

U.S. Department of Agriculture
Forest Service Resource Bulletin SO-59

Hardwood Distribution On Pine Sites In the South

Prepared by
Staff of Forest Resources
Research Work Unit

Southern
Forest
Experiment
Station

FOREWORD

The combined efforts of several people have gone into this report. Joe F. Christopher, Project Leader of Forest Resources Research in the Midsouth, planned and coordinated the various phases of the endeavor. Herbert S. Sternitzke conceived and developed the pine site concept. Roy C. Beltz adapted the SYMAP program for use by the unit. Jacqueline M. Earles was in charge of data compilation, and Mary S. Hedlund processed the data to produce the maps.

Hardwood Distribution On Pine Sites In the South

This report describes the concentration of hardwood species growing on pine sites in the Southern States from Virginia to Oklahoma and Texas. The maps and tables are an initial endeavor to show volumetric distribution of each major hardwood species on pine sites.

The source data for this report were gathered during 1964-1974 by the Forest Resources Research units of the Southern and Southeastern Forest Experiment Stations of the Forest Resources Research units of the Southern and Southeastern Forest Experiment Stations of the Forest Service, U. S. Department of Agriculture. An analysis of the hardwood inventory and opportunities for converting low-grade hardwoods on these sites to more productive pine was published in 1975.

Data shown here were determined from a systematic sample of plots 2 to 4 miles apart. The volume is expressed in cubic feet, inside bark, of trees from stump to a minimum 4-inch top diameter of central

stem. All trees 5 inches in diameter at breast height are included.

The maps are an adjunct to and an elaboration of the tables in that they show the general distribution of volume throughout a State. The maps are presented in a contour format which connects all points having the same volume of a particular hardwood species growing on pine sites. The area displayed extends to the approximate western limit of the southern pinery.

The maps were produced by SYMAP, a system widely employed by geographers for the display and analysis of spatial information. Spatial data are presented using data points and coordinates of these points. The data points for each map are the geographic centers of the counties, and the data value is the amount of a hardwood species growing on pine sites in that county. The intensity of the print indicates the relative values of the data points. Each species map uses the same four symbols to represent cubic feet as follows: . = zero, + = 1- 2,499, 0 = 2,500 - 9,999, □ = 10,000 and over.

Table 1. Volume of all hardwoods on pine sites and hardwood sites, Alabama

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	344	284	60
Post oak (<i>Q. stellata</i> Wangenh.)	406	381	25
White oak (<i>Q. alba</i> L.)	782	633	149
Black oak (<i>Q. velutina</i> Lam.)	293	255	38
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	127	43	84
Laurel oak (<i>Q. laurifolia</i> Michx.)	210	95	115
Northern red oak (<i>Q. rubra</i> L.)	155	105	50
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	193	166	27
Shumard oak (<i>Q. shumardii</i> Buckl.)	45	25	20
Southern red oak (<i>Q. falcata</i> Michx.)	646	602	44
Water oak (<i>Q. nigra</i> L.)	743	379	364
Hickory (<i>Carya</i> spp.)	1,152	850	302
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,612	950	662
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	671	323	348
Red maple (<i>Acer rubrum</i> L.)	162	126	36
Ash (<i>Fraxinus</i> spp.)	276	53	223
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	633	419	214
Sweetbay (<i>Magnolia virginiana</i> L.)	332	82	250
Elm (<i>Ulmus</i> spp.)	221	68	153
Hackberry (<i>Celtis</i> spp.)	143	8	135
Other hardwoods	1,740	609	1,131
Total hardwoods	10,886	6,456	4,430

Table 2. Volume of all hardwoods on pine sites and hardwood sites, Arkansas

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wangenh.)	1,236	801	435
White oak (<i>Q. alba</i> L.)	1,356	893	463
Black oak (<i>Q. velutina</i> Lam.)	757	353	404
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	274	109	165
Laurel oak (<i>Q. laurifolia</i> Michx.)	1	...	1
Northern red oak (<i>Q. rubra</i> L.)	455	221	234
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	2	2	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	39	15	24
Southern red oak (<i>Q. falcata</i> Michx.)	730	589	141
Water oak (<i>Q. nigra</i> L.)	357	112	245
Hickory (<i>Carya</i> spp.)	1,197	518	679
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,288	611	677
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	383	216	167
Red maple (<i>Acer rubrum</i> L.)	107	41	66
Ash (<i>Fraxinus</i> spp.)	283	50	233
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	3	1	2
Sweetbay (<i>Magnolia virginiana</i> L.)	23	1	22
Elm (<i>Ulmus</i> spp.)	380	102	278
Hackberry (<i>Celtis</i> spp.)	244	5	239
Other hardwoods	2,059	286	1,773
Total hardwoods	11,174	4,926	6,248

Table 3. Volume of all hardwoods on pine sites and hardwood sites, Florida

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wangerh.)	22	15	7
White oak (<i>Q. alba</i> L.)	16	8	8
Black oak (<i>Q. velutina</i> Lam.)	(¹)	(¹)	(¹)
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	2	...	2
Laurel oak (<i>Q. laurifolia</i> Michx.)	645	146	499
Northern red oak (<i>Q. rubra</i> L.)	...	...	...
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	3	1	2
Southern red oak (<i>Q. falcata</i> Michx.)	54	49	5
Water oak (<i>Q. nigra</i> L.)	270	104	166
Hickory (<i>Carya</i> spp.)	124	37	87
Sweetgum (<i>Liquidambar styraciflua</i> L.)	420	93	327
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,168	158	1,010
Red maple (<i>Acer rubrum</i> L.)	374	23	351
Ash (<i>Fraxinus</i> spp.)	366	2	364
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	35	14	21
Sweetbay (<i>Magnolia virginiana</i> L.)	467	60	407
Elm (<i>Ulmus</i> spp.)	88	4	84
Hackberry (<i>Celtis</i> spp.)	21	1	20
Other hardwoods	<u>1,386</u>	<u>363</u>	<u>1,023</u>
Total hardwoods	5,461	1,078	4,383

¹Negligible.

Table 4. Volume of all hardwoods on pine sites and hardwood sites, Georgia

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	452	224	228
Post oak (<i>Q. stellata</i> Wangerh.)	279	252	27
White oak (<i>Q. alba</i> L.)	777	573	204
Black oak (<i>Q. velutina</i> Lam.)	283	188	95
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	23	12	11
Laurel oak (<i>Q. laurifolia</i> Michx.)	779	254	525
Northern red oak (<i>Q. rubra</i> L.)	282	148	134
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	335	247	88
Shumard oak (<i>Q. shumardii</i> Buckl.)	28	12	16
Southern red oak (<i>Q. falcata</i> Michx.)	465	418	47
Water oak (<i>Q. nigra</i> L.)	749	459	290
Hickory (<i>Carya</i> spp.)	761	501	260
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,819	1,055	764
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,937	575	1,362
Red maple (<i>Acer rubrum</i> L.)	768	244	524
Ash (<i>Fraxinus</i> spp.)	293	45	248
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	982	616	366
Sweetbay (<i>Magnolia virginiana</i> L.)	251	37	214
Elm (<i>Ulmus</i> spp.)	214	80	134
Hackberry (<i>Celtis</i> spp.)	57	2	55
Other hardwoods	<u>1,465</u>	<u>658</u>	<u>807</u>
Total hardwoods	12,999	6,600	6,399

Table 5. Volume of all hardwoods on pine sites and hardwood sites, Louisiana

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wengenb.)	328	307	21
White oak (<i>Q. alba</i> L.)	322	283	39
Black oak (<i>Q. velutina</i> Lam.)	20	19	1
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	208	110	98
Laurel oak (<i>Q. laurifolia</i> Michx.)	120	42	78
Northern red oak (<i>Q. rubra</i> L.)	...	...	...
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	9	3	6
Southern red oak (<i>Q. falcata</i> Michx.)	458	446	12
Water oak (<i>Q. nigra</i> L.)	710	254	456
Hickory (<i>Carya</i> spp.)	676	197	479
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,640	690	950
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	395	154	241
Red maple (<i>Acer rubrum</i> L.)	271	51	220
Ash (<i>Fraxinus</i> spp.)	527	42	485
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	31	10	21
Sweetbay (<i>Magnolia virginiana</i> L.)	72	36	36
Elm (<i>Ulmus</i> spp.)	359	47	312
Hackberry (<i>Celtis</i> spp.)	341	3	338
Other hardwoods	3,392	391	3,001
Total hardwoods	9,879	3,085	6,794

Table 6. Volume of all hardwoods on pine sites and hardwood sites, Mississippi

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	5	3	2
Post oak (<i>Q. stellata</i> Wengenb.)	489	453	36
White oak (<i>Q. alba</i> L.)	548	438	110
Black oak (<i>Q. velutina</i> Lam.)	119	94	25
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	236	120	116
Laurel oak (<i>Q. laurifolia</i> Michx.)	41	12	29
Northern red oak (<i>Q. rubra</i> L.)	10	6	4
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	43	39	4
Shumard oak (<i>Q. shumardii</i> Buckl.)	73	46	27
Southern red oak (<i>Q. falcata</i> Michx.)	634	568	66
Water oak (<i>Q. nigra</i> L.)	604	217	387
Hickory (<i>Carya</i> spp.)	698	356	342
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,166	531	635
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	540	233	307
Red maple (<i>Acer rubrum</i> L.)	137	53	84
Ash (<i>Fraxinus</i> spp.)	205	29	176
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	268	122	146
Sweetbay (<i>Magnolia virginiana</i> L.)	212	63	149
Elm (<i>Ulmus</i> spp.)	318	82	236
Hackberry (<i>Celtis</i> spp.)	170	4	166
Other hardwoods	1,900	358	1,542
Total hardwoods	8,416	3,827	4,589

Table 3. Volume of all hardwoods on pine sites and hardwood sites, Florida

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wangerh.)	22	15	7
White oak (<i>Q. alba</i> L.)	16	8	8
Black oak (<i>Q. velutina</i> Lam.)	(¹)	(¹)	(¹)
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	2	...	2
Laurel oak (<i>Q. laurifolia</i> Michx.)	645	146	499
Northern red oak (<i>Q. rubra</i> L.)	...	...	...
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	3	1	2
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Laurel oak (<i>Q. laurifolia</i> Michx.)	120	42	78
Northern red oak (<i>Q. rubra</i> L.)	...	...	...
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	9	3	6
Southern red oak (<i>Q. falcata</i> Michx.)	458	446	12
Water oak (<i>Q. nigra</i> L.)	710	254	456
Hickory (<i>Carya</i> spp.)	676	197	479
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,640	690	950
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	395	154	241
Red maple (<i>Acer rubrum</i> L.)	271	51	220
Ash (<i>Fraxinus</i> spp.)	527	42	485
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	31	10	21
Sweetbay (<i>Magnolia virginiana</i> L.)	72	36	36
Elm (<i>Ulmus</i> spp.)	359	47	312
Hackberry (<i>Celtis</i> spp.)	341	3	338
Other hardwoods	3,392	391	3,001
Total hardwoods	9,879	3,085	6,794

Table 6. Volume of all hardwoods on pine sites and hardwood sites, Mississippi

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	5	3	2
Post oak (<i>Q. stellata</i> Wangerh.)	489	453	36
White oak (<i>Q. alba</i> L.)	548	438	110
Black oak (<i>Q. velutina</i> Lam.)	119	94	25
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	236	120	116
Laurel oak (<i>Q. laurifolia</i> Michx.)	41	12	29
Northern red oak (<i>Q. rubra</i> L.)	10	6	4
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	43	39	4
Shumard oak (<i>Q. shumardii</i> Buckl.)	73	46	27
Southern red oak (<i>Q. falcata</i> Michx.)	634	568	66
Water oak (<i>Q. nigra</i> L.)	604	217	387
Hickory (<i>Carya</i> spp.)	698	356	342
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,166	531	635
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	540	233	307
Red maple (<i>Acer rubrum</i> L.)	137	53	84
Ash (<i>Fraxinus</i> spp.)	205	29	176
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	268	122	146
Sweetbay (<i>Magnolia virginiana</i> L.)	212	63	149
Elm (<i>Ulmus</i> spp.)	318	82	236
Hackberry (<i>Celtis</i> spp.)	170	4	166
Other hardwoods	1,900	358	1,542
Total hardwoods	8,416	3,827	4,589

Table 7. Volume of all hardwoods on pine sites and hardwood sites, North Carolina

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	957	300	657
Post oak (<i>Q. stellata</i> Wangerh.)	369	261	108
White oak (<i>Q. alba</i> L.)	1,553	1,022	531
Black oak (<i>Q. velutina</i> Lam.)	453	219	234
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	64	40	24
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	697	150	547
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	760	420	340
Shumard oak (<i>Q. shumardii</i> Buckl.)	...	...	...
Southern red oak (<i>Q. falcata</i> Michx.)	405	357	48
Water oak (<i>Q. nigra</i> L.)	524	293	231
Hickory (<i>Carya</i> spp.)	912	422	490
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,673	804	869
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,956	298	1,658
Red maple (<i>Acer rubrum</i> L.)	1,639	502	1,137
Ash (<i>Fraxinus</i> spp.)	405	42	363
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	2,064	946	1,118
Sweetbay (<i>Magnolia virginiana</i> L.)	58	7	51
Elm (<i>Ulmus</i> spp.)	221	63	158
Hackberry (<i>Celtis</i> spp.)	29	6	23
Other hardwoods	2,335	686	1,649
Total hardwoods	17,074	6,838	10,236

¹Includes water tupelo (*N. aquatica* L.).

Table 8. Volume of all hardwoods on pine sites and hardwood sites, Oklahoma

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wangerh.)	407	226	181
White oak (<i>Q. alba</i> L.)	94	62	32
Black oak (<i>Q. velutina</i> Lam.)	147	53	94
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	2	1	1
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	25	12	13
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	25	4	21
Southern red oak (<i>Q. falcata</i> Michx.)	88	35	53
Water oak (<i>Q. nigra</i> L.)	34	6	28
Hickory (<i>Carya</i> spp.)	209	88	121
Sweetgum (<i>Liquidambar styraciflua</i> L.)	56	32	24
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	32	18	14
Red maple (<i>Acer rubrum</i> L.)	7	2	5
Ash (<i>Fraxinus</i> spp.)	54	5	49
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	...	...	...
Sweetbay (<i>Magnolia virginiana</i> L.)	...	...	...
Elm (<i>Ulmus</i> spp.)	116	18	98
Hackberry (<i>Celtis</i> spp.)	24	1	23
Other hardwoods	281	70	211
Total hardwoods	1,601	633	968

Table 9. Volume of all hardwoods on pine sites and hardwood sites, South Carolina

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	58	35	23
Post oak (<i>Q. stellata</i> Wengenh.)	149	132	17
White oak (<i>Q. alba</i> L.)	382	287	95
Black oak (<i>Q. velutina</i> Lam.)	91	78	13
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	75	52	23
Laurel oak (<i>Q. laurifolia</i> Michx.)	499	113	386
Northern red oak (<i>Q. rubra</i> L.)	68	55	13
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	111	94	17
Shumard oak (<i>Q. shumardii</i> Buckl.)	11	6	5
Southern red oak (<i>Q. falcata</i> Michx.)	194	170	24
Water oak (<i>Q. nigra</i> L.)	469	268	201
Hickory (<i>Carya</i> spp.)	341	185	156
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,373	636	737
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,318	296	1,022
Red maple (<i>Acer rubrum</i> L.)	591	153	438
Ash (<i>Fraxinus</i> spp.)	308	42	266
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	381	210	171
Sweetbay (<i>Magnolia virginiana</i> L.)	14	2	12
Elm (<i>Ulmus</i> spp.)	204	71	133
Hackberry (<i>Celtis</i> spp.)	67	9	58
Other hardwoods	1,389	464	925
Total hardwoods	8,093	3,358	4,735

Table 10. Volume of all hardwoods on pine sites and hardwood sites, Tennessee

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	1,057	571	486
Post oak (<i>Q. stellata</i> Wengenh.)	343	139	204
White oak (<i>Q. alba</i> L.)	1,348	530	818
Black oak (<i>Q. velutina</i> Lam.)	684	333	351
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	115	6	109
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	494	208	286
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	538	321	217
Shumard oak (<i>Q. shumardii</i> Buckl.)	11	2	9
Southern red oak (<i>Q. falcata</i> Michx.)	339	132	207
Water oak (<i>Q. nigra</i> L.)	45	1	44
Hickory (<i>Carya</i> spp.)	1,334	492	842
Sweetgum (<i>Liquidambar styraciflua</i> L.)	366	53	313
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	252	111	141
Red maple (<i>Acer rubrum</i> L.)	344	147	197
Ash (<i>Fraxinus</i> spp.)	302	42	260
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	775	278	497
Sweetbay (<i>Magnolia virginiana</i> L.)	...	...	...
Elm (<i>Ulmus</i> spp.)	243	26	217
Hackberry (<i>Celtis</i> spp.)	97	4	93
Other hardwoods	1,568	328	1,240
Total hardwoods	10,255	3,724	6,531

Table 7. Volume of all hardwoods on pine sites and hardwood sites, North Carolina

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	957	300	657
Post oak (<i>Q. stellata</i> Wengenb.)	369	261	108
White oak (<i>Q. alba</i> L.)	1,553	1,022	531
Black oak (<i>Q. velutina</i> Lam.)	453	219	234
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	64	40	24
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	697	150	547
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	760	420	340
Shumard oak (<i>Q. shumardii</i> Buckl.)	...	...	...
Southern red oak (<i>Q. falcata</i> Michx.)	405	357	48
Water oak (<i>Q. nigra</i> L.)	524	293	231
Hickory (<i>Carya</i> spp.)	912	422	490
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,673	804	869
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,956	298	1,658
Red maple (<i>Acer rubrum</i> L.)	1,639	502	1,137
Ash (<i>Fraxinus</i> spp.)	405	42	363
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	2,064	946	1,118
Sweetbay (<i>Magnolia virginiana</i> L.)	58	7	51
Elm (<i>Ulmus</i> spp.)	221	63	158
Hackberry (<i>Celtis</i> spp.)	29	6	23
Other hardwoods	2,335	686	1,649
Total hardwoods	17,074	6,838	10,236

¹Includes water tupelo (*N. aquatica* L.).

Table 8. Volume of all hardwoods on pine sites and hardwood sites, Oklahoma

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wengenb.)	407	226	181
White oak (<i>Q. alba</i> L.)	94	62	32
Black oak (<i>Q. velutina</i> Lam.)	147	53	94
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	2	1	1
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	25	12	13
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	25	4	21
Southern red oak (<i>Q. falcata</i> Michx.)	88	35	53
Water oak (<i>Q. nigra</i> L.)	34	6	28
Hickory (<i>Carya</i> spp.)	209	88	121
Sweetgum (<i>Liquidambar styraciflua</i> L.)	56	32	24
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	32	18	14
Red maple (<i>Acer rubrum</i> L.)	7	2	5
Ash (<i>Fraxinus</i> spp.)	54	5	49
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	...	...	...
Sweetbay (<i>Magnolia virginiana</i> L.)	...	...	...
Elm (<i>Ulmus</i> spp.)	116	18	98
Hackberry (<i>Celtis</i> spp.)	24	1	23
Other hardwoods	281	70	211
Total hardwoods	1,601	633	968

Table 9. Volume of all hardwoods on pine sites and hardwood sites, South Carolina

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	58	35	23
Post oak (<i>Q. stellata</i> Wengenh.)	149	132	17
White oak (<i>Q. alba</i> L.)	382	287	95
Black oak (<i>Q. velutina</i> Lam.)	91	78	13
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	75	52	23
Laurel oak (<i>Q. laurifolia</i> Michx.)	499	113	386
Northern red oak (<i>Q. rubra</i> L.)	68	55	13
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	111	94	17
Shumard oak (<i>Q. shumardii</i> Buckl.)	11	6	5
Southern red oak (<i>Q. falcata</i> Michx.)	194	170	24
Water oak (<i>Q. nigra</i> L.)	469	268	201
Hickory (<i>Carya</i> spp.)	341	185	156
Sweetgum (<i>Liquidambar styraciflua</i> L.)	1,373	636	737
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	1,318	296	1,022
Red maple (<i>Acer rubrum</i> L.)	591	153	438
Ash (<i>Fraxinus</i> spp.)	308	42	266
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	381	210	171
Sweetbay (<i>Magnolia virginiana</i> L.)	14	2	12
Elm (<i>Ulmus</i> spp.)	204	71	133
Hackberry (<i>Celtis</i> spp.)	67	9	58
Other hardwoods	1,389	464	925
Total hardwoods	8,093	3,358	4,735

Table 10. Volume of all hardwoods on pine sites and hardwood sites, Tennessee

Species	All sites	Pine sites	Hardwood sites
- - - Million cubic feet - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	1,057	571	486
Post oak (<i>Q. stellata</i> Wengenh.)	343	139	204
White oak (<i>Q. alba</i> L.)	1,348	530	818
Black oak (<i>Q. velutina</i> Lam.)	684	333	351
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	115	6	109
Laurel oak (<i>Q. laurifolia</i> Michx.)	...	...	...
Northern red oak (<i>Q. rubra</i> L.)	494	208	286
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	538	321	217
Shumard oak (<i>Q. shumardii</i> Buckl.)	11	2	9
Southern red oak (<i>Q. falcata</i> Michx.)	339	132	207
Water oak (<i>Q. nigra</i> L.)	45	1	44
Hickory (<i>Carya</i> spp.)	1,334	492	842
Sweetgum (<i>Liquidambar styraciflua</i> L.)	366	53	313
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	252	111	141
Red maple (<i>Acer rubrum</i> L.)	344	147	197
Ash (<i>Fraxinus</i> spp.)	302	42	260
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	775	278	497
Sweetbay (<i>Magnolia virginiana</i> L.)	...	...	...
Elm (<i>Ulmus</i> spp.)	243	26	217
Hackberry (<i>Celtis</i> spp.)	97	4	93
Other hardwoods	1,568	328	1,240
Total hardwoods	10,255	3,724	6,531

Table 11. Volume of all hardwoods on pine sites and hardwood sites, Texas

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	...	...	...
Post oak (<i>Q. stellata</i> Wangenh.)	508	405	103
White oak (<i>Q. alba</i> L.)	202	180	22
Black oak (<i>Q. velutina</i> Lam.)	28	20	8
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	133	69	64
Laurel oak (<i>Q. laurifolia</i> Michx.)	26	18	8
Northern red oak (<i>Q. rubra</i> L.)	...	...	...
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	...	...	...
Shumard oak (<i>Q. shumardii</i> Buckl.)	14	6	8
Southern red oak (<i>Q. falcata</i> Michx.)	388	343	45
Water oak (<i>Q. nigra</i> L.)	405	219	186
Hickory (<i>Carya</i> spp.)	253	155	98
Sweetgum (<i>Liquidambar styraciflua</i> L.)	791	554	237
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	216	124	92
Red maple (<i>Acer rubrum</i> L.)	51	25	26
Ash (<i>Fraxinus</i> spp.)	106	33	73
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	...	...	...
Sweetbay (<i>Magnolia virginiana</i> L.)	34	10	24
Elm (<i>Ulmus</i> spp.)	183	64	119
Hackberry (<i>Celtis</i> spp.)	73	13	60
Other hardwoods	811	355	456
Total hardwoods	4,222	2,593	1,629

Table 12. Volume of all hardwoods on pine sites and hardwood sites, Virginia

Species	All sites	Pine sites	Hardwood sites
- - - - Million cubic feet - - - -			
Chestnut oak (<i>Quercus prinus</i> L.)	1,792	35	1,757
Post oak (<i>Q. stellata</i> Wangenh.)	100	72	28
White oak (<i>Q. alba</i> L.)	2,001	1,149	852
Black oak (<i>Q. velutina</i> Lam.)	644	337	307
Cherry bark oak (<i>Q. falcata</i> var. <i>pagodaefolia</i> Ell.)	31	17	14
Laurel oak (<i>Q. laurifolia</i> Michx.)	12	3	9
Northern red oak (<i>Q. rubra</i> L.)	898	264	634
Scarlet oak (<i>Q. coccinea</i> Muenchh.)	897	510	387
Shumard oak (<i>Q. shumardii</i> Buckl.)	1	...	1
Southern red oak (<i>Q. falcata</i> Michx.)	339	285	54
Water oak (<i>Q. nigra</i> L.)	31	20	11
Hickory (<i>Carya</i> spp.)	1,034	372	662
Sweetgum (<i>Liquidambar styraciflua</i> L.)	736	499	237
Black tupelo (<i>Nyssa sylvatica</i> Marsh.)	479	204	275
Red maple (<i>Acer rubrum</i> L.)	921	384	537
Ash (<i>Fraxinus</i> spp.)	224	56	168
Yellow-poplar (<i>Liriodendron tulipifera</i> L.)	1,360	805	555
Sweetbay (<i>Magnolia virginiana</i> L.)	4	2	2
Elm (<i>Ulmus</i> spp.)	121	43	78
Hackberry (<i>Celtis</i> spp.)	9	1	8
Other hardwoods	2,017	1,060	957
Total hardwoods	13,651	6,118	7,533

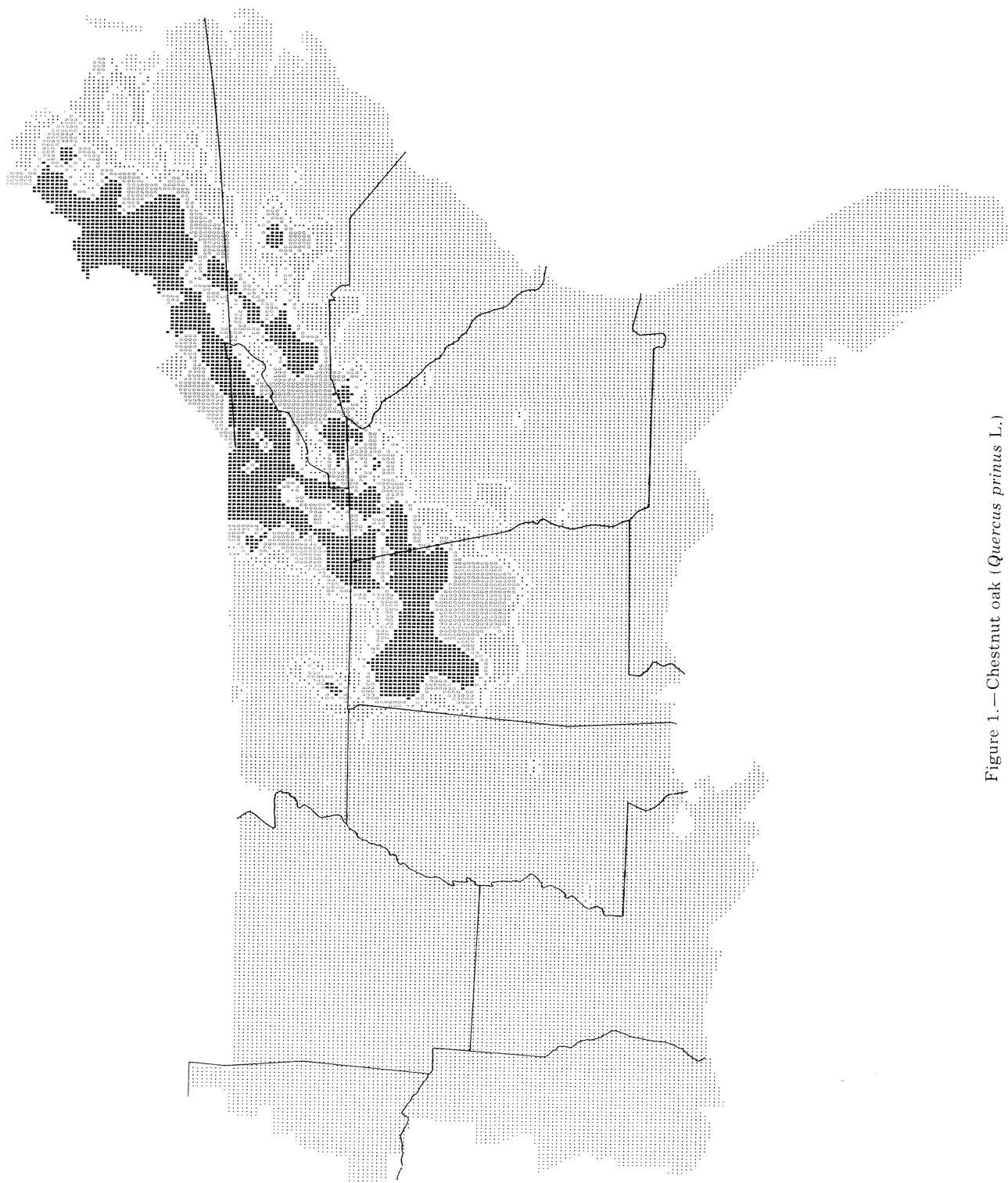


Figure 1.—Chestnut oak (*Quercus prinus* L.)

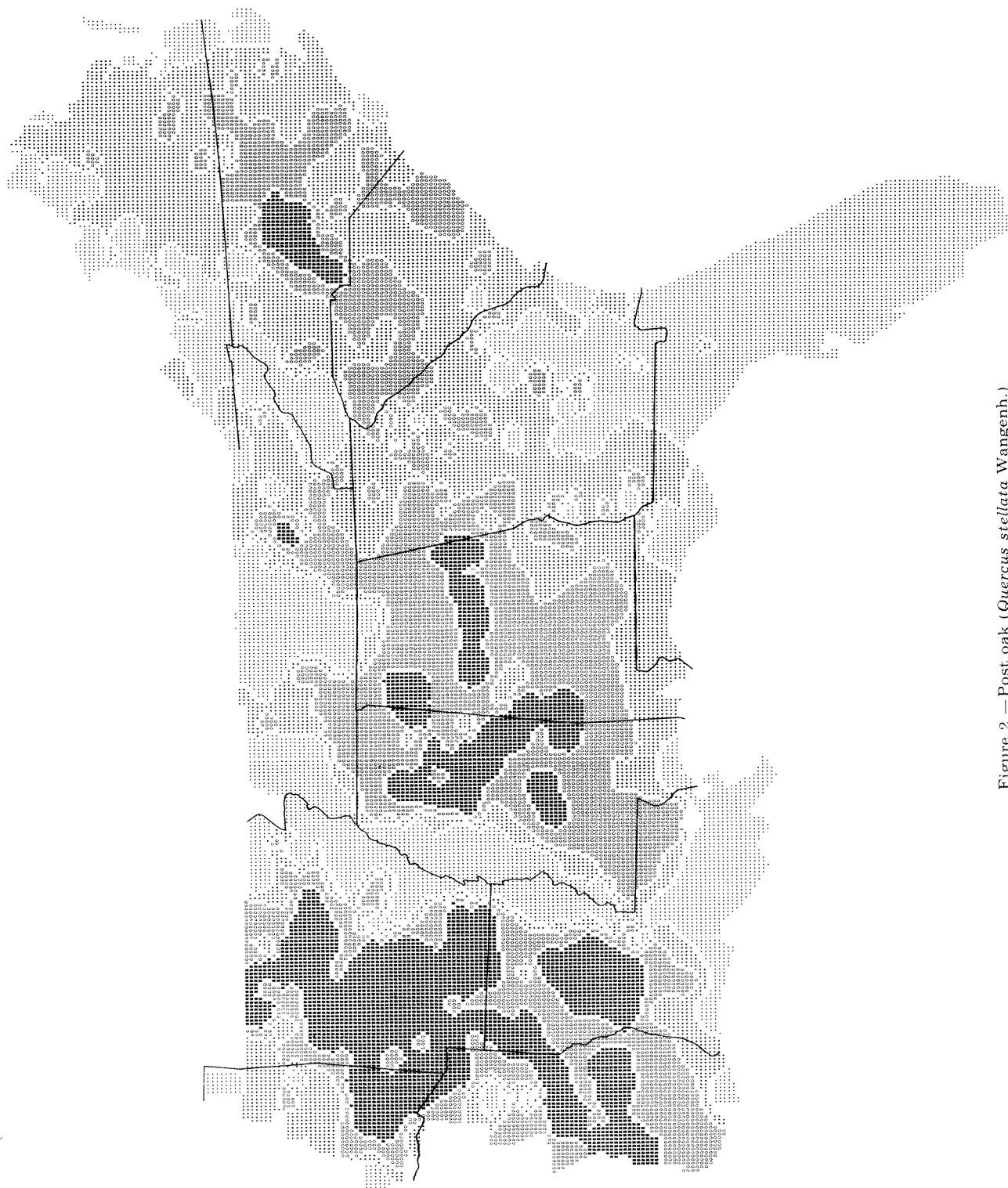


Figure 2. — Post oak (*Quercus stellata* Wangenh.)

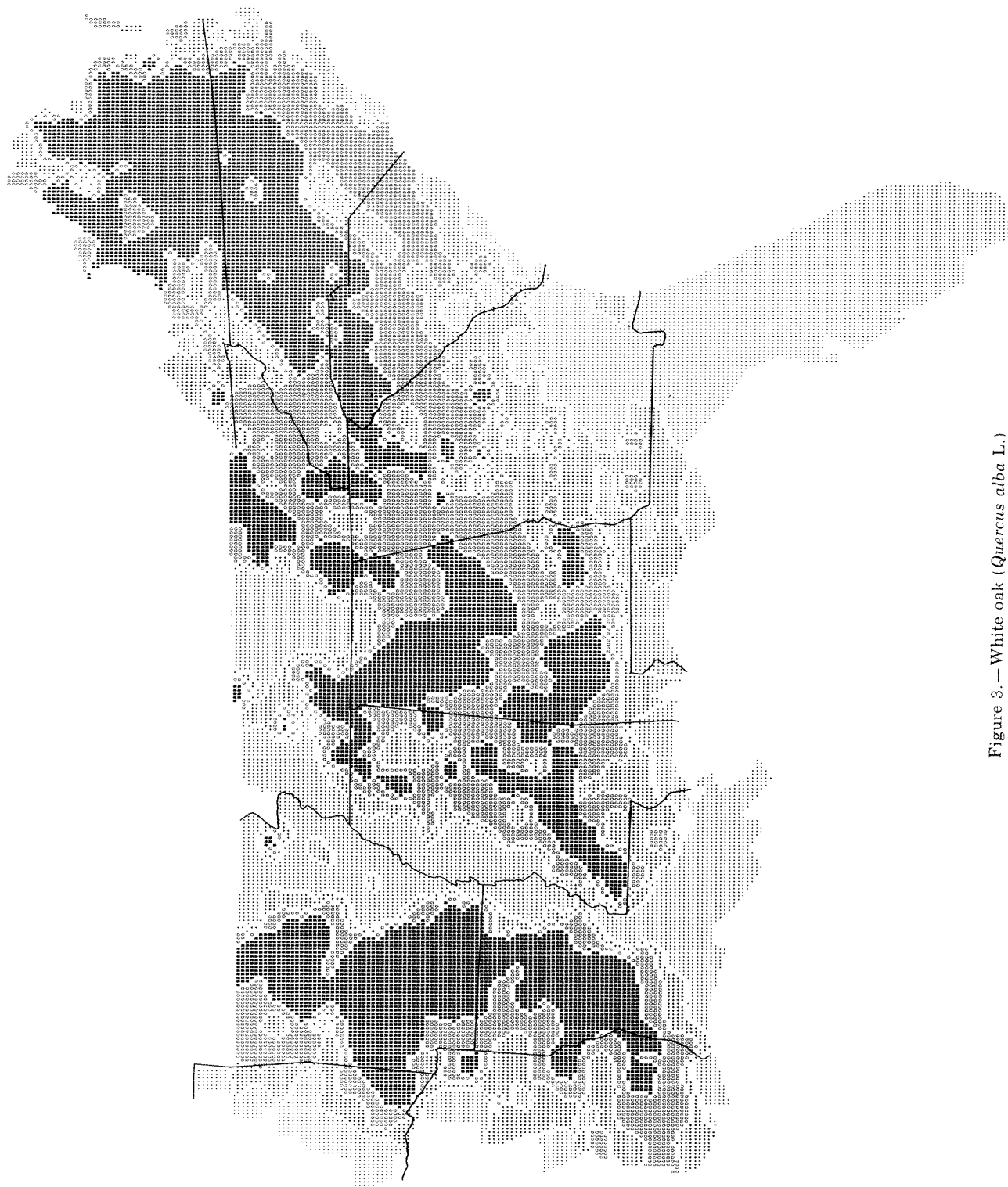


Figure 3. — White oak (*Quercus alba* L.)

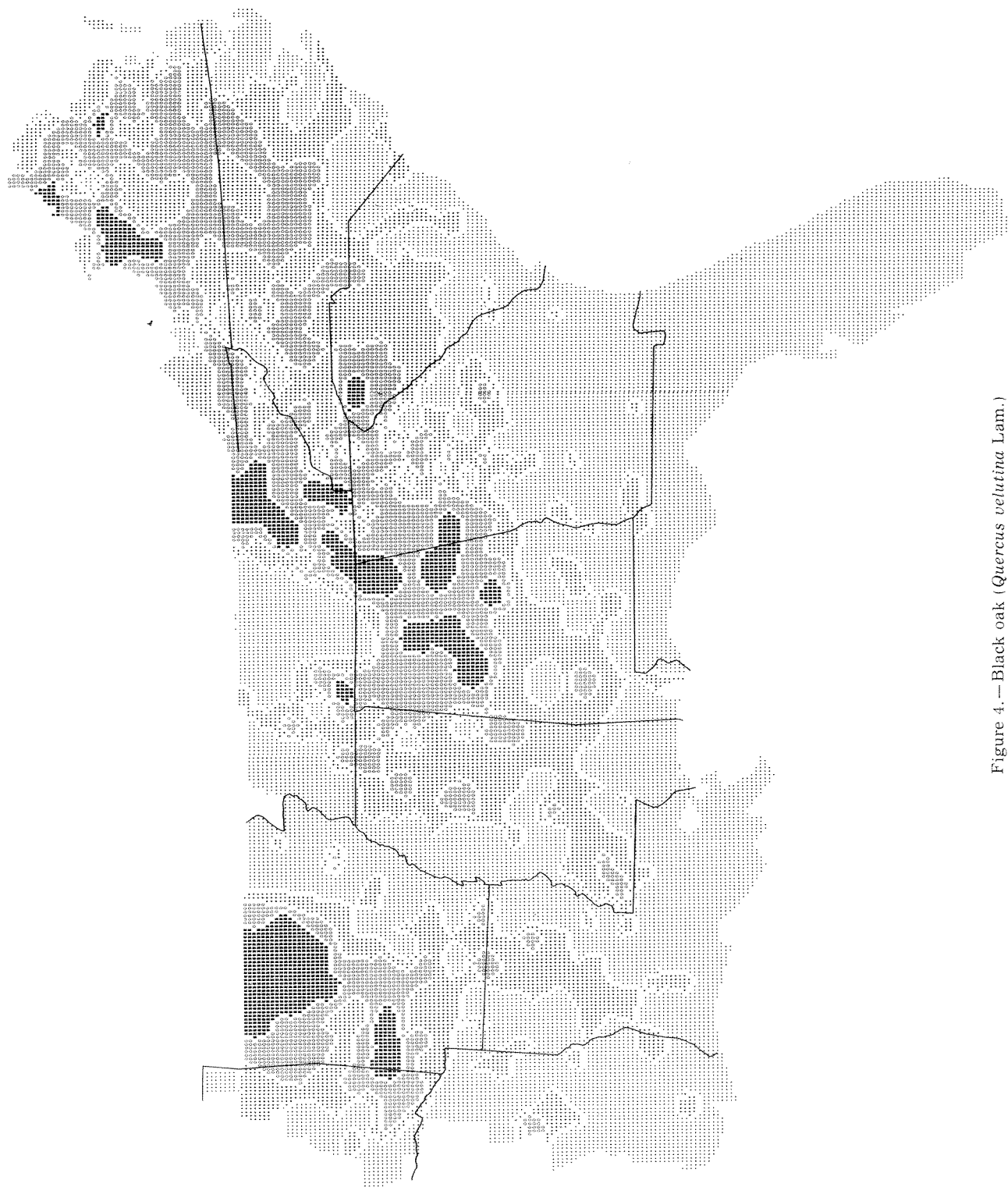


Figure 4.—Black oak (*Quercus velutina* Lam.)

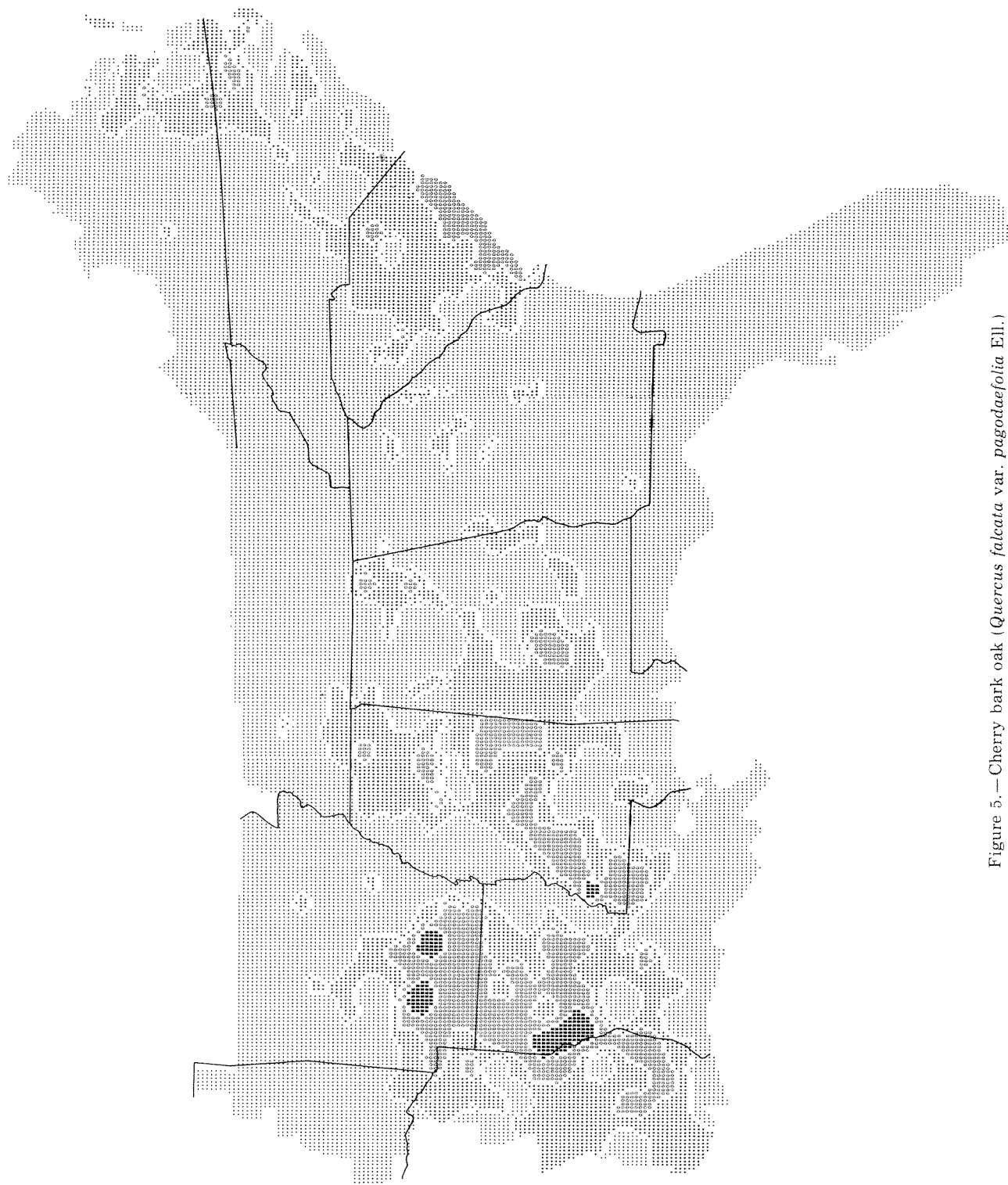


Figure 5.—Cherry bark oak (*Quercus falcata* var. *pagodaefolia* Ell.)

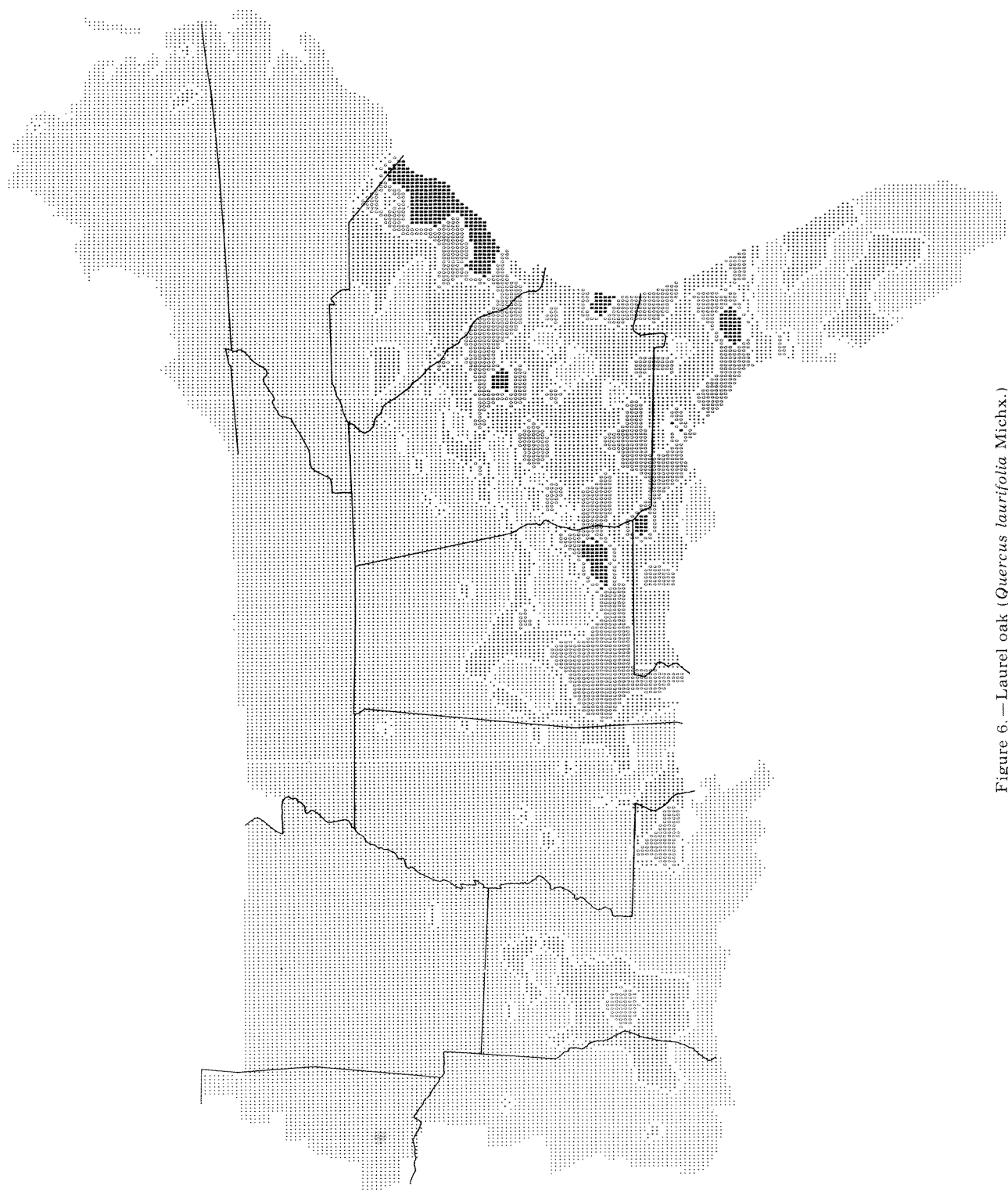


Figure 6. — Laurel oak (*Quercus laurifolia* Michx.)

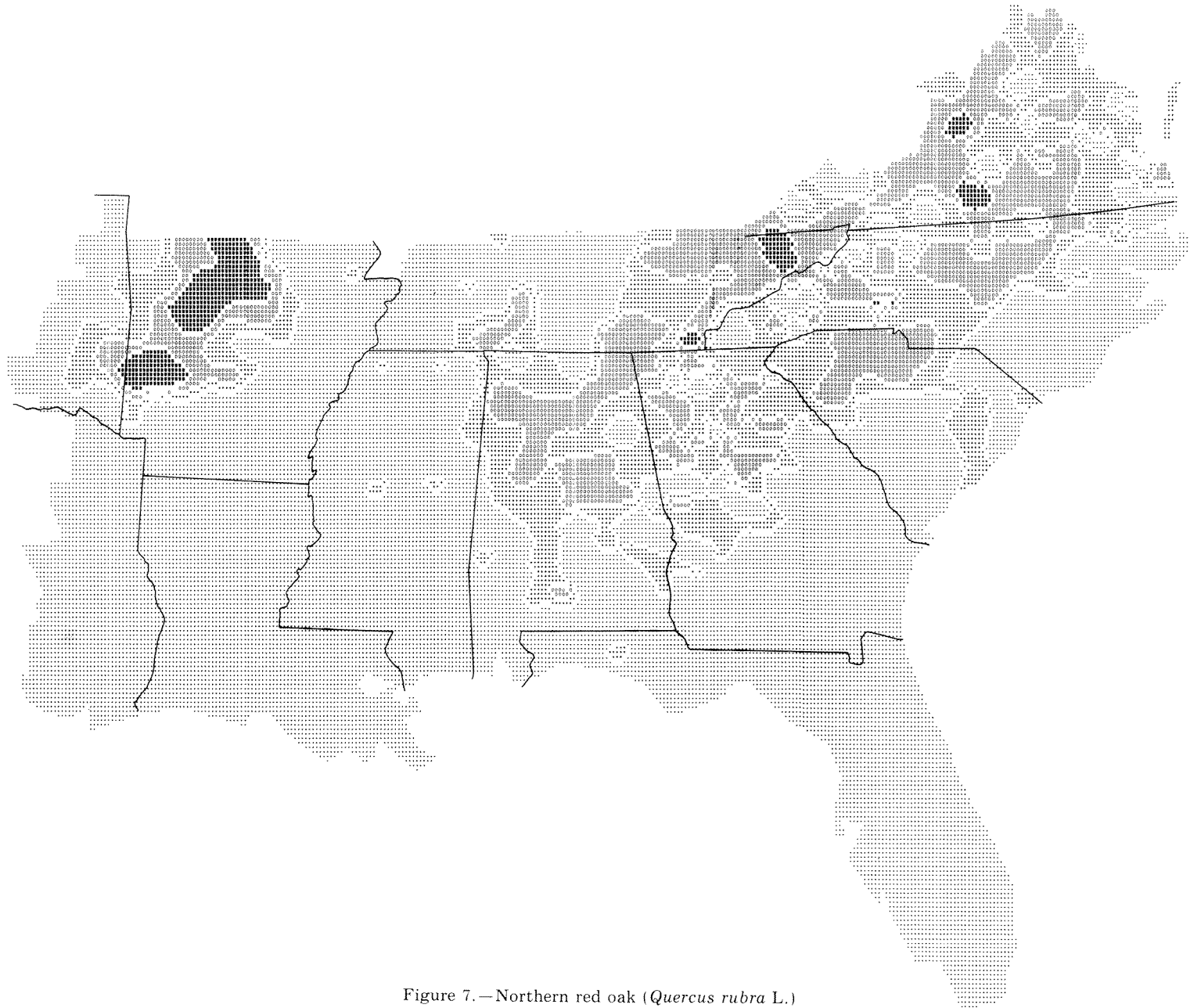


Figure 7.—Northern red oak (*Quercus rubra* L.)

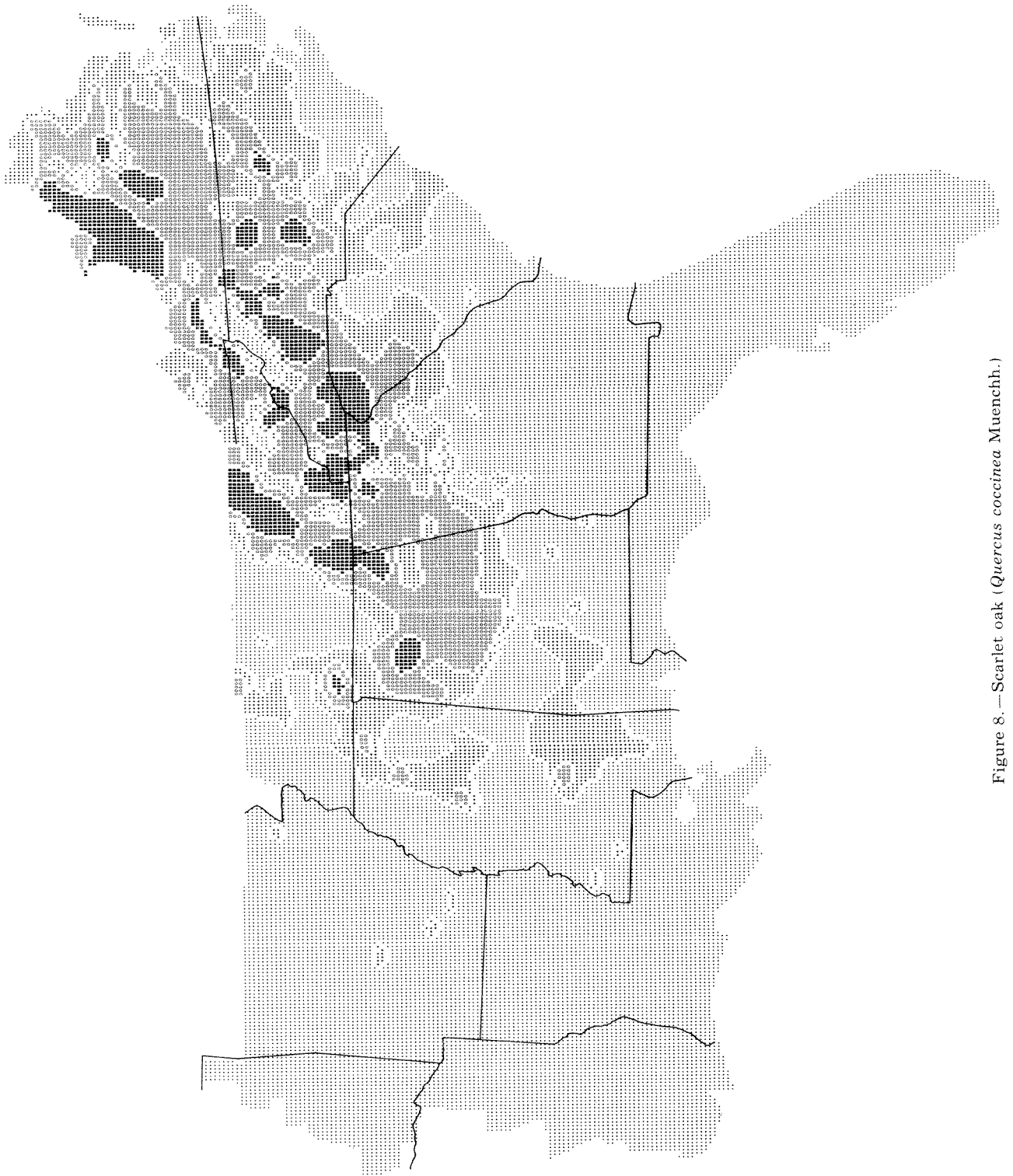


Figure 8.—Scarlet oak (*Quercus coccinea* Muenchh.)

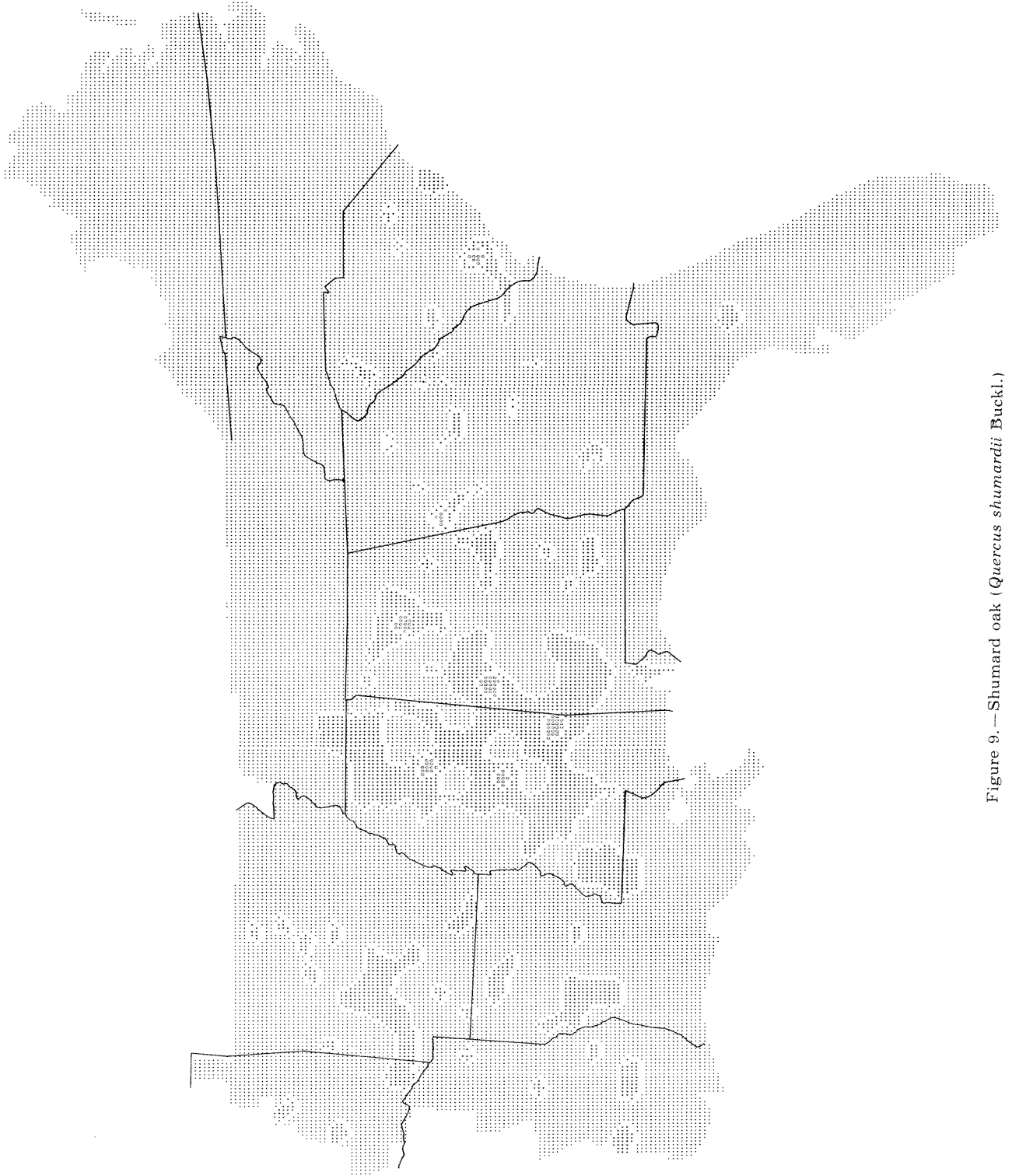
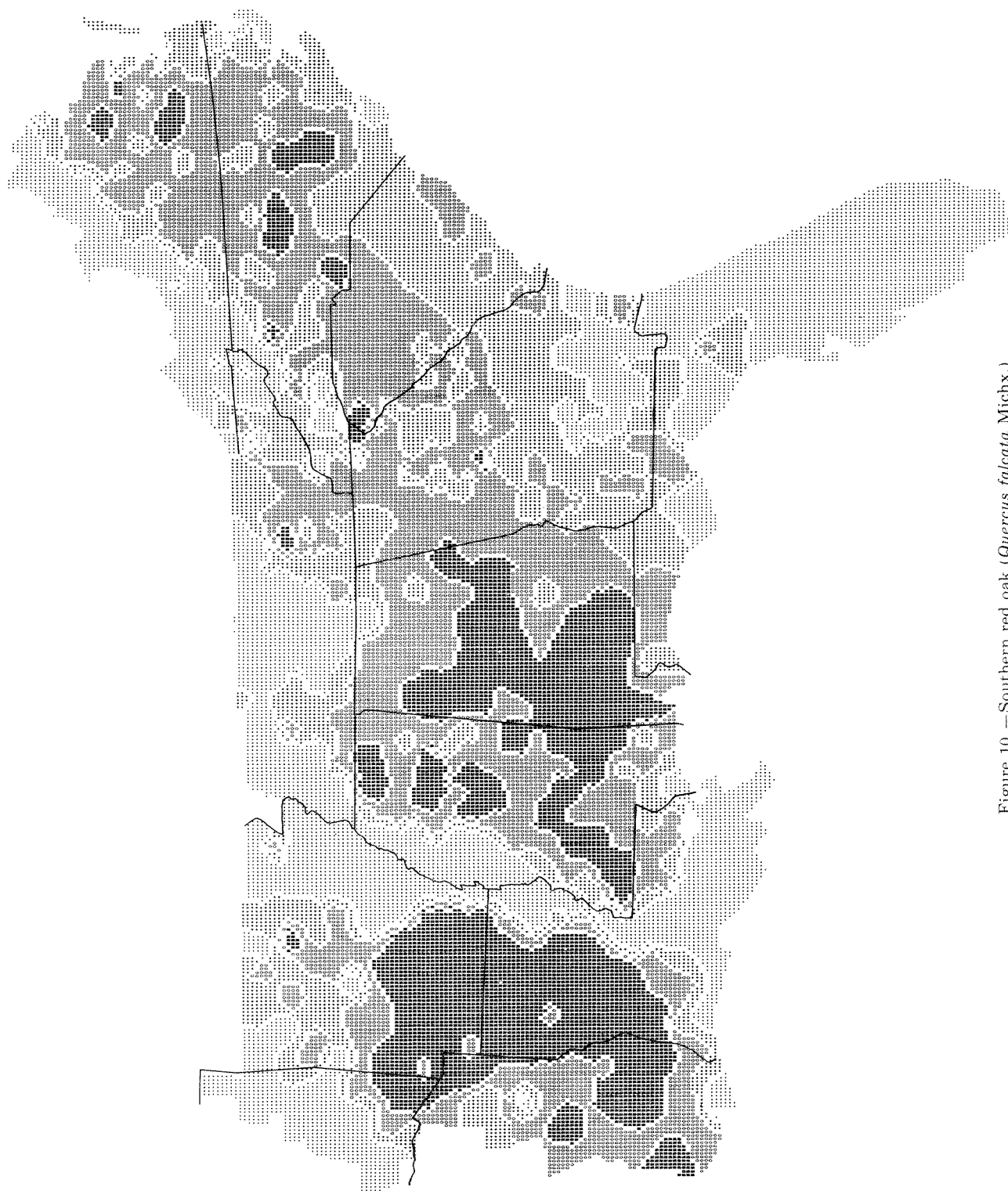


Figure 9. — Shumard oak (*Quercus shumardii* Buckl.)



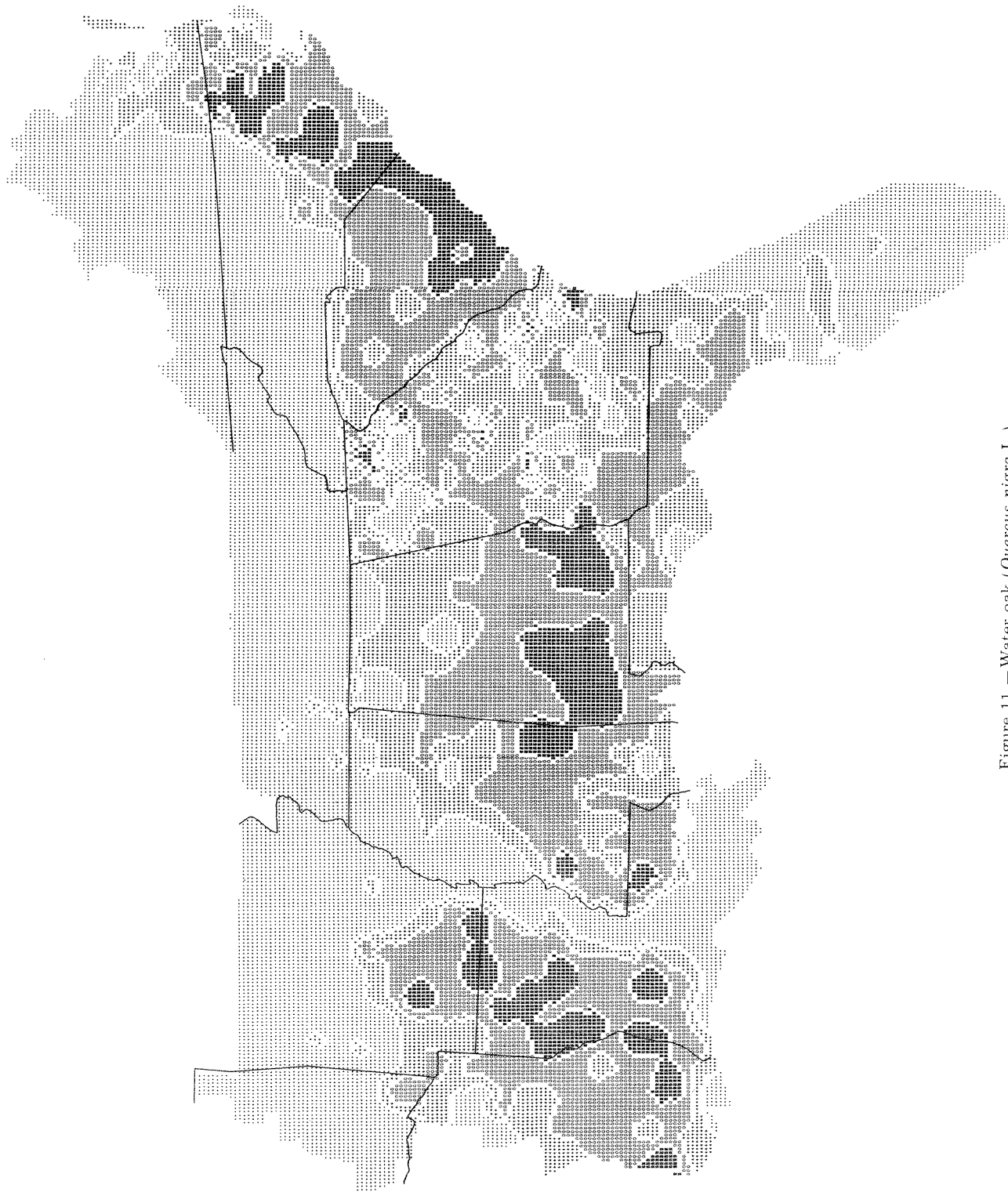


Figure 11. — Water oak (*Quercus nigra* L.)

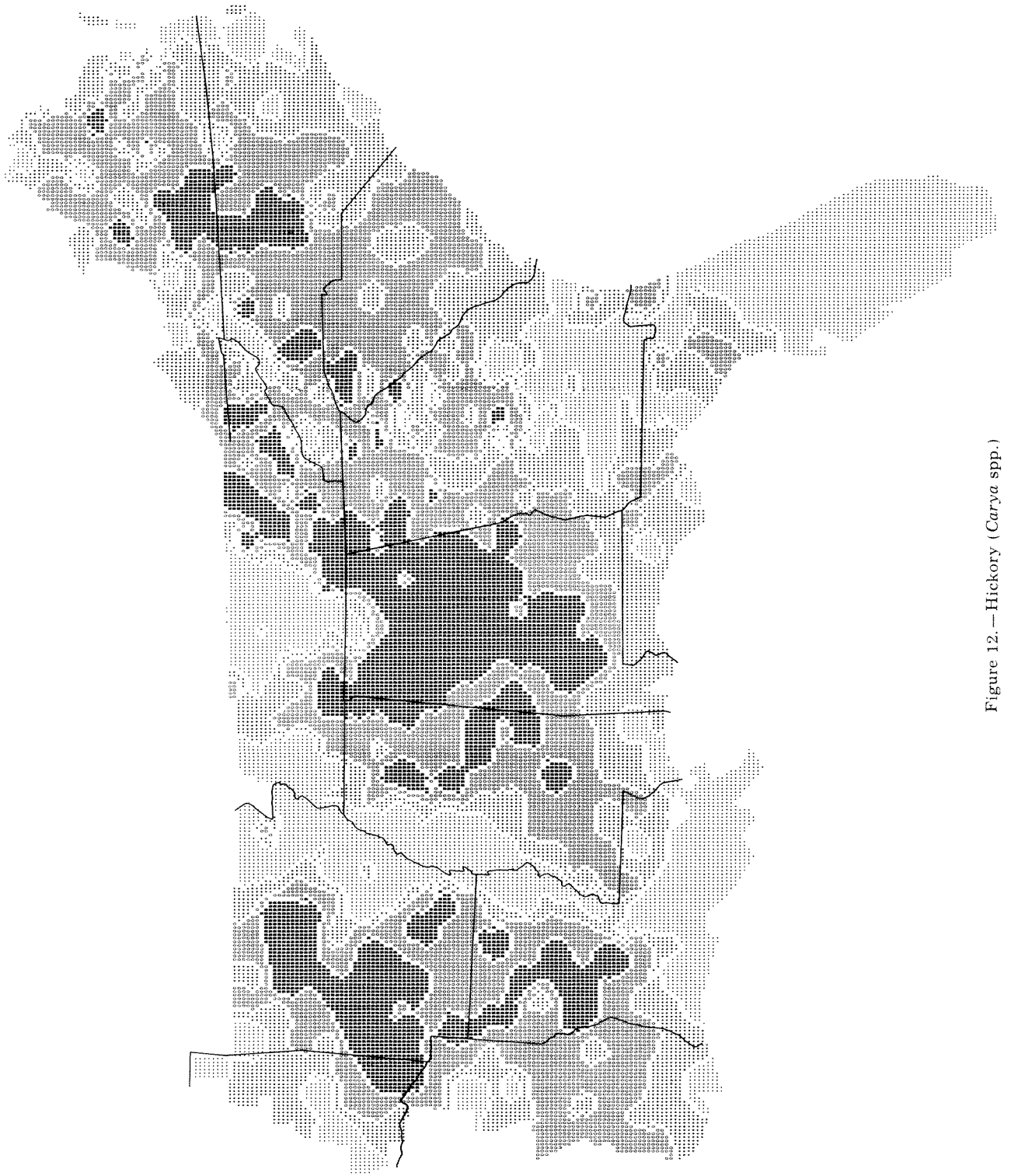


Figure 12. — Hickory (*Carya* spp.)

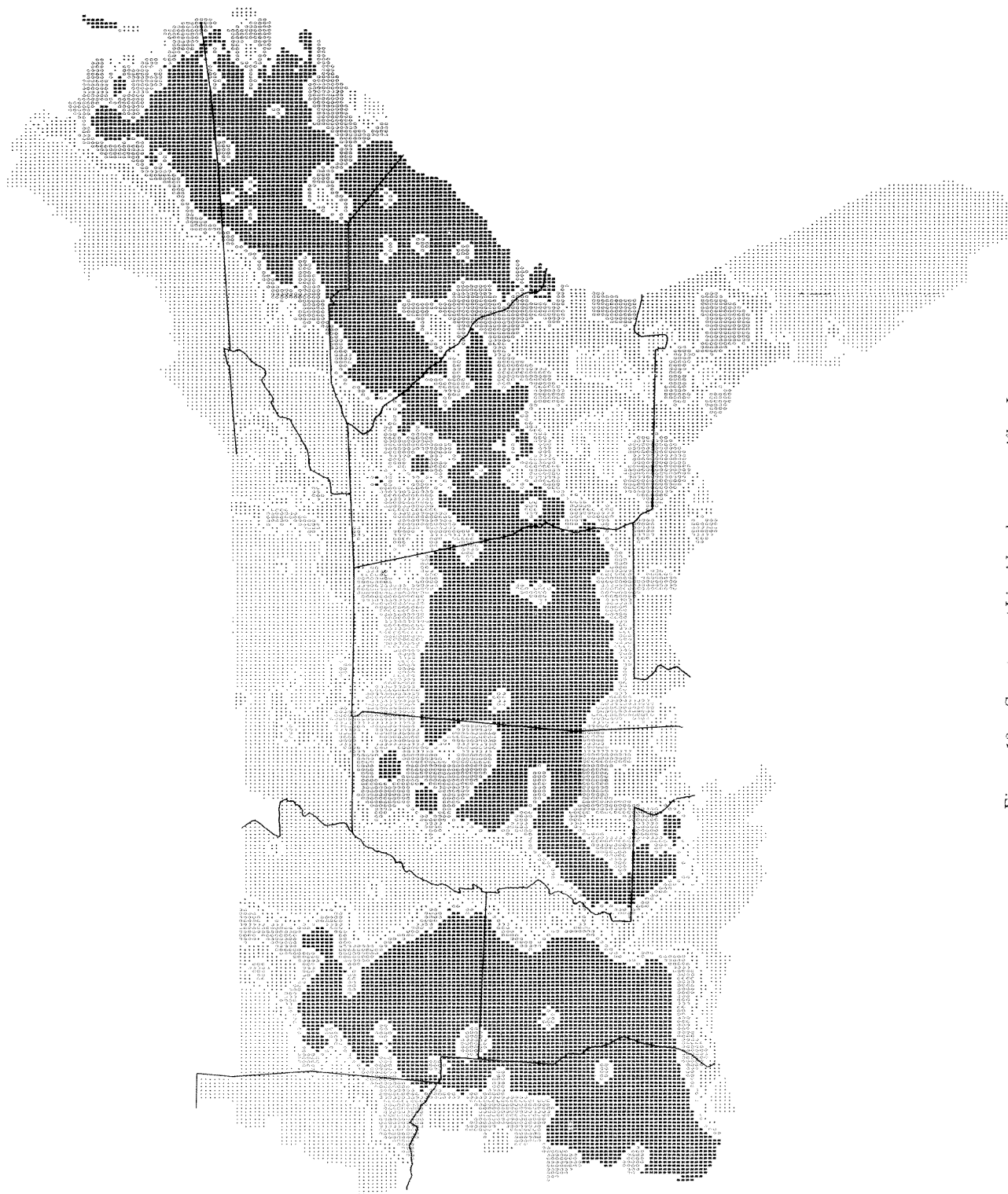


Figure 13. — Sweetgum (*Liquidambar styraciflua* L.)

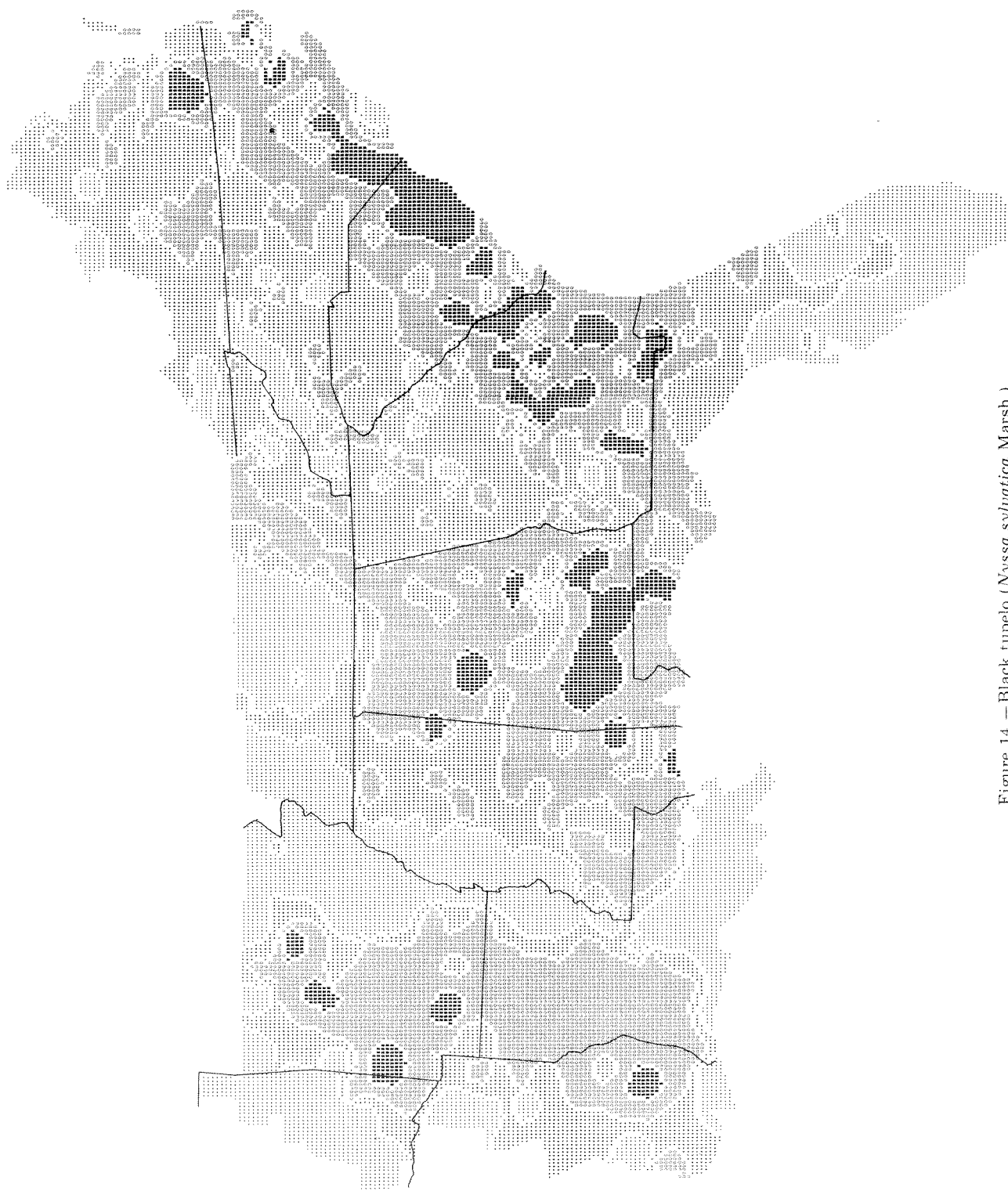


Figure 14. — Black tupelo (*Nyssa sylvatica* Marsh.)

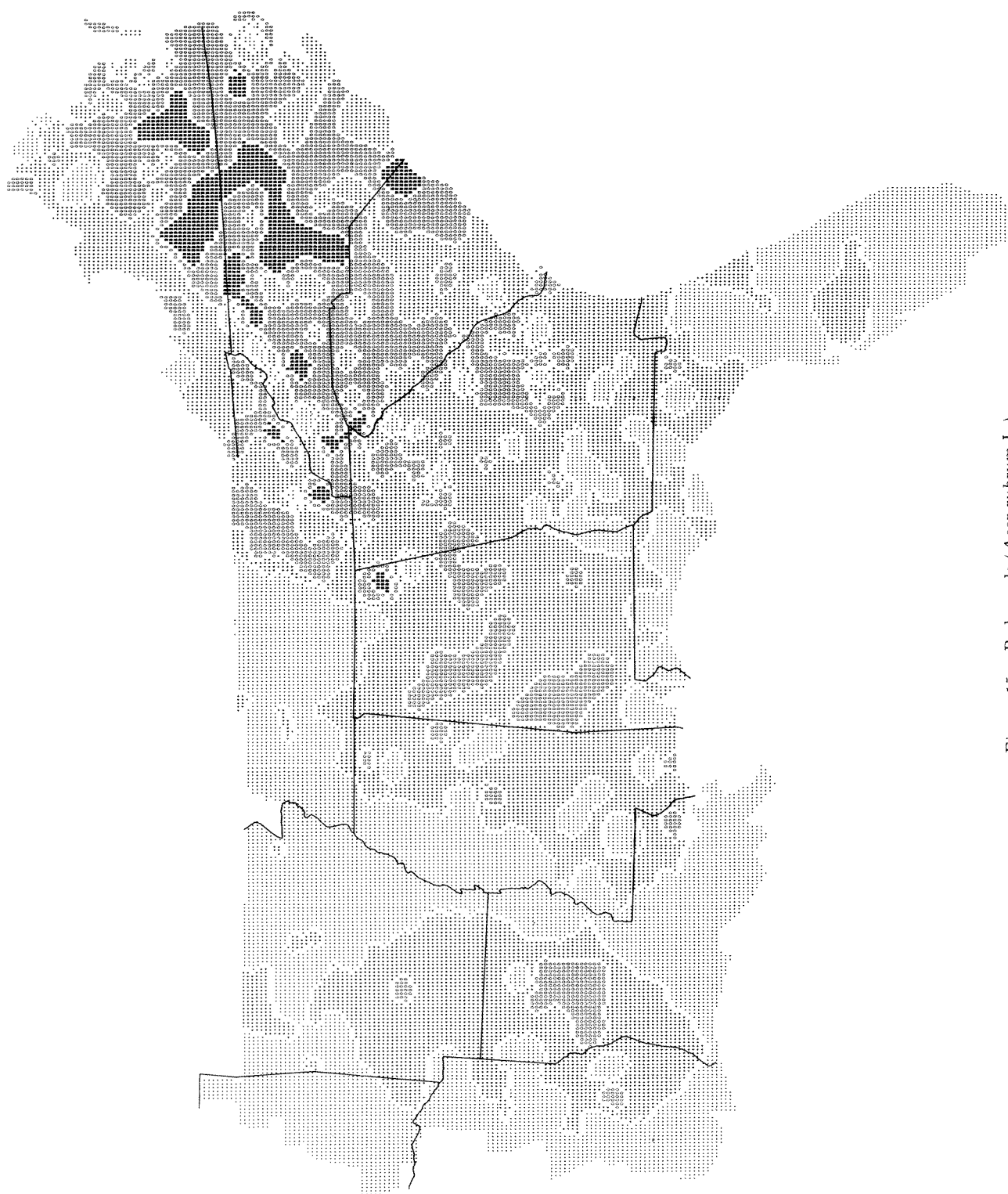


Figure 15.—Red maple (*Acer rubrum* L.)

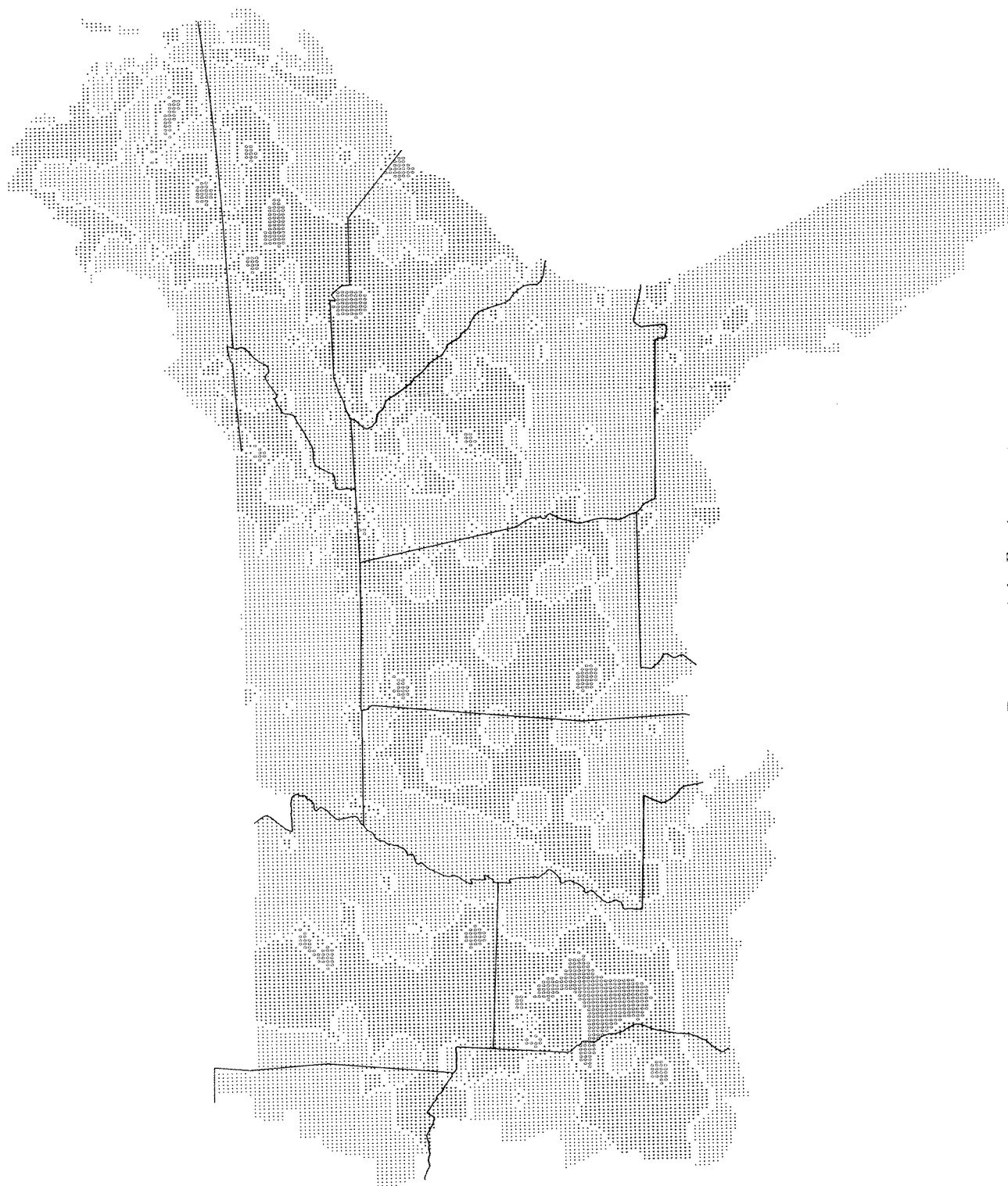


Figure 16.—Ash (*Fraxinus* spp.)

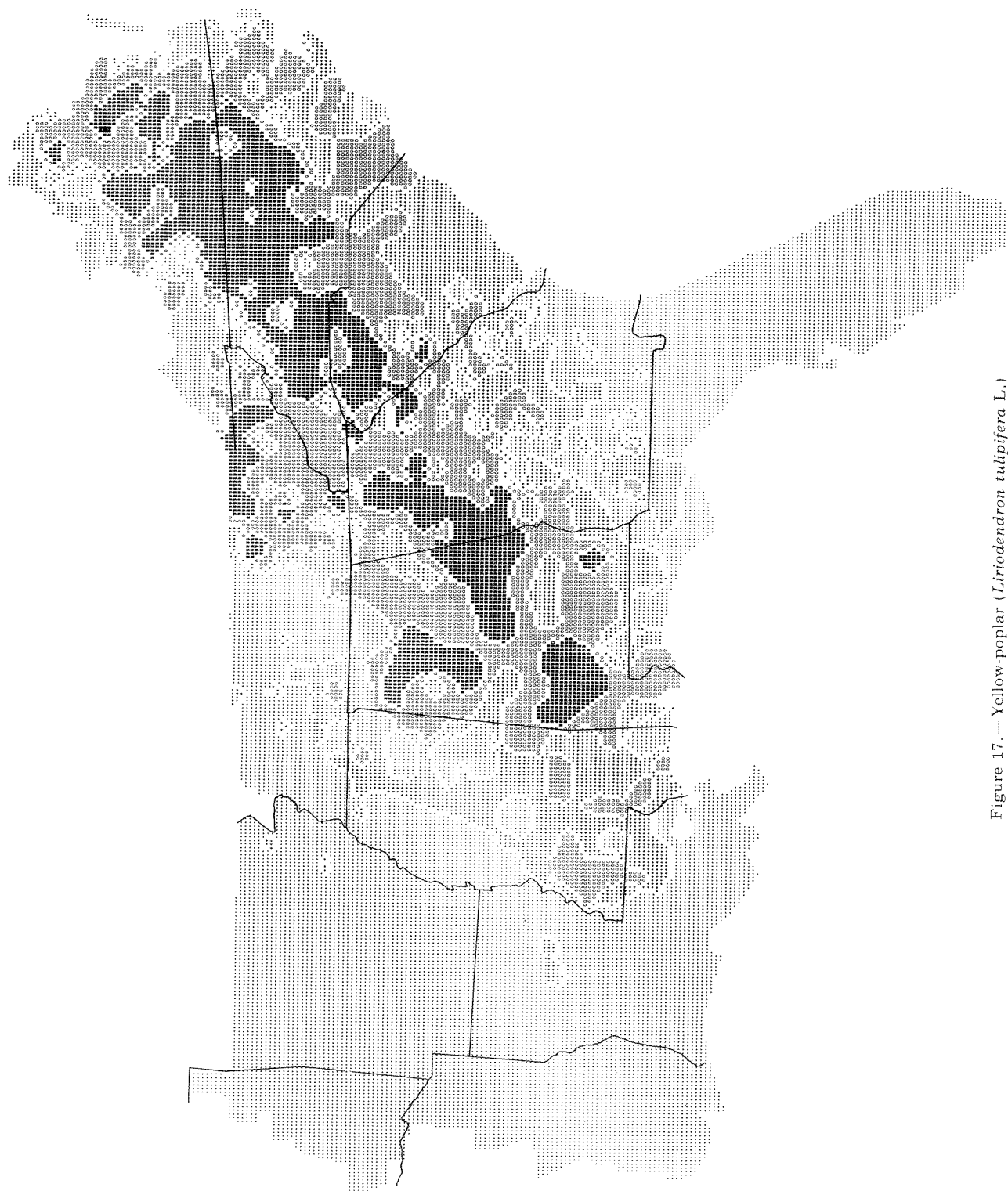


Figure 17. — Yellow poplar (*Liriodendron tulipifera* L.)

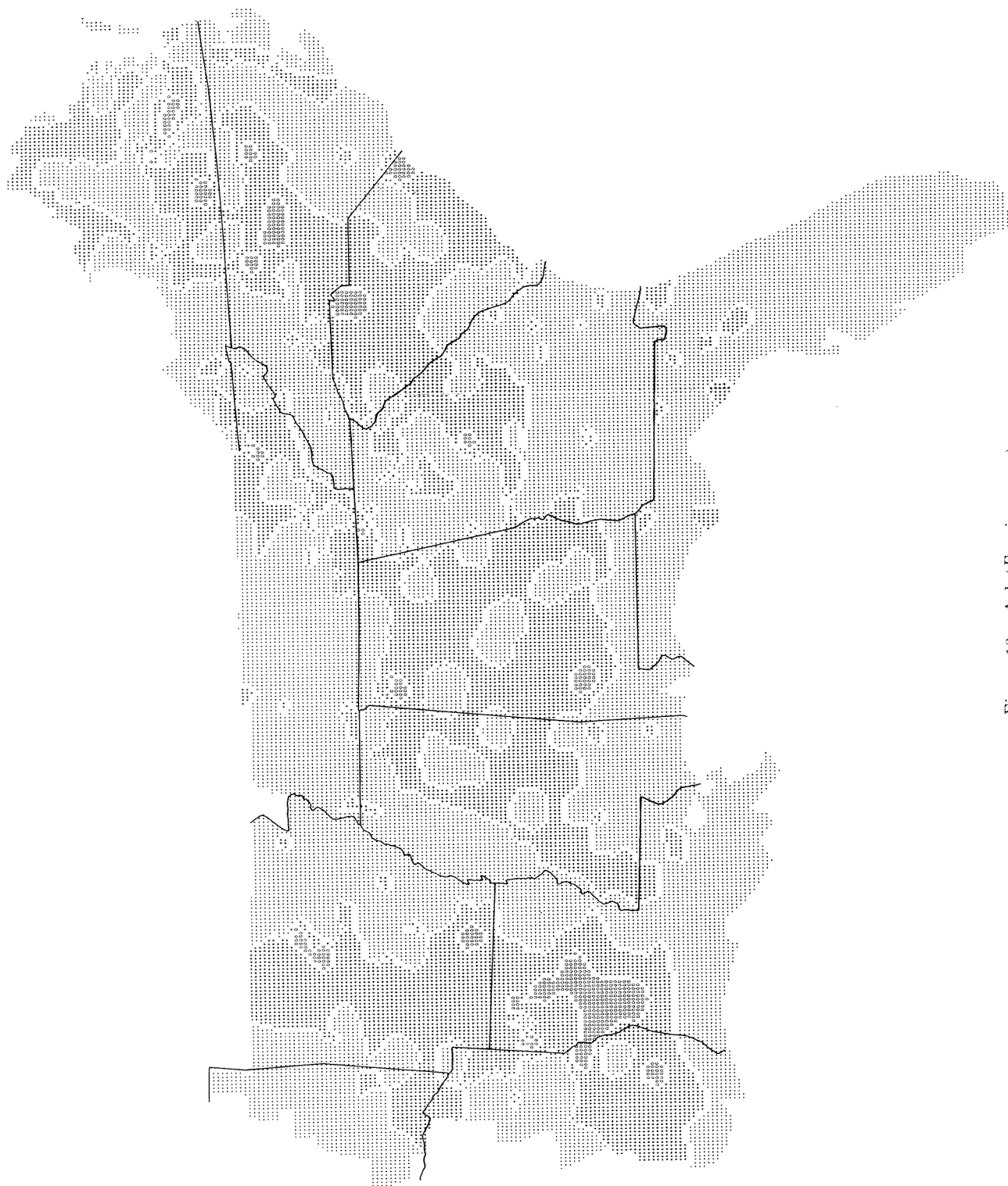


Figure 16. — Ash (*Fraxinus* spp.)

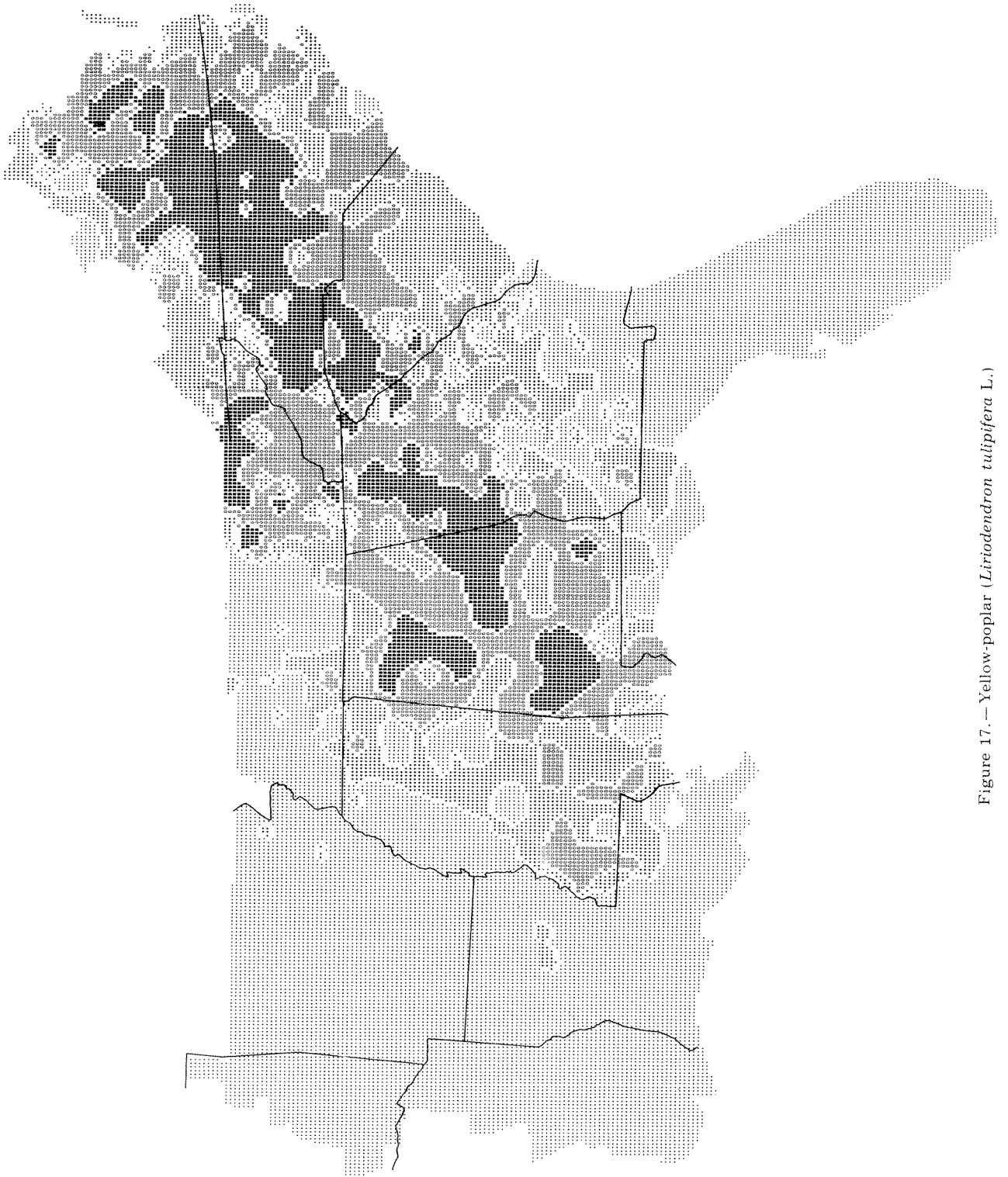


Figure 17. — Yellow-poplar (*Liriodendron tulipifera* L.)

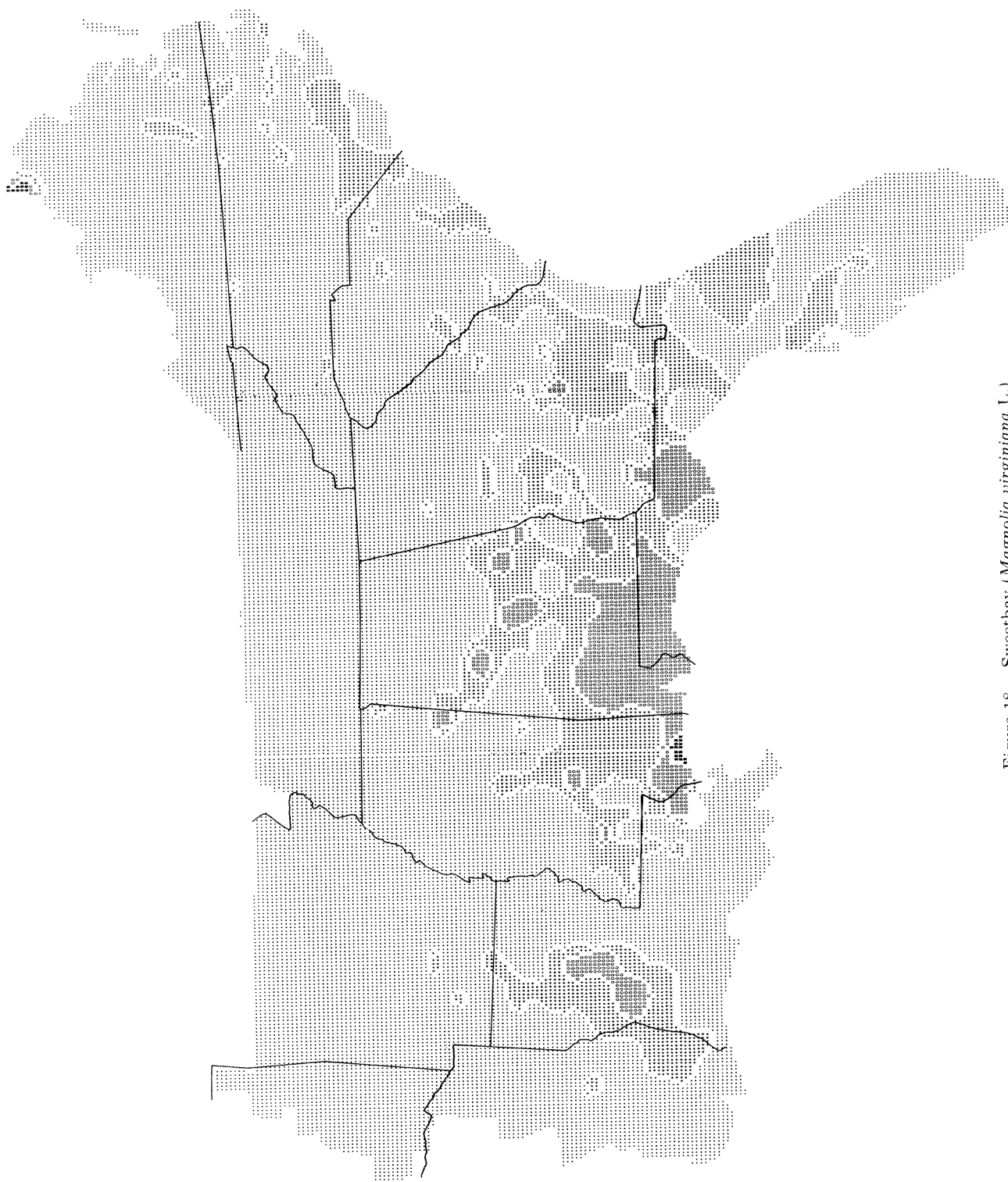


Figure 18. — Sweetbay (*Magnolia virginiana* L.)

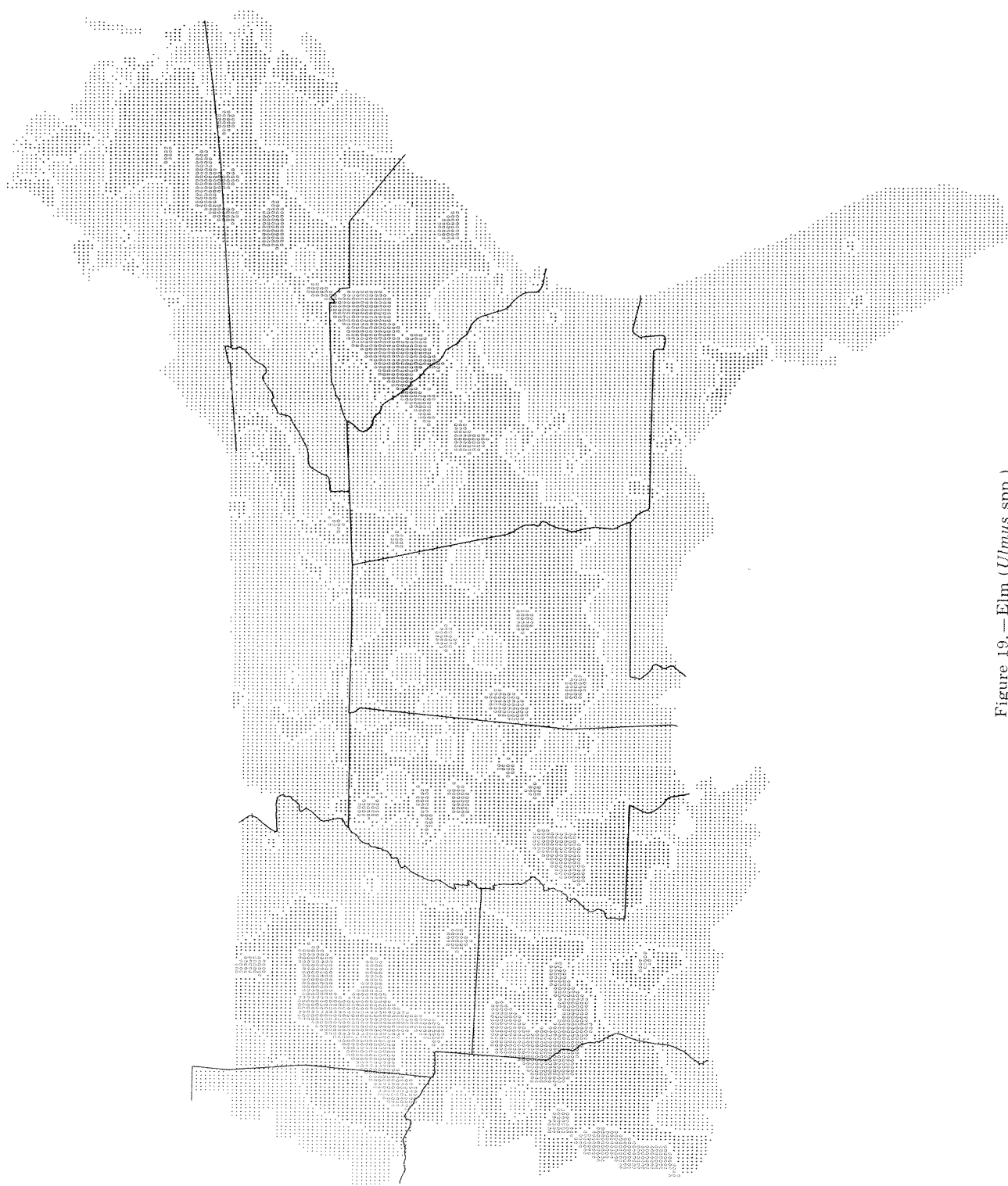


Figure 19. — Elm (*Ulmus* spp.)

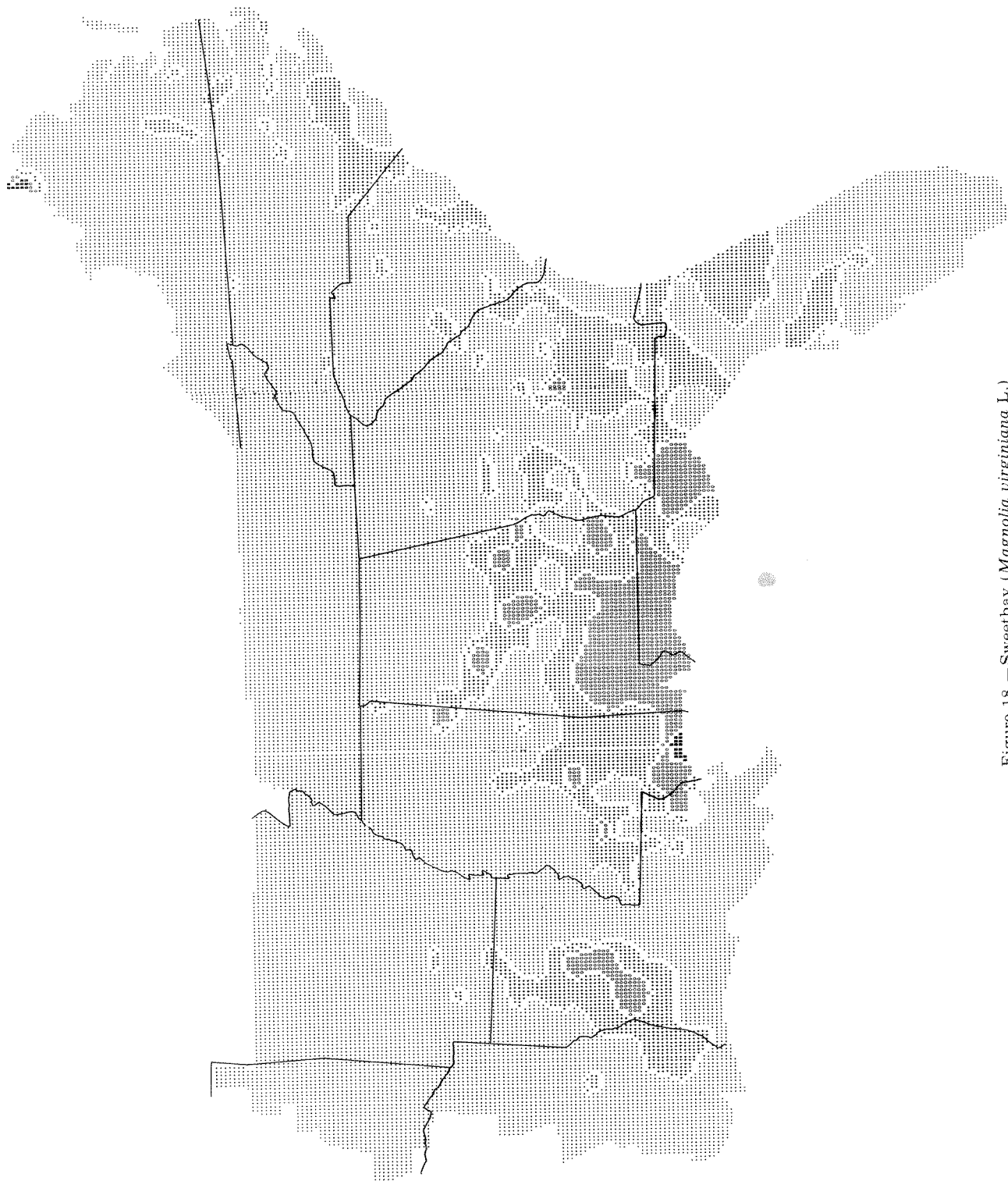


Figure 18. — Sweetbay (*Magnolia virginiana* L.)

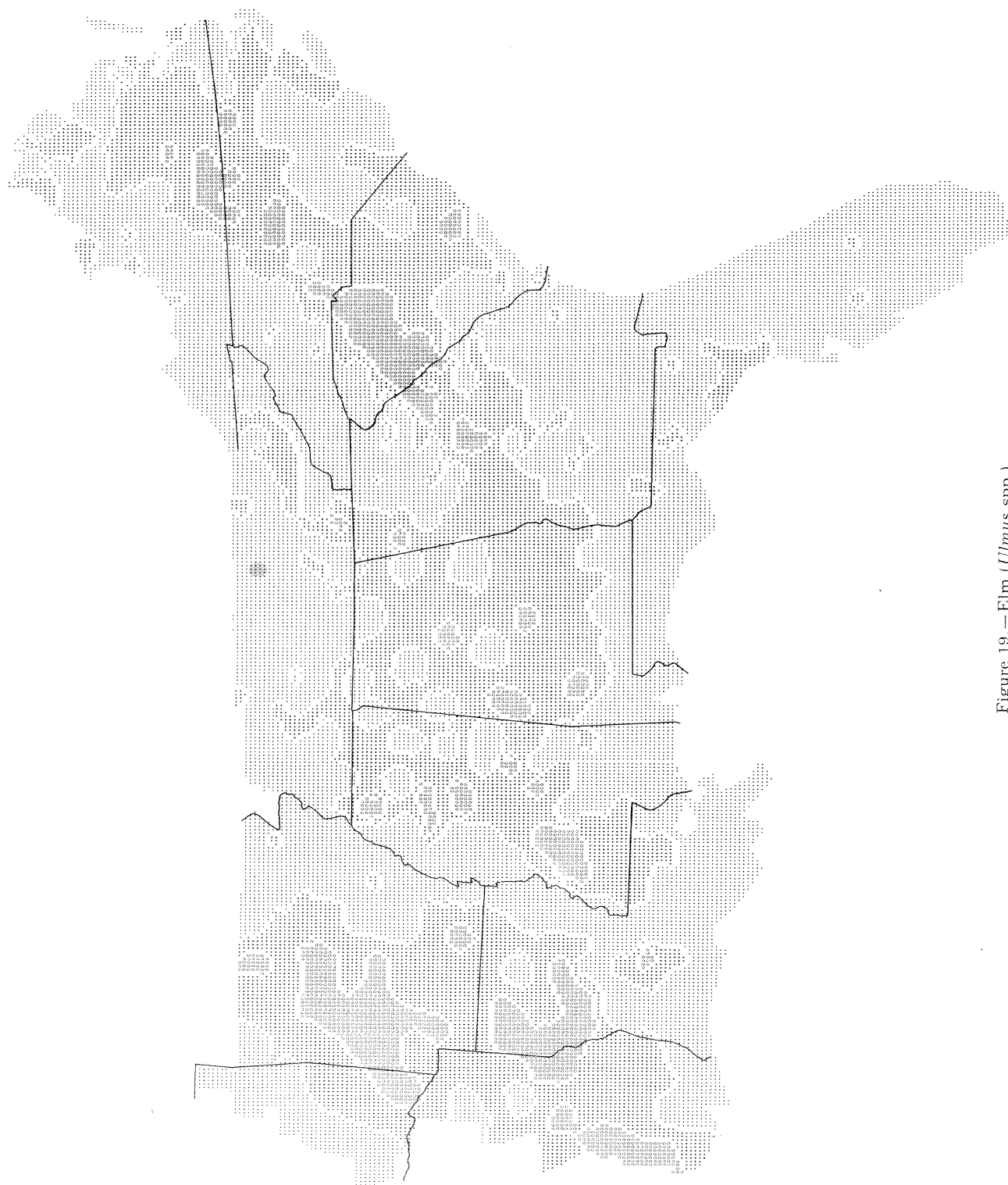


Figure 19. — Elm (*Ulmus* spp.)

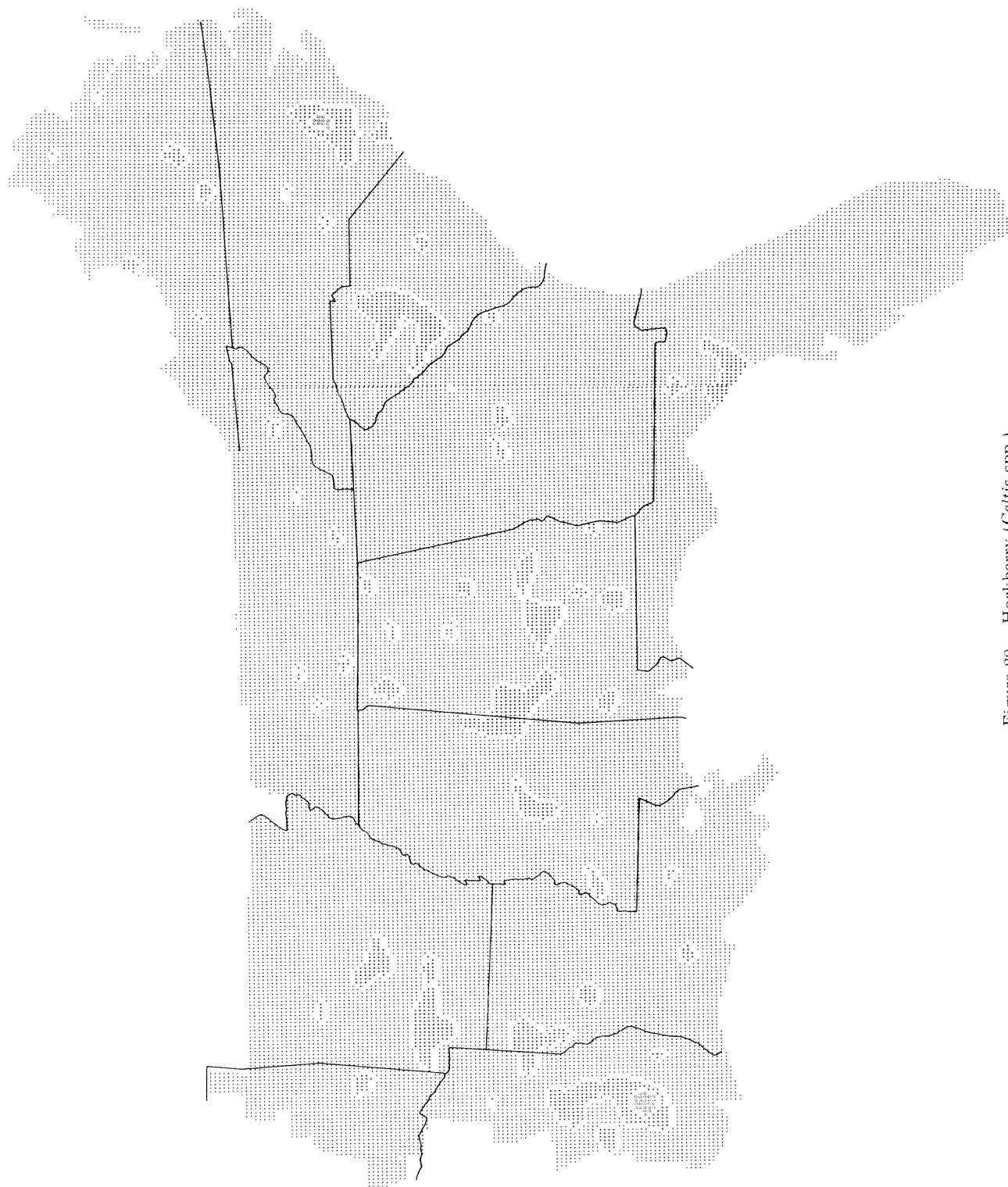


Figure 20.—Hackberry (*Celtis* spp.)

Staff of Forest Resources Research Work Unit.

1976. Hardwood distribution on pine sites in the south.
South. For. Exp. Stn., New Orleans, La. 27p.
(USDA For. Serv. Resour. Bull. SO-59).

Tables and maps present the volumetric distribution of 20 hardwood species occurring on pine sites in the South.

Additional keywords: SYMAP, type conversion, hardwood utilization.

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