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Movements of Pheasants in Central Iowa

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Abstract. A study of pheasant movements in central Iowa during 1961-4 indicated that pheasants tended to move greater distances in spring as they dispersed from winter concentration areas than at other times of the year. Movements during this period averaged 0.9 mile. During the winter, movements were much more restricted, averaging only 0.2 mile; however, this may have been due in part to the unusually severe weather conditions that prevailed during the particular winter in which movements were studied. Compared with other areas in the Iowa and Midwest pheasant range, there appeared no detectable differences in the length or type of movement, which might help account for the generally poor pheasant populations that occur in this area at the edge of the major Iowa pheasant range.

Relatively few studies of pheasant movements have been conducted. Since distances traveled by pheasants were early found not extensive, the problem of egress and ingress, as it affected the density of local pheasant populations, may not have been considered important. Although in general this assumption is probably valid for populations found in the heart of the pheasant range, the importance of movements in populations located in submarginal range or at the edges of the major continental pheasant range has not been determined.

The area in which the present study was conducted, because it contains an extremely abrupt decline in pheasant numbers proceeding from north to south, presented a unique opportunity to attempt to determine the imporance of movement in pheasant populations in a marginal area. Earlier studies of pheasant movements in Iowa by Weston (1954) and Grondahl (1953) were conducted in prime pheasant habitat in the northcentral part of the state, well within the established Midwest pheasant range, and both studies were concerned only with adult birds during winter and spring dispersal. Furthermore, the studies took place over 10 years ago. Since then, the forfeiture of nesting habitat and winter cover to increasingly intensive agricultural operations has undoubtedly occurred in both northcentral and central Iowa, so that the importance of this loss to pheasants might be reflected in movement and should be evaluated.

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Study Area

This investigation was carried out in immediate vicinity of Ames on the Central Iowa Study Area, consisting of three separate areas of 2 square miles each and located in Hamilton, Story and Boone counties. The Hamilton County and Story County areas are situated immediately north of Ames, and the Boone County Area is located slightly southwest of Ames. (To facilitate reference to them, the areas were termed Northern Area, Middle Area and Southern Area, respectively.) The topography of the three areas is predominantly undulating, with a few nearly level and rolling areas. All three areas lie within the Wisconsin glacial drift area. The areas are intensively farmed. During the 3 years of the study, corn, soybeans and oats accounted for about 80% of the total acreage; hay and pasture accounted for 16%.

Pheasant trapping was carried out primarily on the Northern Area of the Central Iowa Areas; the low populations of the other two areas precluded capturing enough pheasants to obtain movement records.

Methods

Trapping took place during winter, late summer and fall. During the winter of 1961-2, weather conditions were sufficiently adverse to permit the use of a wire trap similar to the Ohio-type trap first described by Hicks and Leedy (1939). Cold, windy weather prevailed for long periods, and deep snow covered the food supply, forcing birds into areas of brushy or woody vegetation where they were easily trapped. Trapping began in late December and continued through to late March when birds dispersed from winter concentration areas. The birds were banded, tagged and released.

During the winter of 1961-2, three traps were kept in continual operation. Two of these traps (A and B) were located on the Northern Area, one in a fencerow, the other in a plum thicket. The remaining trap (C) was placed in a 60-yard-long hedgerow bordering a farmstead located about one-fourth mile east of the study area. Trap A was located 2.7 miles from trap B and 2.3 miles from trap C. Trap B and trap C were located 1.6 miles apart.

In 1963 and 1964, pheasants were captured at night during late summer and fall with the use of spotlighting equipment. A specially-rigged four-wheel-drive vehicle, equipped with five 150-watt flood lamps and spotlights powered by a gasoline-driven, 120-volt, 1500-watt, Onan (AC) generator, was driven systematically through oat stubble, soil bank and uncut hayfields. Birds spotted in the vegetation by use of the floodlights and then "held"

motionless by a concentrated beam from a 12-volt, 100,000-candle power spotlight were captured with long-handled nets.

Captured pheasants were banded with aluminum leg bands and marked with a harness-type back tag constructed of Naguahyde material similar to that described by Labisky and Mann (1962).

Each back-tag was painted with a distinctive red symbol so that individual birds could be recognized with the naked eye or with the aid of binoculars. Tags of different color were used at each trap-site, and when a marked bird was reobserved in the field, the color of the tag alone disclosed the original site of capture. Birds less than 9 weeks of age were too small for back-tagging; those less than 6 weeks old could not be banded. Birds were released at the site of capture immediately after they had been tagged and banded.

Records of pheasant movements were obtained from four sources: (1) recaptured pheasants, (2) reobservations of tagged pheasants, (3) tagged or banded pheasants shot by hunters, and (4) bands or tags recovered in the field by Unit personnel and farmers. Birds in the first category were termed recaptures, and those in the second category were called *reobservations.* Movement records obtained from birds found dead or from tags and bands found loose in the field were termed *recoveries,* and those secured from pheasants shot by hunters were designated as *returns.* Movement was recorded to the nearest 0.1 mile from either the winter trapsite or the center of the field of original capture to the point at which the pheasant was again caught, reobserved or killed, or the band or tag recovered. Birds trapped by spotlighting were released within the field of capture. The center of the field was counted as the site of release.

All these sources of movement records were subject to biases of varying degree, which tended to make computed mean distances moved by pheasants for each category somewhat shorter than those which probably occurred. Since data on movements were obtained mainly incidental to the performance of other field duties on the area, or during spotlighting activities, records were more likely to be obtained from the area itself than from areas immediately adjacent. Undoubtedly, some of the longest records of movement would probably have been obtained from these bordering areas, but little additional time was available for off-area activities. Recaptures and reobservations especially were subject to this type of bias. Records of pheasant movements obtained from tags, bands or dead birds on the area found by me and assisting personnel were also subject to this bias. Records in this category obtained from farmers, however, were somewhat less subject to bias; i.e., farmers from contiguous surrounding

areas were to some extent aware of the trapping program and its purpose and, therefore, would probably have been likely as resident farmers to report a recovered tag or band. The records secured from banded or taged birds shot during the hunting season on the study areas and the immediate surrounding area were probably the least biased by comparison. Hunters appeared fairly evenly distributed on the study area and the immediate surrounding areas. Marked birds that had left the area, therefore, probably had about the same probability for being shot and reported as those that remained. Each year hunters' "bags" were checked for marked birds during the opening weekend of the season, both on the area and for 1 mile outward in all directions. There probably existed less tendency for tags and band from pheasants bagged on farms more than 1 mile from the area to be reported because many of these farmers were not familiar with the project. The absence of records beyond 1-mile from the area itself indicate that this type of bias probably was not important.

Results and Discussion

During the 3 years, 281 pheasants representing 258 individual birds were marked for study. Twenty-three birds were subsequently retrapped. Of these, 19 were retrapped once, and 4 were retrapped twice. Two cocks, retrapped once during the late summer, were shot by hunters the following November. A hen, captured at trap C during the winter of 1961-1962 was later retaken 0.3 miles from the original trap-site location by means of spotlighting in 1964, almost 2 years and 8 months later.

From these 258 pheasants, 89 records of movement were secured; 27 recaptures, 32 reobservations, 25 returns and 5 recoveries (Table 1). Recoveries showed the greatest mean movement and birds rcaptured during winter the least movement. The greatest distance a bird moved was 4.9 miles. To further facilitate comparison with other studies, movements were grouped according to the season in which they were recorded, irrespective of source (Table 2). Thus, the winter movements recorded during the period mid-December through early April corresponded to a similar period in two previous studies of pheasant movements in Iowa and two in Wisconsin. The period extending from mid-April through June (spring movements) conformed to the period of "spring dispersal" in the other studies. Movements recorded during the interval, July through November, were designated as "late summer and fall movements."

Winter Movements. All records of winter movements were obtained during 1961-1962. Forty-one such movements averaged 0.2 mile with a range of 0.0-4.9 miles (Table II). Excluding the individual record of 4.9 miles, however, the mean distance of

Table 1. Records of 89 pheasant movements obtained on the central Iowa Areas, 1962-1964, grouped according to source of record.

	Recaptures			Reobservations	Returns (shot)	Recoveries		
	Winter trapping	Spot-lighting	Both methods				Overall mean	*Total*
Number	18	9	27	32	25	5		89
Mean miles moved	0.0	0.2	0.1	0.3	0.4	0.8	0.3	
Maximum miles moved	0.0	0.3	0.3	4.9	1.5	1.5		
Range in miles moved		0.0-0.3	0.0-0.3	0.0-4.9	0.0-1.5	0.2-1.5		

Table 2. Pheasant movements on the Central Iowa Areas, 1962-1964, grouped according to season.

			Late summer and fall movements[a]			
	Winter movements[b]	Spring movements[c]	Adults	Juveniles	Age unknown	All ages
Number	41	4	9	29	6	44
Mean miles moved	0.2	0.9	0.3	0.4	0.2	0.3
Maximum miles moved	4.9	1.5	0.8	1.5	0.4	1.5
Range in miles moved	0.0-4.9	0.1-1.5	0.0-0.8	0.0-1.5	0.0-0.4	0.0-1.5

[a] July through November.
[b] Mid-December through early April.
[c] Mid-April through June.

winter movements was only 0.1 mile; the next longest such movements were three of 0.4 mile each.

The winter of 1961-1962 was extremely adverse, with temperatures averaging 5.1 degrees below normal during the months of January, February and March. Snow depths averaged between 10 and 18 inches during this same period—the number of consecutive days of snow on the ground was the highest on record in central Iowa since the winter of 1935-1936. Towards the end of February and in early March, birds that had died from starvation were found occasionally at trap-sites A and B, and many other birds too weak to fly normally were also observed. Birds at trap-site C did not starve because a small unpicked cornfield was nearby. Probably because of these adverse weather factors, and possibly also because of the ready availability of the corn bait itself, pheasant movements were restricted during this period. Birds marked at one trap-site were never recaptured at another. Since traps were located no less than 1.6 miles and as far as 2.7 miles from each other, however, extensive movement between trap-sites was not expected. There were few large concentrations of birds on or near the area other than those located at the three trap-sites. One small group of wintering pheasants was located about 0.7 mile east of trap-site B, and two other groups, one of about 18 birds and the other of approximately 25 birds, were located about 0.9 and 0.5 mile, respectively, from trapsite A. No marked pheasants were observed at these locations, and periodic counts of these outlying groups revealed almost no fluctuation in the number of pheasants in each concentration, indicating that both ingress to and egress from these concentration areas were limited. The extreme movement record of 4.9 miles was obtained during a winter pheasant census on the northernmost sec-

tion of the Middle Area, but judging by the restricted movements of other pheasants, a movement of such magnitude was atypical.

Weston (1954) in 1949 and 1950, conducted an investigation of the winter-spring movements of pheasants on two state-owned marshes in northern Iowa. During the 2-year period, based on 162 marked pheasants recorded off the areas, winter movements averaged approximately 0.5 mile, ranging from 0.0 to 2.1 miles (Table 3). Thus, the winter movements recorded by Weston (1954) were slightly more extensive than those recorded in the present study.

Grondahl (1953), in the winter of 1950-1951, measured the winter daily cruising radius movements of pheasants on the Winnebago Pheasant Research Area in northcentral Iowa. Based on 119 roadside and field observations of marked birds, the mean movement recorded was approximately 0.4 mile (Table 3). One-hundred-and-eight (91%) of these were observed within 0.75 mile of the site of capture.

Further information on winter movements was provided by 33 recaptured marked birds. Fourteen of these birds were recaptured at the same site at which they were marked, and 19 others were taken in two other traps, both located 0.4 miles from the site of the original capture. Thus, the winter movements recorded in Grondahl's (1953) study were only slightly more extensive than those recorded on the Northern Area in central Iowa, especially if the eight records of "permanent" movement are considered.

Unique circumstances may have contributed in part to the seemingly more restricted movements in central Iowa compared with those in northern Iowa. Weather conditions in central Iowa in the winter of 1961-1962 were much more severe than the conditions prevailing during the studies of Weston (1954) and Grondahl (1953). As a result, pheasants observed by Weston and Grondahl were probably less confined and restricted in their movements and cruised greater distances from concentration points. Second, Grondahl (1953) reported considerable movement between traps located as little as 0.4 mile apart, indicating that, unlike the Northern Area of central Iowa, concentration areas were in some instances quite close together. The mere presence and easy availability of such parcels of cover therefore probably encouraged more movement between them. The rarity of similar proximate areas of winter cover on the Northern Area may have prevented greater and more frequent movements than those recorded during the winter of 1961-1962.

The magnitude of winter movements in all three Iowa studies did not appear extensive. This agrees closely with a study of

Table 3. Comparison of pheasant movements (miles).

Study	Winter movements			Spring movements			Late summer and fall movements		
	Number	Mean Movement	Maximum Movement	Number	Mean Movement	Maximum Movement	Number	Mean Movement	Maximum Movement
Weston, 1954	162	0.5	2.1	707	0.9	7.0	13		5.0+
Grondahl, 1953									
(reobservations)	119	0.4	2.0	87	0.6	1.85			
(recaptures)	33	0.2	0.4						
Buss, 1946	876	0.0							
Mallette and Bechtel, 1959									
(reobservations)							393	1.3	
(recaptures)							601	0.5	
This study	41	0.2	4.9	4	0.9	1.5	44	0.3	1.5

winter movements of pheasants in southcentral Wisconsin in which no movement of 876 marked birds was recorded between two known winter concentration areas separated by only 1.25 miles of cultivated farmland (Buss 1946) (Table 3).

Spring Movements. Only four records of spring movements were obtained in the 3 years of the study. The mean of these movements was 0.9 mile, with a range of 0.1 to 1.5 miles (Table 2). Two of the recorded movements, however, were over 1 mile.

Weston (1954), in 1949 and 1950, recorded the movement of 707 pheasants during the period, March 6 to June 8, on the Birge Lake and Grass Lake areas. Mean distance of movements recorded within this period was approximately 0.9 mile. Four movements of 7 miles each were the longest recorded during spring dispersal.

Grondahl (1953) reported that the mean distance of spring dispersal was approximately 0.6 mile, based on observations of 87 marked birds during April and May. The longest record of spring dispersal was 1.85 miles, and thus, he concluded that "the maximum observed mid-winter movement of birds can be expected to approach or even exceed the distance of mean observed spring dispersal."

It therefore appears that the average distance of spring dispersal recorded by Weston (1954) was somewhat greater than that observed on both the Winnebago Area in 1951 and during the 3 years of the present study (Table 3). However, as pointed out by Grondahl (1953), the longer distance of spring dispersal observed by Weston probably was attributable to the greater size of the wintering area. Such large areas as the Birge Lake and Grass Lake areas harbored large concentrations of pheasants and therefore must have attracted birds from greater distances. Probably for the same reason, movements during spring dispersal from a large tract of winter cover used traditionally by pheasants in Wisconsin (Buss, 1946) were somewhate more extensive than those recorded in the study of Grondahl (1953) and in the present study. Although most movement records in the Wisconsin study were less than 0.5 mile, five (15%) were greater than 1 mile. Also, in South Dakota in an area where winter cover was entirely restricted to the Missouri River bottomlands, movements of up to 10 miles have been recorded from winter to summer range, based on crowing intensity samples (Kimball, 1949).

Late Summer and Fall Movements. During the 3 years, 44 movement records were obtained from 9 adult and 29 juvenile pheasants recaptured in late summer or reobserved or shot during

the hunting season. The mean of these movements was 0.3 mile, with a range of 0.0 to 1.5 miles (Table 2).

Weston (1954) reported that, of 13 cocks shot by hunters during the pheasant season, nine were killed on the Birge Lake and Grass Lake areas. Three of the remaining four were reported bagged over 5 miles from the area on which they were banded. However, since all birds reported had been trapped during previous winters, many of these movements may have occurred during spring dispersal and therefore were not representative of true summer or fall movements.

Records of pheasant movements in the Sutter Basin of California during 1952-1958 (Mallette and Bechtel, 1959) probably are more comparable to movements recorded in late summer and fall in central Iowa than are those obtained by Weston (1954). As in the present study, pheasants were trapped by use of the spotlighting method, and records of movement were secured from recaptured birds and cocks during the hunting season. (Hunting regulations in California also permitted shooting of hen pheasants.) The movement of 601 cock and hen pheasants of all ages retrapped during the same year of banding averaged 0.5 mile (Table 3). Records of movement obtained from 347 cocks and 46 hens shot during the hunting season indicated that, on the average, hens tended to move greater distances than cocks, and juveniles greater distances than adults. Mean movement of hens and cocks was 1.6 miles and 1.3 miles,respectively. Mean movement of juveniles was 1.3 and of adults, 1.1 miles. The authors attributed this greater movement by adult hens and juveniles during late summer months to disturbance by crop rotation and double cropping practices that continued throughout the hatching and brooding period, resulting in loss of habitat and an inadequate food supply for hens and broods.

In the present study, however, there was no clear indication of greater movements by juveniles (Table 2), and too few records of hen movements during late summer and fall were obtained to allow meaningful comparisons between distances moved by hens and cocks. When movements of pheasants on the Central Iowa Area are compared with movements on other areas within the pheasant range in the Midwest and California, there appears to be not detectable difference in the length or type of movements. One important aspect of pheasant movements indicated by the study, however, is that winter movements from concentration areas are rare, even in the face of declining food supplies.

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