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THE EFFECT OF FOOD PLANTINGS, CLIMATIC CONDITIONS, AND LAND USE PRACTICES UPON THE QUAIL POPULATION ON AN EXPERIMENTAL AREA IN NORTHWEST FLORIDA

By ROBERT W. MURRAY

Florida Game and Fresh Water Fish Commission
Tallahassee, Florida

Ten years ago farm game habitat development projects in the southeast were primarily concerned with the distribution of bush lespedeza planting material to farmers. With the discovery of bicolor lespedeza, it was felt that the solution to restoring and maintaining high quail populations on southeastern agricultural lands had been found. The program of wholesale distribution of this new wonder plant to farmers became the leading project of many state game departments. Not too much thought and attention were devoted to follow-up studies to learn the actual effect of the program upon quail populations. Results were being assumed rather than measured.

The Florida Game and Fresh Water Fish Commission was anxious to test the merits of this new plant. Plans were to develop an experimental area of typical agricultural land with bush lespedeza plantings and census the bird population annually. In 1948, a 5,500-acre area was set up in Jackson County, Florida. The land was typical northwest Florida corn and peanut farmland. The landowners agreed to let the Commission make the desired number of plantings on their farms. The area was essentially square in dimension. Topography is gently to moderately rolling. Although the area is rather intensively farmed, there is

a good distribution of cover provided by woody vegetation along hedge rows. This vegetation consists predominately of laurel oaks, water oaks, live oaks, hackberries, wild cherries, and occasional wild plum thickets. There are a few timbered areas that are comprised predominately of hardwoods.

One hundred seven plantings were made on the area in the spring of 1949. These plantings were failures, however, and were replanted in the spring of 1950. This year plantings were successfully established. Plantings were maintained annually and were fenced against livestock where necessary.

In 1953 it became evident that results which were being obtained from the study were not conclusive. This was due to the fact that there was no check-area to measure the changes in population. Although there had been an increase in the quail population, there had also been an increase in the bird population throughout this section of the State. It was, therefore, impossible to conclude whether the increase on the area was a corresponding increase, or one produced by adding food. It was decided that the area would be divided into two equal halves and that plantings would be destroyed on one-half and maintained on the other. The undeveloped half would serve as a check against the developed section in further population studies. This was accomplished and approximately 50 plantings were maintained on the developed half. Drought during 1954 destroyed the plantings and they were replanted in the spring of 1955. These plantings were again seriously damaged by drought during that year. However, most of the plantings were rejuvenated by better moisture conditions in 1956. Those which did not regain vigor were replanted in the spring of 1957.

The area was censused with bird dogs annually during mid-winter to determine the wintering quail population. Concerted efforts were made each winter to collect crops from birds killed by hunters in order to learn to what extent the birds were utilizing the food plantings. Sex and age data were also collected from bagged birds in an effort to determine productivity.

It became apparent in 1952 that the pattern of land use on the area was changing. At the beginning of the study most of the land was in cultivation and was being cropped to corn and peanuts. The cattle boom that hit Florida in the early '50s was inducement for some of the landowners to buy cows and graze their land. This trend continued through 1955. By that year much of the land that had been profitable cropping land was being overgrazed by cattle. Corn and peanut land that had produced high quail populations at the beginning of the study produced consistently fewer birds as grazing intensity increased. The drought years and dropping beef prices took a toll of the landowners' purses. Some were forced out of the cattle business in 1956. In 1957 two landowners, who owned a large portion of the area, sold their cows and planted much of their land in pine trees.

This change in land use only added to the confusion of the study. It was thought impossible to reach definite conclusions from the food planting program under changing land use conditions. It became quite evident that this change was having more effect upon the quail population than the food planting program. The effect of the drought years on the quail population in this section of the State was likewise evident. It was, therefore, decided to continue this study to learn the effect of changing land use and weather conditions upon the quail populations in northwest Florida. Fortunately, fields that were in cultivation each year had been noted on a cover map of the area prepared at the beginning of the study. Had this not been done from year to year, the intensity of land use changes could not have been measured.

The quail population as determined by the annual census is presented in Table I. Each year the population was broken down to show the population on each half of the area. The half on which plantings were maintained is described as the "developed" half, while the half on which they were destroyed is described as "undeveloped." For simplification, these terms are used each year, although the plots on the undeveloped half were not destroyed until 1953.

TABLE I
ANNUAL QUAIL POPULATION ON JACKSON COUNTY AREA

<i>Winter</i>		<i>Number Coveys</i>	<i>Total Birds</i>	<i>Birds Per Covey</i>	<i>Popu. Density Birds/Acres</i>
1948-49	Developed	13	159	12.2	1:17.3
	Undeveloped	12	141	11.8	1:19.5
1949-50	Developed	19	228	12.0	1:12.0
	Undeveloped	16	192	12.0	1:14.3
1950-51	Developed	22	284	12.9	1:9.7
	Undeveloped	26	316	12.1	1:8.7
1951-52	Developed	18	214	11.9	1:12.8
	Undeveloped	17	206	12.1	1:13.3
1952-53	Developed	15	198	13.2	1:13.9
	Undeveloped	16	228	14.1	1:12.0
1953-54	Developed	17	187	11.0	1:14.7
	Undeveloped	15	165	11.0	1:16.6
1954-55	Developed	10	111	11.1	1:24.8
	Undeveloped	9	108	12.2	1:25.4
1955-56	Developed	10	121	12.1	1:22.7
	Undeveloped	8	95	11.9	1:28.9
1956-57	Developed	14	184	13.1	1:14.9
	Undeveloped	9	110	12.2	1:25.0
1957-58	Developed	12	150	12.5	1:18.3
	Undeveloped	15	165	11.0	1:16.6

FOOD HABITS

Results of the food habits study varied from year to year depending upon the quality of the plantings. Bicolor and thunbergii seed were the leading foods in years when the plantings were of good quality. In years when they were of poor quality, as well as during the first two years of study before plantings were established, corn, peanuts, and acorns were the leading foods. There was also considerable variance in sex and age data obtained from year to year. Due to the small number of birds examined in some years, these data were considered inadequate in showing positive trends in productivity.

WEATHER CONDITIONS

It is generally concluded that summer weather conditions play an important part in governing annual quail populations in this section of the State. Productivity is highest during summers of high rainfall and low mean temperatures. The reason for this is perhaps that low soil moisture and high soil temperature adversely affect egg hatchability and result in small broods. Also, food and cover are less abundant during dry years. An effort was made to correlate the declining population on the area with the hot dry summers of the drought years. Climatological data were obtained from the U. S. Weather Bureau for each year of the study. A weather station was located one mile from the area. Table II shows the monthly precipitation for each year between the months of April and October. Table III shows the mean temperature for these months, which were selected since they are the months of summer productivity.

TABLE II
MONTHLY PRECIPITATION ON JACKSON COUNTY AREA

<i>Year</i>	<i>April</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Total</i>
1948	4.45	3.21	1.51	11.30	5.76	5.03	2.50	33.76
1949	9.07	1.70	6.76	9.92	6.08	3.60	3.37	40.50
1950	5.27	2.30	4.13	11.57	12.70	1.79	1.02	38.78
1951	5.08	4.64	5.21	4.14	1.69	8.11	.74	29.61
1952	3.75	2.29	1.62	3.58	11.56	3.35	.55	26.66
1953	9.73	2.14	2.99	6.29	3.50	7.48	.98	33.11
1954	4.07	2.98	1.41	4.42	4.32	3.22	3.01	23.43
1955	3.83	3.27	1.09	8.74	4.61	2.99	2.08	26.61
1956	2.59	4.23	2.09	9.48	4.95	5.92	4.95	34.21
1957	5.31	4.03	5.29	10.99	4.59	17.10	1.24	48.55

TABLE III
MEAN MONTHLY TEMPERATURE ON JACKSON COUNTY AREA

Year	April	May	June	July	Aug.	Sept.	Oct.	Avg.
1948	72.3	75.8	80.4	80.2	78.5	74.6	62.6	74.9
1949	66.9	74.7	78.7	80.2	79.4	75.0	74.0	75.5
1950	63.9	76.6	80.8	78.4	79.2	74.8	68.1	74.5
1951	66.0	72.6	79.6	81.3	82.3	78.0	70.4	75.7
1952	64.0	74.6	83.8	83.1	80.6	75.4	64.4	75.1
1953	65.2	77.1	81.3	81.2	80.6	77.4	68.5	75.9
1954	72.4	71.0	81.0	82.4	82.4	78.9	66.8	76.4
1955	70.7	77.1	77.8	81.4	82.9	79.5	67.0	76.6
1956	65.2	76.5	78.5	80.5	82.1	74.9	69.2	75.3
1957	69.1	75.3	80.9	82.4	81.7	77.6	65.1	76.0

LAND USE PRACTICES

It was becoming rather obvious by the mid-term of the study that changing land use practices were affecting the quail population. Efforts were made to correlate these changes with the population changes. Table IV shows the acres in cultivation and the acres grazed during each year of study. Most of the grazed land was severely overgrazed, especially during the drought years.

TABLE IV
LAND USE PRACTICES ON JACKSON COUNTY AREA

Year	Acres in Cultivation			Acres Grazed		
	Developed	Undeveloped	Total	Developed	Undeveloped	Total
1948	740	880	1,620	230	300	530
1949	760	920	1,680	210	280	490
1950	795	1,010	1,805	205	280	485
1951	520	600	1,120	640	790	1,430
1952	460	580	1,040	660	980	1,640
1953	390	480	870	720	1,020	1,740
1954	280	420	700	800	1,320	2,120
1955	250	360	610	830	1,700	2,530
1956	240	400	640	780	1,240	2,020
1957	130	560	690	820	1,180	2,000

CONCLUSIONS

It will be noted from Table I that, with the exception of three years, the developed half of the area produced the highest bird population. However, the difference in figures for each half is not sufficiently great to be considered significant. Also, this half of the area produced the most birds during the first two years of study before plantings were established. It is, therefore, concluded that destroying the plantings on one half of the area had little, if any, effect upon the bird population on either half. It is further concluded that plantings had no appreciable effect upon the population trend on the area as a whole from year to year. The decline in population during the course of study must be considered due to some other factor.

It was found that an apparent correlation existed between climatic conditions and the population from year to year. This can be readily seen when plotted as in Figures 2 and 3. The summers of lowest precipitation and highest temperature coincided with the years of lowest productivity. Although this factor is no doubt responsible for trends in population changes over large sections of the country as a whole, it is not believed to be responsible for such a spectacular change or decline in local populations as occurred on the area. It probably contributed partially to the decline, but the main cause must be attributed to some other factor.

Upon examining Table IV, a distinct correlation is found to exist between land use changes and population changes. The population varied directly with the acreage in cultivation and inversely with the acreage grazed. This correlation can be seen distinctly when Figure 4 is examined. Population changes on the area varied in equal proportion to the land use changes.

Figure 1. Quail Population on Jackson County Area

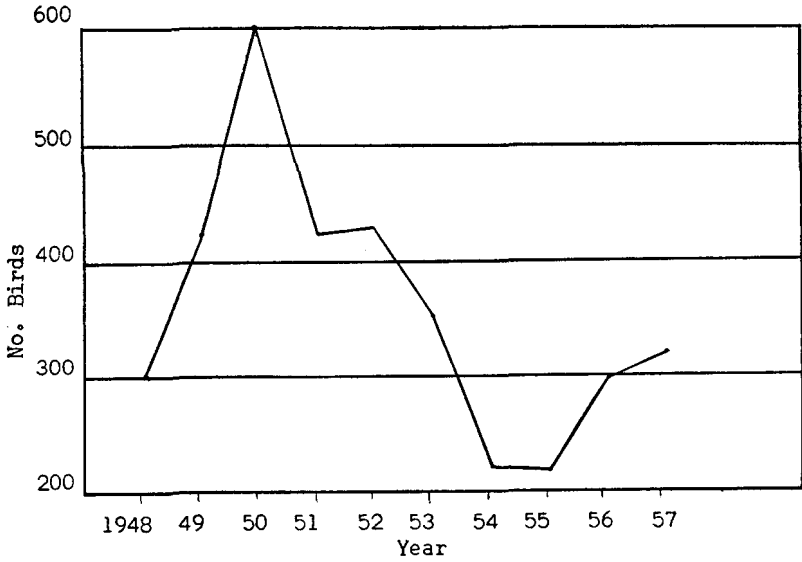


Figure 2. Monthly Precipitation on Jackson County Area

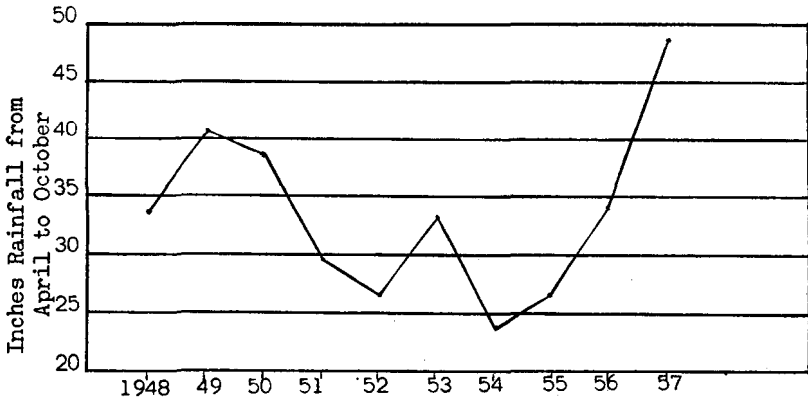


Figure 3. Mean Monthly Temperature on Jackson County Area

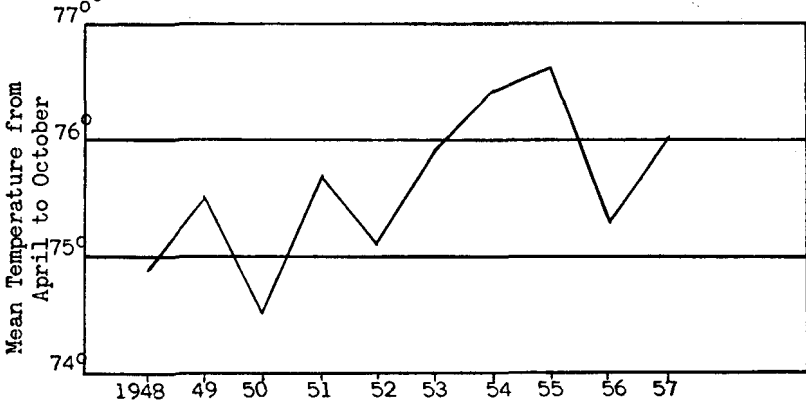
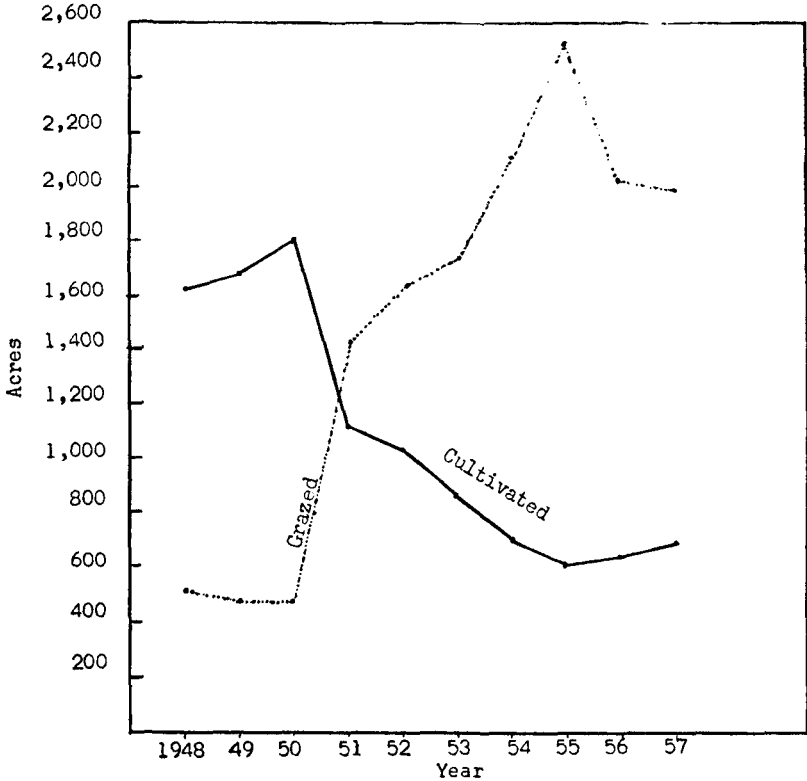


Figure 4. Land Use on Jackson County Area



When land in northwest Florida is taken out of corn and peanut production and converted into grazing land, the carrying capacity of that land for quail is seriously lowered. The reason for this decline is that some of the leading foods in this section of the State are destroyed in this land use conversion. Not only are such important foods as corn and peanuts lost, but other annuals such as Florida beggarweed, watergrass, and ragweed are lost. Grazing, on the other hand, especially overgrazing, destroys natural foods and much protective ground and escape cover. The effect of such changes in land use upon quail populations is clearly measured in this study. This study has shown that something is lost on agricultural quail range in this section of the State when it is taken out of corn and peanut production that cannot be duplicated through food planting programs. This is a disturbing thought when it is realized that we are face to face with the Soil Bank Program.

It is concluded from this study that establishing food plantings on corn and peanut cropland in northwest Florida does not materially affect the quail population, but that the removal of this land from cultivation does seriously affect the population, especially in times of drought when natural productivity is impaired.