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MOBILITY OF THE NORTHERN BOB-WHITE AS INDICATED BY BANDING RETURNS

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THE primary objective of the banding work here discussed was the acquisition of accurate information on Wisconsin Bob-white movements, particularly during the winter months. Specific questions, the answers to which were desired, had to do principally with the stability of winter coveys with respect to composition and territory occupancy, and the amount of annual dispersal to be expected in normal quail populations.

Although the files of Professor George Wagner, who has had charge of the general bird-banding activities at the University of Wisconsin, have accumulated data on the Bob-white prior to 1930, it was not until the University's main banding program for the winters and springs of 1930–1931 and 1931–1932 was assigned to Mr. Harry G. Anderson that this species received any special attention. The project was jointly financed and supervised by the University and by the Wisconsin Quail Investigation (established at the University by the Sporting Arms and Ammunition Manufacturers' Institute and the United States Biological Survey), represented respectively by Professor Wagner and myself.

For the most part the banding operations were conducted on an irregular tract of University Farm properties of about a square mile in area. These were located west of Madison, bounded roughly on two out of four sides by a lake, on the third by a residential district of the city, and on the fourth by open suburban and agricultural country.

The quail population dealt with was one that had from 1929 to 1932 held at a fairly stationary level of around a bird per six acres or close to the estimated carrying capacity of the land without directed management. Cover was as a rule of good quality and well distributed; the inherent environmental weakness, as proved incidentally to be a limiting factor over much

of the Wisconsin quail range, seemed a matter of an inadequate or a restricted winter food-supply. All in all, the quail led naturally independent lives; they were subjected to slight human molestation apart from the necessary capture and handling of trapped birds, this being accomplished with no detected losses or serious injuries.

Baiting at the trapping areas was begun about December 1st, when coveys could be assumed to be reasonably well settled in their winter quarters and when the work of the investigators was aided both by tracking snows and by a decreasing availability of the ordinarily staple quail foods. Seldom could the small amounts of scratch feeds used for baiting be regarded as an appreciable supplement to the food upon which the quail subsisted; the baits were kept at the minimum consistent with attractiveness, so the birds would still be compelled to forage for themselves and retain essentially their wild habits. Subsequent to two or three weeks of baiting, traps were put out at strategic places frequented by the birds and were kept running all winter and as late into the spring as the quail continued to be attracted by grain baits.

Traps of the "government sparrow trap" design but with fishnet buffers to prevent imprisoned Bob-whites from scalping themselves on the wire tops gave the most satisfaction, though various other types were tried. United States Biological Survey bands were used.

Altogether, Wagner's records for the areas under discussion show 279 bands used on Bob-whites up to June, 1932. These include 17 for May, 1928, placed mainly by H. Folsom; 17 for April and 5 for May, 1929, mainly by Anderson and John Gundlach; 6 for March and 14 for April, 1930, by Gundlach and Errington. Omitting consideration of repeats from the same locality within a week to a month or so of the initial banding, few data came from these 59 banded birds except in four instances. No. 506,776, banded May 8, 1928, repeated at the same place May 21, 1929; returns were procured on three others, also from the vicinity of where banded. These latter were 506,775, banded May 3, 1928, and returned June 8, 1930, and 352,306, banded April 15, 1929, and 352,313, banded April 13, 1930, both returned July 17, 1930.

Peculiarly enough Anderson, trapping 88 birds in January, February, and March, 1931, failed to recapture a single quail banded during the previous years, nor did G. Stanek, who banded most of 22 new birds for April and May, 1931, find trace of them.

I do not think that this points to a total absence of quail

carrying bands at this time, for it seems unlikely that all of the old birds could have been eliminated in a few months or that outward drift could be completely explanatory. I suspect that the mild and almost snowless winter of 1930–1931 had a pronounced influence on the banding results; the quail population, having a food-supply unusually available, conceivably did not feel the strongest of incentives to turn to the trap baits offered. It appears reasonable that if the quail were not really pressed for food, the bulk of those caught would be the comparatively inexperienced individuals of the season's increase, the banded, more self-sufficient adults being not quite so ready to enter the traps. Experience with English Sparrows and with fur-bearers has impressed upon me a realization that the adults of higher vertebrates are likely to display more shyness toward traps than do juveniles, the exception of chronic "repeaters" notwithstanding. Then, again, the total of annually active banded birds doubtless had been reduced in mathematical significance by normal mortality turnover and possibly by some egress from the area, as an average of only 20 bands per year had been placed since the spring of 1928.

The most spectacular banding feat of the campaign can be credited to Robert Halpin, who caught July 9, 1931, a mother quail (651,185) and her brood of fourteen half-grown young. Three of the brood (A429744–48–51) repeated with the mother at the same place July 25th; another (A429749) was killed by motor traffic about one hundred fifty yards distant on December 5, 1931; and one more (A429750) repeated in the immediate locality February 7, 1932. Nothing further has been heard of this brood.

Far more productive of data was Anderson's second season of intensive quail banding. From December, 1931, to May, 1932, he was responsible for nearly all of the 96 birds banded, and in the course of his work he recorded a substantial number of repeats. Most of these repeats were of birds recaptured within a month or two at or near the place where banded. Indeed, if a winter bird repeated at all within three months it was usually taken at about the same place, although appearances at points a quarter-mile distant were not uncommon.

Some examples of important 1931–1932 repeats at the original banding stations might be listed, illustrative of birds exhibiting attachment for definite territories:

Band	*Date Banded*	*Date Repeated*
649893	Dec. 12, 1931	Jan. 14, April 13, 1932
A429773	Dec. 28, 1931	Jan. 14, 18, Mar. 1, 1932
A418509	Dec. 28, 1931	Mar. 1, 1932
A427767	Dec. 28, 1931	April 13, 1932
A418507	Dec. 28, 1931	Mar. 31, 1932
A418508	Dec. 28, 1931	Jan. 14, Mar. 31, 1932
A429771	Dec. 28, 1931	Mar. 1, 31, 1932
A429772	Dec. 28, 1931	Mar. 31, 1932
A429778	Dec. 28, 1931	Feb. 19, 29, Mar. 31, 1932
651154	Feb. 2, 1931	Feb. 3, 8, 19, May 19, 20, June 23, 27, July 7, 1931
651185	Feb. 8, 1931	July 9, 25, 1931; Feb. 7, 1932
651188	Feb. 19, 1931	July 2, 22, 1931
A427780	Mar. 24, 1931	July 10, 1931
A427748	April 7, 1931	Dec. 15, 28, 1931
A427749	April 14, 1931	Dec. 29, 1931
A427764	May 13, 1931	Dec. 29, 1931

In the above table will be noted 651185, the hen trapped July 9, 1931, with her brood of fourteen. One of the young (A429750) repeated with her on the last date, February 7, 1932.

Examples of 1931–1932 repeats at distances of about a quarter-mile from where banded follow:

Band	*Date Banded*	*Date Repeated*
525358	Jan. 25, 1931	Dec. 28, 1931
651160	Feb. 2, 1931	April 19, 1931 (bird also repeated where banded Feb. 3, 8, April 21, 27, May 2, 1931)
651181	Feb. 2, 1931	April 21, 1931 (repeated where banded Feb. 8, April 21, 22, 1931)
651153	Feb. 2, 1931	Dec. 13, 1931; Feb. 28, 1932
A427741	Mar. 24, 1931	May 14, 1931
646665	April 18, 1931	Feb. 7, 1932
646662	April 18, 1931	Feb. 12, 1932 (repeated where banded May 9, 1931, and nearby April 14,1932)
646666	April 19, 1931	May 26, 1931; Feb. 7, 1932 (repeated where banded May 4, 1931)
646669	April 21, 1931	June 27, July 7, 1931
649892	Dec. 12, 1931	Dec. 29, 1931; Jan. 13, 16, 1932 (repeated where banded Feb. 7, 1932)
649894	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Dec. 20, 29, 1931)
649895	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Jan. 4, 1932)
649897	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Dec. 20, 29, 1931)
649898	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Dec. 20, 25, 1931; Jan. 13, 1932)

649900	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Dec. 20, 28, 1931; Jan. 16, 1932)
A427734	Dec. 12, 1931	Feb. 19, 1932 (repeated where banded Dec. 20, 29, 1931)
A427735	Dec. 23, 1931	Dec. 29, 1931; Jan. 8, 1932
A427736	Dec. 23, 1931	Dec. 29, 1931
A427738	Dec. 23, 1931	Dec. 28, 1931; Jan. 17, 1932 (back where banded Feb. 7, 1932)
A427765	Dec. 28, 1931	Feb. 19, 1932 (repeated where banded Jan. 11, 1932)
A418501	Dec. 28, 1931	Feb. 19, 1932
A418504	Dec. 28, 1931	Feb. 7, 1932
A418506	Dec. 28, 1931	Feb. 7, 1932

1931–1932 repeats at a distance of about a half-mile from where banded:

Band	*Date Banded*	*Date Repeated*
443936	Jan. 24, 1931	Dec. 13, 1931
653006	Jan. 24, 1931	Mar. 31, 1932
653009	Jan. 24, 1931	Dec. 28, 1931 (repeated where banded Feb. 2, 8, 1931)
653012	Jan. 24, 1931	Mar. 31, 1932
A427750	April 21, 1931	Feb. 7, 1932
A437806	Feb. 7, 1932	April 13, 1932 (repeated where banded Feb. 13, 1932)

Worthy of separate mention are two particularly ambitious wanderers. No. 427761, banded April 22, 1931, was recaptured April 27th about 1200 yards away, repeated at the latter place May 2d, was taken the same day at still another banding station nearly 900 yards distant, and finally repeated at another trap site, 550 yards from the last, May 7th, 8th, 11th, 12th, 13th, and 14th. The longest move of which I have record was by A427775, banded at the University Hill Farm March 19, 1931, and caught as a repeat February 7, 1932, at a distance of two miles. Neither sex has revealed more propensity than the other to range widely; for the seven quail repeats farthest from original stations, the male-female ratio was 3: 4.

Bands taken from birds collected as specimens or found dead substantiated on the whole data derived from repeats at banding stations. The following constitute the most reliable 1931–1932 returns at hand:

Band	*Date Banded*	*Date Returned*	*Distance from Station*
653008	Jan. 24, 1931	June 19, 1932	Half-mile
651182	Feb. 3, 1931	Fall, 1931	About the same place
651184	Feb. 8, 1931	May 23, 1931	Less than quarter-mile
651187	Feb. 19, 1931	July 16, 1931	Less than quarter-mile
651176	Mar. 10, 1931	Feb. 10, 1932	Less than half-mile
A427760	Mar. 19, 1931	Mar. 30, 1931	Same place
A427757	Mar. 19, 1931	May 17, 1931	Half-mile
A427776	Mar. 19, 1931	June 2, 1931	125 yards
A427771	Mar. 19, 1931	July 10, 1931	Less than half-mile
646664	April 18, 1931	July 16, 1931	About 1000 yards
A429749	July 9, 1931	Dec. 5, 1931	150 yards
A429777	Dec. 28, 1931	Feb. 20, 1932	About same place
A437844	April 13, 1932	June 20, 1932	About 1000 yards

Tabular recapitulation of 1928 to 1932 data on the movements of 125 Bob-whites, totalling 201 repeats and 16 returns:

	Total repeats and returns	*At or near banding station*	*Within 200 yards*	*Within Quarter-mile*	*Within Half-mile*	*Within Two miles*
First month.....	115	95	6	11	3	
Second month.....	31	22	5	4		
Third month.....	23	8		12	4	
Fourth month.....	12	9	2		1	
Fifth month.....	6	4	2			
Sixth month.....	5	5				
Seventh month....	1	1				
Eighth month.....	2	2				
Ninth month.....	3	3				
Tenth month.....	4			3	1	
Eleventh month...	4		1		2	1
Twelfth month....	4	1		2	1	
Thirteenth month .	2	1	1			
Fourteenth month.						
Fifteenth month...	2				2	
Sixteenth month...	2		1		1	

The lack of repeats for the sixth to ninth months at distances away from the station is doubtless due to the fact that no trapping on any extensive scale was carried on during the warmer months; the one or two stations usually working would take banded birds that happened to visit them but would reveal nothing concerning many others that might be in the neighborhood.

On the basis of the assembled data, what conclusions are we entitled to arrive at with respect to the stability of winter coveys? It is apparent that the Bob-white tends to remain for more or less protracted periods of time in relatively small areas. This is especially true of moderate populations well situated as to food and cover during the cold weather months. The Bob-white covey, while determined to be but a unit of convenience and of no fixed number or composition (see Stoddard, The Bob-white Quail, 1931), nevertheless may be said when once settled for the winter to take on a certain definiteness. Now and then birds may leave their coveys or territories and others may come in, but commonly they are reluctant to depart from their seasonal living routine, provided conditions for existence are tolerable. On the basis of field experience, too, I feel fairly able to predict just about what a given covey is likely to do from day to day, though it is by no means to be asserted that covey habits are equally predictable over a space of weeks or months.

Indeed, in terms of year-round behavior and residence, one can speak with increasingly less assurance as to what a quail is going to do or where it is going to be. Granted that the scanty data presented here do not bear it out particularly, it seems evident from field observation that by far the greater proportion of Bob-white territory-shifting not attributable to gross environmental changes (those linked with food and cover) is initiated by restlessness attendant upon the spring sex awakening. The disintegration of coveys preliminary to pairing is followed by the occupancy of rather large tracts of land previously quail-vacant. When the advent of fall draws the miscellaneous juveniles and adults together as coveys, the banding results show that the old birds do not necessarily gravitate back to their former winter coverts.

Furthermore, it appears likely that the redistribution of the adult quail population after the breeding season, within limits of a half or three-quarters mile or even a greater radius, may be to no small degree fortuitous; a bird spending practically the entire winter within a quarter-mile or less of the center of the covey territory may the next season winter in a territory possibly a couple of miles away. In other words an individual Bob-white may continue to live in approximately the same place from year to year, or it may not.