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A Proposed Comparison of Fall Roadside Pheasant Counts and Flushing Rates[1]

By E. L. Kozicky, H. O. Hartley, and G. O. Hendrickson[2]

Although the fall roadside pheasant census (Bennett and Hendrickson, 1938) has reflected the fall pheasant population from an administrative standpoint for the past 17 years within the primary range in Iowa (Kozicky, et al., 1952), there still exist the problems of correlating these roadside counts to actual populations or flushing rates. Inasmuch as we do not have any known method of obtaining exact numbers of birds for a given section of land at the present time, we cannot develop a method of interpreting the roadside count as reflecting a mean number of birds per acre in the primary pheasant range within a specified confidence limits. However, it may be possible to relate the index obtained from the roadside count to birds flushed per hour on a section of land. The evaluation would be of assistance to administrators and sportsmen alike. The sportsmen are interested in knowing just how many birds they can expect to flush in an hour of hunting, based on roadside counts, and the administrator would like confirmation on the correlation, if any, between the roadside count and flushing rates.

METHODOLOGY

The fall roadside pheasant counts would be continued as in the past with modifications as suggested by Klonglan (in press). Once the time of year is established for the roadside counts, probably August, the same procedure would be followed throughout the proposed time of study, 5 or more years, within the primary pheasant range (Figure 1).

In addition to the roadside counts, it is now proposed to conduct a parallel experiment on the flushing rate of pheasants throughout the primary range. The design of the experiment (Table 1) would be limited to the 33 counties that have comprised

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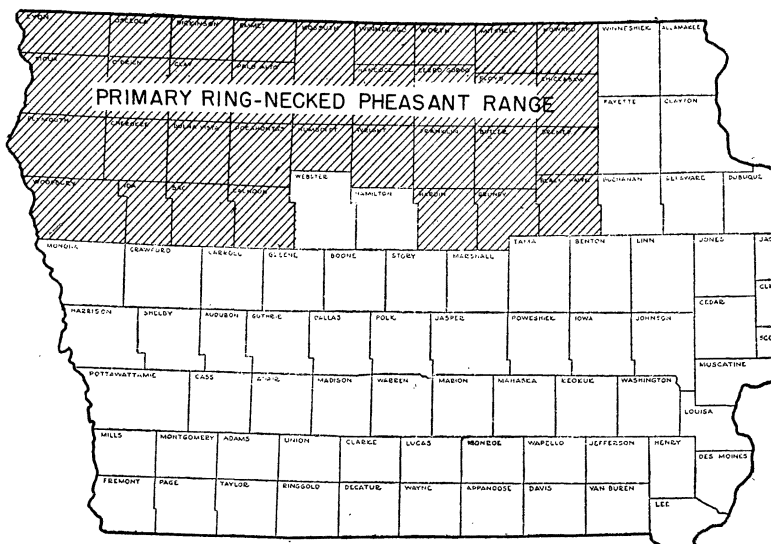
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Figure 1. Iowa's Primary Ring-necked Pheasant Range, 1936-1953.

our primary pheasant range for the last 15 years. The fall road-side pheasant count has been evaluated over this area to the degree that we have confidence that the mean number of birds per mile does reflect the population trend.

As some sections because of certain delays in haying operations or unfavorable weather conditions, such as hailstorms, have a greater or smaller population than the general average for the primary range, it would be advantageous to stratify the primary range, 33 counties, into 10 equal size strata. Such action would insure sampling within the different regions of the primary range and undoubtedly increase the precision of estimating the mean flushing rate. We believe that it is safe to assume that pheasant populations within adjoining counties are less likely to vary than population in widely separated counties.

The task of obtaining flushing rates per hour per section is a formidable one. It could be accomplished by a group of men walking across a section spaced at specified distances; however, such an arrangement would require a large number of individuals and involve considerable expense at present day labor costs. The other alternative is to employ about 12 individuals, who are skilled in handling dogs capable of flushing pheasants. Such individuals and their dogs would be field tested to check and compare their efficiency with some standard, perhaps the mean flushing rate of the 12 individuals.

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Table I

Schematic Diagram of Field Operations for a Comparison of Fall Roadside
Pheasant Counts and Flushing Rates in Iowa's Primary Pheasant
Range, Showing Strata A to J in Which a Randomly
Selected Section is Flushed by Men on Days
as shown

Period	Days	Observers									
		1	2	3	4	5	6	7	8	9	10
	1	A	B	C	D	E	F	G	H	I	J
	2	B	C	D	E	A	G	H	I	J	F
I	3	C	D	E	A	B	H	I	J	F	G
	4	D	E	A	B	C	I	J	F	G	H
	5	E	A	B	C	D	J	F	G	H	I
		(retain)					(switch)				
	1	F	G	H	I	J	A	B	C	D	E
	2	G	H	I	J	F	B	C	D	E	A
II	3	H	I	J	F	G	C	D	E	A	B
	4	I	J	F	G	H	D	E	A	B	C
	5	J	F	G	H	I	E	A	B	C	D
		(retain)					(switch)				
	1	A	B	C	D	E	F	G	H	I	J
	2	B	C	D	E	A	G	H	I	J	F
III	3	C	D	E	A	B	H	I	J	F	G
	4	D	E	A	B	C	I	J	F	G	H
	5	E	A	B	C	D	J	F	G	H	I
		(switch)					(retain)				
	1	F	G	H	I	J	A	B	C	D	E
	2	G	H	I	J	F	B	C	D	E	A
IV	3	H	I	J	F	G	C	D	E	A	B
	4	I	J	F	G	H	D	E	A	B	C
	5	J	F	G	H	I	E	A	B	C	D
		(switch)					(retain)				

As cover conditions are important in the number of birds that
one is able to flush and cooler weather facilitates the efficiency
of bird dogs, October probably presents the ideal month. The
flushing counts would start after 50 percent or more of the soybeans
are harvested. After this date corn is the major vegetative cover
present throughout the primary range. Birds are cencentrated
in cornfields or in slough areas from which they can be flushed
in numbers.

Each of ten observers would plan on checking a section of land
a day, working all of the available corn fields and other cover
on that section. Records would be maintained on the total number

of birds flushed per hour of effort. It would be highly important for each observer to use approximately the same technique in covering a section of land, depending on the stage of the corn harvest, during the five-year period.

As the flushing counts will be made during the period of corn harvest, it is deemed advisable to design the survey so that some estimate could be made of the influence of this factor. Therefore, each observer will check one section in the early corn harvest, periods I and II, in each of the ten strata and the other section within each strata in the late harvest, periods III and IV (Table 1). As individual sections will vary in percent corn harvested from the regional percentage, the individual observer will be asked to estimate the stage of corn harvest within 10 percent in each section that he checks.

The plan calls for 12 observers with dogs capable of flushing pheasants over a period of about five years. Only ten men will be needed for the survey, but the two additional observers will serve as "floating substitutes" in case one or more of the ten observers is ill or cannot complete the five year program. The daily working rate of a section a day is proposed in order to avoid fatigue and to allow for travel time. No counts will be made during snow or rainstorms or during periods when the wind is above 15-20 m.p.h. Observers will plan on working between 8 A. M. and 4 P. M.

In order to estimate the variability due to individual observer differences in flushing rates, areas, periods, and days, the balanced 'Latin square' type of schedule of Table 1 would be adopted. Also, it is proposed to have each observer check two sections in each of the 10 strata within the primary range. For the first year these ten men will be assigned two sections at random in each of the ten strata. Further, the ten men will be asigned at random into two teams of five men each. During the first period of seven days of the survey, each man on each team will be asked to complete five sections, starting at random on one section and proceeding in a systematic fashion through the remaining four. Each observer is allowed seven days in any one period to complete the five sections. All members of either of the two teams must start the next period together. The ten areas will be split at random into two groups, that is, areas A to E and F to J. In order to reduce travel costs it will be seen from Table 1 that the itinerary of each observer on the first team, for example, is a complete cycle in the sequence A to B to C to D

to E to A . . . Further, the observer travels in a clockwise or counterclockwise direction between the strata during any one of the four periods. It is not expected that this arrangement will introduce non-random features into the error component. During the second period of seven days, the scheme will be repeated on the remaining five sections that were not counted within the ten strata (Table 1). Each man will be assigned his first of five sections on a random basis. In the third and fourth periods the two teams will repeat the process on ten different random sections in two periods of seven days.

It will be noted that in Table 1 four of the 8 'squares' are marked 'retain'. The sections covered by these squares will be flushed in the second year by the same men, in the same sequence, and in the same period. The remaining squares in Table 1 are marked 'switch'. The section covered by these squares will be abandoned and replaced by new sections randomly chosen from the same areas and assigned at random to the appropriate men. These latter sections will be retained in the third year while the sections covered by the 'retain' squares of Table 1 will be replaced so that from now on every section will be flushed for two consecutive years. This scheme will provide direct comparisons of the flushing rates for one-half of the sections from year to year and will involve the results from the four Latin squares of matched sections in which flushing rates can be computed for two consecutive years. The precise method of combining the estimates from these four Latin squares with the flushing rates from the remaining four Latin squares will depend on the relative variances and correlations on which experience is to be accumulated. The basic analysis will be that for a 5x5 Latin square, which may be applied to both the flushing rates for an individual year or, in the case of matched sections, to the difference between flushing rates for two consecutive years. It is, also, expected that the error components for certain of the eight Latin squares may be pooled, but first tests confirming that this is permissible will have to be conducted.

The sections to be sampled should include all sections within the 33 counties except those sections within incorporated towns or where less than 75 percent of the land is under cultivation. These sections can be selected within the ten strata by means of random coordinates.

As a subsidiary study it may be possible, if differences in flushing counts exist depending on the stage of the corn harvest, to

adjust the flushing rates to a constant factor of corn harvest. Comparisons can be made of population differences as forecasted by flushing rates and the fall roadside counts as well as between men and strata. Although the scheme would not prove or disprove the relationship between fall roadside counts and actual pheasant population, a better understanding of the correlation between the present roadside counts and the above flushing rate would be of great utility to sportsmen and administrators.

DISCUSSION

The main purpose of the analysis is to obtain an estimate of the number of birds flushed per section for each year. By confining our observations to a period of 28 days following a 50 percent harvest of soybeans and by confining our flushing rates per section to the particular group of field men and their dogs, we are entitled to eliminate from the variation of observed flushing rates the component due to difference in (1) the days of the 28-day period and (2) the varying ability of the field men to obtain low or high flushing rates. This means that the "Error Component" of a standard Latin square analysis will provide an appropriate estimate of error, if we confine ourselves to claiming that our estimated flushing rate applies only to precisely the conditions stated above.

By this study we would hope to establish a correlation between the fall roadside pheasant count, which will probably be conducted in August, and flushing rates of pheasants, which will be conducted principally in October. Although a high correlation between these two counts is expected, there is a possibility that an abnormal loss of birds may occur due to storms or other factors. If such an event occurred, the relationship would be affected. Further, if a particular year deviates from normal harvest operations to the extent that 50 percent or more of the soybeans were not harvested by October 15th, insufficient time would be available to complete the project prior to November 11th, the normal opening of the pheasant season. If either of the two above events occurred, the flushing counts would have to be skipped until the following year as it would be essential to have August to November pheasant mortality and stage of harvest operations comparable throughout the proposed five-year study period.

Finally, from a sportsmen's point of view, it might be suggested that the fall roadside pheasant count should be correlated with flushing rates made during the hunting season, but the

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disturbance of pheasants, the heterogeneity of hunting pressure, and the influence of winer weather on pheasant flocking behavior during the open season would seriously bias flushing rates on numerous sections.

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