1936 PHEASANT NESTING STUDY

BY ALDO LEOPOLD

A preliminary study of pheasant nests in hayfields was made in 1936 on the University Farms near Madison, Wisconsin, by the author, on the Riley Game Area in Dane County by Ellwood B. Moore, and on the Elkhorn and Whitewater Game Areas in Rock County by Douglas E. Wade.

Twenty-three parcels of freshly cut hay-stubble, totaling 141 acres, were "cruised" by a strip survey. The width of the strips varied from ten to forty feet, depending on obstructions to visibility. The object was to find all hayfield nests. No thorough cruise of fence-rows or other nesting cover was attempted.

Of the twenty-three parcels, fourteen were alfalfa. The remainder were mostly red clover or clover mixtures. All were first-crop mowings, and fell between the dates June 19 and July 4. Drought postponed the second crops until after the nesting season, hence the second haying was not studied.

Forty-two nests were found, all pheasants except one Hungarian Partridge nest at Elkhorn. There are no Hungarians at Riley or the University Farms. A few quail are present on each of the areas, but no nests were found.

The average hayfield nesting density was found to be 0.3 nests per acre, or 3.4 acres per nest, but this average has little meaning because of the startling disparity as between the various areas. This disparity is reserved for later discussion.

Nest and Hen Mortality. Of the forty-two nests found:

17	had hatched before cutting	41 per cent
1	had been destroyed by a predator	2 per cent
19	were destroyed by cutting	45 per cent
5	destroyed by cutting, together with hen	12 per cent
42		100

The total mowing mortality was twenty-four out of forty-two hay field nests, or 57 per cent.

Parts of chicks mangled by the mower were found near four nests. The five mower-killed hens found had invariably lost their legs, and often wings and heads also. The proportion of mower-killed hens may be greater than the observed 12 per cent. Farmers repeatedly told of legless hens flying away, and even eluding (by a second

flush) an attempt to put them out of their misery. Unless the mower cuts feathers as well as legs it is easy to overlook evidence of hen-mortality.

A total of ten mower-killed young rabbits, seventeen *Microtus*, one Redwing Blackbird, and one tame turkey were found, together with hundreds of torn-up *Microtus* nests and some rabbit nests. All in all, the trail of the mowing Juggernaut is a gruesome one.

Two dead cock pheasants, seemingly pre-dating the mowing, were found.

I could see no tendency for nests to occur on edges, as reported by English (2) in Michigan and Hamerstrom (1) in Iowa. In at least three 10-acre patches of alfalfa, one of which was extra dense and heavy, numerous nests occurred in the very center. However these fields averaged from one to two nests per acre, so perhaps the crowding forced the birds to accept non-peripheral locations.

Desertion of Cutover Nests. Of the nineteen pheasant nests destroyed by cutting without known loss of the hen, all were deserted, regardless of the stage of incubation. This is mentioned because instances of return of hens to mowed-over nests are recorded by Hamerstrom (p. 187).

However a Marsh Hawk nest cut over on June 19 was reoccupied by the incubating bird immediately after the mowers had left the alfalfa field in which it was situated. A half-moon of cut hay was left to shield it from crows. Despite many visits by curious observers, all five eggs hatched nine days later, and the young were (except for one taken as a pet by the owner) successfully raised.

A Hungarian nest of twenty-two eggs, situated in a very narrow fencerow of quack grass, was pipping on June 19 just at the time of mowing. The edge of the mower-knife passed within a foot of the nest. The hatched chicks were successfully led away by the anxious parents, but four unhatched eggs were deserted.

Reading Evidence; Points of Technique. Crows seemed to get most of the eggs exposed by mowing within a few days, especially if the eggs had been scattered by the rake. Some nests uncovered by the mower but not scattered by the rake were never found by crows. Eggs opened by crows could be detected at a greater distance than unbroken eggs.

In one such case, an oat stubble nest of four eggs found eight days after mowing, it was suspected that the hen had resumed incubation because one egg, broken as a test, emitted no odor and con-

tained a chick ready to hatch. On returning ten days later, another egg, when broken, showed still no odor, and little or no decomposition. Apparently, then, deserted nearly-hatched pheasant eggs are very slow to decay, or else these particular eggs had been actually "cooked" and thus preserved by the sun.

Re-growth of stubble begins to hide evidence of nests within a few days after mowing, so that cruising strips must grow progressively narrower with stubble-age. Cruising becomes impossible after a week unless drought has abnormally retarded re-growth.

It was sometimes puzzling to distinguish the weathered shells of eggs opened early in 1936 from 1935 egg shells.

Hatched egg shells could be easily distinguished from predator work by the neatly-halved shells and membranes, and by the absence of yolk stains. Advanced incubation in predator-opened shells could often be detected by blood stains.

Mower-killed hens which flew away could usually be detected by finding the severed feet, and by finding feathers clipped by the mower. Blood stains were not found, though they must have been present.

It was seldom found impossible to count the clutch in mowed-over nests except in nests too deeply depressed to be scattered by the rake. Where eggs or hatched shells were reached by a rotary rake, they were scattered so widely that in a field containing many nests one often felt uncertain which eggs belonged to which nest. Furthermore I have no doubt that many shells and some whole eggs actually reach the haymow.

Fields with hay which has been mowed and windrowed but not loaded can be cruised by deducting a percentage for the windrow-covered area.

Farmers' estimates of hayfield nests were found unreliable and usually too low. The farmer sees the nests from which incubating hens are flushed, but he is less likely to see those from which the hen is absent, or those hatched previous to mowing. Clutches of eggs uncovered but not scattered are seldom seen by the farmer. In one case a perfectly reliable farmer, who had just mowed over sixteen nests on eight acres of alfalfa, told me the field contained only three nests (in each of which he had killed a hen), plus several broods of chicks which he had assisted to escape unhurt. He had apparently failed to see the thirteen other nests (six pre-hatched, one previously destroyed by predators, and six going nests) which he had uncovered. The heat,

hurry, and worry of getting hay in before the next rain is not conducive to good observation of incidentals like game.

Population Density and Hayfield Nests; Flushing-bars. The original object of the study was to find out whether enough nests are destroyed by mowers to warrant the use of flushing bars.

The information obtained, however, proved to be pertinent to a much more important question: Why do pheasants nest in hayfields anyhow?

In Table I the five areas studied are arranged in descending order of population density. The hayfield nest density (last column) is seen to follow the same order. The non-hay nesting cover was substantially similar on each of the five areas. We have, then, a series

TABLE I

AREA			SPRING CENSUS			PHEASANT DENSITY	
Name	Acres	Hay-Cruised Acres	Pheasants	Quail	Hungarians	Acres per bird	Acres of hay per nest
University Bay Farm	500	30	300?	25?	0	1.7	0.8
Whitewater	240	12	65	0	5	3.7	No nests found
Riley	1700	81	150?	40?	0	11.0	27.0
Elkhorn	780	18	57	31	52	14.0	22.0
University Hill Farm	200	11	6	8	0	14.0	No nests found

of comparable samples in which hayfield nesting is proportional to nesting population. On the thinly populated samples there are virtually no hayfield nests; on the thickly populated samples there are many hayfield nests. On the first sample (University Bay Farm) the nests averaged more than one per acre.

This strongly suggests the hypothesis that pheasants nest in hay because they have to; that heavy hayfield nesting occurs only where the other (and preferred) cover does not suffice to accommodate more than a part of the population.

Substantially the same conclusion was drawn by Hawkins (3) from a nesting study of Hungarian Partridge at Faville Grove. This hypothesis, if ultimately substantiated by more ample data, answers the flushing-bar question. On thickly populated areas flushing-bars would save many nests, but are not needed because there are already enough pheasants. On thinly populated areas there are not enough hayfield nests to justify the bother of using bars. In either case more fencerows would appear to be a sounder way to save nests than more flushing-bars.

Flushing-bars would seem to have a place on areas where there is a good stand of pheasants but more are desired, where more fencerows are impossible, and where damage to crops does not occur or may be ignored.

It may here be remarked that on the University Bay Farm, which the table shows to have the heaviest population and the heaviest hayfield nests, pheasants inflicted severe damage on corn in both 1935 and 1936. There was no damage on the other areas.

Movements. The University Bay Farm and the University Hill Farm, which contrast so strongly in both population and hayfield nests, are separated only by a highway. The former is partly lowland, the latter all upland. Both are fed in winter and both are nominally refuge. The University Bay Area is so hedged in by lake, woods, golf links, and residential property that any spread of birds must be in the direction of the Hill farm. Why do the pheasants from the crowded University Bay not spread to the nearly empty coverts of the Hill farm, at least for nesting? Wight's (unpublished) findings in Michigan indicate a spring dispersion of up to three miles. The direction of this movement is toward uplands.

I am unable to answer this question, except to suggest that the Hill Farm is heavily poached, whereas University Bay is not. For this or some other reason the University Bay birds prefer to nest on their winter range, despite its crowded condition.

None of the conclusions herein set forth can be considered as more than tentative until the work is repeated through a series of years, and until the nesting density in fencerows and other covers is determined for both thinly and thickly populated samples.

LITERATURE CITED

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