# SOME OBSERVATIONS ON A PAIR OF RED-TAILED HAWKS

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The data presented herein were taken by the writer when a graduate student of the University of Michigan working on the Williamston Game Management Project.[1] This coöperative project concerned itself mainly with managing farm lands to increase game species, particularly the pheasant. The writer was assigned the problem of determining "Causes of Pheasant Mortality in Michigan".[2] The Red-tailed Hawk (*Buteo borealis borealis*) was found to be one of these causes at Williamston, Michigan.

Barrows (1912), writing on the Red-tailed Hawks, says, "This hawk is rarely if ever found in Michigan in winter, but arrives from the south very early, usually before the middle of March, and remains until mid-October or later." In the course of this study, however, they have been observed during every month of the year. Therefore it seems probable that they may winter here. The winter records for these hawks in Williamston Township are shown in Table I. These hawks are not numerous in the township, due to the activities of residents directed against them. Many of them are of the opinion that they are detrimental and for that reason they are kept at a minimum.

TABLE I

*A Table Showing the Number of Times that Red-tailed Hawks Have Been Observed at Williamston During the Winters of 1931 and 1932.*

| | Activities | | | | Perching | | |
|---|---|---|---|---|---|---|---|
| | Flying | Circling | Hunting | Mating | Tree | Woods | Total |
| November | 1 | .... | .... | .... | 12 | 1 | 14 |
| December | 2 | .... | .... | .... | 8 | .... | 10 |
| January | 2 | .... | .... | .... | 1 | .... | 3 |
| February | 2 | 1 | 3 | .... | 11 | 4 | 21 |
| March | 2 | 3 | .... | 2 | 7 | .... | 14 |
| Total | 9 | 4 | 3 | 2 | 39 | 5 | 62 |

BREEDING HABITS AT WILLIAMSTON. A pair of these hawks was observed on February 11, 1932, and frequently thereafter, flying over

[1]Agencies that have coöperated at one time or another are the Izaak Walton League of America, the Michigan Department of Conservation, the Michigan Department of Agriculture, the U. S. Biological Survey, the Sporting Arms and Ammunition Manufacturers Institute, the American Game Association, Michigan State College, the University of Michigan, the Williamston Progressive Hunting Club, and farmers in Williamston Township, Ingham County, Michigan. Particular credit is due Mr. Harry F. Harper, whose enthusiastic moral support and generous financial backing aided in the studies completed. The work was supervised by H. M. Wight of the University of Michigan.

[2]"Causes of Pheasant Mortality in Michigan", unpublished Ph. D. thesis, University of Michigan, 1934, by P. F. English.

a territory which will be described later as their feeding or hunting area. Only this one pair nested successfully in the township in 1932, showing the scarcity of the birds in the area.

On March 21, 1932, while the heaviest snowstorm of the winter (eleven inches) was in progress, a Red-tailed Hawk was observed on a horizontal branch of a basswood tree about fifty feet from the

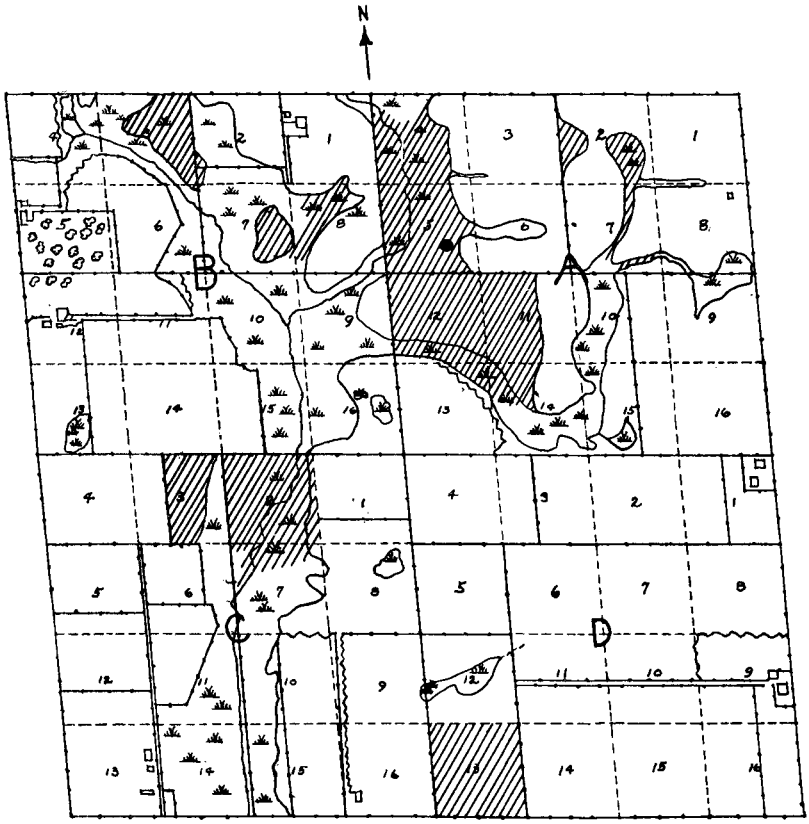


FIG. 18. Williamston Township, Williamston, Mich. The location of the Red-tailed Hawk's nest is shown by the solid black circle.

ground. In a short time a second red-tail alighted on the same branch within a foot of the first one. Subsequent events proved them to be male and female. Ten minutes later at 9:15 A. M., the second hawk copulated with the first, and while the act was in progress the female gave a series of screams characteristic of the species. After mating the male perched on the branch beside the female and both remained quiet for six minutes, when the female flew away, followed a minute later by the male.

From certain peculiarities of markings, these hawks, especially the female, which had one of the primaries of the right wing broken, could be easily identified whenever observed.

THE NEST. On April 23 a Red-tailed Hawk nest was discovered in a tree about fifty feet from where the mating had occurred on March 21. The nest was in the uppermost crotch of a basswood tree, sixty-five feet from the ground in an upland, cut-over woods at the point indicated on the accompanying map. The surrounding land had an especially heavy population of game as compared with adjacent areas, which had more of a rodent population. So far as could be determined by field observations, the area hunted by this pair of hawks was about 5,000 acres. Thus their cruising radius was about one and one-half miles. The hunting territory of these hawks overlapped that of a Great Horned Owl and that of two pairs of Marsh Hawks. Two very young hawks in down plumage were first observed in this nest on May 2, one noticeably larger than the other, which is seemingly a characteristic of broods of young hawks and owls. Besides the young hawks, the partial remains of a female Japanese Pheasant, a band No. A-880 from a Hungarian Partridge, and a few twigs of juneberry with leaves and buds were found in the nest.

FEEDING HABITS. In order to study better the feeding of these hawks, their nest was removed from the tree and the young were transferred to a false nest constructed from old unpainted lumber, three feet square and two feet deep, with a solid bottom. This nest was placed nine feet from the ground in a small maple tree about ten feet from the original nesting tree (see Figure 19). The actual transfer from one site to the other was made on May 16 during a sudden heavy spring shower. The young at this time were still in their down plumage.

The new nest was visited twice daily to ascertain whether the experiment was going to be successful. It was necessary to hand feed the young with hamburger for the first few days. By May 19, however, the parent hawks discovered the young and fed them a juvenile cottontail. Thereafter food was brought regularly. A possible explanation for the adult hawks' not finding the young promptly might be the windy and rainy weather of this period.

Before going into detail as to the feeding habits of the Williamston red-tails, it might be well to review the feeding habits of the red-tail as reported by other workers. In a sense the findings herein reported are not comparable, since the hawks studied were a single pair and their young, giving a picture of their diet from May 19 to July 15.

Other workers, with the exception of Errington (1930) have based their conclusions on the stomach analyses.

Fisher (1893) examined the stomachs of Red-tailed Hawks from the District of Columbia, twenty-four states, and two Canadian Provinces. He states: "Of 562 stomachs examined, 54 contained poultry

FIG. 19. Improvised nest for the Red-tailed Hawk, at Williamston, Mich., 1932.

or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians or reptiles; 47, insects; 8, crawfish; 1, centipede; 13, offal; and 89 were empty."

Warren (1890) examined the stomachs of 173 and found: 131 contained the remains of mice; 6, rabbits; 3, red squirrels; 2, skunks; 18, small birds; 14, poultry; 3, insects; 3, snakes; and 4, offal or carrion.

Errington (1933), in his study of raptor food habits, compiled from the 165 individuals of prey tabulated as quantitative data, gives the following: "Cottontail (including 8 or more juvenals), 18; arboreal squirrel, 11; Franklin ground squirrel, 3; striped ground squirrel, 49; chipmunk, 3; Norway rat, 1; meadow mouse, 42; deer mouse, 4; house mouse, 1; weasel, 1; shrew (5 Blarina, 1 Sorex), 6; young horned lark, 1; domestic pigeon (young?), 1; domestic chicken (all young but two), 18; gallinule, 1; snake, 4; frog, 1."

Referring back to the improvised hawk nest under study at Williamston, in order to be sure of what was brought in the nest was covered with a piece of old woven wire so that the parent hawks could drop the prey to the young hawks, but were not able to carry off any of the remains of prey not consumed by the young. In this way, by making frequent visits to the nest, it was possible to obtain a record of what the hawks were taking during the period of time covered by these observations. The smaller of the two young died May 26, ten days after it was placed in the new nest.

The following specimens of vertebrate prey were brought into the nest by the adults during a period of seventy-four days, between May 2 and July 15: Avian prey: Pheasants, 7; Hungarian partridge, 3; quail, 2; flickers, 3; starlings, 2; and sparrows, 2. Mammalian prey: moles, 7; Microtus, 7; cottontail (juvenile), 5; weasels, 5; fox squirrel, 5; red squirrel, 1; and spermophile, 1. One milk snake was also brought in. Some of the smaller animals, especially *Microtus*, were eaten immediately and left no trace. For this reason they could not be recorded from remains found in the nest. Pellet analyses disclosed, however, that many animals were eaten which were not observed as fresh prey. On the basis of the ninety-four pellets analyzed, *Microtus* runs up to sixty-two and other small birds to fifteen. A summary of the prey brought to the nest is given in Table II.

Mention should be made of the fact that the young hawk was held in the nest much longer than normal. It was noticed on June 1 that the young raptor was making use of its wings so that on this date a leather anklet was attached to its tarsus, in a manner similar to that used by Errington (1932). To this was fastened a small snap and swivel and two feet of light chain which was secured to the bottom of the nest. In this way the young hawk was held in captivity until released on July 14, some forty-five days later than the hawk would normally have remained on the nest. Table II summarizes our observations together with data on the food taken by the Red-tailed Hawks as compiled from various sources.

TABLE II

*Food of the Red-tailed Hawk on a Percentage Basis.*

| | 792 Stomachs | | Prey Brought to Young | |
|---|---|---|---|---|
| | Warren | Fisher | Errington | English |
| Fowl | 8.09 | 7.29 | 10.99 | 0.00 |
| Game birds | 0.00 | 2.31 | 0.60 | 10.52 |
| Other birds | 10.40 | 9.07 | 1.21 | 13.15 |
| Mice | 75.72* | 39.50* | 28.48 | 54.38 |
| Shrews | 0.00 | 6.22 | 3.63 | 0.00 |
| Rabbits | 3.46 | 4.62 | 10.99 | 4.38 |
| Other mammals | 2.89 | 10.83 | 41.21 | 16.83 |
| Batrachians | 0.00 | 2.49 | 0.60 | 0.00 |
| Reptiles | 1.73 | 3.55 | 2.42 | 0.81 |
| Insects | 1.73* | 8.18* | 0.00 | 0.00 |
| Crayfish | 0.00 | 1.42 | 0.00 | 0.00 |
| Centipedes | 0.00 | 0.179 | 0.00 | 0.00 |
| Offal | 2.31* | 2.31 | 0.00 | 0.00 |
| Empty | 0.00 | 15.81 | 0.00 | 0.00 |
| Total | 106.33 | 113.77 | 100.00 | 100.00 |

*Some duplication.

The information compiled in the above table was obtained in different ways. The data of Warren (1890) and Fisher (1893) were compiled from stomachs of 792 red-tails, and were based on the stomach analysis method. By this method at most only one meal can be recorded for each hawk taken, and when the stomach was empty no evidence of the bird's food habits was provided. It is not the intention of the writer to underestimate the value of this method. It is felt, however, that the findings based on observations of kills and pellet analyses are more indicative of food habits.

Although the Red-tailed Hawks are commonly called "chicken hawks" or "hen hawks", it will be noted from Table II that not one chicken was brought to the nest under observation during the period of study from May 2 until July 15, even though plenty of poultry was available in their hunting territory. The fact that they took so many game birds deserves comment. On April 9, 1932, at 3:00 P. M., the State Department of Conservation released fifty-six leg-banded Hungarian partridges, all of which were hand reared and semi-tame. Several of these birds had one wing clipped so that it was impossible for them to fly. These birds were released in one of the improved areas at Williamston. This location was also the well-established hunting area of the red-tails, and three of these partridges, identified by the retrieved leg bands, are known to have been taken by this pair of hawks.

The practice of releasing tame birds in strange surroundings, forcing them to fend for themselves, and placing them in places where

they are forced to escape from predators often proves disastrous to the birds. The wing-clipped partridges that were released were certainly handicapped in their chances to escape from predators. Undoubtedly it is unwise to release wing-clipped game birds. It is not known whether the wing-clipped birds were taken as no record was kept at the game farm.

As indicated in Table II, seven pheasants were brought to the nest. In order to obtain the true significance of this number of pheasants in the diet of these hawks over the period of this study, it is necessary to know the approximate number of pheasants inhabiting the feeding area of the hawks. This information is provided by the semi-annual pheasant censuses which have been made in the years 1930-1933. According to the census data, the 1932 winter population of this area (hunted over by the red-tails, about 5,000 acres) was about 440 birds, and the 1932 fall population was approximately 550 pheasants. Since the midsummer population is known to be considerably higher than either of the figures given, it is probable that the seven pheasants which were brought in to the young hawks comprised slightly more than 1.0 per cent of this population. While this study gave no information as to what the pair of adult hawks were eating during this time, it is possible that they were likewise feeding upon pheasants. Assuming that each ate as many as were brought to the young, an improbably high assumption, this one pair of nesting red-tails may have destroyed approximately 3.2 per cent of the summer population of pheasants in the 5,000 acre area.

Stoddard (1931), in his work with the quail, says: "Unless red-tails are unusually numerous they may well be tolerated upon quail preserves because of their usefulness in catching cotton rats and other destructive rodents, and because they eat snakes, which are the most difficult of quail enemies for man to control."

The determination of the economic status of any species must balance the value derived from their presence against the damage they do. It is often difficult to decide whether certain items in any animal's diet should be considered beneficial or harmful from man's viewpoint. This is true in the instance of the weasels taken by the Red-tailed Hawks. Weasels are commonly thought to be harmful by the layman, but Dearborn (1932) showed that 83.34 per cent of the weasel's diet consists of mice, one of man's greatest enemies.

## Conclusions

1. From the information obtained by this study it has been found that Red-tailed Hawks sometimes winter in southern Michigan.

2. In this study, which took place on an area under intensive game management, it was found that these hawks were taking too many mammal and avian game species.

3. The red-tails involved in this study nested in a territory in which there also nested another harmful predator, the Great Horned Owl, and fed in the territory covered by two pairs of Marsh Hawks.

4. From the evidence there is no way to determine whether the hawks had taken sick or weak birds.

5. It is feared that if these individuals are allowed to continue to breed in the territory just studied, since they have developed a taste for pheasants and partridges, they would be very harmful. A part of a game management program would be to control the hawks. Their nesting period overlaps the nesting season of the pheasant and it is feared that they might develop a marked taste for pheasants.

6. Widespread slaughter of red-tails is not recommended but in areas where game management is being practiced, as it is at Williamston, Michigan, systematic control of the offending individuals is necessary. This no doubt would allow useful species to nest in the territory, as, for example, the Red-shouldered Hawk.

7. Since weasels live principally upon mice, might they not be more useful alive than as food for Red-tailed Hawks?

## Bibliography

Barrows, Walter Bradford, 1912. Michigan Bird Life. Special bulletin of the Dept. of Zool. and Phys., Michigan Agricultural College, pp. 820, plates LXX, figs. 152.

Dearborn, Ned, 1932. Foods of Some Predatory Fur-bearing Animals in Michigan. Bul. No. 1, School of Forestry and Conservation, University of Michigan, Ann Arbor, pp. 52, charts 21, figs. 8.

Errington, Paul L., 1930. The Pellet Analysis Method of Raptor Food Habits Study. The Condor, Vol. XXXII, No. 6, November, 1930, pp. 292-296.

——1932. Technique of Raptor Food Habits Study. The Condor, Vol. XXXIV, No. 2, March-April, 1932, pp. 75-86, with 2 illus.

——1933. Food Habits of Southern Wisconsin Raptors, Part II, Hawks. The Condor, Vol. XXXV, No. 1, January-February, 1933, pp. 19-29.

Fisher, A. K., 1893. The Hawks and Owls of the United States in Their Relation to Agriculture. U. S. Dept. Agric., Div. Orn. and Mamm., Bul. 3, pp. 210.

Stoddard, Herbert L., 1931. The Bobwhite Quail; Its Habits, Preservation and Increase. C. Scribner's Sons, New York, 559 pp., illus.

Warren, B. H., 1890. A Report on the Birds of Pennsylvania. Harrisburg, 434 pp., illus.

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