	34	22	12	4	-	9
All species	2,483	653	819	480	346	98	87
Percent	100.0	26.3	33.0	19.3	13.9	4.0	3.5

Table 6.--Hardwood saw-timber volume by species group and
percentage distribution in log grades, 1950

Species group	: Volume	: Log grade 1	: Log grade 2	: Log grade 3
	: Million	: - - - - -	: Percent	: - - - - -
	: bd. ft.			
White oaks ^{1/}	301	4.0	15.6	80.4
Red oaks ^{2/}	658	6.8	8.4	84.8
Other hardwoods	1,524	7.3	14.4	78.3
All hardwoods	2,483	6.8	12.9	80.3

^{1/} Includes white oak and post oak group.

^{2/} Includes black oak, northern red oak, and other red oaks.

NORTHERN REGION

Table 7.--Total cubic volume of sound material on commercial forest area by species and class of material, 1950

Species	Growing stock						
	Total	Total	Sawlog: portion	Tops ^{1/}	Pole: trees	Limbs ^{2/}	Cull trees ^{3/}
- - - - - Million cubic feet - - - - -							
White oak	60.1	43.0	30.9	0.9	11.2	16.2	0.9
Post oak group	28.2	19.1	14.7	.3	4.1	7.7	1.4
Black oak	112.3	76.3	56.7	1.5	18.1	29.7	6.3
Northern red oak	51.0	33.2	28.9	.4	3.9	15.1	2.7
Other red oaks	36.5	24.6	14.2	.3	10.1	7.4	4.5
Hickory	34.6	26.1	14.8	.6	10.7	7.8	.7
Elm	142.5	96.2	75.9	1.0	19.3	39.7	6.6
Soft maple	54.5	28.1	22.9	.3	4.9	12.0	14.4
Sugar maple	74.1	47.6	42.3	.1	5.2	22.1	4.4
Sycamore	12.6	8.2	7.3	.2	.7	3.8	.6
Ash	31.6	23.1	13.2	.4	9.5	6.9	1.6
Cottonwood	11.0	7.4	6.9	.1	.4	3.6	(4/)
Basswood	20.2	11.4	10.1	.1	1.2	5.3	3.5
Beech	38.3	20.5	19.7	.1	.7	10.3	7.5
Black walnut	8.6	5.6	3.5	.1	2.0	1.8	1.2
Other hardwoods	45.4	33.1	12.4	.5	20.2	6.5	5.8
Noncommercial species	2.0	--	--	--	--	--	2.0
All species	763.5	503.5	374.4	6.9	122.2	195.9	64.1
Percent	100.0	65.9	49.0	0.9	16.0	25.7	8.4

^{1/} Includes only the portion of the upper stem capable of growing into saw-timber size and quality.

^{2/} Of merchantable hardwood saw-timber trees.

^{3/} Including tops and limbs of cull trees.

^{4/} Less than 0.05 million cubic feet.

NORTHERN REGION

Table 8.--Cubic volume of growing stock on commercial forest area
by species and stand-size class, 1950

Species	Total	Large : saw- timber: stands:	Small : saw- timber: stands:	Pole- timber: stands:	Seedling and sapling stands ^{1/}
	<u>Million</u> <u>cu. ft.</u>	<u>Percent</u>	- - -	<u>Million cubic feet-</u>	- - -
White oak	43.0	8.5	28.5	10.9	3.6 --
Post oak group	19.1	3.8	16.8	.2	2.1 --
Black oak	76.3	15.1	49.2	15.2	11.2 0.7
Northern red oak	33.2	6.6	30.3	1.3	1.5 .1
Other red oaks	24.6	4.9	12.5	3.9	8.1 .1
Hickory	26.1	5.2	19.5	3.0	3.2 .4
Elm	96.2	19.1	81.1	4.5	10.3 .3
Soft maple	28.1	5.6	23.5	.2	4.3 .1
Sugar maple	47.6	9.4	46.0	1.4	.2 --
Sycamore	8.2	1.6	8.0	.2	-- --
Ash	23.1	4.6	19.2	1.1	2.8 --
Cottonwood	7.4	1.5	7.4	--	-- --
Basswood	11.4	2.3	10.5	.4	.5 --
Beech	20.5	4.1	20.5	--	(2/) --
Black walnut	5.6	1.1	3.5	1.2	.9 --
Other hardwoods	33.1	6.6	15.2	5.6	12.3 --
All species	503.5		391.7	49.1	61.0 1.7
Percent		100.0	77.8	9.8	12.1 0.3

^{1/} Includes the volume on nonstocked and other areas.

^{2/} Less than 0.05 million cubic feet.

NORTHERN REGION

Table 9.--Cubic volume of growing stock on commercial forest area
by stand-size class and tree-diameter class, 1950

Stand-size class	Total	6-8 inches	10 inches	12-14 inches	16-18 inches	20-22 inches	24-26 inches	28 inches and larger
----- Million cubic feet -----								
Large saw-timber stands	391.7	25.0	28.1	78.7	115.4	69.3	49.4	25.8
Small saw-timber stands	49.1	8.2	10.1	23.2	6.1	.9	--	.6
Pole-timber stands	61.0	36.4	13.1	8.6	2.2	--	.7	--
Seedling and sapling stands ^{1/}	1.7	1.1	.2	.2	.2	--	--	--
All classes	503.5	70.7	51.5	110.7	123.9	70.2	50.1	26.4
Percent	100.0	14.0	10.2	22.0	24.6	13.9	10.0	5.3

^{1/} Includes the volume on nonstocked and other areas.

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Table 10.--Average volume per acre by stand-size class, 1950

Stand-size class	Average volume per acre	
	<u>Board feet</u>	<u>Cubic feet</u> ^{1/}
Large saw-timber stands	6,506	1,145.3
Small saw-timber stands	3,281	861.4
Pole-timber stands	407	365.3
Seedling and sapling stands ^{2/}	33	18.9
All classes	3,785	767.5

^{1/} Growing stock only.

^{2/} Includes the volume on nonstocked and other areas.

FOREST SURVEY PROCEDURE

The inventory of the forest resources of Central and Northern Indiana was made during the period November 1949 to December 1950. The sampling procedure used involved an office study of aerial photographs and a field examination of randomly selected forest and nonforest plots.

The proportion of forest land in each county was obtained by placing a transparent template marked with uniformly spaced dots over aerial photographs and by counting the number of dots falling on forest and nonforest areas. The percentage of forest dots in a county, multiplied by the total area gave a preliminary estimate of the forest area. This was later adjusted after field examination indicated the number of plots that had changed from forest to nonforest since the aerial photos were taken and vice versa.

The locations of a selected number of dots falling on forest land were marked on the photographs. The acre surrounding each marked dot was examined under stereoscope and was classified by stand-size class on the basis of the height, crown width, and number of trees on the plot. Plots to be examined in the field were randomly drawn from those classified under stereoscope. In making this selection, the greatest weight was given to the stand-size classes containing the largest timber volume. In addition, several nonforest plots were selected for field examination to measure the movement of open land to forest since the photographs were taken.

The locations of the selected field plots were marked on the photographs, which were then sent to the field. Crews of two men each located these points on the ground. On forest land a 1/5-acre circular plot was established for which species, size, quality, and growth of trees were recorded.

The following tabulation gives the number of dots and plots examined for each of the two regions.

	<u>Central Region</u>	<u>Northern Region</u>
Number of photo dots counted for forest-area determination	62,394	52,813
Number of plots stereoscopically examined on photos	1,889	1,880
Number of forest plots field examined	269	289
Number of nonforest plots field examined	26	99

ACCURACY OF DATA

Statistical analysis of forest-area and timber-volume data shows the following sampling errors^{2/} for each of the two Regions:

	<u>Central</u>	<u>Northern</u>
Forest area		
Total		
M acres	515	656
Error		
M acres	±12.9	±23.6
Percent	± 2.5	± 3.6
Growing stock volume		
Total		
Million cu. ft.	421.4	503.5
Error		
Million cu. ft.	±20.6	±22.7
Percent	± 4.9	± 4.5

These estimates of sampling error do not include errors resulting from the development and application of volume tables and cull factors, or from mistakes in measurement or judgment. All phases of field and office work were closely supervised to keep these errors to a minimum. Since the percentage error increases with each subdivision of the total, small acreages or volumes may have large errors and may therefore indicate only relative magnitudes.

^{2/} At one standard deviation; that is, the chances are two out of three that the calculated acreages and volumes do not differ from the totals that would have been obtained by 100-percent measurement by more than the errors shown in the tabulation.

EXPLANATION OF TERMS USED

Forest land.--Includes (a) lands which are 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; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and which have not been developed for other use; (c) afforested areas; and (d) chaparral areas.

The minimum area that will qualify as forest land is 1 acre. Strips of timber must be at least 120 feet wide before the area will qualify as forest land. Conversely, clearings, streams, and unimproved treeless strips less than 1 acre in area or less than 120 feet in width within forest areas will be classified as forest land. Improved rights-of-way such as graded roads, railroads, or transmission lines will be classified as nonforest regardless of width.

Commercial forest land.--Forest land which is (a) producing, or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Reserved forest land.--Forest land that has been withdrawn from timber utilization through statute, ordinance, or administrative order.

Noncommercial forest land.--Forest land incapable of yielding usable wood products (usually saw timber) because of adverse site conditions, or so physically inaccessible as to be permanently unavailable economically, and not withdrawn for specified purposes.

Forest types

Oak-hickory.--Forests of hardwoods in which oaks and hickories comprise at least 50 percent of the dominant and codominant trees, except where pines comprise 25 percent or more, in which case the stand would be classified as hardwood-pine.

Maple-beech.--Forests in which at least 50 percent of the dominant and codominant trees are sugar maple or beech, singly or in combination.

Mixed hardwoods.--Forests in which 50 percent or more of the stand is upland ash, elm, basswood, walnut, soft maples, or associated species, singly or in combination, except where pines comprise 25 percent or more of the stand, in which case the stand would be classed as hardwood-pine.

Pin oak flats.--Forests on poorly drained flats in which 25 percent of the dominant and codominant trees are pin oaks.

Lowland hardwoods.--Forests on characteristically moist to wet sites where 50 percent or more of the stand is composed of sycamore, hackberry, honey locust, blackgum, sweetgum, southern cypress, ash, elm, willow, cottonwood, and red and silver maple, singly or in combination.

Tree classes

Saw-timber tree.--A live softwood (coniferous) tree at least 9.0 inches d.b.h. or live hardwood trees of commercial species at least 11.0 inches d.b.h., with a sound butt log at least 8 feet long, or with at least half of the gross volume of the tree in sound material.

Pole-timber tree.--A live, sound tree at least 5.0 inches d.b.h. but less than saw-timber size that gives promise of becoming a saw-timber tree.

Seedling and sapling trees.--Trees of commercial species less than 5.0 inches in diameter at breast height.

Cull tree.--A live tree at least 5.0 inches d.b.h. that does not qualify as a saw-timber or pole-timber tree because of species, poor form, limbiness, rot, or other defect.

Volume estimates

Board-foot volume includes the volume of that portion of live saw-timber trees merchantable for sawlogs, but not less than 8 inches in diameter (see specification for grade 3 hardwood logs, page 28). Volume deductions have been made for rot, crook, and other defects. Board-foot volumes are shown in the International 1/4-inch log rule, which approximates green lumber tally.

Cubic-foot volume

Growing stock includes the volume of sound wood inside bark in (1) the sawlog portion of saw-timber trees, (2) the upper stem of softwood saw-timber trees to a minimum top diameter of 4.0 inches inside bark, (3) the upper stem of hardwood saw-timber trees to the limit of potential merchantability for saw timber, but never less than 4.0 inches inside bark, and (4) pole-timber trees to a minimum top diameter of 4.0 inches inside bark.

Total volume includes the sound wood inside bark in both sound and cull living trees 5.0 inches d.b.h. and larger, from the stump to a minimum top diameter of 4.0 inches

inside bark. It includes the upper stems of softwood trees and the upper stems and limbs of hardwoods.

Stand-size class

Large saw timber.--Stands having a minimum net volume of 1500 board feet per acre in saw-timber trees, and having more than half of this volume in trees 15.0 inches d.b.h. and larger.

Small saw timber.--Stands having a net volume of 1500 board feet per acre in saw-timber trees, and having at least half of this volume in trees smaller than 15.0 inches d.b.h.

Pole timber.--Stands failing to meet the saw-timber stand specifications, but at least 10 percent stocked with pole-timber and larger trees and with at least half the minimum stocking in pole-timber trees.

Seedlings and saplings.--Stands not qualifying as either saw-timber or pole-timber stands but having at least 150 seedlings and saplings of commercial species per acre.

Nonstocked.--Commercial forest land not qualifying for any other class.

Hardwood log grades

Grade 1.--Butt logs at least 14.0 inches (uppers at least 16 inches) in diameter inside bark with five-sixths of the surface on the three best faces clear of defect in not more than two cuttings, (minimum length of cutting variable, 3-7 feet, depending upon log diameter and position in tree). On the average such logs will yield at least 65 percent No. 1 common and better lumber.

Grade 2.--Logs at least 12 inches in diameter inside bark with two-thirds of the surface on the three best faces clear of defect in not more than three cuttings, (minimum length of cutting, 3 feet). On the average such logs will yield at least 40 percent No. 1 common and better lumber.

Grade 3.--Merchantable logs at least 8.0 inches in diameter inside bark which do not meet the requirements of higher grades. On the average such logs will yield less than 25 percent No. 1 common and better lumber or will be suitable for ties or timbers.

SPECIES LISTED

Hardwoods

White oak

Post oak group includes:

Post oak

Swamp white oak

Swamp chestnut oak

Overcup oak

Bur oak

Chinquapin oak

Chestnut oak

Black oak includes:

Black oak

Scarlet oak

Northern red oak includes:

Northern red oak

Swamp red oak

Cherrybark oak

Other red oaks include:

Southern red oak

Pin oak

Willow oak

Water oak

Shingle oak

Hickory

Elm

Soft maple includes:

Red maple

Silver maple

Boxelder

Sugar maple

Sycamore (American)

Ash

Yellow-poplar

Cottonwood (Eastern)

Cottonwood (Swamp)

Sweetgum

Blackgum

Blackgum (Swamp)

Beech

Black walnut

Other hardwoods - include all other commercial hardwood species.

- Quercus alba

- Quercus stellata

- Quercus bicolor

- Quercus prinus

- Quercus lyrata

- Quercus macrocarpa

- Quercus muehlenbergii

- Quercus montana

- Quercus velutina

- Quercus coccinea

- Quercus borealis

- Quercus falcata var.
pagodaefolia

- Quercus falcata var.
leucophylla

- Quercus falcata

- Quercus palustris

- Quercus phellos

- Quercus nigra

- Quercus imbricaria

- Carya spp.

- Ulmus spp.

- Acer rubrum

- Acer saccharinum

- Acer negundo

- Acer saccharum

- Platanus occidentalis

- Fraxinus spp.

- Liriodendron tulipifera

- Populus deltoides

- Populus heterophylla

- Liquidambar styraciflua

- Nyssa sylvatica

- Nyssa aquatica

- Fagus grandifolia

- Juglans nigra

Noncommercial species - include species that do not normally have commercial value such as hawthorn, redbud, hornbeam, hophornbeam, alder, and serviceberry.

TERRITORY SERVED BY THE
CENTRAL STATES FOREST EXPERIMENT STATION
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

