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H. Elliot McClure
Nebraska Game, Forestation and Parks Commission

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CENSUSING PHEASANTS BY DETONATIONS

H. Elliott McClure
Nebraska Game, Forestation and Parks Commission, Ord, Nebraska

A study of the ecology and management of the ring-necked pheasant (*Phasianus c. torquatus*) was begun in Nebraska in the spring of 1941. Prime among the objectives of the survey was to devise some method by which the populations could be estimated or counted. In conjunction with roadside counts as practiced in Minnesota, Iowa, Ohio, Pennsylvania and other states, attempts were made to derive a closer estimate than by that method. Every game technician working with roadside counts of pheasants realizes the difficulties involved. Having had success in estimating the numbers of mourning doves by counting their calls (McClure, H. E., Journ. Wildl. Mgt. 3: 323–328, 1939) a similar study of the calling of pheasants was undertaken. Throughout the summer of 1941 it was found that an average rooster in morning and evening, while establishing, feeding in, or surveying his grounds, would call at intervals of approximately 2 minutes. During these observations it was noted that these birds responded by crowing following thunder, blasting, or the explosions of shot guns. Even such noises as the slamming of a car door or banging on a metal tub would stimulate them to crow.

An attempt was made, therefore, to devise a method whereby this peculiar response could be utilized. Four sizes of aerial bombs, commonly called Day-go bombs, were purchased from a fireworks company. The volumes of explosive used in these bombs is at present a military secret, but they cost 10 to 50 cents apiece. In preliminary tests, observers were placed at one quarter, one half, and one mile intervals in various directions from the bombs. It was determined that pheasants would respond by crowing to these explosions at distances up to three miles or more. For practical purposes the 10-cent bomb had the advantage of not being so loud as to deafen the observer's ears, but loud enough to stimulate the birds for a mile or more. With all sizes of bombs, pheasants less than 200 yards away were frightened into silence. In calm weather birds crowing more than a mile away may be heard. Firecrackers placed on the ground did not elicit as uniform a response from the birds, nor did the discharge of a shot gun. This is explained by the fact that sound travels upward and outward from a fire cracker, and is directed forward by the gun. The explosion from an aerial bomb travels downward and outward, simulating thunder, and it results in a more uniform response. The most critical weather condition from the standpoint of the observer is the presence and amount of wind. Wind carries the sound of the bomb away, prevents distant calls from reaching the observer, and whistles by the observers' ears so that he cannot hear nearby calls. A simple rule is not to attempt to stimulate the birds by these bombs when there is a wind strong enough (about 5 miles per hour) to blow out the match used to light the fuse. In Nebraska there usu-

TABLE 1.—RESPONSES OF PHEASANTS TO BOMBS, BY MONTHS

Month	*Number of shots*	*Average responses per shot*	*Number of 1-minute counts*	*Average calls per minute*
January	0			
February	27	30.7	—	—
March	34	20.2	28	12.7
April	5	12.0	35	22.0
May	13	12.1	—	—
June	53	5.4	87	8.7
July	28	6.7	95	4.4
August	27	3.0	15	0
September	27	6.7	—	—
October	37	5.5	—	—
November	20	4.9	—	—
December	6	2.9	—	—
Total	277	11.0		

ally is wind from within an hour after sunrise until an hour before sunset; hence no tests were run during the midday hours. The majority of the observations were made by one person.

This census method now has been experimented with for one year. It gives promise and is described in the hope that those interested in pheasant tabulation in other states will try it and record their findings. The observer drives through any area to be censused from dawn until an hour after sunrise. At intervals of five miles a bomb is shot and the pheasants responding are counted. Even with the present driving restrictions, a much greater area can be censused than by the roadside count which covers only 15 to 30 miles.

Detonation tests were conducted in 10 counties at different periods of the year; pheasant responses, by months, are shown in Table 1. It is evident that pheasants respond most readily to explosions during the early months of the year, before and during the breeding season when they are normally crowing. Response was least during August when natural crowing ceased and the males were molting.

During the hours in which observations were made, the most consistent response was in the early morning. The high, between 5 and 6 p.m. (Table 2), is probably the result of insufficient data, but there is a regular drop in response from 6 to 10 a.m. and from 6 to 9 p.m.

TABLE 2.—RESPONSE OF PHEASANTS TO BOMBS AT DIFFERENT HOURS

Time of day	*Number of shots*	*Average responses per shot*
6–7 A.M.	19	12.0
7–8	54	11.1
8–9	39	8.4
9–10	29	6.6
4–5 P.M.	5	1.2
5–6	9	28.2
6–7	25	10.0
7–8	20	8.9
8–9	46	5.0
Total	246	10.1

There does not seem to be any important effect of temperature upon the responses. The optimum range(Table 3) appears to be between freezing and 50°F., which is the usual early morning range of temperature during the spring. The high response from zero to 10°F. results from insufficient data. This method can be used, however, when

temperatures are below freezing, with a good response by the birds.

There is no conspicuous relation between the response of the birds and types of weather (Table 4). On clear humid mornings sounds travel longer distances and reverberate from hills and objects so that there is an excellent response. In cloudy weather it is much the same, except that the sound of the explosion reverberates from the clouds and stimulates an equally good pheasant response. As already indicated, wind greater than five miles per hour nullifies the success of the method.

TABLE 3.—RESPONSE OF PHEASANTS TO BOMBS AT DIFFERENT TEMPERATURES

Air Temperature	*Number of shots*	*Average responses per shot*
0– 9° F.	4	36.2
10–19°	8	4.5
20–29°	30	10.3
30–39°	27	27.1
40–49°	35	15.3
50–59°	19	7.1
60–69°	76	7.1
70–79°	37	2.4
80–89°	10	4.3
90–100°	0	

Except in May, the number of pheasants calling during one minute was counted at each stop made to fire a bomb. The greatest normal volume of crowing was during April, with a steady trend downward to cessation of crowing in August. In March the response to bombs was greater than the number of birds heard crowing in one minute. In April (data incomplete) the number of birds crowing spontaneously was greater than in response to explosions. In June it was also greater, but was less in July than the response to bombs. In all probability, the use of the one minute count at each stop is as effective, if not more effective, than the use of the bomb as a method of estimating populations for the pre-breeding and breeding periods. For the remaining eight months of the year the detonation method continues to be effective. It is

TABLE 4.—RESPONSE OF PHEASANTS TO BOMBS IN DIFFERENT KINDS OF WEATHER

Weather	*Number of shots*	*Average responses to bombs*
Clear	100	11.4
Partly cloudy	97	9.3
Cloudy	45	11.4
Total	242	10.7

believed that if the present studies can be continued for a two or three year period so that we have an average monthly response, it will be possible to determine factors which will give us a reliable estimate of the pheasant population.

The detonation method gives a consistently better population estimate in the summer and autumn, as compared with roadside counts. Then only one or two birds per mile may be seen during a 15 or 30 mile trip, but many more will respond to the explosions, indicating a denser population than the roadside counts would reveal. This, too, needs further examination.

As yet, we have no correlation between the numbers of pheasants crowing in response to a bomb and the actual number of males present on a given piece of land. Preliminary attempts to derive this information are shown in Table 5. On the W. E. Dunne ranch in Loup County, within the Nebraska sandhills and along the Calamus River, two sections of land were covered once a week in an effort to count all pheasants present. During these observations in the summer and autumn of 1942, when the air was calm at sundown,

TABLE 5.—RESULTS OF DETONATION TESTS WITH PHEASANTS ON W. E. DUNNE RANCH, LOUP COUNTY, NEBRASKA

Date (1942)	6/4	6/11	6/18	6/25	7/2	8/5	8/13	8/30	10/1	10/8	10/29	11/12
Bombs exploded	4	4	4	4	4	4	4	4	4	4	4	4
Total calls	17	19	10	22	17	1	1	1	13	4	2	16
Average calls per shot	4.2	4.8	2.5	5.5	4.2	1.7	.2	.2	3.2	1	.5	4
Total calls in 5-minute counts	46	61	41	103	105	1	0	1	6	—	—	—
Average calls per 5 minutes ÷ 2	7.5	7.5	5.0	12.8	13.1	—	—	—	3	—	—	—
Average calls per minute	3	3	2	5.1	5.2	.05	—	.05	—	—	—	—
Birds responding more than once	4	5	2	6	4	—	—	—	3	—	—	2
Birds responding to all shots	1	1	0	0	1	1	—	—	2	—	—	2
Total birds heard	9	12	6	14	18	4	1	1	7	3	2	12
Percentage of birds calling per shot	*46*	*40*	*41*	*40*	*23*	*42*	*100*	*100*	*46*	*33*	*50*	*33*
Percentage of birds calling in 1 minute	*33*	*25*	*33*	*37*	*30*	—	—	—	—	—	—	—
Percentage of birds calling in 5 minutes	*83*	*62*	*83*	*91*	*73*	—	—	—	*43*	—	—	—
Total males counted in section	7	5	5	8	7	3	0	2	27	49	52	71
Percentage of birds heard to birds seen	*1 0*	*240*	*120*	*175*	*260*	*130*	*100*	*50*	*26*	*6*	*4*	*17*

four bombs were shot at five-minute intervals. In the 20 minutes needed for the test, the total number of pheasants calling were recorded. From this we had the average number of responses to each bomb and the total calls in each five-minute period. Since the average pheasant crows twice in five minutes, dividing this figure by two would indicate the number of birds calling. When feeding of an evening, a pheasant usually moves only a matter of a few yards in twenty minutes. By spotting on a map the position of each bird as it called, it was possible to determine which ones were responding to more than one bomb. Over the 20-minute period, through the use of this map, all of the birds calling could be spotted. During June and July it seemed that the number of birds calling at each shot was consistently over 40 per cent of the total calling in 20 minutes, whereas the number calling in one minute was approximately one third of those calling in 20 minutes. Furthermore, the number crowing in five minutes was consistently more than 60 per cent of the total. Thus there are three possibilities: (1) a one-minute count may yield one third of the birds in a vicinity; (2) use of the bomb causes nearly 50 per cent to crow; and (3) by counting the birds for five minutes nearly three-fourths of the male population is heard. The factor still unknown is the percentage of males not crowing. Because of the adroitness of these birds at hiding, even a thorough traverse of the land would not show as many in the area over which crowing counts were made as the number of birds heard calling would indicate as present. These variables are included in Table 5.

The data obtained are presented at face value, realizing that the method has not been tested adequately or over a period of sufficient length. The results given in the tables obviously may change as more material is accumulated. The method is spectacular and has the advantage of capturing the layman's imagination. It shows promise as compared with other methods of pheasants censusing, and when restrictions on the use of fireworks have been lifted, should be worth attempting in various states where the pheasant is important as a game bird.

SUMMARY

Pheasant populations may be estimated or densities indicated by stimulating the males to crow in response to the explosion of small aerial bombs. The males respond at all seasons, but in greatest numbers in the spring. Response is greatest in early hours of morning and evening. Optimum temperatures appear to be between freezing and 50°F. Weather has little effect except that the method is not practicable during wind greater than five miles per hour.