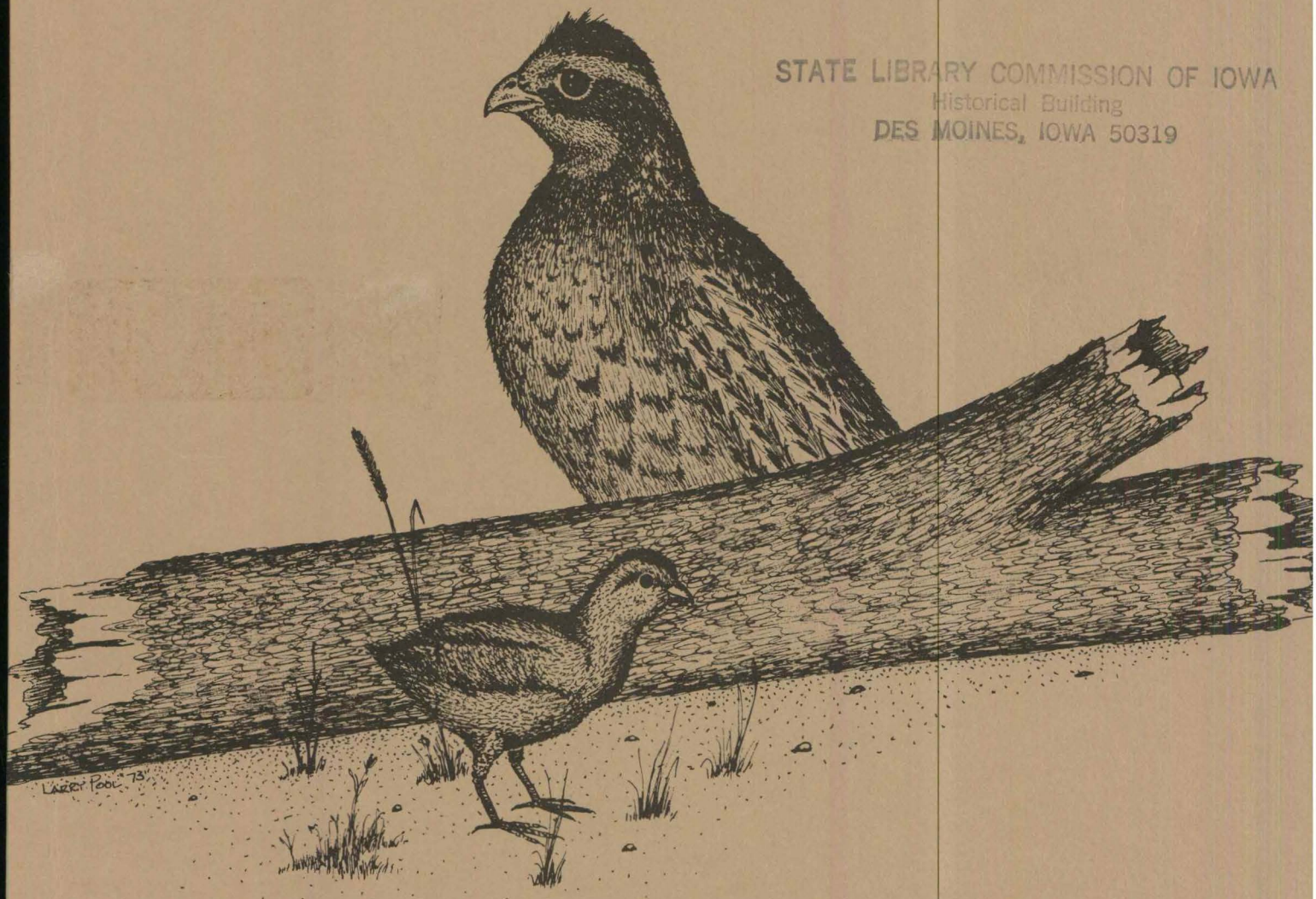
THE BOBWHITE IN IOWA 1972

BY

CHARLES C. SCHWARTZ – WILDLIFE BIOLOGIST



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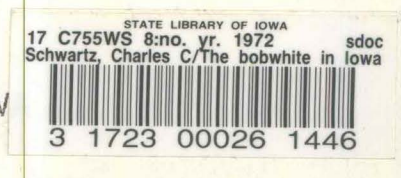

Abstract: Data collected on the bobwhite quail (*Colinus virginianus*) in Iowa during the 1972 season are presented. Statistical analyses are also presented for the relationship between survey data and hunter harvest and success. Winter brood stock surveys indicated a 59.8 percent decrease in the 1971-72 fall population to the 1972 spring population with adequate breeding stock entering the spring season. The 1972 hatching season was late and extended well into August. Only 55.7 percent of the total hatch was complete by July 31. Age and sex ratios determined from 10,465 wings collected from 1963 to 1972 do not follow any specific trends. There was a mean of 84.7 young per adult in the fall populations from 1963 through 1972. Sex ratios were quite variable with a mean of 87 hens per 100 cocks. Correlation analysis indicated that there was no significant ($P > 0.05$) relationship between the percent of young in the harvest and both total hunter kill ($r = -0.00$) and birds bagged per hunter per season ($r = -0.05$). There was no significant ($P > 0.05$) relationship between the percent of young in the bag and mean number of whistling cocks in the spring ($r = -0.48$). The whistling cock quail index for 1972 was 25.6 calling birds per route, which was a 23 percent increase from 1971. Statistical analyses indicated a significant ($P < 0.05$) correlation between the whistling cock index and the hunter kill ($r = 0.692$), but no significant ($P > 0.05$) correlation between the whistling cock index and bag per hunter per season ($r = 0.639$) or with fall quail numbers ($r = 0.378$). Statistical analysis indicates there is a significant ($P < 0.01$) correlation between quail sighted on the August roadside pheasant survey and both the hunter kill ($r = 0.954$) and the birds bagged per hunter per season ($r = 0.874$). Fall population estimates indicate a 276.0 percent increase from the spring population. Fall and winter weather plus a delayed crop harvest reduced hunter success. There were 732,200 quail killed in Iowa during the 1972-73 season, a 29.5 percent decrease from the 1971-72 season.

ACKNOWLEDGEMENTS

I wish to thank those Conservation Officers and Wildlife Biologists who assisted in collecting data on whistling cock routes and quail wings. I also wish to thank those landowners on the Decatur-Wayne Quail Research Area for their cooperation in allowing Conservation Commission personnel access to survey quail. Thanks also to Dr. A. L. Farris and Jack Coffey for help in conducting the quail survey. I am also grateful to J. K. Mayhew and Dr. V. L. Wright for statistical assistance and to Drs. A. L. Farris, E. D. Klonglan and V. L. Wright for review of the manuscript and to Kathy Schlutz, Secretary, for typing the report. Credit is also due Larry Pool for the cover drawing.

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INTRODUCTION

This bulletin is the second in a series on quail and contains data collected on the bobwhite in Iowa during the 1972 season. Surveys discussed include: (1) winter brood stock survival and spring breeding prospects, (2) nest initiation and hatching dates, (3) sex and age ratios, (4) whistling cock quail counts and their usefulness as predictors of hunter harvest, (5) the August roadside survey as an indication of hunter harvest, (6) fall population prospects, (7) hunting season dates and weather, and (8) hunter harvest and success.

Pertinent background information on the bobwhite, including history and distribution have been discussed by Schwartz, 1972.

WINTER BROOD STOCK SURVIVAL AND SPRING BREEDING PROSPECTS

Winter quail survival is determined annually in Iowa on the Decatur-Wayne Quail Research Area. The detailed description of the area is in Sanders, 1943:701-706. Each winter after severe weather has passed (late February to early March) quail numbers are estimated. Biologists aided by bird dogs systematically cover brush and timber patches located near crop fields. In addition idle fields and cover patches in pastures are checked. Average covey size is determined from those coveys for which a complete count of birds is made.

The 1972 spring census revealed 11 coveys with a mean of 11.4 birds per covey; this was a 59.8 percent decline from the previous fall population of 27 coveys with 11.5 birds per covey (Table 1). Past data from the Decatur-Wayne survey indicate an average fall to spring loss of 47.5 percent from 1965 to 1972 with a range from 12.3 to 63.5 percent. The 1972 fall to spring population decline appears to be "normal" and well

Table 1. Fall and spring bobwhite densities and percent annual changes on the Decatur-Wayne Quail Research Area, 1965-1972.

Year	Spring				Fall			
	Number of coveys	Mean No. birds per covey	Total birds	Percent loss from previous fall	Number of coveys	Total birds	Mean No. birds per covey	Percent gain[a] during year
1972	11	11.4	125	59.8	32	470	14.7	276.0
1971	16	12.8	205	57.3	27	311	11.5	51.7
1970	18	12.8	230	55.4	33	479	14.5	108.3
1969	20	10.4	208	32.5	36	518	14.4	149.0
1968	14	11.0	154	45.0	25	308	12.3	100.0
1967	14	11.0	154	63.5	25	280	11.2	81.8
1966	10	10.0	100	54.5	32	422	13.2	322.0
1965	11	11.0	121	12.3	24	221	9.2	82.6

[a]Calculation of the percent gain from spring to fall from 1965 to 1971 presented by Schwartz (1972) were incorrect. Figures presented here have been recalculated correctly.

within limits to allow adequate brood stock carry over. Extreme quail die-offs occur in Iowa when winter weather is severe. Kozicky and Hendrickson (1952) suggest that in Iowa with 0.1 inches or more of snow on the ground for 55 to 60 days, the population declined 30 percent, and with 100 days of snow cover loss of 80 percent. Table 2 summarizes weather data in Iowa during 1972.

January, 1972 was mild with subnormal precipitation. The first major snow storm of the year occurred on the 24th-25th when snowfall blanketed most of Iowa quail range and temperatures dropped to near zero. February was cold and dry with temperatures at the end of the month reaching record high levels in many southern Iowa areas. Snow cover on the ground remained in most areas until the 16th. Including snow from January, there were 21 continuous days of snow on the ground, but snow cover did not remain long enough to cause major quail losses. March was a relatively dry, cloudy month with temperatures near normal. April was a cool month with considerable cloudiness and below normal sunshine. Except for the adverse weather during late January and early February, winter weather was quite favorable for quail brood stock carry-over. Winter weather was neither extreme nor persistent. All indications, including the late winter census, pointed toward adequate carry-over of spring brood stock.

NEST INITIATION AND HATCHING DATES

The 1972 bobwhite nesting season was late. Pairing began as early as March 8 and first whistling was heard on the 18th. Early nesters were hampered by unusually cool, wet spring and summer weather. Many birds undoubtedly delayed nesting or failed at early attempts as indicated by hatching dates in Figure 1. In Iowa, during most years a peak in hatching

Table 2. A summary of weather data for the bobwhite range in Iowa, 1972 (U.S. Dept. Commerce, 1972).

	Temperature						Precipitation								
	Southeast		South central		Southwest		Southeast			South central			Southwest		
Month	$\bar{X}$	Dep.	$\bar{X}$	Dep.	$\bar{X}$	Dep.	in.	Dep.	CSC*	in.	Dep.	CSC*	in.	Dep.	CSC*
January	21	-3.6	20	-3.2	21	-2.4	.7	- .8	9	.5	- .8	5	.3	- .7	7
February	24	-4.0	24	-2.8	26	- .8	.7	- .5	27	.7	- .3	18	.3	- .6	21
March	39	.9	39	2.1	41	4.1	2.0	- .4	2	1.1	-1.1	0	.8	-1.2	1
April	50	-1.0	50	-..7	51	- .1	4.4	1.2	0	3.3	.4	0	3.9	1.4	1
May	64	1.2	62	.6	62	0	3.8	- .1	-	5.2	1.1	-	5.0	1.0	-
June	70	-1.9	70	-1.2	72	0	4.2	- .9	-	2.9	-2.3	-	2.5	-2.7	-
July	75	-1.9	74	-2.3	74	-2.8	3.8	.4	-	5.5	2.3	-	6.5	3.2	-
August	74	- .9	73	-1.2	73	-1.6	3.6	- .1	-	4.4	.2	-	2.6	-2.0	-
September	68	1.1	66	- .2	67	.3	3.8	.5	-	7.2	3.8	-	7.6	4.2	-
October	51	-4.6	50	-5.1	51	-4.8	2.4	.0	-	1.8	- .4	-	3.7	1.6	-
November	37	-3.3	36	-3.4	36	-2.6	2.7	.7	5	1.5	6.5	18	3.4	1.8	17
December	23	-6.0	21	-7.2	21	-7.3	1.7	.1	24	1.8	.7	24	1.9	1.0	24
Annual	49.7	-1.9	48.9	-2.1	49.6	-1.5	33.8	.1	27	37.4	4.8	24	38.5	7.0	24

*CSC = Cumulative number of days of continuous snow cover. Maximum number of days with 1 or more inches of snow cover.

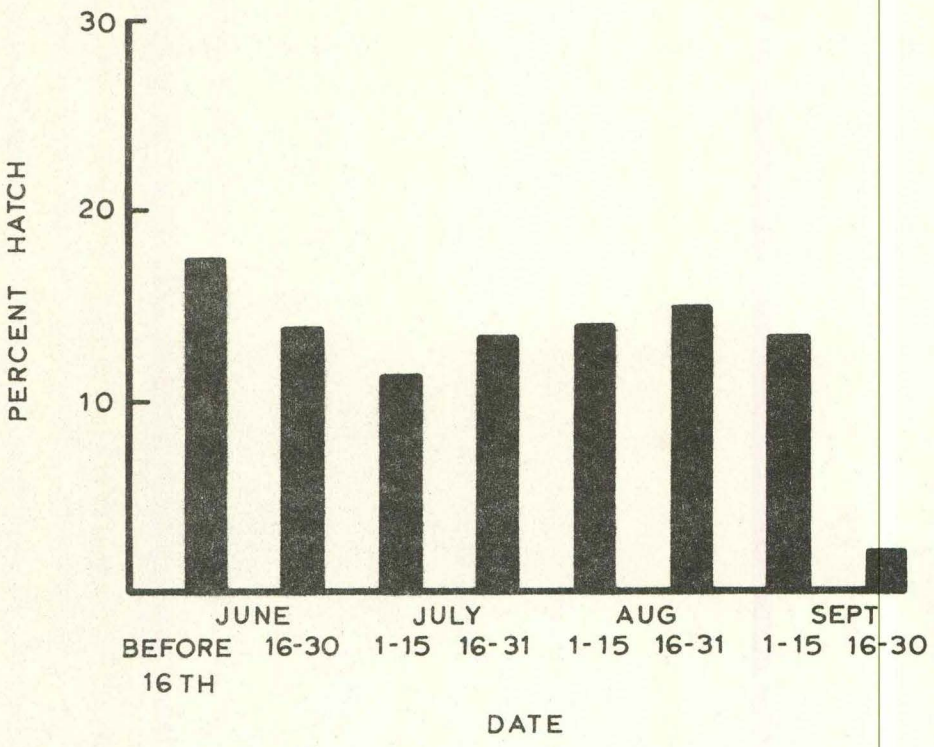

Figure 1. Bimonthly hatching dates, 1972.

occurs during the second two weeks in June (1971, 1970, 1966 - weak peak) and may extend into early July (1969, 1967) (Table 3). The 1972 hatch as determined by primary feather replacement of 503 usable wings indicated a family uniform hatch over the entire summer (Figure 1). Weather data (U.S. Dept. Commerce, 1972) indicated that the nesting season was unseasonally cool and the wettest since the early 50's. This weather undoubtedly caused some nest losses or delays in nesting and is probably responsible for the shift in hatching from late June-early July to August.

SEX AND AGE RATIOS

Fall sex and age ratios collected from 1963 to 1972 do not show any specific trends. Since spearate envelopes are not used for wings from male and female quail, it was not possible to determine separate sex ratios for adult and juvenile birds. Sex ratios determined from adults and juvenile quail together indicate a ratio of 87 hens per 100 cocks (Table 4), with a range from 67 to 102. Kabat and Thompson (1963) indicate that late-hatched broods may affect sex ratios. Westerskov (1957) reported an increase in hens in late hatches of partridges and cited similar observations by Mills (1955), King (1915) and Jull (1923) on rabbits, rats, and fowls, respectively.

This trend does not appear in Iowa data from 1966 to 1972. If a comparison is made between the ratio of hens per 100 cocks (hen ratio) and the percent cumulative hatch (Table 3), no apparent relationship appears. Since late hatches occur in August and September, the cumulative hatch to July 16-31 should indicate the extent of the early hatch. Correlation analysis of the hen ratio to the percent of the hatch by July 31 indicate a nonsignificant ($P > 0.05$) relationship ($r = 0.70$). The years 1972,

Table 3. Percent of the total and cumulative quail hatching dates in Iowa, 1966-1972.

Year	Number of usable wings	June		July		August		September
		Before 16th	16-30	1-15	16-31	1-15	16-31	1-15
1972	503	17.4	13.6 (31.0)[a]	11.6 (42.6)	13.1 (55.7)	13.9 (69.6)	14.9 (84.8)	13.1 (97.9)
1971	413	20.0	30.5 (50.5)	12.8 (63.3)	16.3 (79.6)	7.5 (87.1)	8.2 (95.3)	3.6 (98.9)
1970	908	20.6	28.3 (48.9)	12.4 (61.3)	10.7 (72.0)	10.7 (82.7)	11.3 (94.0)	5.5 (99.5)
1969	1,252	30.9	13.0 (43.9)	16.0 (59.9)	7.0 (66.9)	8.0 (74.9)	14.0 (88.9)	7.7 (96.6)
1968	1,067	22.0	12.0 (34.0)	14.0 (48.0)	16.0 (64.0)	12.0 (76.0)	11.0 (87.0)	11.0 (98.0)
1967	855	13.0	16.0 (29.0)	21.0 (50.0)	15.0 (65.0)	13.0 (78.0)	13.0 (91.0)	7.0 (98.0)
1966	1,060	3.1	30.0 (33.1)	18.0 (51.1)	8.1 (59.2)	13.3 (72.5)	17.9 (90.4)	9.0 (99.4)
Total	6,058							

[a]Figures in parentheses represents cumulative hatch to date.

Table 4. Age and sex ratios of Iowa quail, 1963-1972.

Year	Total wings	Percent adult	Percent young	Young/ adult	Females/ 100 males
1972	503	19.5	80.5	4.12	96
1971	413	17.9	82.1	4.58	67
1970	908	13.0	87.0	6.69	89
1969	1,252	13.0	87.0	6.69	76
1968	1,067	14.0	86.0	6.14	76
1967	855	19.5	80.5	4.12	95
1966	1,060	14.0	86.0	6.61	91
1965	1,364	15.0	85.0	5.65	91
1964	1,404	15.0	85.0	5.66	102
1963	1,639	12.3	87.7	7.12	87
$\bar{X}\pm$S.E. Σ =10,465		15.3 ± 0.8	84.7 ± 0.8	5.74 ± 0.35	87 ± 3

1967, and 1966 all had hen ratios above 90 percent, with corresponding cumulative hatch percents of 55.7, 65.0 and 59.2 for 1972, 1967, and 1966, respectively. Years 1972 and 1966 had high hen ratios and corresponding late hatches. However, 1970 had a hen ratio of 89 percent with a cumulative hatch of 72.0 percent (high hen ratio, early hatch); 1968 had a hen ratio of 76 percent and a cumulative hatch of 64.0 percent (low hen ratio, late hatch). It therefore appears that no simple relationship exists between the hen ratio and a corresponding late hatch. It is interesting to note, however, that the two extremes in the hen ratio correspond with the two extremes in the cumulative hatch, excluding 1964 when no hatching information was gathered.

Age ratios showed less variation than did the sex ratios for the years 1963 to 1972 (Table 4). The percent young as determined from wing collections was 84.7 percent with a range of 80.5-87.7 percent. The young per adult ratio was 5.74 with a range of 4.12-7.12. Rosene (1969:385)

gives the composition of various bobwhite populations arranged in sequence from south to north. These data indicate a gradual increase in the percent of juvenile birds and juvenile per adult from south to north in quail range. Data collected in Iowa fit this trend well.

In order to determine if any relationship existed between the percent of young quail in the bag (Table 4) and total hunter harvest, or quail bagged per hunter per season, correlation analyses were conducted. In addition similar analysis was conducted to determine if whistling cock counts in the spring were related to the percent young quail in the bag. Results indicate there is no significant ($P > 0.05$) correlation between either the percent young in the bag and hunter harvest ($r = -0.00$) or the percent young in the bag and quail bagged per hunter per season ($r = -0.05$). Bennitt (1951) indicates that "a number of writers appear to assume that because the size of the fall population is largely determined by the number of young brought to maturity, hunting success is indicated by the percentage of young birds in the fall. The implication is that in a year when there are 80 percent of young birds in the fall there are fewer birds in the field and hence poorer hunting than in a year when young birds make up 85 percent of the population." He goes on to say that in Missouri hunting success has not declined with decreasing percentages of young in the bag and may in effect have an inverse relationship to it. It appears that hunter success is dependent on factors other than the percent of young quail in the fall population.

For Iowa data, there was a non-significant ($P > 0.05$) correlation ($r = -0.48$) between whistling cocks in the spring and the percent of young in the bag. Bennitt (1951) in Missouri found, "a close correlation between call index and the percent of old birds in the fall population ($r = 0.938$,

with 6 d.f.); conversely, the higher the call index, the smaller the proportion of young in the bag." Iowa data follow this same trend; however, the amount of variation is much greater. Kabat and Thompson (1963:36) report that Stanford in Missouri obtained a great variation between the call index and the percentage of young for Missouri quail in recent studies.

There are no obvious statistical relationships between sex and age data and other population measurements presented here. This probably lies in the fact that biologists often try to find simple relationships to explain the complex dynamics that function within a wildlife population.

WHISTLING COCK QUAIL COUNTS

To obtain an index to fall quail populations, annual changes in the number of whistling cock quail are determined on established whistle routes within Iowa quail range. Stempel (1962) and Schwartz (1972) give a description of the method used.

The 1972 July whistling cock quail counts indicate a mean of 25.6 calling males per 10 mile route (Table 5). This is a 23 percent increase from the 1971 mean of 20.8 percent.

Several investigators (Bennitt, 1951; Reeves, 1954; Rosene, 1957) have used this index to predict fall populations. Norton, et al. (1961) indicate that whistling cock quail counts do not accurately predict fall quail numbers. To determine whether whistling cock counts were predictive of fall population numbers, several correlation and regression analyses were applied to Iowa data collected from 1962 to 1971. Variables tested include: (1) hunter harvest, (2) bag per hunter per season, and fall quail numbers on the Decatur-Wayne Quail Research Area. Results (Table 6)

Table 5. Annual July whistling cock quail counts, 1962-1972.

Year	Number of routes	Mean whistling cock quail/route
1972	70	25.6
1971	57	20.8
1970	63	21.7
1969	61	23.4
1968	65	25.1
1967	66	24.7
1966	64	20.1
1965	64	16.3
1964	49	15.9
1963	51	9.9
1962	59	6.6

Table 6. Correlation and regression analysis of hunter kill, bag per hunter per season, and total birds on the Decatur-Wayne Quail Survey (y) with whistling cock index in the spring (X) for 1963-1971.

(y)	(n)	r	r^2	a	b
Hunter kill	9	.692*	.480	-.164	0.048
Bag/hunter/season	9	.639	.409	3.21	0.428
Fall quail numbers	8	.378	.143	83.5	13.17

*Significant at the 0.05 level.

indicate that there is a significant ($P < 0.05$) correlation between the mean whistling cocks per route in the spring and the subsequent hunter harvest. There was no significant ($P > 0.05$) correlation between the mean whistling cocks per route in the spring and the bag per hunter per season or total quail estimated on the fall Deactur-Wayne quail survey.

Regression analysis was also applied to the above data to determine the percent of variation explained by the whistle count (x) in hunter kill (y), bag per hunter per season (y) and fall bird estimates (y) (Table 6). Significant regression values were determined for both hunter kill and bag per hunter per season but not for fall quail estimates. Values for r^2 indicate that only 48.0 percent and 40.9 percent of the variation in hunter kill and bag per hunter per season could be explained by changes in whistling cocks in the spring. It appears from these analyses that the whistling cock index is not the best predictor of fall quail numbers and only partly explains hunting success. This is understandable since there are many other factors (crop harvest, hunting pressure, hatching success, etc.) which affect total quail harvest. Kozicky, et al. (1956) stated that whistling quail are only indices of potential quail production and do not estimate actual quail production.

Since Iowa is on the northern edge of quail range, population distribution is affected by the severity of winter weather. Whistling cock counts should be a measure of spring bird density, which is an indicator of bird distribution throughout quail range in Iowa. During periods of severe winters, quail in marginal range will perish. The subsequent index to whistling counts in the spring should reflect the extent and distribution of surviving quail throughout Iowa.

In addition to range-wide whistling cock counts conducted in mid-July, bi-monthly whistling cock counts are conducted on the Decatur-Wayne Quail Research Area from May to September (Table 7). The 1972 whistling remained high from early June until mid-August indicating prolonged nesting activity.

Table 7. Decatur-Wayne bi-monthly whistling cock counts, 1965-1972. Data are given as the number of different calling cocks.

Year	May		June		July		August	
	1-15	16-30	1-15	16-30	1-15	16-31	1-15	16-31
1972	5	13	32	33	40	44	44	5
1971	9	25	36	47	41	--	23	15
1970	9	36	47	45	53	53	31	13
1969	7	21	23	42	42	36	45	32
1968	7	29	27	50	50	33	26	26
1967	15	14	33	53	41	--	54	11
1966	15	17	37	47	45	40	24	9
1965	13	4	18	14	6	--	--	--

AUGUST ROADSIDE CENSUS

The August roadside pheasant census is conducted annually in Iowa to determine pre-hunting season pheasant populations. These counts have been conducted since 1954. Starting in 1962, several route changes and other modifications were made. Klonglan (1962) gives a detailed explanation of this census method and describes how the August roadside pheasant routes were standardized in 1962. The total number of quail sighted during these routine routes has been recorded since 1962 (Table 8).

Statistical analyses were conducted in order to determine if quail sighted annually on this census correlated with fall population numbers. Results indicate that there is a significant ($P < 0.01$) relationship between quail sighted per 30 miles of August roadside route and both total hunter harvest ($r = 0.954$) and quail bagged per hunter per season ($r = 0.874$). Regression analysis of these data indicate there is a significant ($P < 0.01$) regression for quail sighted per 30 miles of

Table 8. Quail sighted per 30 mile route on the August roadside pheasant surveys in Iowa, 1962-1972.

Year	Number of routes	Birds per 30 mile route
1962	100	0.77
1963	108	0.75
1964	133	1.32
1965	183	1.84
1966	181	2.38
1967	186	2.05
1968	186	1.94
1969	173	2.68
1970	181	2.85
1971	169	2.62
1972	168 (204)[a]	2.04 (2.22)

[a]Additional routes were established in 1972. Information in parenthesis include these routes.

August roadside pheasant census on total hunter harvest and on bag per hunter per season (Figure 2).

The number of quail sighted on the August roadside pheasant survey is a good predictor of the subsequent hunter harvest and to a lesser extent the bag per hunter per season. There are two interesting points of discussion pertaining to this relationship. August roadside pheasant routes are generally located in the best pheasant range. Conversely, excellent pheasant range is not the best quail range. Consequently quail fluctuations on these routes reflect population changes in poor to marginal quail range. Populations in these areas are prone to fluctuate to a greater degree than the fluctations of those populations in excellent quail range. This is because marginal range can support quail only under ideal conditions (i.e., in Iowa this is most dependent on the severity of the winter), while excellent range supports birds under all but

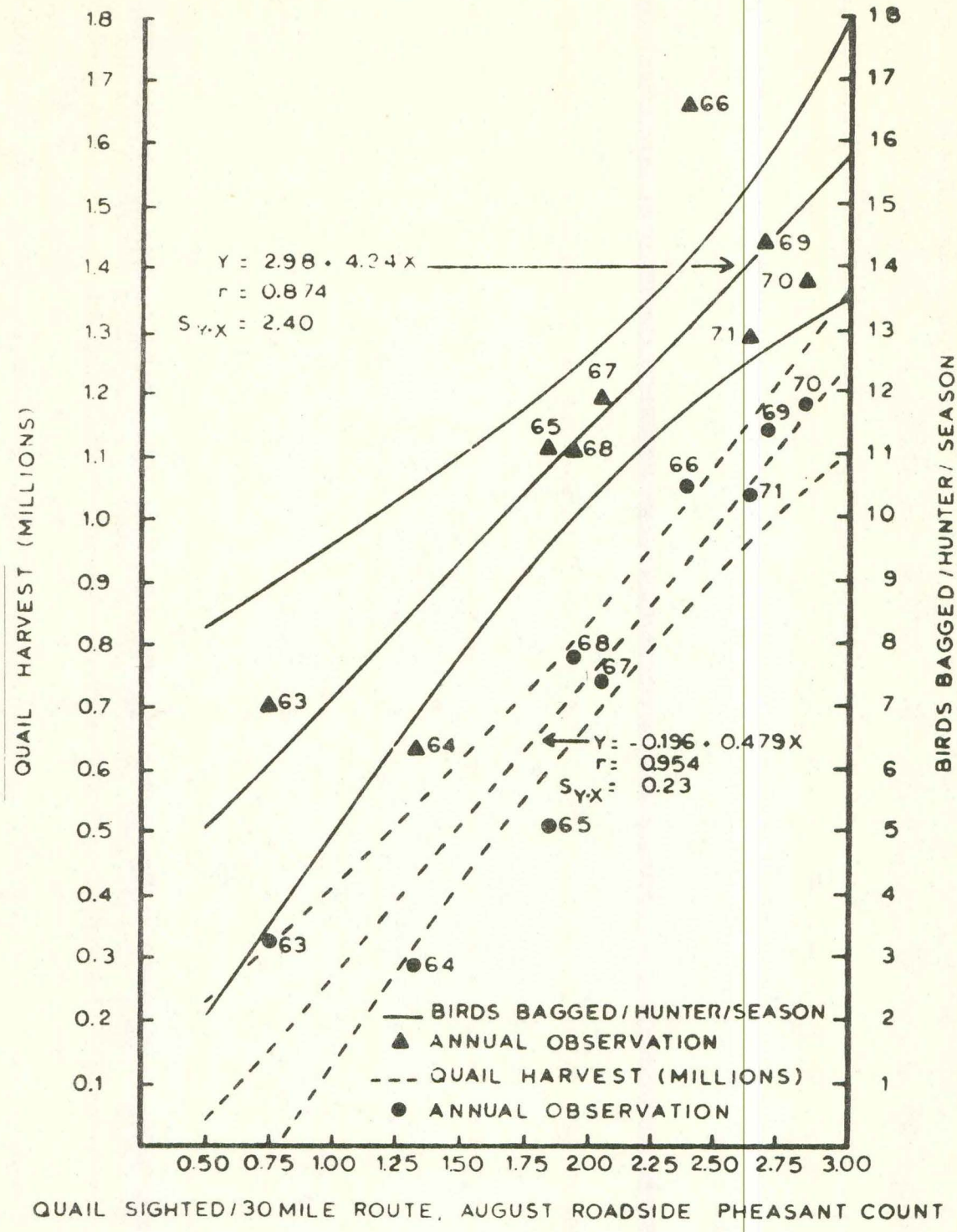

Figure 2. Relationship between total hunter harvest, bag per hunter per season and the quail sighted per route on the August roadside pheasant count, 1963-1971.

catastrophic conditions. These marginal quail areas are therefore good indicators of population ups and downs throughout Iowa. Hunting success which is related to bird density should also reflect these population ups and downs. When populations are up in marginal areas, hunting success will also go up.

Second, since the August roadside pheasant census is conducted after the major portion of the reproductive season is complete, hatching and brood rearing success are measured; whistling cock counts only indicate the spring potential and not the actual reproductive success. Since the August roadside is conducted in the early part of the month, years with an extremely late hatch may tend to underestimate the total kill. This is in part due to the fact that most quail broods are not sighted until they are 2-4 weeks old, so birds hatched in early August may be missed.

FALL POPULATION PROSPECTS

In Iowa there is no census used to estimate fall quail populations. Fall quail numbers are determined on the Decatur-Wayne Quail Research Area during the month of October. This census is conducted the same way as the late winter census except several rechecks are conducted on areas where standing crops make the first census difficult. The 1972 fall census was hampered by extensive areas of unharvested crops. The census which is normally complete by mid-November, continued well into December. Birds were difficult to locate and many rechecks were essential. Snowfall in early December made it possible to locate birds associated with standing crops. Tracks left by moving birds were easily located and a subsequent thorough search generally located the covey itself. Results of the 1972 fall survey (Table 1) revealed 32 coveys with an average of 147 birds per

covey. This is a 276.0 percent increase over the spring population or an increase in quail densities to 10.1 acres per bird from 37.9 acres per bird. Six more possible coveys were located by sign alone (i.e., tracks in snow); however, these coveys were not counted in the overall total because it was felt they would tend to bias the data. In most years the fall census is complete well before snow cover is present and coveys cannot be located by sign alone. There may also be a bias in data due to coveys flushed in crops after their tracks were located in the snow; however in most normal years, the crop harvest is near completion and standing crops do not hamper the survey. These factors should tend to balance each other out. Also since birds were surveyed later in the fall, normal hunting pressure plus natural mortality probably reduced the mean number of birds per covey from their early fall levels. Survey results do indicate excellent reproductive success.

HUNTING SEASON DATES AND WEATHER

The 1972-73 bobwhite hunting season opened on October 28 and continued through January 31, a 96-day season. Shooting hours were from 8:00 a.m. to 4:30 p.m. with a daily bag of 8 and a possession limit of 16. There was essentially no change from the 1971-72 season (Table 9).

Opening weekend throughout most of Iowa quail range started with cool cloudy weather and generally good hunting conditions. Hunters were hampered with extensive areas of unharvested crops. Rainy weather and wet field conditions delayed crop harvest. By November 6th, corn harvest was 30 percent complete, which was well behind both the 1966-70 average of 47 percent and 72 percent in 1971. Soybean harvest was 80 percent complete, both behind the 1966-70 average of 88 percent and the 93 percent a year

Table 9. Bobwhite hunting season regulations, 1963-1973.

Year	Season dates	Total days	Shooting hours	Daily bag-possession limit
1972-73	Oct. 28-Jan. 31	96	8:00 AM-4:30 PM	8-16
1971-72	Oct. 23-Jan. 31	101	8:00 AM-4:30 PM	8-16
1970-71	Oct. 24-Jan. 31	100	8:00 AM-4:30 PM	8-16
1969-70	Oct. 25-Jan. 31	99	8:00 AM-4:30 PM	8-16
1968-69	Oct. 26-Jan. 31	98	8:00 AM-4:30 PM	8-16
1967-68	Oct. 21-Jan. 28	103	8:00 AM-4:30 PM	8-16
1966-67	Oct. 22-Jan. 31	102	8:00 AM-4:30 PM	8-16
1965-66	Nov. 6-Jan. 31	86	8:30 AM-4:00 PM	8-16
1964-65	Oct. 31-Jan. 3	65	8:30 AM-5:00 PM	8-16
1963-64	Nov. 2-Jan. 1	61	8:30 AM-5:00 PM	6-12

ago. November hunting was similar to that of late October. Continued wet conditions hampered crop harvest, making birds difficult to find, and coveys flushed invariably sought refuge in standing crops. Much of December's hunting was hampered by extremely cold weather and crusty snow conditions. Birds were extremely wild making hunting difficult. By mid-January unseasonally warm weather had melted snow cover and hunting was good. The 1972-73 season was hampered by the extremely late crop harvest and poor weather conditions.

HUNTER HARVEST AND SUCCESS

Annual hunting success is determined in Iowa by a hunter postcard survey. The 1972-73 quail harvest statistics indicate a total quail harvest of 732,200 birds. This is well below the 1971-72 harvest of 1,037,900 birds (Table 10).

Application of the regression formula (Figure 2) calculated from August survey data and harvest statistics from 1963-1971 indicate that

Table 10. Results of bobwhite hunter postcard survey, 1963-1972. Resident and non-resident hunters are pooled.

Year	Total kill	Total quail hunters	Percent of all hunters	Avg. trips /hunter/ season	Avg. bag /hunter/ season	Avg. hrs. to bag one quail
1963-64	328,000	47,028	15	3.6	7.0	1.8
1964-65	291,000	46,535	15	3.0	6.3	1.8
1965-66	513,800	46,450	17	4.2	11.1	1.4
1966-67	1,051,600	63,785	22	6.1	16.5	1.5
1967-68	736,500	62,485	21	5.5	11.9	1.8
1968-69	777,700	70,367	23	5.4	11.1	1.8
1969-70	1,144,700	81,100	25	4.8	14.4	1.5
1970-71	1,78,700	87,665	26	4.7	13.8	1.5
1971-72	1,038,000	80,250	22	5.9	12.9	1.6
1972-73	732,200	----[a]	--[a]	---[a]	----[a]	---[a]

[a]The 1972-73 postcard survey was modified; this statistic could not be calculated.

the 1972-73 harvest should be between 707,100 and 855,100 at the 95 percent confidence limit. The actual kill fell within this confidence interval.

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