TEN YEARS OF INCOME TO LAND FROM UNDEVELOPED MINERAL RIGHTS IN WESTERN OKLAHOMA

TEN YEARS OF INCOME TO LAND FROM UNDEVELOPED MINERAL RIGHTS IN WESTERN OKLAHOMA

By

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CHAPTER I

INTRODUCTION

Income from land in Oklahoma involves not only income from agricultural production but also, of almost equal importance, income from the subsurface.[1] Subsurface income arises in several ways. Most important is the income from actual sale of minerals, but of wider geographic distribution is income derived from the leasing of subsurface rights. The Mid-Continent Oil and Gas Association states in a mimeographed release[2] that, "During the 10 so-called depression years from 1930 to 1939 inclusive, there were in force in the State an average of 72,000 leases, covering an average of 7,350,000 acres annually. This amount of acreage represented more than 16 percent of the 44 million acres in the State."

Other data from the same source indicate that the lease rental per acre averaged 90 cents. Moreover, it was estimated that more than 1,000,000 acres of new leases were taken each year with an average bonus paid of about $10.00 per acre. The same release points out that there were many farmers whose major source of cash income during some depression years consisted of lease rental money. Incomplete investigations by workers in the field of subsurface land economics indicate that such income was at least an important part of total income of some farmers during those years.

Another practice from which landowners realize cash is the selling of subsurface rights; that is, the sale of the right to participate in any

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[1] Statistics compiled by the Mid-Continent Oil and Gas Association show that the 5-year average (1937-41) value of crude oil produced in Oklahoma was $199,645,000. Data from the B.A.E., U.S.D.A., Oklahoma City office show the yearly average cash income from agriculture to be $216,607,000 for the same period.

[2] The Oil Industry in Oklahoma, February 3, 1941.

income accruing to the subsurface whether it be from lease rent and bonuses or from the sale of produced oil. A transaction of this nature is simply the sale of possible future income for a present cash consideration, but it is a means by which a landowner can reduce his capital investment in land.

Although the most important source of income is that derived from the sale of the actual oil and gas, this income accrues to relatively few people.[3] More widely distributed, and the subject for this study, is the income arising from leasing activity.

Purpose and Scope of the Study

Numerous indications point to the fact that landowners give considerable thought when buying and selling land to the possibility of income from leasing their land for oil and gas development. However, there has been little in the nature of empirical data to which anyone could turn to see just how important, from a financial standpoint, is the income from leasing over a period of years. Or, how often can an individual landowner expect to lease his land over a period of years? This study is an attempt to furnish information of this nature by analyzing factual data from public records in a certain segment of the State for a designated period.

It is believed that from these data, it will be possible to establish: (1) the average income derived from undeveloped mineral rights in an area, (2) the income value of these mineral rights, and (3) the chances an individual has of leasing his land.

Edwards[4] in his study of Payne County, in Oklahoma, found that for a 43-year period, 1904-1946, the average income per acre from leasing amounted

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[3] The Mid-Continent Oil and Gas Association estimated that in 1939 oil and gas were being produced on only 620,000 acres. Ibid.

[4] Roy Vernell Edwards, A Study of the Source and Distribution of Income Arising from the Ownership of Mineral Rights in Payne County, Oklahoma, Master's Thesis, Oklahoma A. and M. College, 1947.

to 55 cents per year. He further showed that 36 percent of the land was under lease more than half the time and that 79.2 percent was under lease more than one year out of four. On this basis, he estimated that the income value of the undeveloped mineral rights for the county as a whole would average $11.00 per acre.

Edwards' data show that prior to the late 1930s the proportion of land under lease each year varied widely from the 43-year average. Beginning with about 1938, the proportion of land under lease was relatively stable in that part of Payne County included in the area studied in this thesis. The proportion leased each year after 1938 was roughly equal to the 43-year average.

Payne County lies in a transition zone between the rougher, timbered areas of Central Oklahoma and the prairie land of Western Oklahoma. Also, the county lies at the western edge of the area of intensive mineral exploration occurring before the late 1930s. Leasing activity has been moving westward in recent years. Because Payne County is situated as it is, and because the data show that leasing activity has been relatively stable during recent years, Edwards' study served as a guide in choosing the area to be studied in this thesis and the period of years to be examined.

The area studied is the major portion of Western Oklahoma (Figure 1). The eastern line of the area follows, in general, the eastern border of the Central Prairies and the Low Rolling Plains. The area extends westward to the Texas line except in the Panhandle. At this point, the area extends six miles beyond the western line of Harper County.

The area is relatively uniform physiographically consisting of two natural sub-regions, the Central Prairies and Rolling Plains.[5] It is an

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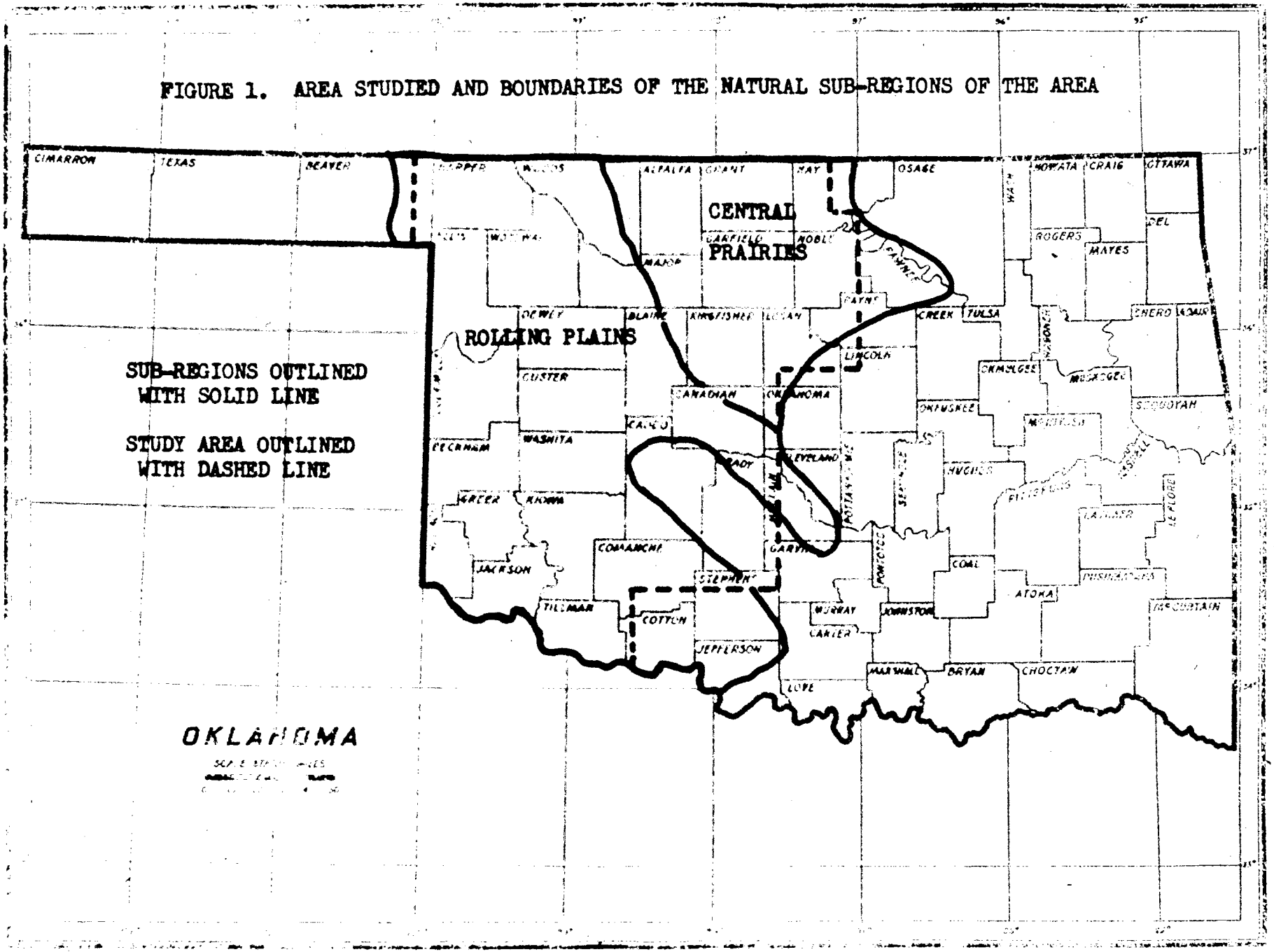
[5] Natural Sub-Regions of the South Central Region (Oklahoma and Texas) Agricultural Atlas, Agricultural Post War Planning Committee, South Central Region, United States Department of Agriculture and State Agricultural Agencies cooperating. (No date).

FIGURE 1. AREA STUDIED AND BOUNDARIES OF THE NATURAL SUB-REGIONS OF THE AREA



area that until the late 1930s saw relatively little mineral exploration and recovery. Newspapers and other sources indicate that oil companies are looking to this section for new sources of oil. It might be expected, therefore, that leasing for oil and gas will be active in the western part of the State.

Edwards' study had indicated that leasing activity, at least along the eastern edge of the present study area, was relatively stable after the late 1930s. This suggested that a considerably shorter period of time than Edwards used might be representative of leasing activity in the area. In order to get as recent data as possible and still keep the project small enough to be manageable, the 10-year period 1938 through 1947 was chosen. The assumption is that this period would not only be fairly representative of the past but would give some indication of leasing activity in at least the immediate future.

CHAPTER II

METHOD OF PROCEDURE

The preliminary investigation was begun by sending questionnaires to 254 oil companies and operators.[1] The questionnaire asked for the number of acres of undeveloped leaseholds held in each county as of that year, 1947. Replies were received from 121 firms, or more than 47 percent of those questioned. Twenty-four of the firms answering had no land under lease. Fifty-seven percent of the firms usually designated as "major oil companies" answered the questionnaire.

Summarizing these returns gave an indication of the intensity of leasing in various counties. This summarization also gave further lead in choosing the study area. With this much data available to indicate that leasing might be a significant source of income, it was felt that as a guide to further study a hypothesis should be formulated.

This hypothesis, broken into three parts, stated: 1. During the past 10 years, the proportion of land under lease for oil and gas has averaged 50 percent of all farmland in Western Oklahoma.

2. Leasing activity results in a significant supplementary income to landowners of Western Oklahoma.

3. Capitalization of income from leasing will indicate the value of undeveloped mineral rights and serve as a basis of judgment on the part of landowners for evaluating their property rights in the subsurface.

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[1] This list was furnished by the Mid-Continent Oil and Gas Association in the form of a mimeographed booklet entitled, List of Representative Petroleum Industry Units Operating in Oklahoma and Kansas. The Secretary of the Association, Mr. Clarel B. Mapes, designated the firms who normally are active lessees of land for oil and gas.

The first problem to be dealt with was that of determining how much land was under lease in the area during each year of the period under study. A study of the entire universe was obviously out of the question because of cost and time requirements. Some sampling technique, therefore, seemed to be the best solution.

There are, in the study area, 23 complete counties and portions of 12 other counties consisting of roughly 15,791,000 acres of land in farms (Table I). The study was undertaken with the idea of dividing the study area into six sub-areas. The counties comprising each segment were determined by the leasing activity of major oil companies during the last five years of the study period. After the area was divided, it was contemplated that a rather intensive study of one county within each sub-area would be made. The county chosen was to be the one that seemed to be most representative of each particular segment as revealed by the study of leasing activity of these major companies.[2]

However, even after the counties were chosen for sampling (Figure 2), it was apparent that a further reduction in the size of the sample was necessary --that is, all of the land within the sample counties could not be studied. Consideration was given to the random sampling of several survey townships within the county. However, the nature of leasing activity seemed to rule out this course. Random sampling, even within all survey townships of the county apparently would not be a representative sample.[3] Leasing of land may or may not be randomized. It is well known that leasing frequently follows

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[2] Statistics of this nature are available in the Yearbook of the National Oil Scouts and Landmen's Association, Volumes VII and XVII. However, the data are rather sparse prior to Volume XIV in the yearbooks.

[3] A random sample drawn of sections of a hypothetical township closely grouped the sample areas in one part of the township.

Table I. Total Farmland Area, Acres and Percentage Leased Each Year, 1937-1947, Western Oklahoma

County		Total Acres of Farmland*	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Sub-Area I							(Acres and Percentage Leased)						
Part Beaver	(Acres)	240,640	22,139	22,139	13,957	6,016			16,123	16,123	24,064	74,117	98,181
	(Percent)		9.2	9.2	5.8	2.5	0.0	0.0	6.7	6.7	10.0	30.8	40.8
Harper	(Acres)	605,000	55,660	59,895	45,980	23,595	19,360	22,385	47,190	52,635	133,100	232,925	270,435
	(Percent		9.2	9.9	7.6	3.9	3.2	3.7	7.8	8.7	22.0	38.5	44.7
Woods	(Acres)	771,000	131,070	109,482	87,123	67,077	60,138	56,283	128,757	183,498	283,728	349,263	454,890
	(Percent)		17.0	14.2	11.3	8.7	7.8	7.3	16.7	23.8	36.8	45.3	59.0
Major	(Acres)	566,000	63,958	45,280	95,088	95,088	73,014	41,884	41,884	335,638	367,900	369,598	406,388
	(Percent)		11.3	8.0	16.8	16.8	12.9	7.4	7.4	59.3	65.0	65.3	71.8
Woodward	(Acres)	748,000	28,424	37,400	24,684	24,684	43,348	50,116	87,516	230,384	382,976	483,208	517,616
	(Percent)		3.8	5.0	3.3	3.3	5.8	6.7	11.7	30.8	51.2	64.6	69.2
Ellis	(Acres)	704,000	108,570	108,570	71,808	63,360	63,360	63,360	80,960	90,112	160,512	274,570	221,056
	(Percent)		15.4	15.4	10.2	9.0	9.0	9.0	11.5	12.8	28.8	39.0	31.4
Dewey	(Acres)	598,000	23,322	23,322	23,322	23,322	36,478	23,322	49,634	116,012	159,666	192,556	192,556
	(Percent)		3.9	3.9	3.9	3.9	6.1	3.9	8.3	19.4	26.7	32.2	32.2
Blaine	(Acres)	552,000	126,408	103,224	166,704	166,704	131,928	80,592	126,408	299,184	307,464	359,352	376,464
	(Percent)		22.9	18.7	30.2	30.2	23.9	14.6	22.9	54.2	55.7	65.1	68.2
SUB-AREA I - TOTAL	(Acres)	4,784,640	559,551	509,312	528,666	469,846	427,626	337,942	578,472	1,323,586	1,819,410	2,335,589	2,537,586
	(Percent)		11.69	10.64	11.05	9.82	8.94	7.06	12.09	27.66	38.03	48.81	53.04
Sub-Area II													
Roger Mills	(Acres)	696,000	105,096	92,568	83,520	44,544	37,584	33,408	44,544	48,024	58,464	87,000	184,440
	(Percent)		15.1	13.3	12.0	6.4	5.4	4.8	6.4	6.9	8.4	12.5	26.5
Custer	(Acres)	595,000	32,130	26,180	26,180	29,155	27,965	21,420	21,420	75,565	101,745	164,815	164,815
	(Percent)		5.4	4.4	4.4	4.9	4.7	3.6	3.6	12.7	17.1	27.7	27.7
Beckham	(Acres)	537,000	131,565	113,844	89,679	58,533	31,146	58,533	58,533	44,571	122,289	91,782	227,151
	(Percent)		24.5	21.2	16.7	10.9	5.8	10.9	10.9	8.3	22.8	17.1	42.3
SUB-AREA II - TOTAL	(Acres)	1,828,000	268,791	232,592	199,379	132,232	96,695	113,361	124,497	168,160	282,498	343,597	576,406
	(Percent)		14.70	12.72	10.91	7.23	5.29	6.20	6.81	9.20	15.45	18.80	31.53
Sub-Area III													
Part Comanche	(Acres)	430,000	42,570	46,870	55,900	49,450	49,450	55,900	53,750	49,450	64,930	87,290	85,140
	(Percent)		9.9	10.9	13.0	11.5	11.5	13.0	12.5	11.5	15.1	20.3	19.8
Part Cotton	(Acres)	85,000	12,070	12,070							12,070	6,035	
	(Percent)		14.2	14.2	0.0	0.0	0.0	0.0	0.0	0.0	14.2	7.1	0.0

(Continued)

Table I. Total Farmland Area, Acres and Percentage Leased Each Year, 1937-1947, Western Oklahoma - Continued

County		Total Acres of Farmland*	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
						(Acres and Percentage Leased)							
Tillman	(Acres)	531,000	210,276	181,602	127,440	104,076	82,305	96,642	75,402	79,119	96,111	176,823	125,316
	(Percent)		39.6	34.2	24.0	19.6	15.5	18.2	14.2	14.9	18.1	33.3	23.6
Jackson	(Acres)	470,000	90,710	91,180	66,740	51,700	51,700	69,560	43,240	43,240	52,640	76,140	68,620
	(Percent)		19.3	19.4	14.2	11.0	11.0	14.8	9.2	9.2	11.2	16.2	14.6
Kiowa	(Acres)	622,000	59,712	77,128	73,396	68,420	63,444	69,042	89,568	93,922	106,362	110,094	129,998
	(Percent)		9.6	12.4	11.8	11.0	10.2	11.1	14.4	15.1	17.1	17.7	20.9
Greer	(Acres)	380,000	55,480	50,160	47,500	47,500	47,500	67,640	60,040	60,040	57,380	60,040	69,920
	(Percent)		14.6	13.2	12.5	12.5	12.5	17.8	15.8	15.8	15.1	15.8	18.4
Harmon	(Acres)	309,000	40,788	47,277	47,277	37,698	66,126	69,216	29,973	17,304	6,180	12,669	25,338
	(Percent)		13.2	15.3	15.3	12.2	21.4	22.4	9.7	5.6	2.0	4.1	8.2
SUB-AREA III - TOTAL	(Acres)	2,827,000	511,606	506,287	418,253	358,844	360,525	428,000	351,973	343,075	395,673	529,091	504,332
	(Percent)		18.10	17.91	14.79	12.69	12.75	15.14	12.45	12.14	14.00	18.71	17.84
Sub-Area IV													
Grady	(Acres)	654,000	213,204	128,184	109,218	131,454	124,260	109,218	149,766	170,040	390,438	432,948	464,340
	(Percent)		32.6	19.6	16.7	20.1	19.0	16.7	22.9	26.0	59.7	66.2	71.0
Caddo	(Acres)	801,000	177,021	216,270	152,991	173,016	173,016	113,742	140,976	156,996	294,768	326,007	378,072
	(Percent)		22.1	27.0	19.1	21.6	21.6	14.2	17.6	19.6	36.8	40.7	47.2
Part Stephens	(Acres)	109,000	27,250	22,672	31,828	40,875	40,875	22,672	40,875	54,500	68,125	68,125	76,082
	(Percent)		25.0	20.8	29.2	37.5	37.5	20.8	37.5	50.0	62.5	62.5	69.8
Washita	(Acres)	614,000	132,010	150,430	147,360	147,360	147,360	173,762	217,356	270,774	289,808	273,844	324,192
	(Percent)		21.5	24.5	24.0	24.0	24.0	28.3	35.4	44.1	44.2	44.6	52.8
Part McClain	(Acres)	115,000	67,045	15,985	22,310	19,205	19,205	31,970	38,295	25,530	48,760	87,055	87,055
	(Percent)		58.3	13.9	19.4	16.7	16.7	27.8	33.3	22.2	42.4	75.7	75.7
Part Garvin	(Acres)	46,000	19,182	7,682		7,682	7,682			15,318	23,000	23,000	30,682
	(Percent)		4.17	16.7	0.0	16.7	16.7	0.0	0.0	33.3	50.0	50.0	66.7
SUB-AREA IV - TOTAL	(Acres)	2,339,000	635,712	541,223	463,707	519,592	512,398	451,364	587,268	693,158	1,114,899	1,210,979	1,360,423
	(Percent		27.18	23.14	19.83	22.21	21.91	19.31	25.11	29.63	47.67	51.77	58.16
Sub-Area V													
Alfalfa	(Acres)	507,000	147,582	162,789	129,210	134,721	129,495	95,373	84,729	156,342	174,832	216,444	316,929
	(Percent)		29.1	32.1	25.5	26.6	25.5	18.8	16.7	30.8	34.5	42.7	62.5
Garfield	(Acres)	647,000	323,500	307,325	323,500	272,387	234,214	183,101	188,924	307,325	350,674	350,675	383,024
	(Percent)		50.0	47.5	50.0	42.1	36.2	28.3	29.2	47.5	54.2	54.2	59.2

(Continued)

Table I. Total Farmland Area, Acres and Percentage Leased Each Year, 1937-1947, Western Oklahoma - Continued

County		Total Acres of Farmland*	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
			(Acres and Percentage Leased)										
Kingfisher	(Acres)	540,000	250,020	268,380	251,640	226,260	218,700	111,240	207,900	392,580	417,960	362,880	370,440
	(Percent)		46.3	49.7	46.6	41.9	40.5	20.6	38.5	74.7	77.4	67.2	68.6
Canadian	(Acres)	526,000	142,020	107,830	136,760	139,390	106,252	76,796	195,672	253,532	248,272	254,058	266,156
	(Percent)		27.0	20.5	26.0	26.5	20.2	14.6	37.2	48.2	47.2	48.3	50.6
Part Logan	(Acres)	349,000	174,500	198,930	184,970	139,600	118,660	83,760	125,640	195,440	205,910	184,970	184,970
	(Percent)		50.0	57.0	53.0	40.0	34.0	24.0	36.0	56.0	59.0	53.0	53.0
Part Oklahoma	(Acres)	80,640	22,015	7,338	14,676	22,015	14,676	7,338	36,611	47,658	47,658	43,949	36,611
	(Percent)		27.3	9.1	18.2	27.3	18.2	9.1	45.4	59.1	59.1	54.5	45.4
SUB-AREA V - TOTAL	(Acres)	2,649,640	1,059,637	1,052,592	1,040,756	934,373	821,997	557,608	839,476	1,352,877	1,445,306	1,412,976	1,558,130
	(Percent)		39.99	39.73	39.28	35.26	31.02	21.04	31.68	51.06	54.55	53.33	58.81
Sub-Area VI													
Grant	(Acres)	616,000	308,000	315,392	293,216	289,520	256,872	179,872	152,152	146,608	142,912	142,912	172,480
	(Percent)		50.0	51.2	47.6	47.0	41.7	29.2	24.7	23.8	23.2	23.2	28.0
Part Kay	(Acres)	176,400	51,685	53,625	46,040	30,694	32,634	38,279	47,981	34,574	38,279	38,279	53,625
	(Percent)		29.3	30.4	26.1	17.4	18.5	21.7	27.2	19.6	21.7	21.7	30.4
Part Noble	(Acres)	389,000	101,918	87,525	94,138	77,800	59,906	103,863	137,706	131,093	105,419	112,421	150,543
	(Percent)		26.2	22.5	24.2	20.0	15.4	26.7	35.4	33.7	27.1	28.9	38.7
Part Payne	(Acres)	149,140	80,536	79,044	69,350	53,690	61,147	59,656	62,639	52,199	59,656	52,945	45,786
	(Percent)		54.0	53.0	46.5	36.0	41.0	40.0	42.0	35.0	40.0	35.5	30.7
Part Lincoln	(Acres)	34,500	20,355	20,907	15,352	15,352	15,904	14,800	15,904	11,212	11,212	11,212	8,970
	(Percent)		59.0	60.0	44.5	44.5	46.1	42.9	46.1	32.5	32.5	32.5	26.0
SUB-AREA VI - TOTAL	(Acres)	1,365,040	562,494	556,493	518,096	467,056	426,463	396,470	416,382	395,686	357,478	357,769	431,404
	(Percent)		41.21	40.77	37.95	34.22	31.24	29.04	30.50	27.52	26.19	26.21	31.60
AREA TOTAL	(Acres)	15,793,320	3,597,791	3,398,499	3,168,857	2,881,943	2,645,704	2,284,745	2,898,068	4,256,542	5,358,509	6,161,770	6,968,281
	(Percent)		22.78	21.52	20.06	18.25	16.75	14.47	18.35	26.95	33.93	39.02	44.12
Sample Counties Only PERCENT LEASED			22.65	20.58	19.63	18.12	16.31	13.71	18.11	27.39	29.09	33.52	41.95

* Rounded to the nearest thousand where a complete county is studied.

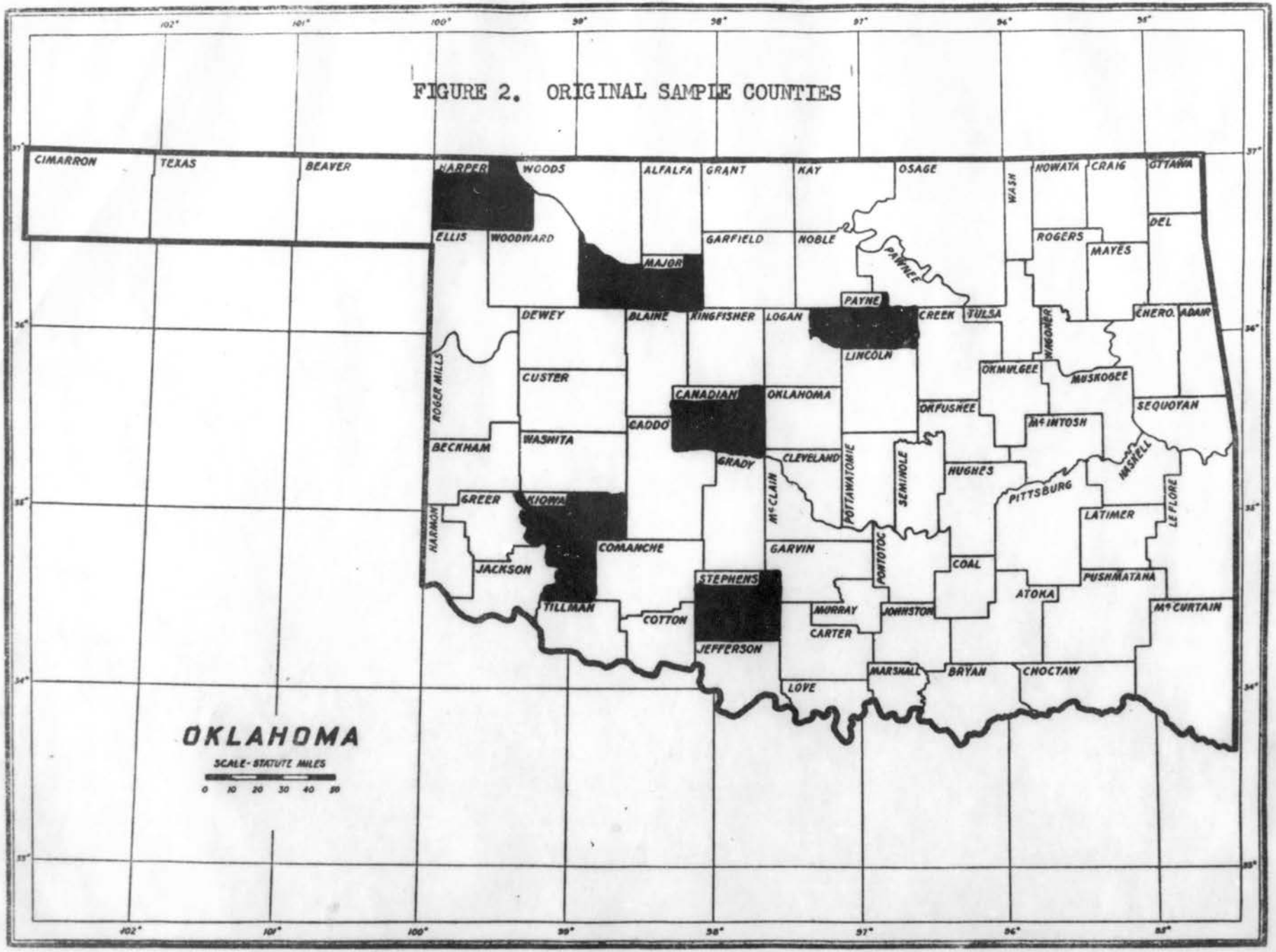
FIGURE 2. ORIGINAL SAMPLE COUNTIES
OKLAHOMA
SCALE - STATUTE MILES
0 10 20 30 40 50
CIMARRON
TEXAS
BEAVER
HARPER
WOODS
ALFALFA
GRANT
KAY
OSAGE
WASH
NOWATA
CRAIG
OTTAWA
ELLIS
WOODWARD
GARFIELD
NOBLE
PAWNEE
ROGERS
MAYES
DEL
MAJOR
PAYNE
DEWEY
BLAINE
KINGFISHER
LOGAN
CREEK
TULSA
WAGONER
CHERO.
ADAIR
LINCOLN
ROGER MILLS
CUSTER
CANADIAN
OKLAHOMA
OKMULGEE
MUSKOGEE
ORFUSHEE
SEQUOYAH
CADDO
Mc INTOSH
BECKHAM
WASHITA
GRADY
CLEVELAND
POTTAWATOMIE
SEMINOLE
HUGHES
MUSKELL
PITTSBURG
GREER
KIOWA
Mc CLAIN
HARMON
LATIMER
LE FLORE
COMANCHE
GARVIN
JACKSON
STEPHENS
PONTOTOC
COAL
PUSHMATAHA
ATOKA
TILLMAN
COTTON
MURRAY
JOHNSTON
Mc CURTAIN
CARTER
JEFFERSON
MARSHALL
BRYAN
CHOCTAW
LOVE
102°
101°
100°
99°
98°
97°
96°
95°
37°
36°
35°
34°
33°

trends of favorable subsurface structures as revealed by seismograph or other means of choosing leases. This is particularly true in leasing done by the larger operators who employ seismograph crews or geologists. For this reason, it was believed that a geographic distribution of the sample within each survey township was preferable to a random sample. Accordingly, the southwest quarter of sections 3, 13, 15, 17, 26, 29, and 33 were selected for study. The southwest quarter of section six was designated as an alternate to be used when for some reason one of the regular quarters could not be used.[4] An effort was made, therefore, to get a sample of seven quarter-section tracts in each complete township. A sample this size constitutes 4.85 percent of the land in a township.

When the data from one county were compiled, the adequacy of the sample was checked by splitting the sample into two parts. It was found that as valid results were obtained with a sample of three quarters per township as with a seven-quarter sample. After checking data from three counties by this method, the clerks in the remaining three counties were instructed to cut down the size of the sample to three quarters, the southwest of 3, 13, and 29. Reducing the number of quarters studied not only lowered costs but accelerated the work.

Data for the smaller sample could be compiled in less than half the time required for the original sample. It appeared feasible, therefore, to increase the number of sample counties and nine more counties were selected for sampling. This gave a sample of 15 counties in the area (Figure 3). The additional counties were selected so as to be well distributed over the entire area.

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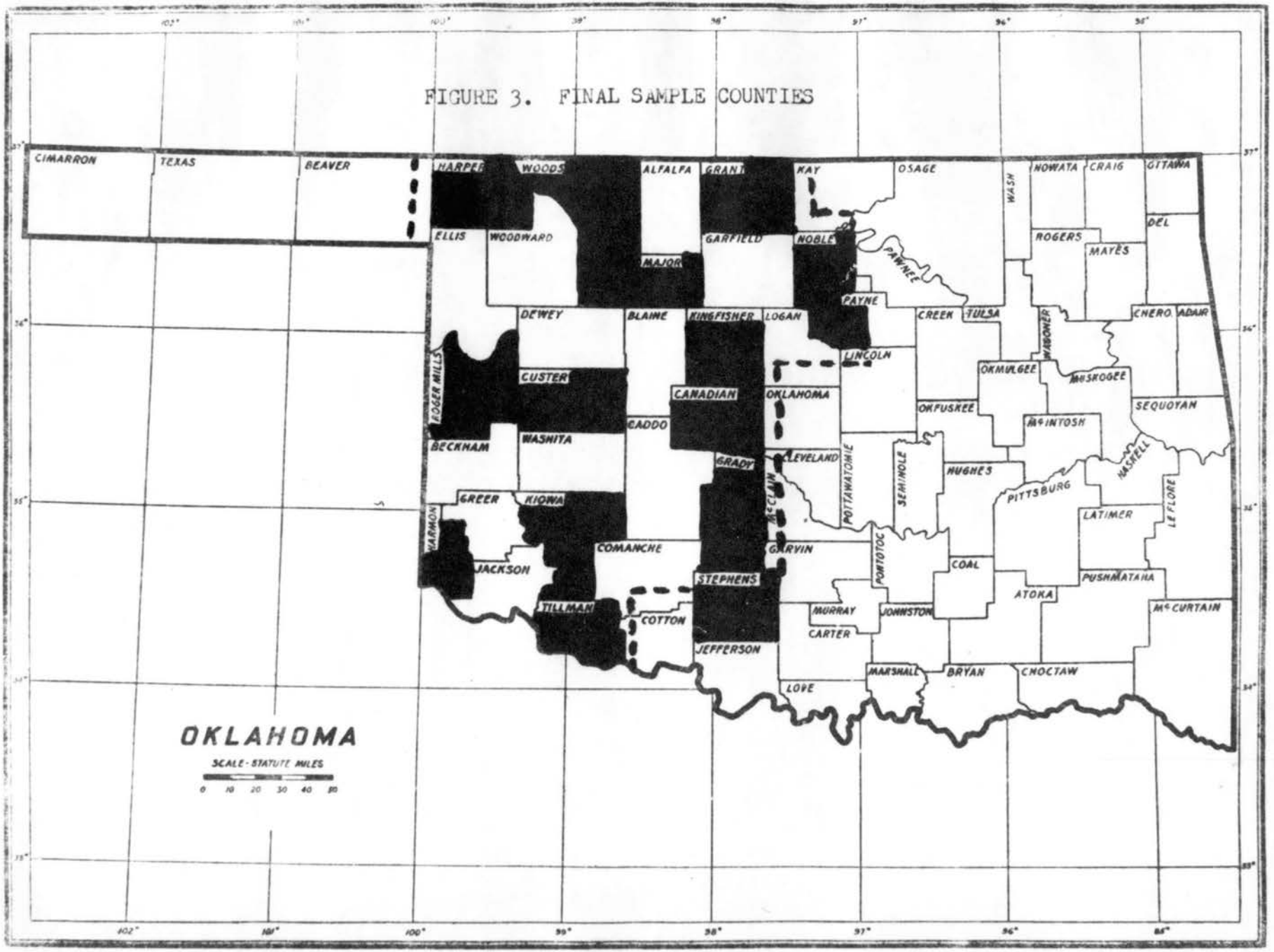
[4] A regular quarter was considered unusable when it lay in a town or city, was publicly owned, or where property rights transfers were so confusing as to be nearly impossible to follow.

FIGURE 3. FINAL SAMPLE COUNTIES



However, because of the failure of the person hired in Stephens County to do the work, the results are based on a 14 county sample and apply to an area somewhat smaller than originally planned.

A Critique of the Sampling Method

The method of selecting the sample may be open to criticism. For instance, why were these particular sample counties chosen? As stated earlier, the original six counties were chosen after an examination of data pertaining to the leasing activity of major oil companies showed them to be fairly typical of the average of adjoining counties. The nine chosen later were selected so as to give maximum geographic distribution over the area. A random selection of counties was considered. This process of selection was not carried out because of the danger of clustering or grouping the sample counties in one part of the area. Such a grouping obviously would not have reflected the true picture of the whole area. The breaking down of the area into numerous segments and taking a random selection from each was considered. However, even this would not have entirely eliminated the element of arbitrary selection. Random sampling is of greatest value when little or nothing is known of the characteristics of the universe. Considerable is known of the characteristics of leasing. Furthermore, in research in land economics, geographic distribution is a prerequisite to an adequate study of the universe. It is believed, therefore, that the present selection of counties, and the stratified sampling within the county will present as accurate a picture of leasing activity as can be obtained without studying more counties or in some other way greatly increasing the size of the sample.

Method of Summarizing Data

The data pertaining to the leasing activity for each quarter section were tabulated for each year of the 10-year period. A total of the land

sampled was obtained by adding together the acreage of all quarter sections sampled in the county.[5] The percentage of land under lease each year was obtained by dividing the total acreage in the sample into the total of the acreage leased each year. This percentage figure was then applied to the total acres of farmland in the county in 1940.[6]

Imputing Acreages in Non-Sampled Counties

To obtain the acreage leased in the counties not sampled, the following procedure was used. Survey townships in the sample counties nearest to the unsampled counties were picked out for separate analysis. For example, in computing the percentage of land leased in Dewey County, the bordering townships next to Dewey County in Major, Roger Mills, and Custer were analyzed. From this analysis the percentage of acres leased each year in all of these townships was determined. These percentage figures were then applied to the total acreage of land in farms in Dewey County. This gave an indication of the acres under lease each year in that county.

In cases where a county was not fairly well surrounded by sample counties, only a portion of that county was considered to be in the study area; namely, Comanche, McClain, Garvin, Stephens, Cotton, Oklahoma, Logan, Lincoln, Kay, and Beaver.[7] In each of these counties only the portions so situated that they might logically be considered as similar to adjoining sampled townships are included within the area (See Figure 3).

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[5] A quarter section ordinarily is 160 acres but may be slightly more or less.

[6] United States Census of Agriculture, 1945, Vol. 1, Pt. 25. The year 1940 was used in view of the fact that it was believed to be more normal. The acres in farmland were used instead of total land area because only farmland was sampled.

[7] While only portions of Noble and Payne are included in the study, they are both sample counties.

Acreage arrived at by this method is, of course, subject to error. As mentioned earlier, leasing may or may not be randomized. In many instances, leasing follows definite trends of subsurface structures. A trend might be broken by a river or other natural feature, but not by a county line. In those instances, therefore, where county lines do not coincide with natural barriers, leasing activity will be similar on each side of the line. This method of imputation was devised in lieu of sampling all counties. The data show (Table I) that the total percentage leased in the sample counties closely approaches the calculated percentages for the area as a whole. An explanation for the comparatively wide variations between the two figures for the last three years of the study period, probably can be found in the situation appearing in the northwestern part of the area. For instance, calculations for Woodward, one of the largest counties of the area, show that 69.2 percent was under lease in 1947. Major County to the east shows 71.8 percent leased, Harper County to the North shows 44.7 percent leased, and Woods County to the north shows 59.0 percent leased. However, a calculation of land leased in townships bordering Woodward County shows that for 1947 the bordering townships in Major County were 54.8 percent leased, in Harper County 76.2 percent leased and in Woods County 77.8 percent leased. It can be seen that in both Harper and Woods counties the greatest intensity of leasing was found next to Woodward County. It seems reasonable, therefore, to assume that leasing activity in Woodward County might be somewhat higher than adjoining counties.[8]

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[8] As a further check, a two quarter-section sample of each survey township in Woodward County was tabulated to see how much land was under lease in 1947. This sample showed that 70.4 percent of the land was under lease in that year.

CHAPTER III

LAND LEASED

Introduction

Most landowners have neither the finances nor the skill required to explore for and reduce to possession the oil and gas that might be found under their land. Such activity is left almost entirely to oil operators whose business is the exploration, production and marketing of petroleum. Landowners, therefore, are generally ready to lease their land for this purpose. The lease gives the lessee the right to come on the land and explore for the minerals which might be found beneath the surface. If oil is found in paying quantities, then the lease further provides that the oil operator can take it and pay to the landowner one-eighth of the gross proceeds from its sale. If the landowner does not own all the subsurface rights, he shares in the one-eighth in proportion to the amount of the subsurface rights he does own.

Most leases are written to cover either a five- or a ten-year period. The lessee may commence actual drilling any time during this period. However, practically all leases provide that unless drilling is started within a year after the lease is made, the lessee will forfeit the lease unless he pays an amount stated in the contract to keep it in force. This payment is called a delay rental and, as the name implies, is simply a payment to the landowner for the right to delay drilling for another year. The operator may make these delay rental payments for the life of the lease.[1]

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[1] It sometimes happens that a lessee will forfeit his lease for non-payment of delay rent without giving a lease release; or the release may not be recorded by the lessor. In any case where no release was shown, it was assumed in this study that the lease ran for the duration of the term of the lease. It should be pointed out, however, that in nearly all cases releases are given promptly and as promptly recorded. Landowners know that it is to their interest to have such releases on record so that potential lessees will know their land is available for lease.

The privilege of paying delay rental is a convenience to oil operators who do not wish to begin drilling within the first year of the lease. There may be any number of reasons for the delay. The lessee may want to explore further the possibilities of getting oil if a well is sunk since drilling an oil well is a costly venture. The lessee may wish to wait for higher oil prices; he may not be able to get the required equipment. Still, the possibilities of finding oil are great enough that the lessee may be willing to continue delay rental payments in order to keep the lease. It is for this reason that a considerable proportion of land is constantly under lease in Oklahoma.

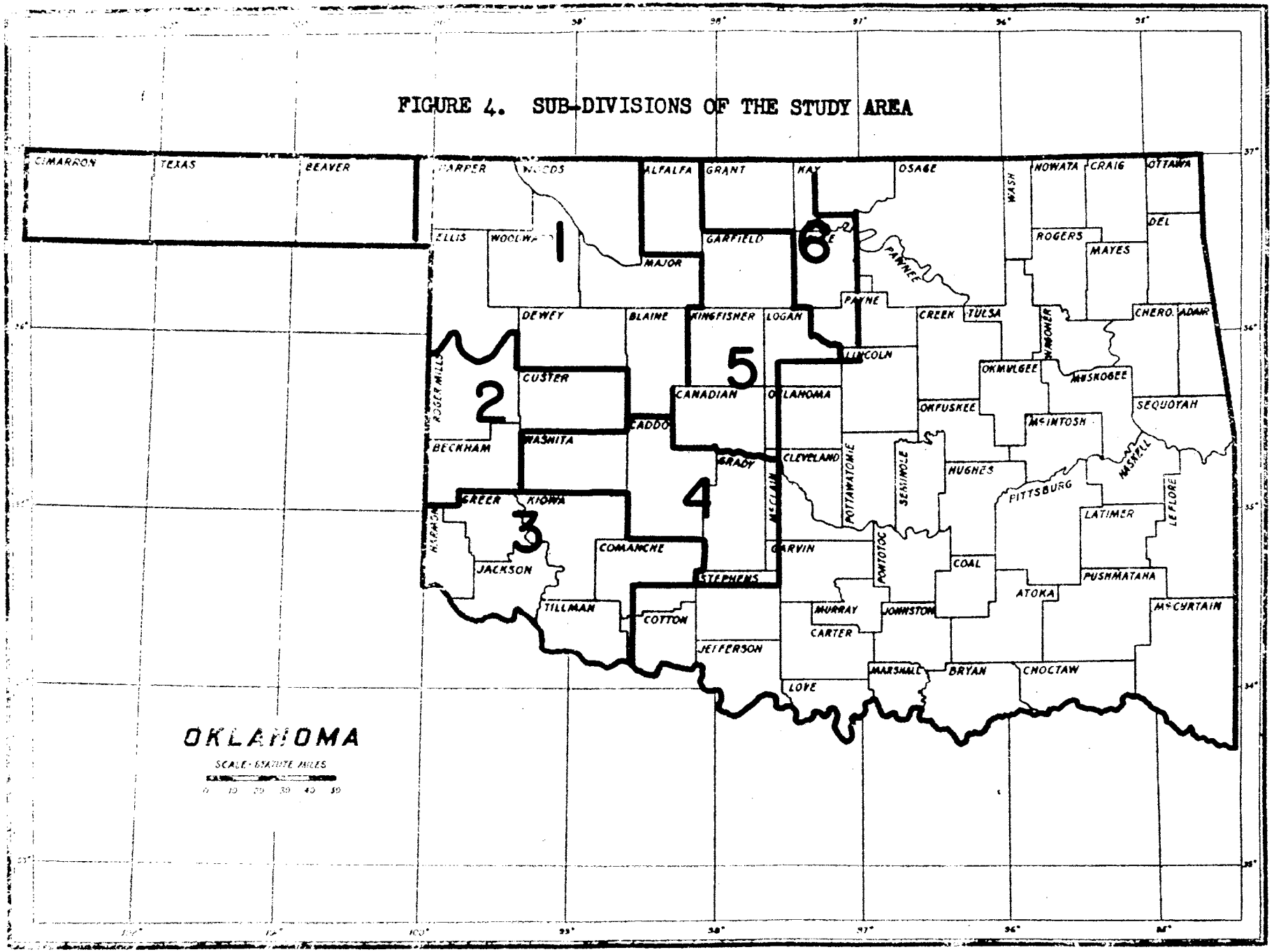
In Chapter I it was pointed out that only a portion of Oklahoma is to be studied. There may be great variations in leasing activity within an area the size of the study area which includes some 16,000,000 acres. For this reason, an analysis of leasing will be made, not only for the area as a whole, but for designated segments of the area (Figure 4). In some parts of the area, leasing activity has been sporadic over many years. In other parts of the area, relatively little leasing occurred until recent years.

Leasing activity may last for only a few years in an area if exploration proves fruitless. On the other hand, new techniques of exploration may keep leasing active even if old techniques have been slow in discovering oil. Under either circumstance, enough new oil or favorable geological formations may be discovered to stimulate further leasing.

The Area

The proportion of land leased, even in a small area, will vary from year to year. Leasing activity is affected by the general economic situation in much the same way that other businesses are affected. The proportion of land under lease in the study area for the years 1938 through 1947 is shown in

FIGURE 4. SUB-DIVISIONS OF THE STUDY AREA



Figures 5, 6, and 7 and in Table II. The year 1942 was the low year in land leased, not only for the area but for nearly all segments of the area.

Table II. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Entire Study Area, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Leased Acres Released
1938	15,793,320	21.52[1]	3,398,499[2]	1.9[1]	303,670[2]	502,962[2]
1939		20.06	3,168,857	2.8	444,588	674,230
1940		18.25	2,881,943	1.9	299,045	585,959
1941		16.75	2,645,704	2.2	345,060	581,299
1942		14.47	2,284,745	2.4	380,646	741,605
1943		18.35	2,898,068	7.6	1,196,149	582,826
1944		26.95	4,256,542	12.9	2,046,577	688,103
1945		33.93	5,358,509	9.7	1,534,638	432,671
1946		39.02	6,161,770	7.3	1,151,257	347,996
1947		44.12	6,968,281	7.2	1,131,765	325,254
Average		25.34	4,002,292	5.6	883,336	546,290

1/ Calculated.
2/ Total of all sections.

It is probable that the low in 1942 was due to the reaction of oil operators to unsettled conditions the first year of the war. It appears that many operators not only refused to lease new land in 1942 but allowed many leases to lapse through failure to pay the delay rental. While the data show that 380,646 acres were under new lease in 1942, 741,605 acres were released. In other words, more than a fourth of the land (28.0 percent) under lease the previous year was dropped. While there had been a downward trend in land leased in nearly all sub-areas since 1938, the trend became more pronounced between 1941 and 1942.

The increased demand for oil and the subsequent encouragement for the oil industry to find new sources of supply led to the sharp rise in leasing

FIGURE 5. PERCENT OF LAND LEASED, BY YEARS

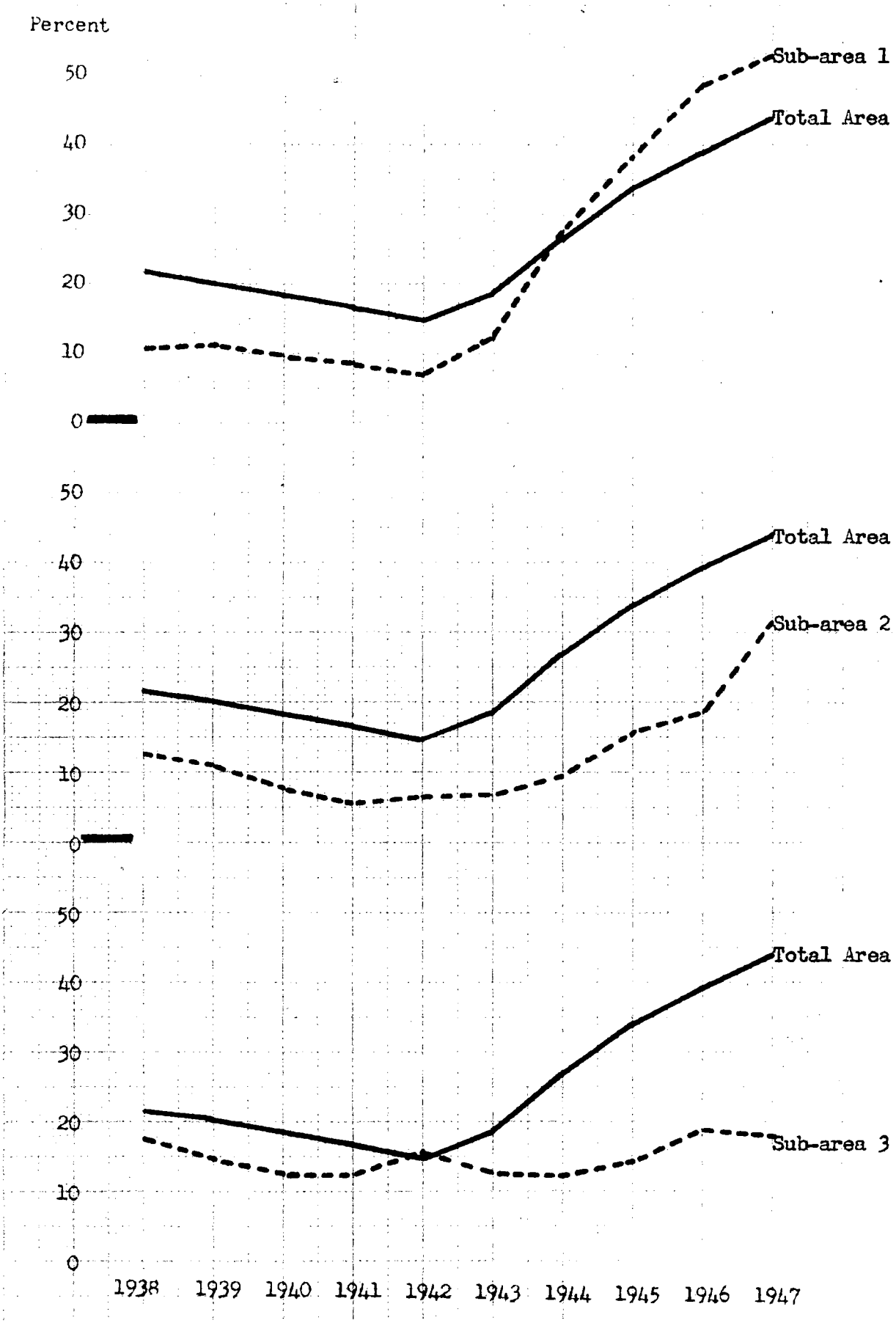
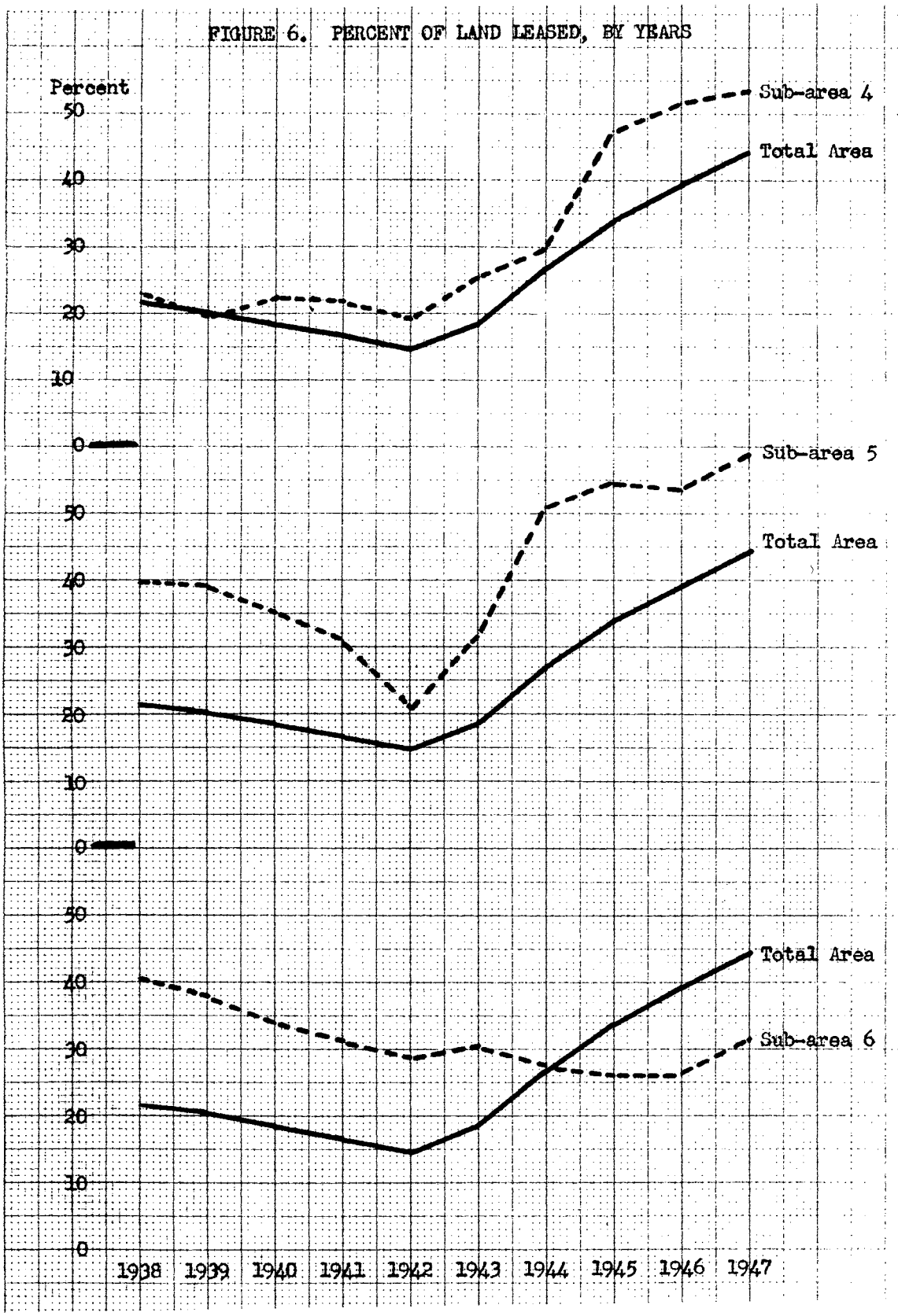


FIGURE 6. PERCENT OF LAND LEASED, BY YEARS



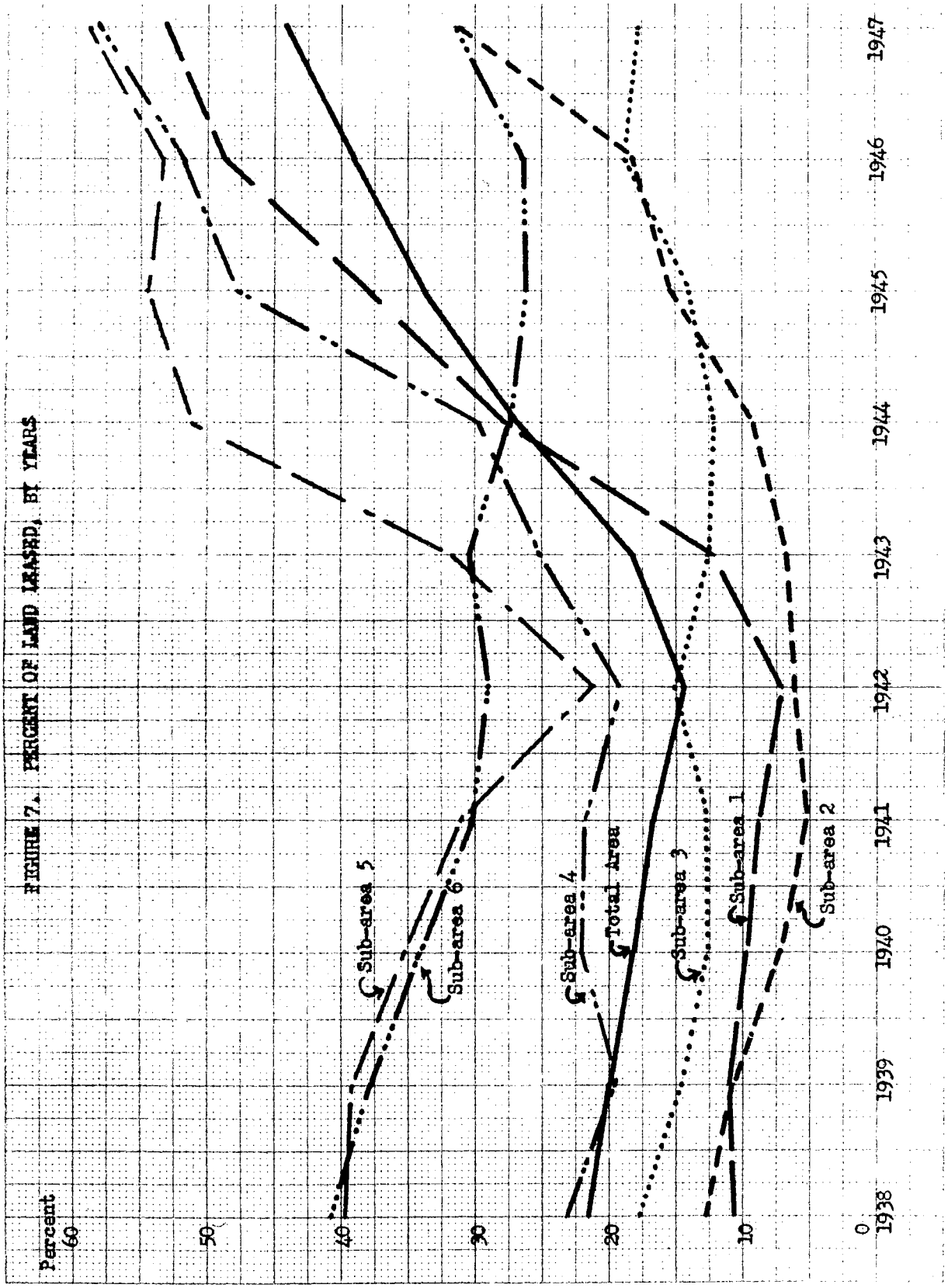


FIGURE 7. PERCENT OF LAND LEASED, BY YEARS
Percent
60
50
40
30
20
10
0
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
Sub-area 5
Sub-area 6
Sub-area 4
Total Area
Sub-area 3
Sub-area 1
Sub-area 2

which began in 1943. In that year more than a million acres in new leases were taken. This amounted to about 41 percent of the land under lease in 1943. The following year, 1944, shows about 27 percent of the land under lease of which about 48 percent was newly leased. This was the peak year for the taking of new leases during the period under study with a little more than 2,000,000 acres being taken. Since 1944 there has been a gradual decline in the taking of new leases. The decline in new leasing has been more than offset by a decline in releases so that a net gain has resulted. In terms of acres, prior to 1940 an average of slightly more than 3,000,000 acres were under lease in the area each year. This figure dropped to a little above 2,000,000 acres by 1942. A sustained upward trend began in 1943 and in 1947 nearly 7,000,000 acres were under lease. The 10-year average of acres leased is roughly 4,000,000 or 25 percent of the total land in farms (Table II).

Considerable stability of leasing is noted for the area in spite of the fact that the proportion of land leased ranges from 57 percent of the 10-year average in 1942 up to 174 percent of that average in 1947. It may be seen, however, that the trend either going up or coming down is smooth. That is, there is no year-to-year fluctuation. This might be expected for an area as large as the study area where a great change in leasing activity in one part might be counteracted by an opposite change in another part of the area (See Figures 5, 6, and 7).

By Sub-Areas

Sub-Area 1

Sub-Area 1, some 4,785,000 acres in size, is by far the largest subdivision of the area. In spite of its size, however, study of the individual counties comprising the sub-area show them to be fairly uniform in leasing activity, particularly during the last half of the study period (Table I).

The counties lying to the northern and western parts of the sub-area lag about a year behind the southern and eastern counties in the increase in leasing which occurred during the last three or four years of the period.

Prior to 1944, relatively little land was leased. The first seven years of the period show approximately 10 percent under lease each year. This varied from 11.1 in 1939 to the low year, 1942, when 7.1 percent, or 337,942 acres, were under lease. The upward trend in leasing began in 1943 when 282,294 acres of new leases were taken. The greatest increase came the following year, 1944, when more than 950,000 acres of new leases were taken (Table III). By 1947, 53 percent of the sub-area was under lease. The heavy increase in leasing during the last four years of the study period caused the yearly average of acres leased to pass the million mark or 22.7 percent of all land in farms under lease.

Table III. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 1, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Leased Acres Released 1/
1938	4,784,640	10.64	509,312	0.9	43,060	93,300
1939		11.05	528,666	2.2	104,325	84,970
1940		9.82	469,846	1.1	52,630	111,450
1941		8.94	427,626	0.8	38,275	80,495
1942		7.06	337,942	1.9	90,500	180,185
1943		12.09	578,472	5.9	282,294	41,764
1944		27.66	1,323,586	20.1	961,712	216,598
1945		38.03	1,819,410	12.6	602,864	107,040
1946		48.81	2,335,589	12.4	593,295	77,116
1947		53.04	2,537,586	5.9	282,294	80,297
Average		22.71	1,086,803	6.4	305,145	107,322

1/ Calculated—new leases plus previous year's land leased minus current year's land leased.

Because of its size, sub-area 1 has been an important factor in the leasing picture of the area as a whole. It may be noted that the curve of leasing activity in this sub-division is closely followed by the curve for the area as a whole (Figure 5).

Sub-Area 2

Sub-Area 2, comprised of three counties, is located in the central portion of the western part of the study area. Leasing has been relatively slow in this sub-division. The leased acreage averaged about 227,000 acres each year of the 10-year period. This acreage amounts to 12.4 percent of the land area, the lowest proportion of any sub-division in the area (Table IV). Leasing was active in this sub-area only during the last four years of the period, during which roughly 600,000 acres of new leases were taken. During the six previous years, a total of only 107,000 acres of new leases were taken.

Table IV. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 2, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Leased Acres Released 1/
1938	1,828,000	12.72	232,590	0.3	5,485	41,685
1939		10.91	199,380	0.5	9,140	42,350
1940		7.23	132,230	0.6	10,970	78,120
1941		5.29	96,695	1.4	25,590	61,125
1942		6.20	113,360	2.1	38,250	21,585
1943		6.81	124,500	1.0	18,280	7,140
1944		9.20	168,160	5.3	96,885	53,225
1945		15.45	282,498	6.6	120,648	6,310
1946		18.80	343,597	7.4	135,272	74,173
1947		31.53	576,405	13.7	250,436	17,628
Average		12.41	226,942	3.9	71,095	40,334

1/ Calculated--new leases plus previous year's land leased minus current year's land leased.

The 10-year average of 227,000 acres of land under lease would have been even lower had not the final three years of the period, with their sharp increase in leasing activity, raised the average (Figure 5). For instance, the average acreage under lease during the first seven years was only 152,400 acres or 8.3 percent of the land in farms. The three-year average for 1945, 1946, and 1947 was more than 400,000 acres or about 22 percent of the land in farms. In 1947 alone, more than 250,000 acres in new leases were taken. The acreage taken in new leases in 1947 was nearly five times as great as the 51,170-acre average of the previous nine years.

Sub-Area 3

Sub-Area 3, consisting of around 2,827,000 acres, is next in size to sub-area 1. It is made up of five complete counties and parts of two others in the southwestern portion of the study area (Figure 4). There has been an average of about 420,000 acres under lease in the sub-area, or 14.8 percent of farmland in the sub-division. The proportion under lease for the period is one of the lowest of any of the sub-areas (Figures 5 and 7). However, the uniformity from year to year of the proportion of land under lease has been marked (Figure 5). The difference between 1946, the year of the greatest leased acreage, and 1944, the year of the smallest leased acreage, is only 186,000 acres or about 6.6 percent of the land area.

In 1946, 529,091 acres were under lease or 18.7 percent of the land area. This year also had the greatest amount of new leasing with a little more than 192,000 acres being taken. In 1944, 343,000 acres were under lease (Table V).

The average of new leases taken amounts to 86,050 per year for the period. The smallest acreage of new leases, 22,615, was taken in 1940.

Table V. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 3, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Acres Released 1/
1938	2,827,000	17.91	506,287	2.8	79,150	84,469
1939		14.79	418,253	1.4	39,578	127,612
1940		12.69	358,844	0.8	22,615	82,024
1941		12.75	360,525	2.4	68,945	67,264
1942		15.14	428,000	3.3	93,291	25,816
1943		12.45	351,973	1.8	50,885	126,912
1944		12.14	343,075	3.0	84,810	93,708
1945		14.00	395,673	3.9	110,250	57,652
1946		18.72	529,091	6.8	192,235	58,817
1947		17.84	504,332	2.4	118,735	143,494
Average		14.84	419,605	3.0	86,050	86,777

1/ Calculated--new leases plus previous year's land leased minus current year's land leased.

Leasing has been fairly active in this area for many years and several small oil or gas fields have been discovered. It is likely that years of exploration in this section has given to oil operators considerable knowledge as to where the more promising formations are located. The higher average of acres released as compared to acres under new lease seems to indicate that operators are gradually eliminating from consideration more and more of the land. Unless new fields or formations are discovered in this sub-area, it is probable that the gradual decline will continue.

Sub-Area 4

Sub-Area 4, in the southeastern part of the area, consists of three complete counties and portions of three others. There are 2,339,000 acres of land in farms in the area.

During the 10-year period 1938-1947, there has been an average of 745,500 acres under lease with roughly 154,000 acres of new leases taken

each year. Year-to-year variations have been wide. In 1942 only 451,000 acres or 19.3 percent of the land was under lease (Figures 6 and 7). In that year about 42,000 acres of new leases were taken but 103,000 acres were released. There was a nominal increase in leased acreage in 1943 and 1944 but in 1944 there was a net gain of about 422,000 acres under lease. In that year, 500,546 acres of new leases were taken and only about 79,000 acres released. The leased acreage continued to show an increase and by 1947, 1,360,423 acres were under lease. This acreage is slightly more than 58 percent of the land in farms, which is high when compared with most of the other sub-divisions (Tables I and VI and Figures 6 and 7).

Table VI. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 4, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Acres Released 1/
1938	2,339,000	23.14	541,223	1.3	30,405	124,894
1939		19.83	463,707	3.1	72,510	150,026
1940		22.21	519,592	4.7	110,340	54,455
1941		21.91	512,398	2.8	65,170	72,364
1942		19.31	451,364	1.8	42,100	103,134
1943		25.11	587,268	8.3	194,140	58,236
1944		29.63	693,158	8.7	203,495	97,605
1945		47.67	1,114,899	21.4	500,546	78,805
1946		51.77	1,210,979	7.0	163,730	67,650
1947		58.16	1,360,423	6.8	159,050	9,606
Average		31.87	745,501	6.6	154,149	81,678

1/ Calculated--new leases plus previous year's land leased minus current year's land leased.

Leasing was relatively active in this sub-area all through the period. In only two of the years was less than 20 percent of the land under lease. In 1939 and in 1942 the leased acreage dropped to 19.8 and 19.3, respectively.

Oil play has been active here for many years and several oil fields have been developed. Interest in the area had declined until in recent years the discovery of new oil sands in the eastern portion stimulated leasing activity. Furthermore, in 1945 one of the deepest test wells in the world was begun in the western part of the sub-division which gave a further stimulus to leasing. The deep test was finally abandoned without discovering oil. Nevertheless, when talk of the test well began, and while the test was in progress, oilmen were eager to lease land. Apparently they wanted to be in a position to take advantage of the discovery of any favorable formations that might be found at workable depths.

New leasing has declined since 1945 and may continue to do so. Most of the land is leased in the probable territory and the deep test may have condemned a portion of the area.

Sub-Area 5

Sub-Area 5, located in the northern part of the area, includes four complete counties and portions of two others. There are approximately 2,649,640 acres of land in farms in this sub-division. Leasing was active in the section all though the 10-year period with an average of 41.6 percent of the land under lease. This 10-year average is the highest average of land under lease found in any of the sub-areas (Tables I and VII and Figure 7).

The proportion of land under lease fell to 21 percent in 1942 but never below 31 percent during any other year of the period (Figure 6). The low ratio in 1942 can be attributed to the small number of acres of new leases taken that year, 45,000, and to the fact that some 309,000 acres of leases were permitted to drop (Table VII). The taking of new leases in 1942 was the smallest for any year, being approached only by the relatively small acreage taken in 1946. The small acreage leased in this latter year is difficult to

Table VII. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 5, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Acres Released 1/
1938	2,649,640	39.73	1,052,592	4.0	105,985	113,030
1939		39.28	1,040,756	6.0	158,975	170,811
1940		35.26	934,373	2.3	61,540	167,923
1941		31.02	821,997	3.0	80,640	193,016
1942		21.04	557,608	1.7	45,045	309,434
1943		31.68	839,476	21.7	574,970	293,102
1944		51.06	1,352,877	23.9	633,265	119,864
1945		54.55	1,445,306	5.5	145,730	53,301
1946		53.33	1,412,976	1.9	50,345	82,675
1947		58.81	1,558,130	7.9	209,320	64,166
Average		41.58	1,101,609	7.8	206,580	156,732

1/ Calculated--new leases plus previous year's land leased minus current year's land leased.

explain. It is possible that oil operators adopted a "wait and see" attitude while further explorations were being made. Moreover, during the years 1943, 1944, and 1945, more than 1,350,000 acres of new leases were taken. It is probable that everything was leased during these three years that looked at all favorable up to that time.

The proportion of land under lease during the last four years of the study period, exceeds 51 percent. No other section has as good a leasing record as this. In 1947, 1,558,000 acres were under lease or 58.8 percent of all land in farms. This is the highest proportion found leased in any one year in any sub-division of the area.

Sub-Area 6

Sub-Area 6, unlike other sub-divisions shows a downward trend in leasing activity during the period (Figures 6 and 7). About 38 percent of the land

was under lease the first three years of the period. During the last three years, an average of 28 percent was leased. In 1947, when 112,000 acres of new leases were taken, the land under lease rose to a little above 431,000 acres or 31.6 percent of the land area. This acreage was the highest since 1940 (Table VIII).

Table VIII. Total Acres, Total Acres Leased by Years, and Acres Under New Lease Each Year, Sub-Area 6, 1938-1947

	Total Acres	Percent Leased	Acres Leased	Percent of Land Area Under New Lease	Acres Under New Lease	Acres Released 1/
1938	1,365,040	40.77	556,493	2.9	39,585	45,586
1939		37.95	518,096	4.4	60,060	98,457
1940		34.22	467,056	3.0	40,950	91,990
1941		31.24	426,463	4.9	66,440	107,033
1942		29.04	396,470	5.2	71,460	101,453
1943		30.50	416,382	5.5	75,580	55,668
1944		27.52	375,686	4.9	66,410	107,106
1945		26.19	357,478	4.0	54,600	72,808
1946		26.21	357,769	1.2	16,380	16,089
1947		31.60	431,404	8.2	111,930	38,295
Average		31.52	430,330	4.4	60,340	73,448

1/ Calculated--new leases plus previous year's land leased minus current year's land leased.

Leasing activity in this sub-area appears to be fairly well stabilized. The proportion under lease averaged 31.5 percent for the period and the annual variation has not been great. The high year for acres under lease, 1938, shows 41 percent leased, and the low year, 1945, shows 26.2 percent under lease.

Sub-Area 6, which lies in the northeastern part of the study area, has a relatively large amount of mineral development. A number of sizable oil fields were developed prior to 1938, some in the early 1920s. The discovery

of oil and the delimitation of areas of production tend to retard leasing in the immediate vicinity of production. "Wildcat" wells in various other parts of the section have failed to discover oil and so have virtually condemned, for leasing, land in the neighborhood of these wells. On the other hand, there remains in the area a considerable amount of unexplored territory and, although leasing activity has been declining, the average has remained fairly high.

CHAPTER IV

INCOME FROM LEASING AND BONUSES

Introduction

In Chapter III it was shown that a considerable proportion of the land in that portion of the State studied is constantly under lease for oil and gas. It was stated that this land is held under lease through the payment of a stipulated sum called a delay rental. In this chapter, consideration will be given to the income derived from delay rentals and bonuses in order to examine the second portion of the hypothesis which states: "Leasing activity results in a significant supplementary income to landowners of Western Oklahoma."

As a rule, one dollar per acre is paid as a delay rental on land under lease. This may vary, however. In the early 1930s, when conditions were depressed, many new lease contracts were made at 50 cents per acre rental. Numerous contracts current at that time were re-negotiated and the rent reduced to 50 cents per acre. This apparently was to the advantage of both the lessor and the lessee. For the lessee, it enabled him to retain or to take new leases he could not otherwise afford. For the lessor, it enabled him to keep leased, land which would otherwise have yielded no return to the subsurface.

Even in more prosperous periods, some leases will be made which call for a delay rental of less than one dollar per acre. Land less favorably situated in relation to known promising geological formations frequently will be leased only at a reduced rate. It is for these reasons that the average rental rate is less than one dollar.

Since it is seldom that the rental rate goes above one dollar per acre, some adjustment usually is made to compensate landowners whose holdings lie

in favorable territory. This adjustment is in the form of a bonus which is an additional payment made to the landowner at the time the lease contract is made.

The bonus is a particularly elusive thing to isolate; one may or may not be paid. Whether a bonus is paid and the size of the payment depends on many things; the general demand for leases in the area, the economic position of the landowner, and the location of the tract in relation to known geological formations. In general, competition for leases is the dominating factor in setting the bonus. Competition usually is sharp when some lessee attempts to lease all land within a locality.[1] Competition also is strong in the vicinity of a "wildcat" well while it is being drilled. Even though the "wildcat" may not discover oil, it may reveal favorable geological formations which further stimulate competition for leases. Bonuses may, therefore, range from nothing to several hundred dollars per acre in order to persuade the landowner to sign the lease. However, lease scouts interviewed reported that more commonly bonuses range from $1.00 to $15.00 per acre with $5.00 being the figure most often quoted. Such bonuses are of frequent enough occurrence that the individual landowner may have reasonable expectations of receiving a bonus when he leases his land.

Factual data on bonuses are difficult to obtain. Only infrequently is a bonus mentioned in the lease contract on file in public records. For this reason, the bonus figure used in the analysis which follows is based on opinions and such factual data as obtained from lease scouts, oil companies,

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[1] This is referred to as a lease block and individuals are particularly eager to lease land within the block, usually with the idea of reselling at a profit to the lessee who is attempting to establish the block.

the U. S. Geological Survey, and the Oklahoma School Land Commission.[2] It is an estimated bonus and is a composite figure reached after careful consideration of the available factual data tempered by the opinions obtained.

It is believed that these figures are as representative of an average or a normal bonus as can be obtained. Some landowners will obtain bonuses much larger than the figures used; a few will obtain less. The data show that over a period of years, bonus income is larger than lease income in most areas. It is a particularly important source of income during periods of great leasing activity when competition for leases is sharp. It is during these periods that lump sum payments are large enough to permit landowners to retire mortgage debts or to make needed improvements or to buy necessary equipment.

The Area

Lease rent for land leased in the area as a whole averaged 93 cents per acre over the past 10 years. The average lease rent income in the area was $2,900,626 per year during the period. In 1942, the per acre lease rent reached a low of 87 cents. However, because of the great number of acres dropped from lease in that year, the following year shows the lowest total lease rental income for any of the years studied, $1,554,727 (Table IX).

The highest average rental was in 1947 when 5,836,516 acres[3] were under lease at 98 cents per acre. This was also the high year for total rental income to landowners when slightly more than $5,743,000 was received.

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[2] The School Land Commission, in particular, has a great deal of factual data on file in the form of bids on school land leases. However, school land lease sales are held only upon request of a prospective lessee. Such a request causes the School Land Commission to advertise the tracts as open for lease which, in effect, is public notice that someone believes the tract is valuable for oil and gas. Competition is thereby stimulated and bids usually go higher than for bonuses ordinarily paid in the locality. For this reason, data obtained from this source must be used with caution.

[3] Total acres leased minus acres under new lease on which no rent was due or paid.

Table IX. Income From Leasing and Bonuses Per Acre and Total, Entire Study Area, 1938-1948 1/

Year	Lease Income		Bonus Income		Total Income	
	Per Acre 2/ (dollars)	Area (dollars)	Per Acre 3/ (dollars)	Area (dollars)	Per Acre 4/ (dollars)	Area (dollars)
1938	.89	2,739,053	4.25	1,289,084	1.18	4,028,137
1939	.90	2,458,150	3.25	1,455,503	1.24	3,913,653
1940	.92	2,383,183	2.50	755,009	1.09	3,138,192
1941	.89	2,036,437	3.65	1,262,273	1.25	3,298,710
1942	.87	1,660,686	2.60	992,549	1.16	2,653,235
1943	.91	1,554,727	5.60	6,712,917	2.85	8,267,644
1944	.97	2,132,993	4.60	9,400,782	2.71	11,533,775
1945	.97	3,706,729	4.10	6,330,249	1.87	10,036,978
1946	.96	4,819,433	4.30	4,986,745	1.59	9,806,178
1947	.98	5,743,050	4.40	4,985,227	1.54	10,728,277
Average	.93	2,900,626	3.53	3,115,646	1.50	6,016,272

1/ Total of the six sub-areas.
2/ Lease income divided by acres on which rent was paid.
3/ Total Bonus income divided by total of new leases taken.
4/ Total income divided by total acres under lease.

The estimated bonus income for the area averaged $3,115,646 per year or $3.53 per acre for new leases.[4] The greatest income from bonuses was received in 1944. In that year more than 2,046,500 acres of new leases were taken at an estimated $4.60 per acre. The resulting bonus income totaled $9,400,782, nearly four times as great as lease income during that year. Per acre bonuses were highest in 1943 when an estimated $5.60 was received for new leases. The low point for bonuses was in 1940 when $2.50 per acre was received. In 1942, a low year for total leasing activity, bonuses averaged $2.60 per acre (Table IX).

Total income for the area as a whole averaged $6,016,272 per year for the period, or $1.50 per acre for all land leased. This income was almost

[4] See Table IX for method of arriving at these figures.

equally divided between lease rentals and bonuses. The highest income year was 1944 when lease rents and bonuses totaled $11,533,775, about 80 percent of which came from bonuses. However, on an income per acre basis, incomes in 1944 were exceeded by those in 1943 when the average per acre income amounted to $2.85 on the acreage under lease (Table IX). The low point in total income during the period occurred in 1942 when slightly more than $2,653,000 was received by landowners, roughly two-thirds coming from lease rentals. In 1940, the year of lowest per acre income, more than $3,000,000 was received in leases and bonuses.

Sub-Area 1

Lease rent per acre averaged 92 cents for the land leased in sub-area 1 for the 10-year period. The annual rental accruing to landowners amounted to $719,125. The low point in rental income was reached in 1942 when $212,800 were received by lessors. The average per acre lease income in 1943 was lower, but a larger acreage drawing rent income made returns about $30,000 higher than in 1942 (Table X).

Bonus income is estimated at $686,576 per year for the period, only a little below lease income. This amounts to an average bonus of $2.25 per acre on all leases taken from 1938 through 1947. In 1940 and again in 1942 per-acre bonuses are estimated at $1.25, the lowest figure reached during the period. However, in 1941, bonus income was only $57,413. For that year, bonuses are estimated at $1.50, but new leases were at their lowest figure for the period with only 38,275 acres taken. Bonus income reached its highest figure in 1944 when $2,644,708 were received by landowners. While the per-acre bonus was not particularly high, nearly a million acres of new leases were taken during that year.

Table X. Income From Leasing and Bonuses Per Acre and Total, Sub-Area 1, 1938-1947

Year	Lease Income 1/		Bonus Income 2/		Total Income 3/	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.89	414,964	1.50	64,590	.94 4/	479,554
1939	.87	369,177	1.50	156,488	.99	525,665
1940	.98	408,872	1.25	65,787	1.01	474,659
1941	.89	346,522	1.50	57,413	.94	403,935
1942	.86	212,800	1.25	113,125	.96	325,925
1943	.82	242,866	2.50	705,735	1.64	948,601
1944	.95	343,779	2.75	2,644,708	2.26	2,988,487
1945	.95	1,155,719	3.50	2,110,024	1.79	3,265,743
1946	.96	1,672,602	4.00	2,373,180	1.73	4,045,782
1947	.98	2,210,186	4.00	1,129,176	1.32	3,339,362
Average	.92	719,125	2.25	686,576	1.29	1,405,710

1/ Computed by applying per acre income to acres leased minus acres under new lease as shown in table on leasing for the sub-area.
2/ Per Acre income estimated and applied to acres of new leases as shown in table on leasing for the sub-area.
3/ The total of lease income plus bonus income.
4/ Total income divided by acres leased as shown in table for leasing in the sub-area.

Total income averaged $1.29 per acre for land under lease in the section. An average of 1,086,803 acres drawing rent together with an average of 305,145 acres of new leases taken each year, resulted in a yearly average income of $1,405,710 to landowners of the section. The lowest income year was in 1942 when landowners received $325,925 or 96 cents per acre for land leased, roughly two-thirds of which was lease rent income. In 1946, the high income year, landowners received more than $4,000,000 in lease rent and bonuses. Roughly 60 percent of this amount came from bonuses. However, the best per-acre return occurred in 1944 when $2.26 per acre yielded slightly less than $3,000,000.

Sub-Area 2

Lease rent per acre averaged 86 cents in sub-area 2. With an average of 155,847 acres drawing rent, a return of $134,028 per year was received by landowners from this source. The low year for lease rent income was 1944 when only $60,584 was received by landowners. While there were 168,160 acres under lease in 1944, nearly 97,000 of these acres were newly leased on which no delay rent was paid (See Tables IV and XI). On a per acre basis, 1938 was the low year with an average of 79 cents being paid in delay rentals. Per acre rentals as well as rent income reached their highest during the period in 1947. In that year, an average of 97 cents per acre on nearly 326,000 acres gave an income of $306,411 to lessors.

Table XI. Income From Leasing and Bonuses Per Acre and Total Income, Sub-Area 2, 1938-1947

Year	Lease Income*		Bonus Income*		Total Income*	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.79	179,413	1.50	8,227	.81	187,640
1939	.80	152,192	1.50	13,710	.83	165,902
1940	.83	100,646	1.50	16,455	.89	117,101
1941	.86	61,150	2.50	63,975	1.29	125,125
1942	.86	64,595	2.50	95,625	1.41	160,220
1943	.88	93,474	3.00	54,840	1.19	148,314
1944	.85	60,584	2.50	242,212	1.80	302,796
1945	.89	144,047	2.50	301,620	1.58	445,667
1946	.92	191,659	3.50	473,452	1.94	665,111
1947	.94	306,411	3.50	876,526	2.05	1,182,937
Average	.86	134,028	2.25	159,964	1.30	293,992

* See Table X for method of computation.

Bonuses are estimated at $2.25 per acre for the period. This resulted in an income of $159,964 per year to landowners, the bonus income averaging higher than lease income. The peak for bonus income during the period was

reached in 1947 when $876,526 was received for 250,436 acres of new leases. In 1938, when 5,485 acres of new leases were taken at $1.50 per acre bonus, income from this source was lowest. In that year only $8,227 was received by landowners.

In terms of total income, landowners in sub-area 2 received, on the average, $1.30 per acre for the land they leased, one of the lowest per-acre averages of any sub-division. The average yearly income from leases and bonuses amounted to $293,992.

Total income as well as income per acre in this section was highest in 1947 (Table XI). Leasing reached a peak for the period in that year with 576,405 acres under lease of which 250,436 acres were newly leased. The highest lease rent for the period combined with one of the highest bonus years gave a total return of $1,182,937 or $2.05 for each acre leased. Of this amount, nearly three-fourths came from bonus income.

The low year for total income during the period was 1940 when landowners received $117,101 or 89 cents per acre for their leased land. Four-fifths of the income in 1940 came from lease rentals. The low in 1940 can be attributed to the small acreage leased and to the small taking of new leases at one of the lowest average bonuses for any year of the period.

Sub-Area 3

The average lease income per year in this sub-area amounted to $316,877 or 95 cents per acre for land under lease during the period (Table XII). The average per-acre rental during the last two years of the study was $1.01. This high rental can be attributed to the greater than ordinary amount of Indian land under lease, which frequently draws a rental of $1.25 per acre.

In 1941, per-acre rent incomes were lowest when they averaged 88 cents. However, the total rent income was lowest in 1944 when only $253,100 were

Table XII. Income From Leasing and Bonuses Per Acre and Total Income, Sub-Area 3, 1938-1947

Year	Lease Income*		Bonus Income*		Total Income*	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.92	392,966	4.00	316,600	1.40	709,566
1939	.96	363,528	2.50	98,945	1.10	462,473
1940	.93	312,693	3.50	79,152	1.09	391,845
1941	.88	256,590	4.00	275,780	1.46	532,370
1942	.93	311,279	2.00	186,582	1.16	497,861
1943	.92	277,001	3.50	178,097	1.29	455,098
1944	.98	253,100	4.50	381,645	1.85	634,745
1945	1.00	285,423	4.50	496,125	1.98	781,548
1946	1.01	340,225	4.50	865,058	2.28	1,205,283
1947	1.01	389,453	4.00	474,940	1.71	864,393
Average	.95	316,877	3.50	301,175	1.47	618,052

* See Table X for method of computation.

received by landowners. In this year per-acre rentals averaged 98 cents, but the number of acres drawing a rent reached a low for the period (Table XII). In 1944 only 343,075 acres were under lease and of these leased acres nearly 85,000 were newly leased and hence called for no rent that year (See Table V).

The highest lease rent income accrued to landowners in 1938 when 92 cents per acre on 427,127 acres gave a return of $392,966.

Bonus income averaged $301,175 per year for the period studied. On a per acre basis, the average bonus is estimated at $3.50. Bonus income was highest in 1946 when an average of $4.50 was received for 192,235 acres of new leases. In 1940 a low for bonus income was reached when an average of $3.50 was received as bonus on 22,615 acres of new leases (Tables V and XII).

Total income from leases and bonuses averaged $1.47 per acre to landowners in sub-area 3. This per-acre return amounts to slightly more than $618,000 per year income on an average of 419,605 acres, the income being almost equally divided between lease rentals and bonuses. The peak year in total

income was 1946 when 529,091 acres earned an average of $2.28 from lease rent and bonuses. The total return that year was $1,205,283. A greater proportion of this income, about 72 percent, can be attributed to the great number of acres taken in new leases at a relatively high bonus.

The low income year was in 1940 when $1.09 per acre was received by landowners on 358,844 acres. The low income that year, a little less than $392,000, can be attributed to the small number of acres taken in new leases.

Sub-Area 4

Lease rent income averaged 98 cents per acre in this sub-division and gave an average annual return of $579,525 to landowners. The yearly per-acre return from lease rent fell below 96 cents in only one year, 1938, and in only one year after 1938 did per-acre rentals fall below 98 cents (Table XIII). In 1939 rent income amounted to $375,549, the year of lowest income from lease rents. In the peak year, 1947, lease rent to landowners of the sub-area reached $1,201,373. During the five-year period beginning with 1943, slightly more than 244,000 acres of new leases were taken each year. During the same period, an average of only 62,380 acres were released annually. The yearly net gain of land leased during the period resulted in a total of 1,201,373 acres drawing lease rent in 1947, the highest for any year of the period studied in this sub-area.

Bonus income in this section averaged $4.50 per acre on new leases, giving an annual return from this source of $693,671, which exceeds lease rent income by more than $100,000. The low year, 1938, shows a return from bonuses of $152,025. While bonuses that year averaged $5.00 per acre, only 30,405 acres were taken. Apparently during this year a few highly desirable tracts were picked up, the rest ignored. It was five years before bonuses again reached $5.00 per acre. In 1945, $5.00 per acre was paid for more than

500,000 acres of new leases. Bonus income in this peak year totaled more than $2,500,000 (Table XIII).

Table XIII. Income From Leasing and Bonuses Per Acre and Total Income, Sub-Area 4, 1938-1947

Year	Lease Income*		Bonus Income*		Total Income*	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.94	480,169	5.00	152,025	1.17	632,194
1939	.96	375,549	2.50	181,275	1.20	556,824
1940	.98	401,067	2.50	275,850	1.30	676,917
1941	1.00	447,228	2.50	162,925	1.19	610,153
1942	.98	401,079	4.50	189,450	1.31	590,529
1943	.98	385,265	5.00	970,700	2.31	1,355,965
1944	.99	484,766	5.00	1,017,475	2.17	1,502,241
1945	1.00	614,353	5.00	2,502,730	2.80	3,117,083
1946	1.00	1,047,249	6.00	982,380	1.68	2,029,629
1947	1.00	1,201,373	6.00	954,300	1.58	2,155,673
Average	.98	579,525	4.50	693,671	1.71	1,273,196

* See Table X for method of computation.

Total income in sub-area 4 averaged $1.71 per acre for the period studied. This means that on an average of 745,501 acres under lease each year, landowners received $1,273,196 per year, with slightly more than half of this amount coming from bonuses. The peak income was reached in 1945 when an average of $2.80 was received on 1,114,899 acres. In that year more than $3,000,000 was received by landowners of the section as income from undeveloped mineral rights. The great amount of leasing activity in 1945, which saw high bonuses being received on a record number of acres of new leases, accounted for about 80 percent of the income that year.

Total income was lowest in 1939 when roughly $557,000 was received by landowners for lease rent and bonuses. While in that year a low was reached in the number of acres drawing lease rent, two-thirds of the total income

in 1939 was from this source. On a per acre basis, however, total income was slightly lower in both 1938 and 1941.

Sub-Area 5

Lease rent in sub-area 5 averaged 90 cents per acre and gave an average annual income to landowners of slightly more than $805,500 from this source (Table XIV). Income from delay rentals reached its highest point during the period in 1947 when $1,335,322 was received on 1,348,810 acres or an average of 99 cents per acre. This acreage, 51 percent of all farmland, had been built up by the great activity in the area during the previous five years. During that period, an average of 322,726 acres of new leases were taken annually; a net gain over releases of more than 200,000 acres per year.

Table XIV. Income From Leasing and Bonuses Per Acre and Total Income, Sub-Area 5, 1938-1947

Year	Lease Income*		Bonus Income*		Total Income*	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.83	785,684	5.00	529,925	1.25	1,315,609
1939	.87	767,150	5.00	794,875	1.50	1,562,025
1940	.87	759,365	3.50	215,390	1.04	974,755
1941	.83	615,327	5.00	403,200	1.24	1,018,527
1942	.77	394,674	3.50	157,657	.99	552,331
1943	.93	245,991	7.50	4,312,275	5.43	4,558,266
1944	.99	712,416	7.50	4,749,487	4.04	5,461,903
1945	.95	1,234,597	5.00	728,650	1.36	1,963,247
1946	.92	1,253,621	5.00	251,725	1.06	1,505,346
1947	.99	1,335,322	5.00	1,046,600	1.53	2,381,922
Average	.90	805,526	5.00	1,032,900	1.67	1,838,426

* See Table X for method of computation.

The low lease rent income year was 1943. In that year slightly less than $246,000 were received on 264,500 acres. In the five years preceding 1943, the trend in leasing had been downward with a net loss of more than 100,000 acres per year between new leases and releases.

Bonus income is estimated at $5.00 on an average of 206,850 acres of new leases given each year. The annual income resulting from new leases amounted to more than $1,000,000 for the period studied which exceeds the annual income from lease rent. In 1944 with an estimated bonus of $7.50 per acre, income to landowners was nearly $4,750,000 from this source (Table XIV). This high figure was approached in only one other year, 1943, when $4,312,275 in bonuses were received. During these two years more than 1,200,000 acres of new leases were taken by oil operators. Bonus income was lowest in 1942 when $157,657 were received by landowners. Per-acre bonuses in that year dropped to $3.50 and only 45,045 acres of new leases were given. As stated earlier, in 1942 the inactivity of lessees was pronounced.

The average per acre total income in sub-area 5 was $1.67 on 1,101,609 acres. This gave a total annual return to landowners in the section of roughly $1,838,000, more than half of which was from bonuses. Total income and per-acre income reached a low for the period in 1942. Per-acre income from leases and bonuses dropped to 99 cents during that year which gave landowners an income of $552,331. The low income during 1942 can be attributed to the fact that in that year 309,000 acres of leases were dropped and only 45,045 acres of new leases taken. In 1943 per-acre income reached its maximum with $5.43 per acre being received on 839,476 acres of leased land. Nearly 95 percent of the total income during this year came from bonuses. In 1944, per-acre incomes dropped to $4.04 but that amount was received on more than 1,350,000 acres. As a result, total income in 1944 reached $5,461,903, the peak income for any year of the period. More than 85 percent of the total income in 1944 was from bonuses paid for new leases.

Sub-Area 6

Lease rent in sub-area 6 returned an average of $336,609 per year to landowners during the period studied. On a per acre basis, this amounts to 91 cents on an average of 369,990 acres drawing lease rent. The low on per acre returns was 1942 when delay rents averaged 85 cents. However, in 1945, rent income reached a low of $272,590. Although rents averaged 90 cents per acre in that year, rent was received on only 302,878 acres (Table XV). The peak in rent income during the period was reached in 1938 when nearly $486,000 were received from this source. Lease rent that year averaged 94 cents per acre.

Table XV. Income From Leasing and Bonuses Per Acre and Total Income, Sub-Area 6, 1938-1947

Year	Lease Income*		Bonus Income*		Total Income*	
	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)	Per Acre (dollars)	Sub-Area (dollars)
1938	.94	485,893	5.50	217,717	1.26	703,610
1939	.94	430,554	3.50	210,210	1.24	640,764
1940	.94	400,540	2.50	102,375	1.08	502,915
1941	.86	309,620	4.50	298,980	1.43	608,600
1942	.85	276,259	3.50	250,110	1.33	526,369
1943	.91	310,130	6.50	491,270	1.92	801,400
1944	.90	278,348	5.50	365,255	1.71	643,603
1945	.90	272,590	3.50	191,100	1.30	463,690
1946	.92	314,077	2.50	40,950	.99	355,027
1947	.94	300,305	4.50	503,685	1.86	803,990
Average	.91	336,690	4.00	241,360	1.34	578,051

* See Table X for method of computation.

Per-acre bonus income in sub-area 6 has been fairly stable, averaging $4.00 per acre on new leases. In this area, lease rent income exceeded bonus income. The highest bonuses were received in 1943 when the per acre average reached $6.50. In that year $491,270 in bonus income were received by landowners. That figure was exceeded in only one year, 1947, when $503,685 were

received in bonuses. The per-acre bonus in 1947 was $4.50, but considerably more acres of new leases were taken in that year than in any other year during the period. In 1940 and again in 1946, per-acre bonuses fell to an average of $2.50. In the latter year, bonus income reached a low of $40,950 when only 16,380 acres of new leases were taken.

Total income averaged $1.34 per acre in sub-area 6 during the period; $578,051 income for lease rent and bonuses on 430,330 acres. The highest total income was received in 1947. In that year, 431,404 acres yielded a return to the undeveloped mineral rights of $1.86 per acre or $803,990, about two-thirds of which was bonus income. The low income year was 1946 when an average income of 99 cents per acre was received on 357,769 acres of land. The low in that year can be attributed largely to the small number of acres of new leases taken at one of the lowest average bonuses paid during the period. During that year, bonus income was only a little more than 10 percent of total income. In addition, the acreage upon which rent was paid was second lowest of any year of the period.

Subsurface and Agricultural Incomes Compared

It is of some interest to see how subsurface income compares with agricultural income. Cash income from crops in the area, as reported by the census,[5] totaled roughly $46,765,000 in 1939 and $121,455,000 in 1944. In view of the fact that wheat and cotton are, by far, the predominant cash crops of the area, the total crop income was divided arbitrarily according to the cash income relationship that wheat and cotton held to each other in those two years. In 1939, 70 percent of the cash income from these two commodities was from wheat, 30 percent from cotton. In 1944, 67 percent of the cash

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[5] United States Census of Agriculture, 1945, Department of Commerce, Bureau of the Census, Vol. 1, Part 25.

income from these two commodities was from wheat, 33 percent was from cotton.

Divided in this manner, calculations show that in 1939 wheat income amounted to $32,735,500;[6] cotton income was $14,029,500. In 1944, wheat income was $81,374,850;[7] cotton income was $40,080,150.

Income to land from undeveloped mineral rights in 1939 was roughly $4,000,000 in the area (Table IX). This figure is about 8.5 percent of the cash income from crops that year. However, cash income from crops is not net income to land. It is difficult to determine the net income with accuracy, but it is believed that an estimation can be made which will reflect the relative importance of surface and subsurface income with some degree of accuracy.

For crop income, it will be assumed that the normal crop share going to the landlord represents the landlord's gross return from land due to crop production. According to figures compiled by the United States Department of Agriculture, estimated landlord expenses comprise about 36 percent of the gross rent income to landlords in the United States.[8]

In 1939, the calculated wheat income amounted to $32,735,500 in the area. One-third of this amount normally goes to landlords. Their gross return from wheat was, therefore, about $10,912,000. Cotton income in 1939 was calculated to be $14,029,500, of which one-fourth normally goes to landlords. The landlords' gross return to land was $3,507,000 from cotton. The estimated gross return to landlords from crops totaled $14,419,000 in 1939.

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[6] Seventy percent of $46,765,000, the total crop income.

[7] Sixty-seven percent of $121,455,000, the total crop income.

[8] Five-year average, 1938-1942, Agricultural Statistics, 1943, U. S. Department of Agriculture, Washington, D. C., Table 499, p. 412.

The return from livestock production is even more difficult to estimate. Apparently, the most accurate estimation would be a calculated figure based on the normal rent paid for pasture. There are approximately 6,525,000 acres of land used for pasture in the area. Over the area as a whole, it requires about 10 acres of pasture to support one animal unit. The going rate over the area is one dollar per animal unit per month. The normal grazing season is seven months. Therefore, the return to landlords from pasture rent is approximately $4,567,500. This amount added to crop income gave a gross return to landlords of $18,986,500. The net return to the land, then, would be 36 percent less than this amount or $12,151,360 from agricultural production in the area in 1939.

As mentioned earlier, returns to land from undeveloped mineral rights amounted to $4,000,000 in 1939. This amount, about 25 percent of the total return to land from both surface and subsurface, is an important element in land income.

However, these two figures may not reveal relative importance without further analysis.

Over the area as a whole, there is a probability that landowners' investments in mineral rights could have been liquidated at an average of about $5.00 per acre in 1939. The only factual data available which shows the selling price of land in the area with mineral rights and without are for counties with a considerable amount of oil production.[9] In these counties, land conveying one-half or more of the mineral rights sold for about $10.00 per acre more than did land with none of the mineral rights. There is much land in the study area that would have sold for considerably more than $5.00

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[9] Grady and Payne Counties, Davidson and Parcher, Op. Cit.

per acre for mineral rights; there probably is more land with subsurface rights which could have been sold only if the selling price had been very low.[10] If, however, it be assumed that $5.00 per acre is a fair average, then all mineral rights in the study area would have sold for a total of $78,966,600 in 1939. The return to this investment was $4,000,000 or about 5 percent that year.

The census value of farms in the area in 1940 was approximately $462,724,000.[11] From this figure, the assumed value of the subsurface is deducted, leaving $383,757,400 as the estimated value of surface realty. The net return to land from agriculture was estimated at $12,151,360 in 1939 or about a 3 percent return to the investment in the surface.

In 1944, cash income from crops was roughly $121,455,000. Using the same procedure for calculating as before, it is found that the gross return to landlords from crops was $37,144,985. There are reasons for believing that pasture rent was about 25 percent higher in 1944 than in 1939. This means that roughly $5,709,400 were received for pasture rent in 1944. This amount added to the gross return from crops gives a gross return to landlords of $42,854,385 from agriculture. The net return to land is calculated to be $30,426,600.[12]

Subsurface income in 1944 was $11,533,755. This amount is 27 percent of the total net return to land from both the surface and subsurface. However,

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[10] It must be remembered that reluctance of a buyer to buy land without complete title and reluctance of some sellers to convey all mineral rights when conveying land makes the transfer of mineral rights contingent on something more than the economic value of those rights.

[11] Census of Agriculture, Op. Cit.

[12] Twenty-nine percent of the gross income. This is the average for the United States for the years 1943-1946. Agricultural Statistics, 1947, U. S. Department of Agriculture, Table 644, p. 543.

it is probable that, in 1944, investments in subsurface rights must be reckoned at a figure higher than in 1939. It is difficult to say how much higher, but returns to land from oil and gas leasing activity are so obvious and direct that it may be possible to estimate the increase with some degree of accuracy. The per-acre returns to land from leases and bonuses in 1944 were 118.5 percent greater than in 1939. There is a probability that mineral rights increased in value by something like that amount between 1939 and 1944. The value of mineral rights in 1944 is, therefore, estimated at $10.92 per acre, with a total value of mineral rights in the area of $172,463,000. An $11,533,755 return gave a 6.7 percent yield on this investment.

The census-reported value of land and buildings in 1944 was $608,672,500 in the area. If, from this is taken the assumed value of subsurface rights, there remains $436,209,500 invested in the surface. The return to the surface from agriculture, calculated to be $30,426,600, is a 7.0 percent yield on the investment.

Although year-to-year agricultural income and value figures for the area are lacking, it may be that an average of the two years, 1939 and 1944, can be taken as representative of the whole 10-year period 1938-1947. On this basis, the average net income to land from agriculture is calculated to be $21,288,980; the average value of the surface, $409,983,450. The average income gave a 5.2 percent return on the average investment.

The average investment in subsurface rights, assuming 1939 and 1944 are representative of the 10-year period, was $125,714,800. The average income for the two years was $7,723,700 or a 6.1 percent return on the investment. Returns to the subsurface were 26.6 percent of the net cash return to land from both surface and subsurface.

It appears, therefore, that for the 10-year period the return to the subsurface is somewhat better than the return to the surface. That, perhaps, is as it should be. In the foregoing analysis, it was assumed that all landowners were one corporate body and that its investments in surface and subsurface yielded the returns as stated, 5.2 percent on the surface investment, 6.1 percent on the subsurface investments during the 10 years. Actually, there are many individual investments and the risk of the individual investor in subsurface rights is greater than the risk involved in investing in the surface. Therefore, a higher rate of return to the subsurface investor probably would be necessary to encourage such investments if a fair rate of return were the only factor governing such investments. As a matter of fact, investments made solely in subsurface rights usually are speculative and a return from the actual production of oil and gas is the primary consideration rather than a return to the undeveloped subsurface rights.

It must be remembered that many of the foregoing figures are estimated and little data are available to substantiate them. The figures were arrived at after careful consideration of all the data available, and it is believed that the relationships shown are proximate. If they are, then subsurface rights are an important source of supplementary income to landowners of the area and return, roughly, an amount equivalent to one-fourth of the estimated net income to land.

CHAPTER V

INCOME VALUE OF UNDEVELOPED MINERAL RIGHTS

Introduction

In this chapter, an examination will be made of the third part of the hypothesis which states:

> "Capitalization of income from leasing will indicate the value of undeveloped mineral rights and serve as a basis of judgment on the part of landowners for evaluating their property rights in the subsurface."

It was stated earlier that consideration is given to the value of mineral rights by buyers and sellers of land. A publication[1] of a study of the reaction of buyers of land to the mineral values of that land reports that over 98 percent of the buyers indicated that some consideration was given to such values before purchasing. The average of their estimated value was $4.95 per acre and ranged from $15.33 per acre average in one county down to $2.53 per acre average in another of the eight counties studied.

Those who gave consideration to the value of the mineral rights but placed no estimate on it, generally indicated that they had no basis for judgment. It is believed that this study will furnish a basis for valuing the mineral rights in the portion of the State studied.

It will be assumed that income from leasing and bonuses over the past 10 years is indicative of future income to land in the various sub-areas and in the area as a whole. However, as was stated earlier, some localities will be so situated in relation to favorable geological formations that incomes will be considerably higher than the average. Other localities may only rarely have any land leased. The particularly good localities from the

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[1] Davidson, R. D., and Parcher, L. A., The Influence of Mineral Rights on Transfers of Farm Real Estate in Oklahoma, Oklahoma Agricultural Experiment Station Bulletin, No. B-278, February 1944.

standpoint of leasing, as well as the particularly poor localities, generally will have a fairly well established value for minerals. It is proposed here to establish some sort of a base from which landowners can work in areas where mineral values have not been established.

There are, however, certain factors in addition to income which a landowner should consider if he contemplates selling any or all of his mineral rights. For instance, it is possible that a tract of land will suffer a loss in value greater than the price received from the severed mineral rights. There is a hesitancy on the part of potential buyers in accepting anything less than a clear and unencumbered title. This lessens the demand for encumbered land except at a considerably lower price. There is evidence that abstracting costs and title clearance problems increase when a portion of the mineral rights is sold.[2] Sale of a major portion of the mineral rights usually results in the loss of control the landowner formerly had in governing what takes place on his land. Mineral deeds usually confer on the grantee not only the right to participate in subsurface income, but also the right to come on the land and explore for oil and take any that is found. Therefore, the possible loss of income, not only from the actual production of oil but also income from future leases and bonuses should be considered.

Men of wide experience in dealings in farmland are in general agreement that only in exceptional cases should a landowner sell more than half his royalty. Most of these men feel that for the landowner to protect himself, the per-acre selling price of the mineral rights should at least be equal to the per-acre agricultural value of the land itself. Of course, individual circumstances might be such that it would be wise to accept a smaller figure.

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[2] Davidson and Parcher, Op. Cit.

The following analysis, then, deals with percentages and averages, and the values calculated are deemed minimum values. No estimate of speculative values is attempted.

The Area

The area, consisting of some 15,793,320 acres has received an average annual income of 38 cents per acre from lease rent and bonuses (Table XVI). This amount capitalized at the usual rate of capitalization of land income, 5 percent, indicates an average value of mineral rights over the area as a whole of $7.60. If, for instance, many tracts of equal size were purchased in the area, and if those tracts were geographically distributed throughout the area, it appears that the buyer could expect to realize an average income of 38 cents per acre from these tracts. He would, therefore, be justified in paying an average of $7.60 per acre for the subsurface rights if he considered 5 percent an adequate return on his investment.

Table XVI. Yearly Average of Acres Leased, Income to the Area, with Average Per Acre Income to Land Leased, and the Average Per Acre of the Area

Sub-Area	Total Acres	Percent Leased	Acres Leased	Total Income	Income Per Leased Acre	Income Per Acre in Area
				Dollars	Dollars	Dollars
1	4,784,640	22.7	1,086,803	1,405,710	1.29	.29
2	1,828,000	12.4	226,942	293,992	1.30	.16
3	2,827,000	14.8	419,605	618,052	1.47	.22
4	2,339,000	31.9	745,501	1,273,196	1.71	.54
5	2,649,640	41.6	1,101,609	1,838,426	1.67	.69
6	1,365,040	31.5	430,330	578,051	1.34	.42
Total Area	15,793,320	25.3	4,002,292	6,016,272	1.50	.38

Or, the buyer of mineral rights might look at his chances in this fashion: The weighted average income value of all tracts leased is $12.60

per acre. The chances are 6 out of 10 that an individual tract will be leased (Table XVII). In other words, out of ten tracts, he can anticipate leasing six of them a part or all of the time provided he has a sufficient number of well-distributed tracts. It appears then, that an investor can afford to pay six-tenths of $12.60, the weighted average per acre income value of leased tracts, or an average of $7.56 per acre. This figure is, of course, very close to the average income value of mineral rights for the area as a whole. However, there might be a considerable variation between these two figures.

Table XVII. Percent of Tracts Under Lease for Specified Number of Years with Cumulative Percentages, 1938-1947

Sub-Area	Years Leased										
	None	1	2	3	4	5	6	7	8	9	10
1. Percent	31.0	7.0	12.7	12.7	19.0	6.3	3.0	2.0	2.7	2.3	1.3
Cumulative	100.0	69.0	62.0	49.3	36.6	17.6	11.3	8.3	6.3	3.6	1.3
2. Percent	60.9	8.0	8.0	6.9	10.3	1.7	1.7	0.6	0.6	1.2	0.0
Cumulative	100.0	39.1	31.1	23.1	16.2	5.8	4.1	2.4	1.8	1.2	0.0
3. Percent	58.1	7.9	9.1	3.7	5.4	3.3	2.1	5.0	1.7	1.6	2.1
Cumulative	100.0	41.9	34.0	29.9	21.2	15.8	12.5	10.4	5.4	3.7	2.1
4. Percent	17.3	8.0	5.8	27.6	16.1	8.1	3.4	3.4	5.7	1.2	3.4
Cumulative	100.0	82.7	74.7	68.9	41.3	22.2	17.1	13.7	10.3	4.6	3.4
5. Percent	15.3	5.8	3.6	9.5	21.2	16.1	3.6	5.8	6.6	8.0	4.4
Cumulative	100.0	84.7	78.9	75.2	65.7	44.5	28.4	24.8	19.0	12.4	4.4
6. Percent	26.9	10.6	5.6	6.9	12.5	6.9	8.1	8.7	5.6	3.8	4.4
Cumulative	100.0	73.1	62.5	56.9	50.0	37.5	30.6	22.5	13.8	8.2	4.4
Area:											
Percent	38.3	7.9	8.5	9.8	13.8	6.4	3.2	4.0	3.3	2.5	2.3
Cumulative	100.0	61.7	53.8	45.3	35.5	21.7	15.3	12.1	8.1	4.8	2.3

If a high proportion of the leased land was under lease for only one or two years of the period, the weighted average income value would be lower than if a high proportion had been under lease for, say, seven or eight years. The disucssion of the various sub-areas shows that considerable variation actually does exist between the average income value of all land and the

weighted income value of the leased land. That difference can be attributed to the variations in the length of time land was under lease.

The buyer or the owner of an individual tract selected at random within the area must place his evaluation of the mineral rights on a different basis than the man who has widely scattered holdings. There are 38 chances out of 100 (Table XVII) that his land will not be leased one year out of ten and, of course, it may never be leased. The chances are the same, therefore, that the subsurface rights are worth from nothing to something less than $3.00 per acre.[3] In other words, roughly two-fifths of all tracts have little or no income value from undeveloped mineral rights (Table XVIII and Figure 8). On the other hand, the chances are better than 50-50, about 54 chances out of 100, (Table XVIII) that he can lease his land two years out of ten at $1.50 per acre per year. This would result in an average annual income of 30 cents per acre. Capitalizing this amount indicates a value of at least $6.00 per acre. That is to say, the mineral rights are worth a minimum of $6.00 on nine tracts out of 17. Whether a particular tract is included in the nine can be determined only by examining the public records on that tract.

There are some tracts so located that they may be leased a minimum of three years out of ten. Out of every 100 tracts, 45 fall in this category (Table XVII). These tracts will earn an average annual income from lease rent and bonuses of 45 cents per acre,[4] and therefore the capitalized value of the mineral rights is $9.00 (Table XVIII).

One out of five or about 22 percent of all tracts will be leased a minimum of five out of ten years. For these tracts the annual average income

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[3] Fifteen cents (one-tenth of the income per leased acre, Table XVI) capitalized at 5 percent.

[4] One dollar and fifty cents for three years out of ten.

FIGURE 8. THE DISTRIBUTION OF LAND BY THE INCOME VALUE OF MINERAL RIGHTS, WESTERN OKLAHOMA, 1938-1947

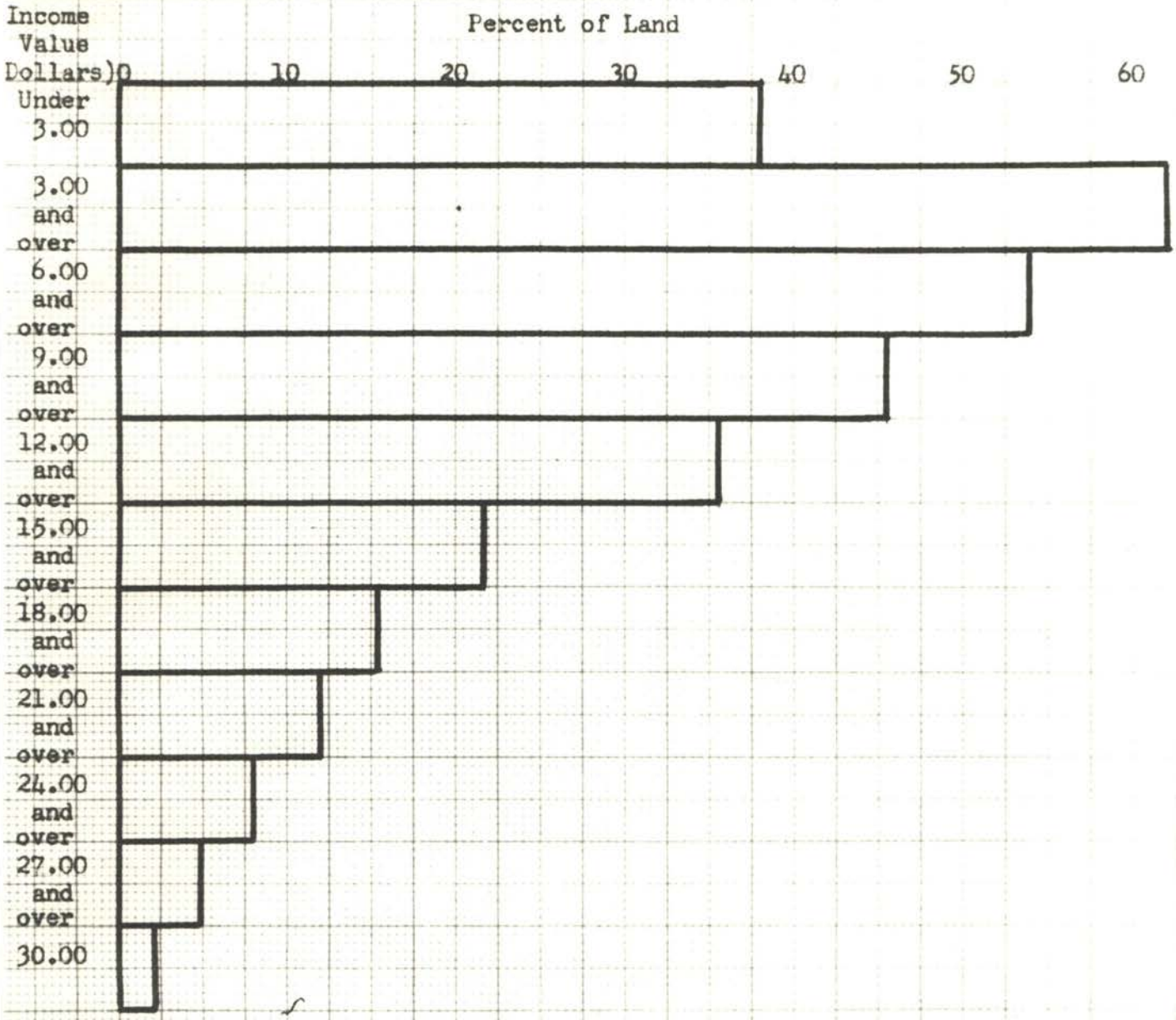

Table XVIII. Percent of All Tracts in the Area Under Lease A Specified Number of Years, With the Cumulative Percentages, the Annual Income Per Acre, and the Proportion of Tracts in Each Category

	Years Leased										
	None	1	2	3	4	5	6	7	8	9	10
Percent	38.3	7.9	8.5	9.8	13.8	6.4	3.2	4.0	3.3	2.5	2.3
Cumulative	100.0	61.7	53.8	45.3	35.5	21.7	15.3	12.1	8.1	4.8	2.3
Annual Income Per Acre (Dollars)	.00	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50
Tracts in Category	2/5	3/5	9/17	5/11	1/3	1/5	1/7	1/8	1/12	1/20	1/50

per acre will be 75 cents which indicates an income value of at least $15.00 per acre. As the length of time a tract will be leased increases, the chances for a particular tract falling into that category decrease very rapidly. There is about 1 chance in 20 that a tract will be leased nine years out of ten and so have an income value of $27.00 per acre. There is only about 1 chance in 50 that a tract chosen at random in the area will be leased all the time and so have an income value of $30.00 per acre (Table XVIII).

To state the chances somewhat differently, the following might be said: If a farm has been leased at any time during the past ten years, the experience in the area as a whole would indicate that certain projections as to future income value could be made for that tract. For instance, it may be assumed that the tract will be leased a minimum of one year in ten and hence will have a minimum income value of $3.00 per acre for the mineral rights (Table XIX); there are 7 chances out of 8 that the tract will be leased two years in ten and will have an income value of $6.00 per acre; the chances are 3 out of 4 that the tract will be leased three years in ten and have an income value of $9.00 per acre. The chances are about even that the tract will be leased

Table XIX. The Percent of Leased Tracts in the Area Under Lease A Specified Number of Years, With Cumulative Percentages, the Annual Income Per Acre, and the Probability of Leasing an Individual Tract the Specified Time

	Years Leased									
	None	1	2	3	4	5	6	7	8	9	10
Percent	12.8	13.8	15.9	22.3	10.4	5.2	6.5	5.3	4.1	3.7
Cumulative Percent	100.0	87.2	73.4	57.5	35.2	24.8	19.6	13.1	7.8	3.7
Annual Income Per Acre (Dollars)	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50
Probability of Leasing	All	7/8	3/4	9/16	1/3	1/4	1/5	1/8	1/12	1/27

four years in ten and have an income value of $12.00 per acre. There is only about 1 chance in 5 that the tract would be leased seven years in ten, and 1 chance in 12 that it would be leased nine years in ten and so have an income value of $27.00 per acre.

Experience in individual localities should govern landowners or land buyers in estimating the value of the mineral rights. However, it appears that the chances are even that the undeveloped mineral rights are worth at least $6.00 per acre on a particular tract any place within the study area. The chances are only 1 to 5 that the income value of the mineral rights on an individual tract selected at random in the area is worth as much as $15.00 per acre.

Sub-Area 1

Annual income in sub-area 1 from undeveloped mineral rights averaged 29 cents per acre for all land in farms (Table XVI). This amount capitalized at 5 percent indicates an average value of $5.80 per acre for mineral rights in this section. However, it appears that the owner of, say, 100 tracts well

distributed throughout the sub-area can place the income value of his subsurface holdings at a figure somewhat higher than $5.80 per acre. The weighted income value of all leased tracts is $9.90 per acre. The distribution shows that about 7 out of 10 tracts were leased a part or all of the time during the period studied. He can, therefore, reckon the average value of his holdings at seven-tenths of $9.90 or $6.93 per acre. This figure is roughly one dollar per acre higher than the average for all land in the sub-area. The higher figure is due to the fact that a relatively high proportion of the land was under lease for four years or more.

On an individual tract basis, values are, of course, arrived at differently. For instance, there are 31 chances out of 100 that an individual tract will not be leased once in ten years--perhaps never (Table XVII). This means the income value of the mineral rights may range from nothing to something less than $2.58[5] per acre.

The chances are good, 62 out of 100, that an individual tract will be leased two years out of ten (Table XVII). This indicates an income value of $5.16.[6] The chances are better than 1 out of 3 (36 in 100) than an individual tract will be leased four years out of ten. Tracts falling into this category will earn an average annual income of $1.29 per acre four out of ten years or an average of 51 cents per acre per year. The income value of the mineral rights on these tracts is $10.32 per acre at the stated rate of capitalization.

The chances are less than 1 in 5 that a tract will be leased for five years or more out of ten. Slightly more than 1 tract in 10 is so situated

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[5] One-tenth of $1.29, the average annual income for leased land, capitalized at 5 percent.

[6] Two-tenths of $1.29 capitalized at 5 percent.

that it has been leased six years or more out of ten. These tracts have earned an average annual income of more than 77 cents per acre. Mineral rights on these tracts are worth at least $15.50 per acre and may go as high as $25.50 per acre. However, only 1.3 percent of all tracts fall into the latter price class.

It appears, therefore, that the owner of an individual tract will most likely have an average annual income of from about 13 cents per acre up to 51 cents per acre. These figures, capitalized, indicate that a majority of landowners (51.4 percent) have mineral rights with an income value of between $2.60 and $10.32 per acre (Table XVII).

Sub-Area 2

Values of undeveloped mineral rights have been lowest in sub-area 2. Over the 10-year period, 1938-1947, the average income amounted to only 16 cents per acre per year to land in that section. Therefore, on the average, mineral rights in sub-area 2 are worth only $3.20 per acre (Table XVI).

The owner of many tracts geographically distributed over the sub-area will find that the weighted average income to the tracts he can lease is about 41 cents per acre. The income value of these leased tracts is $8.24 per acre. He can anticipate leasing about 4 out of 10 tracts as 39.1 percent of all tracts was leased for one year or more. Four-tenths of the weighted average income value of leased tracts is $3.30. This figure, virtually the same as the average income value of all land in the sub-area, must be the average per acre for his investments if he expects a 5 percent return.

A study of the occurrence of leasing of individual tracts shows that nearly 61 percent were not leased during the 10 years studied. The income value of the mineral rights on a majority of the land in the area is, therefore,

something less than $2.60 per acre[7] (Table XVII).

Some tracts, 39 out of 100 if past history is indicative of the future, will be leased a minimum of one year out of ten. The income value of the mineral rights on these tracts is at least $2.60. The chances are fairly remote that the income value of the mineral rights on an individual tract is any greater than this. Out of 100 tracts only 31 were leased two out of ten years; 23 were leased three out of ten years; and 16 were leased four out of ten years. Tracts in the last category have a mineral income value of $7.80. The highest average income value shown was $23.40 per acre and only 1 tract in 100 fell in this group. On only about 6 tracts in 100 did the income value go as high as $15.60 per acre.

It appears, then, that the majority of owners of individual tracts should place the income value of their undeveloped mineral rights at something less than $2.60. Unless the individual owner knows that his tract is favorably located, he can hardly assume the income value of his mineral rights is more than $5.20 per acre, and fewer than one-third of all tracts fall into a class this high.

Sub-Area 3

Income values of undeveloped mineral rights in sub-area 3 average only a little higher than in sub-area 2. Income from mineral rights averaged 22 cents per acre per year during the period studied. This means, that for the sub-area as a whole, the average income value of mineral rights is only $4.40 per acre (Table XVI).

The weighted income value of tracts leased at sometime during the period is $12.05. Four-tenths of all tracts were leased. It appears, then, that

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[7] Land leased in the area one year in ten would have an income value of $2.60 per acre.

the owner or buyer of a sufficiently large number of well-distributed tracts will receive a 5 percent return if his average investment per acre in subsurface rights is no greater than $4.82.

Slightly more than 58 percent of the tracts in the section have an income value of less than $2.94 per acre, this being the proportion of tracts not leased at all during the 10-year period (Table XVII).

Roughly, one-third of the tracts in this section were leased two of the ten years studied. These tracts earned an average of about 29 cents per acre per year and so have an income value of $5.88 per acre. Slightly more than one-fifth of the tracts were leased for a minimum of four years during the period. The per-acre income on these tracts averaged about 59 cents per year and had an income value of at least $11.76. Only 15.8 percent of the tracts were leased for five years or more.

It appears that the majority (58.1 percent) of landowners in sub-area 3 must reckon the value of their mineral rights at less than $2.94 per acre. other landowners may place such values higher but to go above $11.76 would be going beyond reasonable income expectations. For the one man in ten who has land which past experience shows is well located for leasing activity, the income value might be placed at $20.58. Only about 5 tracts in 100 will have income values higher than this.

Sub-Area 4

Income values of undeveloped mineral rights in sub-area 4 are relatively high. The average income for all land in the section amounts to 54 cents per acre and so can be valued at $10.80 per acre (Table XVI). Moreover, the chances of leasing an individual tract are relatively great. Only 17 tracts out of 100 were not leased sometime during the period studied.

The weighted income value of tracts leased one or more years during the period is $14.12 per acre. The data show that 8 out of 10 tracts will be leased. Eight-tenths of $14.12 is $11.30. This is the average amount per acre the owner or buyer of a large number of well-distributed tracts can have invested and realize a 5 percent return on his investment.

In regard to individual tracts, roughly 83 percent of the tracts were leased for one year or more and three-fourths for two years or more (Table XVII). Those tracts leased for two or more years earned an annual average income of at least 34 cents per acre. This indicates that a substantial majority of the tracts in the section have an income value for the undeveloped mineral rights of at least $6.84. More than 40 tracts in 100 have an income value of at least $13.68, and more than one-fifth an income value of $17.10 or more. One tract in 10 received an income of more than $1.36 per acre and on this basis was worth at least $27.36.

It appears that most owners of individual tracts can be fairly certain their undeveloped mineral rights have an income value of at least $6.84 per acre. A substantial number (41.3 percent) can justifiably go to $13.68 per acre; about one-fourth of these can reckon the income value of the undeveloped mineral rights on their land at $27.36 per acre.

Sub-Area 5

Because of the intense activity in sub-area 5 over the past ten years, the indications are that mineral values average the highest here. The average income to all land in the section amounted to 69 cents per acre per year during the period (Table XVI). This amount capitalized gives an average income value of $13.80 for mineral rights.

However, because of the great number of tracts leased for four and five years, the weighted average income value of mineral rights is $17.24 per acre.

As 85 tracts out of 100 were leased, it appears that the buyer or owner of a large number of well-distributed tracts could place the average income value of those tracts at $14.60 per acre.

As pointed out above, only 15 tracts out of 100 were not leased sometime during the period (Table XVII). For those that were leased at sometime, the minimum income was 16.7 cents per acre. Therefore, the chances are excellent, 85 out of 100, that individual tracts have an income value of at least $3.34 per acre. However, the chances are almost as good, 75 out of 100, that an individual tract will be leased a minimum of three years out of ten and consequently have an income value of at least $10.12 per acre.

Nearly a fourth of the tracts were leased a minimum of seven years during the period. Tracts in this category have an income value for the mineral rights of $23.38 per acre. More than 10 percent of the tracts have a lease income value of more than $30.00 per acre.

It appears probable, therefore, that an individual owner should estimate the income value of his mineral rights at no less than $10.12 per acre. The chances are more than fair that such values should be as high as $23.38. The multiple buyer who can obtain a good distribution, will get a 5 percent return on his investment if his purchases of mineral rights do not average above $14.60 per acre.

Sub-Area 6

Average income to undeveloped mineral rights in sub-area 6 was 42 cents per acre. Capitalizing this income at 5 percent gives an average income value of $8.40 per acre in this area (Table XVI). The weighted average income value of all leased tracts is $13.18. More than 7 out of 10 tracts were leased at sometime during the period. It appears, therefore, that an average investment in mineral rights of about $9.25 per acre in the sub-area would yield a

5 percent return from leasing activity, if a sufficiently large number of well-distributed tracts was obtained. This average investment of $9.25 is roughly $1.00 per acre higher than the average income value of all land in the sub-area due to the fact that nearly one-third of the land that was leased was under lease for six years or more during the period (Table XVII).

On an individual tract basis, slightly more than a fourth of the tracts were never leased during the 10-year period.[8] This would indicate that tracts in this category have mineral income values of something less than $2.68.[9] The chances are about 63 out of 100 that an individual tract will be leased two years out of ten if leasing continues as it has during the past ten years. The average annual income from undeveloped mineral rights on these tracts will be about 27 cents per acre. This would make an income value of $5.40 per acre for tracts in this category.

However, the chances are even, 50 out of 100, that an individual tract will be leased four years out of ten. The income value of the mineral rights on these tracts is $10.72. The chances are fair, 31 out of 100, that an individual tract will be leased a minimum of six out of ten years. Income value for tracts in this class is $16.28 per acre. More than 10 percent of the tracts earned an average of more than $1.07 per acre per year. The income value of these tracts is $21.44.

It appears, therefore, that a substantial majority of the landowners can place the income value of their mineral rights on individual tracts at something more than $2.68 but probably not much above $10.72 per acre. However,

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[8] Edwards, Roy, Op. Cit. Edwards, in a study covering 43 years for one county of this sub-area, found that fewer than 2 percent of the tracts had never been leased.

[9] One-tenth of the average annual income capitalized at 5 percent.

a number of owners of such tracts, about 14 out of 100, can place the value of their mineral rights as high as $21.44 per acre. Four out of 100 can go to $26.80 per acre. The owner of many, well-distributed tracts can anticipate an income great enough that he will obtain a 5 percent return if his average investment does not exceed $9.25 per acre.

Land Values

The value of land and buildings in the area as reported by the Census was approximately $462,724,000 in 1940.[10] It is generally believed that landowners, in reporting the value of their farms, use a figure they believe to be current market prices. The question is, how much of this reported value reflects the income value of the mineral rights?

It was seen in the chapter on income that in 1939, about $4,000,000 in income accrued from the leasing of the subsurface in the area. This amount capitalized at 5 percent indicates an income value of $80,000,000--about 17 percent of the total reported value of land and buildings in the area. Income from undeveloped mineral rights was about 25 percent of the calculated net cash income to land from both surface and subsurface that year.

The census value of land and buildings in the area in 1945 totaled approximately $617,873,000. Income from the undeveloped mineral rights in 1944 totaled $11,533,775, which if capitalized indicates a value of $230,675,500 or about 37 percent of the total reported value. Income from undeveloped mineral rights in 1944 was equal to 27 percent of the calculated net income to land from both the surface and subsurface.

There appears to be a relationship between the proportion of income arising from the subsurface and the proportion of the total land value

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[10] Census of Agriculture, Op. Cit.

reflected in the capitalized subsurface income. In one year, 1939, the income value of undeveloped rights was 17 percent of the reported value of land and buildings. In that year, subsurface income was 25 percent of the calculated net income attributable to land. In 1944 the income value of undeveloped mineral rights was 37 percent of the reported value of land and buildings. Subsurface income in 1944 was 27 percent of the calculated net income attributable to land. Usually there is a lag between an increase in farm income and an increase in farm value, therefore it is probable that the increase in farm income between 1939 and 1944 was not yet reflected in an increase in farm value by 1945. For this reason, the income value of minerals looms larger in total farm values than it otherwise would. It may be noteworthy that the average values and incomes for the 10-year period which were mentioned earlier show subsurface income to be roughly 25 percent of net income to land and the average income value of mineral rights to be about 25 percent of the average census value of land and buildings. While year-to-year variations are to be expected, it seems reasonable to believe that over a period of time, subsurface income will be reflected in land values in its approximate relationship to total income to land. There is the chance, of course, that the speculative value of the mineral rights will keep total values higher than income from both the surface and subsurface would justify.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study was conducted so as to examine the hypothesis formulated in Chapter II which stated:

1. During the past ten years, the proportion of land under lease for oil and gas has averaged 50 percent of all farmland in Western Oklahoma.
2. Leasing activity results in a significant supplementary income to landowners of Western Oklahoma.
3. Capitalization of income from leasing will indicate the value of undeveloped mineral rights and serve as a basis of judgment on the part of landowners for evaluating their property rights in the subsurface.

To summarize, statement 1 of the hypothesis will be examined first.

In Chapter III it was seen that while the amount of land under lease in Western Oklahoma is substantial, at no time during the period studied was 50 percent of the land under lease in the area as a whole. The average acreage under lease each year amounted to about one-fourth of all farmland. In only one year, 1947, did the proportion approach 50 percent. In that year, 44.1 percent was under lease.

An examination of the several sub-areas shows that during the period studied, none consistently shows 50 percent of the farmland under lease.

In sub-area 1, the proportion of land leased averaged about 23 percent during the 10-year period. However, during the final two years, the average was above 50 percent. The upward trend, when coupled with oil industry reports, indicates that the proportion leased may remain above 50 percent for some years to come.

The 10-year average of land leased in sub-area 2 was slightly more than 12 percent of all farmland. The highest proportion leased during any one year was 31.5 percent in 1947. The average acreage under lease for the final three years of the period studied was less than one-fourth of the land in farms.

Sub-area 3 had a 10-year average of about 15 percent of the land in farms under lease. The highest proportion under lease during any one year was 18.7 percent in 1946. Leasing in this sub-area is noted chiefly for the uniformity of the proportion leased each year.

Sub-area 4 had an average of roughly one-third of the farmland under lease during the 10-year period. In only two years did the acreage leased fall below one-fifth of the land in farms. However, during the final three years of the period, the average under lease was above 50 percent.

Sub-area 5, with an average of nearly 42 percent under lease each year of the period, had the best leasing record of all the sub-areas. A majority of the land in farms was under lease the last four years of the 10-year period. The average for the last half of the 10-year period closely approached 50 percent when 49.9 percent was under lease.

In sub-area 6, the amount of land under lease was relatively stable during the period. The average for the ten years shows nearly one-third of the land leased each year. While there has been a downward trend in land leased in this sub-division, the trend has been slight and the proportion leased still remains substantial.

The first statement of the hypothesis is, therefore, false. Moreover, it is unlikely that in an area as broad as Western Oklahoma will the average during any 10-year period be as high as 50 percent. This conclusion is based on the fact that in spite of the great activity over a large part of the area during the last half of the period studied, the average acreage under lease for the five years was less than one-third of all land in farms.

Even within sub-divisions of an area as broad as Western Oklahoma, it is exceptional to find 50 percent of the land leased at any time. When such an exception is found, it will be for only a year or so. In only one instance was there even a five-year period when the average proportion under lease approached 50 percent (49.9 percent average, 1943-47, in sub-area 5). In 1947, the peak year for leasing activity, only three of the six sub-areas had as much as 50 percent of the land leased for oil and gas.

The second statement of the hypothesis is that: "Leasing activity results in a significant supplementary income to landowners of Western Oklahoma."

It may be seen in Table IX that an average annual lease income of more than $6,000,000 accrued to landowners in the area. Income varied from $2,653,000 in 1942 to $11,534,000 in 1944. The average per acre subsurface income for land leased was $1.50 per year. Sixty-two percent of the land in farms received income from this source. On the whole, bonus income is somewhat more important than lease rent income, and in some years is considerably more important. Income from leasing activity may assume particular importance during periods of strong competition for leases. It is during these periods that bonus payments are largest and lump-sum payments to landowners frequently are substantial. In periods of declining activity of the oil industry, lease rentals assume increasing importance in total lease income.

A study of individual sub-divisions of the area shows that average annual incomes ranged from about $294,000 in sub-area 2 (Table XI) to roughly $1,838,000 in sub-area 5 (Table XIV). Average per acre incomes to land leased ranged from $1.29 in sub-area 1 (Table X) to $1.71 in sub-area 4 (Table XIII).

It should be pointed out again that these amounts accrued to land leased. In two of the sub-divisions of the area, namely sub-areas 2 and 3, more than half the land was not leased at all during the period studied. In two other

sub-areas, 1 and 6, more than a fourth of the land was not leased during the period.

Comparisons made of estimated net cash income from agriculture and from leasing show that income from leasing comprises about one-fourth of the net returns attributable to land. The only two years for which data for farm income are available, 1939 and 1944, show that lease income was 25 percent and 27 percent, respectively, of total net return attributable to land. Based on certain assumptions of subsurface value, investments in subsurface rights give a better return than do investments in the surface. In view of these figures, it is concluded that the second portion of the hypothesis is correct and that leasing activity does result in a significant supplementary income to landowners of Western Oklahoma.

The third part of the hypothesis states that: "Capitalization of income from leasing will indicate the value of undeveloped mineral rights and serve as a basis of judgment on the part of landowners for evaluating their property rights in the subsurface."

This statement was examined in Chapter V. It was found that income from subsurface leasing capitalized by the usual rate applied to land income gives an indication of the income value of the mineral rights. It was pointed out, however, that only a very small proportion of the tracts are leased all the time. For this small percentage, income value of the undeveloped mineral rights can be determined with a considerable degree of accuracy. For those tracts never leased, one must assume the income value is nil. For tracts leased only a part of the time, only a probable range of value can be calculated.

For the area as a whole, it was found that chances are good (54 out of 100) that undeveloped mineral rights on an individual tract are worth at

least $6.00 per acre. However, the chances are relatively poor (22 out of 100) that these rights have an income value of as much as $15.00 per acre. The buyer or owner of many tracts scattered throughout the area apparently can place the income value of his subsurface property at about $7.50 per acre.

It was found that in sub-area 1, the income value of undeveloped mineral rights probably lies somewhere between $2.58 and $10.32 per acre. The chances appear to be good (62 out of 100) that the minimum income value is about $5.16 per acre. The individual with many tracts geographically distributed over the area can place the average income value of his undeveloped subsurface rights at $6.93 per acre.

The data in Chapter V indicate that owners of individual tracts in sub-area 2 can hardly assume the income value of their mineral rights is more than $5.20 per acre. Actually, the chances are 6 out of 10 that the income value of these tracts is less than $2.60 per acre. Only the holder of many, well-distributed tracts has much assurance that the average income value of his subsurface rights is greater than $2.60 per acre. The indications are that such an owner can have an investment averaging about $3.25 per acre for subsurface rights and realize a 5 percent return on his investment from lease rent and bonuses.

The majority of owners of single tracts in sub-area 3 must figure the income value of their undeveloped mineral rights at something less than $2.94 per acre; 58 tracts out of 100 fall into this category. About one-fifth of all owners of single tracts can place a value as high as $11.76 per acre on their subsurface rights. An individual with a sufficient number of holdings, well scattered throughout the sub-area, apparently can reckon the average value of his subsurface rights at $4.82 per acre.

In sub-area 4, 75 percent of the landowners can place the income value of their mineral rights at least as high as $6.84 per acre. Nearly half can place

such values as high as $13.68 per acre. More than one-fifth of all landowners can place these values at least as high as $17.10 per acre. The buyer or owner of many, well-scattered tracts can place an average subsurface income value of $11.30 per acre on his tracts.

The chances are excellent (3 out of 4) that the income value of undeveloped mineral rights in sub-area 5 is worth at least $10.20 per acre. Nearly a fourth of all tracts have an income value for the subsurface of at least $23.38 per acre. Half of all tracts will have an income of somewhere between these two figures. The owner of many, well-scattered tracts can place the average subsurface income value at about $14.16 per acre on his land.

In sub-area 6, a substantial majority of landowners, 73 percent, can place the income value of their mineral rights at something more than $2.68 per acre and half of all owners can go as high as $10.72 per acre. A fair proportion of the owners, about 1 out of 3, can place these values at least as high as $16.00. There is a good chance, therefore, that an individual can be reasonably sure the value of his undeveloped mineral rights lies somewhere around $10.72 per acre. However, the chances are greater that the value will be as low as $2.68 than that they will be as high as $16.00 per acre. The owner of many, well-scattered tracts can anticipate an income sufficiently high to justify placing an average income value on each tract of $9.25 per acre.

It appears that hypothesis number 3 is only partially correct. For individual tracts, it is possible to indicate only a range of values for undeveloped mineral rights. It is believed, however, that even a range of values will prove helpful to the landowner who has no idea at all in regard to the mineral values. The owner of a tract in a locality where there has been no leasing must, of course, assume the subsurface has no income value. The owner

of a tract in a locality where land is leased all the time, and such localities are not rare, can assume the subsurface income will be $1.00 per acre per year plus one-fifth (or one-tenth)[1] of the usual bonus. In short, $1.00 lease rental plus a bonus of $5.00 per acre every five years would give an income value of $40.00[2] per acre for undeveloped subsurface rights.

The individual who buys, at random, a single tract for the subsurface rights, is of necessity a speculator, one who gambles against uncertainty, for he has no assurance that his expenditure will yield any income. He may, of course, receive income from leasing activity but such income, even in the area of greatest leasing activity, accrues to only about 85 out of 100 tracts. For Western Oklahoma as a whole, such income accrues to only 6 out of every 10 tracts.

On the other hand, the buyer of many tracts geographically distributed throughout the area may be considered an investor. If his average purchase price per tract is no greater than the capitalized value of the weighted average income per leased tract divided by the proportion of all tracts leased, then he would seem to be assured a fair return on his investment. This income will come from leasing and bonuses. If oil is discovered on any tract, the additional return would be pure profit.

Conclusions

1. It is unlikely that as much as one-half the land of Western Oklahoma will ever be under lease for oil and gas at one time. It is likely, however, that within small portions of the area a majority of the land will be leased some years.

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[1] In those areas where leases are commonly made for ten years.

[2] One-fifth of $5.00 is $1.00 plus $1.00 lease rent capitalized by 5 percent.

2. Income from undeveloped mineral rights is a significant part of total farm income in Western Oklahoma. However, all farms do not share in this supplementary income.
3. By capitalizing subsurface income, it is possible to determine a possible range of value for subsurface rights on individual tracts. For a great number of geographically distributed tracts under one ownership, it is possible to estimate the value of subsurface rights with some degree of accuracy.

BIBLIOGRAPHY

1. Agricultural Post War Planning Committee, South Central Region, U. S. Department of Agriculture and State Agricultural Agencies Cooperating. Natural Sub-Regions of the South Central Region, (No Date).

2. Davidson, R. D. and Parcher, L. A., The Influence of Mineral Rights on Transfers of Farm Real Estate in Oklahoma, Oklahoma Agricultural Experiment Station Bulletin, No. B-278, February 1944.

3. Economic and Credit Research Division, Farm Credit Administration, Cattle Ranches, Colorado and New Mexico, Production, Income and Expense, 1937-1938-1939, May 1940, Washington, D. C.

4. Edwards, Roy V., A Study of the Source and Distribution of Income Arising From the Ownership of Mineral Rights in Payne County, Oklahoma, Master's Thesis, Oklahoma A. and M. College, 1947.

5. Jones, Ronald W., Farm Costs and Returns, 1945-1946, U. S. Department of Agriculture, Bureau of Agricultural Economics, Mimeograph Release, April 1947.

6. Mid-Continent Oil and Gas Association, The Oil Industry in Oklahoma, Mimeograph Release, February 1941.

7. National Oil Scouts and Landmen's Association, Yearbook, Volumes VII through XVII.

8. Stephens, P. H., Farm Production Costs in Oklahoma, Oklahoma Agricultural Experiment Station Bulletin, No. 208, February 1933.

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