

CHANGES IN DISTRIBUTION AND ABUNDANCE OF PHEASANTS IN ILLINOIS: 1958 VERSUS 1963

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ABSTRACT.—The relative abundance of pheasants in April, as reported by rural mail carriers in the 74 northernmost counties of Illinois, increased from 7.8 birds per 100 miles of driving in 1958 to 9.3 birds per 100 miles in 1963, or 27 per cent. In both censuses pheasants were most abundant in east-central Illinois. Gains in pheasant abundance between 1958 and 1963 occurred in east-central Illinois and immediately southwestward; significant decreases in pheasant abundance occurred in the northern and northwestern portions of the state.

A prerequisite to intelligent management of the ring-necked pheasant (*Phasianus colchicus*) is a knowledge of changes in patterns of distribution and abundance of its populations. This exotic game bird, introduced into Illinois in the 1890's (Robertson 1958, p. 3), has succeeded in establishing self-maintaining populations in approximately the northeastern third of the state. Its center of abundance, since the mid-1930's, has been in the intensively cultivated cash-grain areas of east-central Illinois (Greeley, Labisky, and Mann 1962, pp. 13-16). The pheasant was first hunted legally in Illinois in 1915 (Robertson 1958, p. 6), and has since become an important game species. The fall harvest of cocks by hunters averaged 835,000 annually from 1956 through 1963 (William L. Prent, Illinois Department of Conservation, personal communication, August 30, 1964).

This paper discusses the distribution and abundance of pheasants in Illinois as reported by rural mail carriers during a census in April, 1958, and in April, 1963. The results of the 1958 census of pheasants were presented, in part, in an earlier publication (Greeley, et al. 1962).

Methods

The pheasant census data reported in this paper were collected by rural mail carriers who counted pheasants that they observed along their routes during the 5-day periods of April 21-25, 1958, and April 22-26, 1963. A detailed description and evaluation of the rural mail carrier method of censusing pheasants in Illinois was published by Greeley, et al. (1962, pp. 3-5). The censuses were conducted in April because Greeley, et al. (1962, p. 5) reported: "The conditions for observing pheasants are probably more nearly constant from year to year in April than in any other month. April, therefore, may be the best time to use rural mail carrier censuses for obtaining annual indices of pheasant abundance."

The census of pheasants was conducted in 74 of Illinois' 102 counties in both 1958 and 1963. Greeley, et al. (1962, p. 14) had previously classified a contiguous block of 28 counties in southern Illinois as non-

pheasant range because no pheasants were observed in these counties during a February, 1957, census by rural mail carriers.

In 1958 and 1963, questionnaires (postcards), with letters of instruction, were mailed to postmasters of all post offices having rural routes in the 74 counties to be censused. Each postmaster was requested to distribute the postcard questionnaires, and the instructions, to the rural mail carriers operating from his post office. The mail carriers were asked to report the counties and political townships in which their routes were located, the length of their routes in miles, and the numbers of pheasants (cocks and hens) observed along the routes on each of the 3 consecutive days specified in the instructions.

If the route of a mail carrier extended into two or more townships, the number of pheasants observed was divided equally among all the townships reported on his questionnaire. The number of miles driven and the number of pheasants seen during the 3 day census period were used to calculate the number of pheasants observed per 100 miles of driving in each township and each county.

FINDINGS

The voluntary participation by rural mail carriers in the April, 1963, census of pheasants was considerably greater than in any of six pheasant censuses conducted in Illinois during 1957 and 1958 (Gresley, et al. 1962, p. 5). Of the 1,320 questionnaires distributed to rural mail carriers via their postmasters in

April, 1963, 1,202 (91 per cent) were returned; 1,150 (87 per cent) of the 1,320 contained usable data.

The relative abundance of pheasants in the 74 northernmost counties of Illinois increased from 7.8 pheasants per 100 miles of driving in April, 1958, to 9.9 pheasants per 100 miles in April, 1963, an overall increase of 27 per cent (Table 1); however, proportionate increases did not occur rangewide (Table 2).

Pheasants increased in abundance between 1958 and 1963 in the counties of east-central Illinois, which have harbored the state's major center of pheasant abundance for the past 30 years, and in the counties immediately south-southwestward (Fig. 1 and 2). In April, 1958, the 10 counties of the state in which pheasants were most abundant were, in descending order of abundance (Table 2): Livingston, Ford, Iroquois, McLean, Champaign, Vermilion, Woodford, Kankakee, Marshall, and Grundy. Correspondingly, in April, 1963, the 10 top-ranked counties included Livingston, Ford, Iroquois, McLean, Champaign, Piatt, Woodford, Kankakee, Putnam, and Grundy; all of these counties showed increases in abundance between 1958 and 1963 (Table 2). The east-central counties of Livingston, Ford, Iroquois, McLean, and Champaign, in that order, occupied positions one to five with respect to relative abundance of pheasants by counties in both 1958 and 1963. These five counties accounted for 56 per cent of all pheasants reported in April, 1958, and 68 per cent of all pheasants reported in April, 1963. In both censuses, pheasants were most abundant in Livingston County, in

TABLE 1.—Comparison of Miles Driven and Adult Pheasants Reported by Rural Mail Carriers From 74 Counties of Illinois in April, 1958 and 1963.

	Category	April, 1958	April, 1963
Miles Driven.....		250,917	316,605
Cocks Observed.....		10,289	17,225
Hens Observed.....		9,277	14,466
Total Pheasants Observed.....		19,566	31,691
Sex Ratio: Hens Per Cocks.....		0.9	0.8
Cocks Per 100 Miles.....		4.1	5.4
Hens Per 100 Miles.....		3.7	4.3
Total Pheasants Per 100 Miles.....		7.8	9.3

TABLE 2.—Comparison of Statistics of Pheasant Abundance, by County, as Reported by Rural Mail Carriers of Illinois during April, 1958 and 1963. Seventy-four of Illinois' 102 Counties were Censused; 28 Counties of Southern Illinois had been Previously Classified as Non-pheasant Range.

County	County Rank		Total Pheasants Reported		Pheasants per 100 Miles		Percentage Difference: 1958 to 1963 ^a
	1958	1963	April 1958	April 1963	April 1958	April 1963	
Livingston.....	1	1	3,634	8,181	56.4	99.1	— 76*
Ford.....	2	2	1,569	2,636	50.7	75.8	— 50*
Iroquois.....	3	3	1,991	3,674	28.9	43.4	— 50*
McLean.....	4	4	2,071	3,867	27.7	43.1	— 56*
Champaign.....	5	5	1,641	3,018	25.7	35.0	— 39*
Piatt.....	12	6	305	986	11.8	34.0	— 193*
Woodford.....	7	7	717	852	15.6	21.8	— 40*
Kankakee.....	8	8	706	973	15.3	19.7	— 29*
Putnam.....	13	9	81	131	10.8	19.1	— 77*
Grundy.....	10	10	323	429	12.5	17.7	— 42*
De Witt.....	19	11	190	547	6.5	16.1	— 148*
Marshall.....	9	12	328	395	14.6	15.0	— 3 ns
Douglas.....	15	13	204	187	8.7	11.3	— 64*
La Salle.....	11	14	873	1,233	12.4	13.8	— 11*
Montre.....	37	15	27	301	1.4	11.3	— 76*
Vermilion.....	5	16	896	728	17.3	11.1	— 36*
Logan.....	15	17	305	344	8.3	9.7	— 17*
Tazewell.....	21	18	284	343	6.1	8.5	— 39*
Massac.....	42	19	27	325	0.7	6.6	— 843*
Marion.....	33	20	66	148	2.7	5.4	— 100*
De Kalb.....	11	21	357	261	10.4	5.2	— 50*
Kendall.....	17	22	134	131	7.4	4.8	— 35*
Du Page.....	25	23	93	117	4.9	4.3	— 12 ns
Edgar.....	24	24	190	214	5.0	4.2	— 16*
McHenry.....	18	25	280	209	7.0	5.9	— 44*
Lee.....	23	26	243	147	6.2	3.1	— 50*
Will.....	25	27	208	179	4.6	3.0	— 35*
Kane.....	28	28	116	98	3.6	2.7	— 25*

TABLE 2.—Continued

County	County Rank		Total Pheasants Reported		Pheasants per 100 Miles		Percentage Difference: 1958 to 1963 ¹
	1958	1963	April 1958	April 1963	April 1958	April 1963	
Coles	31	29	30	86	2.0	2.3	+ 15 ns
Cook	29	30	32	61	2.8	1.6	- 43*
Lake	32	31	50	66	2.0	1.2	- 40*
Christian	52	32	9	67	0.2	1.2	+ 500*
Carroll	33	33	40	39	1.9	1.1	- 23*
Menard	43	34	8	18	0.6	1.0	+ 67 nv
Bureau	23	35	112	21	5.1	1.0	- 80*
Cass	53	36	4	18	0.2	0.8	+ 300 nv
Winnebago	30	34	46	22	1.5	0.6	- 60*
Sangamon	47	38	17	43	0.3	0.6	+ 100*
Shelby	54	39	11	35	0.2	0.5	+ 150*
Stark	29	40	63	9	4.2	0.5	- 88*
Ogle	35	11	75	26	1.5	0.5	- 67 nv
Bureau	38	42	66	28	1.3	0.5	- 62*
Merer	55	43	2	15	0.1	0.5	+ 400 nv
Stephenson	22	41	201	18	5.4	0.3	- 94*
Jo Daviess	33	45	37	15	1.2	0.3	- 75*
Henry	34	46	88	19	1.8	0.3	- 83*
Whiteside	49	47	15	13	0.3	0.5	0 ns
McGar	57	48	2	5	0.1	0.2	+ 100 nv
Pekin	45	49	16	6	0.4	0.1	- 75*
Jasper	49	50	33	4	1.0	0.1	- 90*
Clark	45	51	3	5	0.1	0.1	0 nv
Rock Island	59	52	3	2	0.1	0.1	0 nv
Greene	58	53	2	3	0.1	0.1	0 nv
Montgomery	60	54	3	4	0.1	0.1	0 nv
Warren	49	55	9	3	0.3	0.1	- 67*
Effingham	41	56	4	2	0.3	0.1	- 67*
Knox	62	57	2	3	0.0+	0.1	nv
Cumberland	50	58	6	2	0.3	0.1	- 67 nv
Macoupin ²	59	0	1	0.0	0.0+	0	nv
Jonsey	60	0	1	0.0	0.0+	0	nv
Riehland-							
Madison ³	61	0	1	0.0	0.0+	0	0
Crawford			0	0	0.0	0.4	0
Clay	51	5	0	0.3	0.0	- 100 nv	
Fayette	6	4	0	0.1	0.0	- 100 nv	
Benton			0	0	0.0	0.0	0
Pike	63	1	0	0.0	0.0	0	nv
Scott			0	0	0.0	0.0	0
Brown			0	0	0.0	0.0	0
Adams			0	0	0.0	0.0	0
Hancock			0	0	0.0	0.0	0
Schuyler			0	0	0.0	0.0	0
McDonough	44		19	0	0.6	0.0	- 100*
Henderson	45		10	0	0.5	0.0	- 100 nv
Fulton	64		1	0	0.0+	0.0	0 nv

¹The difference in the abundance of pheasants per 100 miles of driving between 1958 and 1963 in each county was tested for statistical significance by conventional Chi-square analysis. * Indicates significance at the 0.05 level; ns indicates no significance at the 0.05 level; and nv indicates that the test was not valid because minimum expected values were 10 or less.

²No rank assigned to counties from which pheasants were absent.

³Madison County substituted for Riehland County in 1963 census.

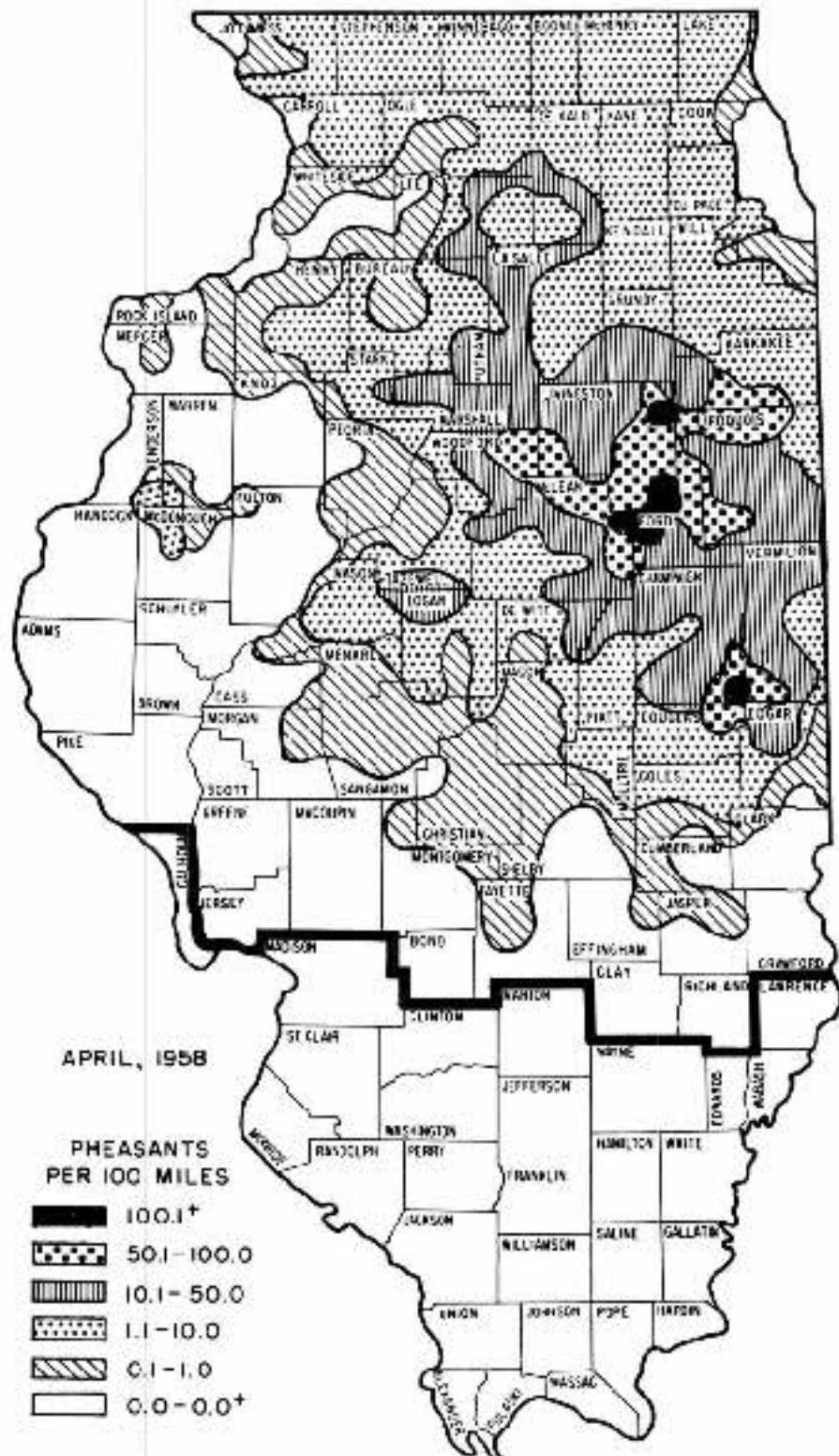


FIGURE 1.—Distribution and abundance of pheasants in Illinois as mapped from data (township) obtained through a rural mail carrier census, April, 1958. This map modified from Greeley, et al. (1962, p. 9). Counties below the heavy line were not censused.

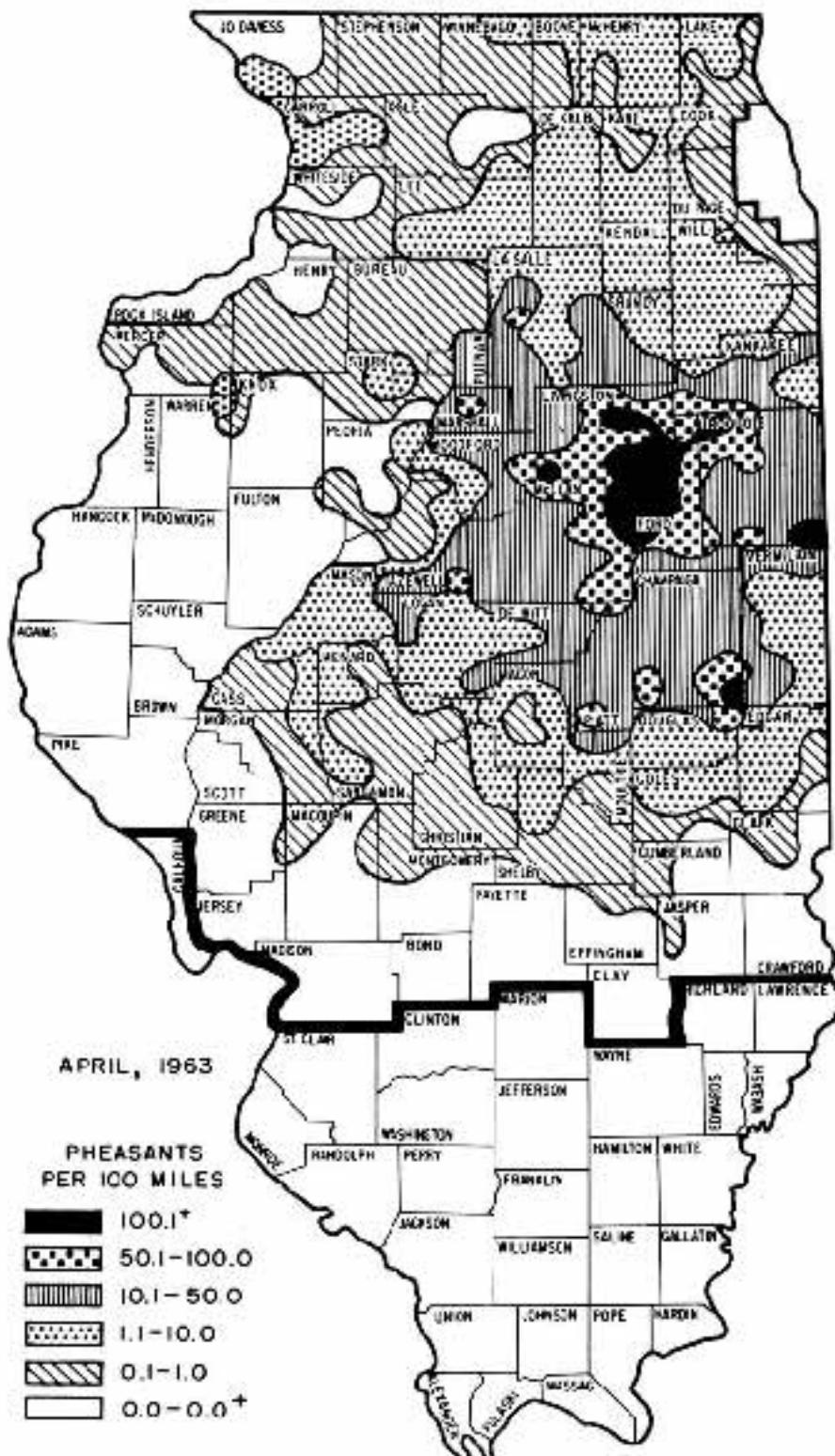


FIGURE 2.—Distribution and abundance of pheasants in Illinois as mapped from data (township) obtained through a rural mail carrier census, April, 1963. Counties below the heavy line were not censused.

which 56.4 and 99.1 birds were observed per 100 miles of driving in 1958 and 1963.

Perhaps the most interesting and notable increase in the abundance of pheasants in Illinois between 1958 and 1963 occurred in the contiguous block of counties including Piatt, De Witt, Moultrie, and Macon, which lie immediately south of McLean County and southwest of Champaign County (Table 2 and Fig. 2). The number of pheasants observed in these four counties nearly quadrupled between 1958 and 1963.

Pheasants declined in abundance throughout northern and northwest Illinois between 1958 and 1963 (Fig. 1 and 2); these regions were characterized by secondary centers of abundance in the late 1940's (Greeley, et al. 1962, p. 16). The most notable decreases in abundance occurred in Stephenson, Boone, Jo Daviess, McHenry, De Kalb, Lee, Winnebago, and Kendall counties; less than 1 pheasant per 100 miles was reported from several of these counties in April, 1963 (Table 2).

The abundance of pheasants along the southern and southwestern fringe of the contiguous pheasant range in Illinois declined or remained unchanged between 1958 and 1963, which indicated that the bird had not spread southward or westward into unoccupied range. Pheasants observed in this marginal portion of the Illinois range numbered less than 1 pheasant per 100 miles in 1958 and 1963.

DISCUSSION

Major changes in the abundance of pheasants within their range are not uncommon. One of the most spec-

taular shifts in pheasant abundance occurred in the plains and prairie states (North Dakota, South Dakota, Nebraska, Minnesota, and Iowa) during the 1940's (Kimbball, Kozicky, and Nelson 1956, pp. 207-212). These population shifts centered about a nucleus of abundance located in eastern South Dakota; gains and losses in abundance occurred both east and west of this nucleus.

In Illinois, the major center of pheasant abundance has been located in the east-central sector of the state since the bird established itself there in the mid-1930's (Greeley, et al. 1962, pp. 13-16). In the late 1940's and early 1950's, secondary centers of abundance were to be found in sectors of northern Illinois; these secondary centers no longer existed by 1963. Whereas abundance declined in northern Illinois after the early 1950's, remarkable increases in abundance occurred south and southwest of the east-central center of abundance during the late 1950's and early 1960's. Thus, in Illinois, population shifts have centered about the nucleus of pheasant abundance in east-central Illinois.

The causes for major shifts in the abundance of pheasants within their range are not well understood. In Illinois, the increase in the abundance of pheasants in Ford County, in the east central sector of the state, during the late 1950's and early 1960's was attributed partially to increased survival of hens and not to increased production of young by individual hens (Ronald F. Labisky, Illinois Natural History Survey, unpublished data). Similar ecological data for other portions of the Illinois pheasant range are not avail-

able. Kimball, et al. (1956, p. 212) concluded that "environmental changes appear to have been an important factor in bringing about the pheasant population fluctuations and shifts in the plains and prairie pheasant island; but some other factor or factors also appear to have exerted an influence."

Whether population shifts among pheasants are caused solely by the cumulative effects of so-called normal animal fluctuations is questionable. The suddenness and magnitude of major changes in the abundance of pheasants within their range certainly can not be explained fully by our present knowledge of accompanying changes in the environmental complex.

In Illinois, rural mail carrier censuses of pheasants will be conducted at intervals of 5 years, if possible, to determine changes in the distribution and abundance of this bird. Such periodic censuses of pheasants over a span of many years may enable ecologists to define not only the specific patterns in the temporal and spatial dispersion of this species but also the mechanisms underlying such population shifts.

POTENTIAL PROBLEMS

More pheasants were present in Illinois in 1963 than in 1958, but they were confined to a smaller portion of the state. The concentration of pheasants in east-central Illinois will probably begin to attract proportionately more hunters than in past years when other portions of the state also offered good pheasant hunting. If this pattern of high

density pheasant populations on a restricted land area persists or becomes exaggerated in future years, conflicts between Illinois pheasant hunters and landowners in this region of high pheasant abundance could evolve.

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