A PRELIMINARY REPORT OF A STUDY OF THE FACTORS AFFECTING THE SURVIVAL OF RELEASED PEN-REARED PHEASANTS IN KENTUCKY

LEE K. NELSON, Kentucky Department of Fish and Wildlife Resources

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In recent years sportsmen and conservation officials in Kentucky have discussed the feasibility of attempting to establish the pheasant in the State. As a means of determining the factors affecting the survival of released pen-reared birds, a Pittman-Robertson study was initiated, with the field work beginning in August, 1950. The original plans called for the study to continue for three years. However, in order to allow sufficient time deemed necessary to obtain more valid results, a two-year extension was requested and granted. This paper is a preliminary report on data collected to May 31, 1954.

During most of the period, project personnel consisted of the leader, assistant leader, and two full-time labor assistants. The total cost of the project for the four years was $55,437.86.

The investigations were originally slated to be conducted on two areas, Boston and Saloma, in central Kentucky. In July, 1953, two additional areas, Henderson and Owensboro, situated in the western section of the state were incorporated into the project, thus data reported here includes two areas for the first three years and four areas the last year. The Boston area, containing a large amount of river bottom land, consists of 2,667 acres while the Saloma area, with 1,946 acres, is typical of the upland farm land-type. The Henderson area, encompassing 2,176 acres, consists of small rolling hills, bisected by a section of flat land containing a series of drainage ditches. The Owensboro area, consisting of 3,487 acres, is characterized by low flat fields interspersed with a network of drainage ditches. Whereas the Boston and Saloma areas support a general type of farming including dairying, tobacco and livestock production, the Henderson and Owensboro areas typify an intensive cropping system with emphasis on corn and soybeans. The Boston and Saloma areas are closed to hunting, while hunting is permitted at Henderson and Owensboro, at the discretion of the landowner, for game species other than the pheasant.

Prior to the project, 60 pen-reared pheasants were released on the Saloma area in 1948 and 220 in 1949 by the Department of Fish and Wildlife Resources. A total of 236 birds was released at Boston in 1949. Five hundred surplus pheasants were released on the Henderson area in 1951 and 300 in 1952. A total of 297 birds was released at Owensboro in 1952.

Over a four-year period a total of 7,919 pen-reared pheasants was released by the project on the study areas (Table 1). Of this number 322 were adults. Age of juveniles ranged from five to 24 weeks, with the majority (85%) between eight and 15 weeks olds. Ring-necked, Formosan, and Mongolian pheasants, plus hybrids of the three, were included; however, it was not possible to obtain differential survival data for the various types.

The releases were made during the summer and fall, with the exception of 200 adult hens liberated on the Boston and Saloma areas in the Spring of 1954. In

Table 1. Pheasant releases.

Area	Year	Sex Ratio Cocks:Hens	Total by Year	Total for Area
Boston	1950	1.4:1	513	
	1951	1.3:1	1,000	
	1952	1.01:1	1,000	
	1953	1.2:1	880	
	1954	All hens	100	3,493
Saloma	1950	1.05:1	446	
	1951	1.2:1	1,000	
	1952	1.05:1	1,000	
	1953	1.85:1	880	
	1954	All hens	100	3,426
Henderson	1953	0.95:1	499	499
Owensboro	1953	1.1:1	499	499

most cases, 120 birds were released at previously selected points. All birds were banded and, in addition, Koroseal tags were attached to the base of the back of the neck by a Number 1 safety pin. Solid color and two-tone combinations were used. Different colored tags were employed at various release sites. In order to distinguish between birds released the previous year, different color combinations were used. Each of the tags was stamped with a number coinciding with the number on the metal leg band, with the exception of the 1950 releases.

During the four-year period 3,848 pheasant observations were made by project personnel at all areas. Included were 70 observations of known wild birds. As a means of showing population trends, a monthly index of birds per hour of field time was calculated for Boston and Saloma. The indices were high for the months in which releases were made and the first month following the liberations. A gradual decline was noted in the months which followed, due to mortality and dispersal from the study areas. Neck tags were identified in 1,430 observations or 37% of the total. A shuffling of the birds from the various release points was noted.

The total known mortality of all releases was 2,218 birds, or 28% of the total released. Over the four-year period 1,086 leg bands and 1,652 neck tags were recovered. It was possible to identify the following percentages of mortalities found: 1950 – 34%, 1951 – 81%, 1952 – 84%, 1953 – 86%, and the Spring, 1954 releases – 80%. The increased percentage identified in 1951 through 1954 was primarily attributed to the stamping of the band numbers on the neck tags, since only the tags were found with the carcass in 728 cases. Causes of mortality are presented in Table 2. The known mortality recorded for the release sites varied considerable, with a high of 60% found at one site on the Henderson area in 1953. Six mortalities of wild pheasants (2 cocks, 4 hens) have been recovered since the project was initiated.

Live-trapping operations, using Ohio-type pheasant traps, resulted in the capture of 69 individual birds (48 cocks, 21 hens) during 1,290 trap-days. Of this total only three cocks and one hen were unbanded and untagged and believed to have been reared in the wild. A cock released October 12, 1950, was captured on

Table 2. Causes of mortality.

Fate	Totals for all releases
Unknown	1,325
Died	322
Possible predation	259
Predation — type unknown	89
Predation — type known	
Dog	19
Cat	1
Cooper's Hawk	1
Mammal — species unknown	67
Hawk — species unknown	5
Fox	4
Rat	1
Turtle	1
Accidents	
Hit by car	36
Hit by train	24
Killed by mowing machine	24
Killed by disk harrow	2
Killed by tractor	2
Killed by hay baler	1
Unknown injury	3
Hit building	2
Plunged to ground during initial flight	4
Caught in fence	2
Shot by hunter	24
Total	2,218

January 22, 1952, an interval of 15 months and 10 days. The remainder of released birds captured had been liberated at the last release prior to the trapping date. Trapping was conducted during the fall, winter, and spring on the Boston and Saloma areas only.

It was estimated that approximately 55% of the pheasants released dispersed off the study areas. In order to obtain data on local dispersal, 1,786 farmer interviews were conducted during the four years, principally within a six-mile radius of the Boston and Saloma areas. of 2,214 pheasant observations reported, 79% were within three miles of the study areas. Most of the observations were made in the fall following the releases, generally tapering off through the winter, spring, and summer. Long-range dispersal up to 177 miles was recorded.

A mid-winter census of pheasants on the Boston and Saloma areas was inaugurated in 1953, repeated in 1954 and extended to the Henderson and Owensboro areas. Only birds which were flushed on the study areas and those flushed off the areas, yet close enough that they might range on the areas, were used in the census calculations. The results are given in Table 3.

Table 3. Mid-winter censuses.

Area	Year	Estimated winter population		
		Cocks	Hens	Total
Boston	1953	22	14	36
	1954	3	0	3
Saloma	1953	25	9	34
	1954	13	3	16
Henderson	1954	12	10	22
Owensboro	1954	12	10	22

Crowing-cock censuses were conducted on the areas each spring. The low population of cocks on the areas contributed to the accuracy of this census method. Winter and spring sex ratios obtained from field observations and the figures representing the cock populations on the study areas provided a basis for calculation of the number of hens present (Table 4).

Table 4. Estimated spring pheasant populations.

Area	Year	Cocks	Hens	Total
Boston	1951	13	11	24
	1952	1	1	2
	1953	13	7	20
	1954	8	2	10
Saloma	1951	10	9	19
	1952	33	11	44
	1953	17	8	25
	1954	10	4	14
Henderson	1954	10	12	22
Owensboro	1954	11	12	23

A total of 36 nests was recorded during the four-year period, of which 13 were reported by farmers in the annual interviews. Of the 36 nests, 17 were on the study areas and 19 in the vicinity of the areas, with 14 at Boston, 17 at Saloma, one at Henderson, and four at Owensboro. Classified by year, one was recorded in 1950, four in 1951, nine in 1952, and 22 in 1953. Fifteen nests were listed as successful, 20 as unsuccessful, and the fate of one was unknown. The failures were due to: mowed over — 9, desertion – 4, crushed by tractor – 2, destroyed by disk – 1, destroyed by dragging – 1, plowed under – 1, flood – 1, and unknown – 1. The average number of eggs per nest, calculated for 34 nests, was nine. A minimum of 123 eggs were believed to have hatched from the nests recorded. Seven eggs were listed as infertile. Nest locations included a variety of cover types: hay fields – 9, fencerows – 6, idle thickets – 5, grain fields – 5, pastures – 4, grass cover crops – 2, ditch banks – 2, soybeans – 1, and unknown – 2.

A total of 99 broods have been recorded. Of this number, 37 were at Boston, 42 at Saloma, 7 at Henderson, and 13 at Owensboro. Three broods were recorded in 1950, 23 in 1951, 22 in 1952, and 51 in 1953. The average brood size was 6.9

chicks. The total minimum number of chicks produced was 683. Thirty broods were observed on the study areas, and sixty-nine were located from ¼ mile up to 11 miles distant. Thirty-five (51%) were within two miles of the study areas. A total of 48 broods were reported by farmers in the annual interviews.

Using only the nests and broods for which complete data were available, the approximate date of laying the first egg of the clutch and the hatching date were calculated. In general, during 1951 and 1952 the peak of the first egg laying occurred during the first two weeks of April, with the height of the hatching falling in the first three weeks of May. In 1953 the reproduction season apparently was slightly later, since the dates of the first eggs of 23 clutches (62%) were distributed rather evenly over a five-week period from April 5 to May 9, while 16 broods hatched during a four-week period from May 17 to June 13.

Since this paper represents a preliminary report of our findings, no attempt will be made to formulate conclusions; however, extremely limited survival of pheasants has been indicated during the past four years.