THE EFFECT OF POLE TRAPS ON HARMLESS AND BENEFICIAL SPECIES*

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An investigation of Michigan's privately owned State game refuge system was made by the writer in 1928, as a coöperative project between the School of Forestry and Conservation, University of Michigan, and the State Department of Conservation.

This investigation considered among many other factors the different types of management that were in use upon the 118 refuges studied. It was found that the opinion prevailed that the most important factor in management was the control of predatory animals. One of the common methods of destroying hawks and owls is by means of the pole trap, and although such traps were not in excessive use at the time, they appeared to be increasing in popularity. Those who were practicing this type of control apparently had given but little thought to the possibility that beneficial or innocent species might be trapped accidentally and, as far as could be ascertained, no reliable information on this question was available in the state. Data concerning this and other information pertaining to pole traps were collected by means of direct experimentation and by distributing questionnaires among users of pole traps. On these questionnaires the trappers were asked to record information from which the ratio of the injurious animals to the beneficial or innocent species taken could be determined. Unfortunately this latter method yielded but little information. One man who had used pole traps for several years, discarded them after keeping trapping records for a few days, for song birds and squirrels were the only animals taken. Obviously because of previous failure to keep records he had not realized the preponderance of beneficial or neutral forms of life that were trapped. Most of the others apparently either failed to keep the records or neglected to send in their results and little definite information was obtained from the questionnaires. An actual test made in the field under personal supervision, however, yielded better results.

This test was made between the 10th and 23rd of April, 1928, a period of the year that appeared to be well suited to a test of this sort. While the period covered was so short that the results cannot

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be regarded as conclusive, they are nevertheless suggestive and are unquestionably reliable so far as they go. The data obtained are therefore presented for the information of those interested and in the hope that they may stimulate some pole trappers to keep records that will serve as a basis for drawing generally applicable conclusions.

A section of land was chosen which included diversified agricultural area, an excellent tamarack bog and swamp, three sedge and wild grass marshes, and six woodlots well stocked with old growth hardwood timber. A good sized spruce and tamarack swamp and several lakes were situated in the immediate vicinity. A reconnaissance of the area clearly showed it to be typical of the better class of Michigan's privately owned state game refuges and demonstrated its suitability for the trapping experiment. The woodlots provided nesting sites for numerous crows and hawks and the location of one red-shoulder's nest and several crows' nests was determined. Both the swamp and the sedge-grass marshes harbored an abundance of mice and provided cover for both pheasants and quail. Ruffed Grouse found food and shelter in the tamarack swamp and the adjoining hardwoods. The area was constantly hunted by Marsh Hawks, a pair of which was known to nest in one of the sedge-grass marshes. Three old strawstacks and three isolated storage barns provided shelter and food for a heavy mouse population. In short, conditions were ideal for hawks and owls.

That these birds were present was proved by a preliminary survey which showed the following species of predatory birds to be within or in the immediate vicinity of the area: The Red-shouldered Hawk, Sharp-shinned Hawk, Marsh Hawk, Broad-winged Hawk, Cooper's Hawk, Red-tailed Hawk, and the Barred Owl, while there were reliable reports of Great Horned Owls and numerous Screech Owls in the nearby timber, and several of the latter were trapped.

The experiment was outlined to obtain definite information on the ratio of the various species captured in pole traps and to determine the effect on efficiency of the size of trap, the length and diameter of the pole, the nature of the sets, and the bait used.

Four dozen jump traps, including numbers 0, 1, and 2, were used in seventeen different batteries with from one to five traps set in a cluster. The site of each set was definitely chosen for specific reasons. For instance, the location of Set No. 1 was chosen for its slightly ele-

vated position, the cover provided by a few trees, its proximity to a marsh, a heavy population of *Microtus* and cottontails, an abundance of blackbirds, and also because other birds were observed to be common here. As Sharp-shinned Hawks had been observed in this locality, this set was made especially with the hope of catching these birds. This cluster of traps yielded Robins, blackbirds, and Red-shouldered Hawks instead of the Sharp-shinned Hawks which were expected.

Set No. VI was located close to the carcasses of a horse and a sheep, which were being eaten by Turkey Vultures and Crows. This set yielded a Crow, a Red-shouldered Hawk, a Sharp-shinned Hawk and a Robin. That there frequently occurred a general relationship between the choice of the locality for expected species and those caught, is demonstrated by Set No. VII which consisted of a battery of three traps placed within the marsh and along its margins, where both pheasant and quail were common. An examination of the margins of this marsh demonstrated a concentrated mouse population. The catch here consisted of a Marsh Hawk, two Screech Owls, and a Meadowlark. Meadowlarks and Marsh Hawks have been observed repeatedly in this vicinity and the concentrated mouse population here provided excellent feeding grounds for the owls and the hawks.

The traps were placed on top of the poles by means of small blocks of wood provided with headless nails. When a trap closed it readily became loosened from the block and fell off, leaving the animal suspended by the trap chain in some instances, while in others the chain was looped about the pole allowing the traps to slide to the ground. Poles from three to twenty feet in length were used. These varied from two inches to six inches in diameter.

Some sets were not baited; others, as already mentioned, were baited by carcasses of animals, while living White Leghorn roosters were used as decoys in the majority of cases. One set used a live Barred Owl as a decoy. This set successfully decoyed and caught the second Barred Owl during the first night. The roosters were either retained in cages with wire or slat tops, or were tethered out by the leg, while one was turned loose and was successfully kept near the traps by daily feeding and watering at the base of the poles. The traps were visited early each morning and were observed frequently throughout the day, to alleviate unnecessary suffering.

Forty-eight pole traps were kept in constant operation from six to thirteen days with a total of 548 pole trap days. Twenty-nine animals were trapped during the period or approximately one catch per nineteen trap days. The animals taken consisted of the following:

HAWKS		
Red Shouldered Hawk	6	
Marsh Hawk	1	
Broad-winged Hawk	1	
Sharp-shinned Hawk	1	
Total		9
OWLS		
Screech Owl	3	
Barred Owl	4	
Total		7
Crow	1	1
SONG BIRDS		
Robin	2	
Blackbird	2	
Meadowlark	2	
Vesper Sparrow	2	
Hermit Thrush	1	
Song Sparrow	1	
Total		10
MAMMALS		
Fox Squirrel	2	2
Grand Total		29

A stomach examination of each owl, hawk, and crow gave the following results:

PREDATORY BIRDS POLE TRAPPED BETWEEN APRIL 11 AND APRIL 23, 1928, ON OR NEAR MASON FARM, WASHTENAW COUNTY, NORTHFIELD AND WEBSTER TOWNSHIPS

Site No.	*Trap No.*	*Species*	*Stomach Content*
I	1	Red-shouldered Hawk	1 field mouse
I	2	Red-shouldered Hawk	1 field mouse
I	4	Red-shouldered Hawk	1 shrew and 2 field mice
IV	3	Red-shouldered Hawk	Few feathers, mouse hair, parts of beetle, and vegetation
VI	3	Red-shouldered Hawk	1 field mouse
XVI	3	Red-shouldered Hawk	Trace of mouse hair
VI	4	Sharp-shinned Hawk	Feathers—small seed eating bird. (Seeds obtained)
VII	4	Marsh Hawk	3 field mice
II	1	Barred Owl	Stomach empty (owl kept as decoy)
II	1	Barred Owl	Stomach empty (owl kept as decoy)
V	2	Barred Owl	Stomach empty
VIII	1	Barred Owl	Stomach empty
VII	3	Screech Owl	2 white-footed mice
VII	3	Screech Owl	Mouse hair and feathers
XVI	3	Screech Owl	Mouse hair and parts of a beetle
VI	1	Crow	Pieces of tissue, presumably from dead horse nearby

An examination of the legal status of the twenty-nine animals listed reveals that ten, or nearly 34.5 per cent, were protected by the State laws of Michigan, and that twenty-seven, or over 93 per cent, are protected by the laws of several other states.

The examination of the stomach content demonstrated that only three of the predators trapped had fed upon birds and two of these had also fed upon mice. Obviously the amount of data collected in the course of this experiment was not sufficient to serve as a basis for the economic classification of the species caught, therefore Fisher's classification of the economic status of predatory birds as given in "Hawks and Owls of the United States in Their Relation to Agriculture" has been adopted as a basis for classifying the birds captured into harmful and beneficial groups. Fisher's classification is based upon the most complete investigation of the subject produced to date. Upon this basis 93.75 per cent of the predatory birds taken in this in-

vestigation between April 11 and April 23, 1928, are chiefly beneficial, and only 6.25 per cent are positively harmful. In addition to these predatory birds, ten song birds, one Crow and two fox squirrels were taken.

It was thought that by the use of large traps the number of song birds taken would be decreased. This did not, however, prove to be the case.

The trap size, the number of each set and the catch for each type is as follows:

Size	*Number Set*	*Large Birds*	*Small Birds*	*Squirrels*
No. 0	14	4	3	1
No. 1	17	3	1	0
No. 2	17	8	8	1

From this it appears that larger traps may take a higher percentage of both large and small birds. A selective tendency on the part of the birds may possibly be expected on the basis of sight.

The forty-eight traps set at varying heights gave the following results:

	Height 0-6′	Catch per Trap Day	Height 7-10′	Catch per Trap Day	Height 11-20′	Catch per Trap Day	Total	Catch per Trap Day
No. of traps	26		10		12		48	
Trap days	302		115		131		548	
Large birds taken	7	.023	2	.017	4	.03	13	.023
Small birds taken	7	.023	4	.034	3	.022	14	.025
Mammals taken	2	.006	0	.0	0	.0	2	.003
Total for class	16	.052	6	.052	7	.053	29	.052

The height of the poles did not prove to be an important factor in the determination of either the number or species taken, except that both of the squirrels were taken on short poles. Neither did the diameter of the pole appear to have any differential effect upon the number or species taken.

If the average pole trap catches as large a proportion of harmless or beneficial birds as were captured in this experiment, its use should either be safeguarded or discontinued. One other method of reducing the objectionable slaughter of innocent birds by pole traps has been suggested; namely, the use of a trap that cannot be set off by a light bird. Any trap can be equipped to provide this safeguard. But even so the problem is by no means solved, for the Sharp-shinned Hawk, one of the most injurious species, might be given the same protection by such devices as is provided the larger song birds, while the beneficial and more readily trapped larger species will be taken together with the Cooper's Hawk, Goshawk, and the Great Horned Owl.

Field Data Table

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
I	1	13	2	White rooster in crate—slat top	3 in.	14 ft.	R. S. Hawk Robin Blackbird	Both legs broken Both legs broken One foot	4-11 P. M. 4-11 A. M. 4-18 P. M.
	2	13	1	White rooster in crate—slat top	4 in.	6 ft.	R. S. Hawk	High on leg	4-17 A. M.
	3	13	2	White rooster in crate—slat top	4 in.	8 ft.			
	4	13	0	White rooster in crate—slat top	5 in.	4 ft.	R. S. Hawk	One toe	4-17 A. M.
II	1	13	2	White rooster in crate—wire top	3 in.	15 ft.	Barred Owl Barred Owl	Toes of one foot Both legs	4-11 A. M. 4-17 A. M.
	2	13	2	White rooster in crate—wire top	3 in.	8 ft.			
	3	13	1	White rooster in crate—wire top	4 in.	5 ft.			
III	1	13	2	White rooster tethered out	2 in.	6 ft.	Vesper Sparrow		4-11 A. M.
	2	13	1	White rooster tethered out	2 in.	12 ft.			
IV	1	13	2	White rooster in crate—wire top	4 in.	5 ft.			
	2	13	2	White rooster in crate—wire top	4 in.	5 ft.	Thrush	Caught high on both legs	4-23 A. M.
	3	13	2	White rooster in crate—wire top	4 in.	5 ft.	R. S. Hawk Fox Squirrel	One leg broken One leg broken	4-17 A. M. 4-20 A. M.
V	1	12	0	Barred owl tethered out	5 in.	4 ft.			

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
	2	12	2	Barred owl tethered out	2 in.	13 ft.	Barred Owl	One leg, high up	4-13 A. M.
	3	10	0	Barred owl tethered out	2 in.	12 ft.			
	4	10	2	Barred owl tethered out	5 in.	4 ft.			
	5	10	1	Barred owl tethered out	3 in.	10 ft.			
VI	1	12	0	Carcasses of horse and sheep	4 in.	5 ft.	Crow Robin	One toe uninjured Both legs broken	4-18 P. M. 4-20 A. M.
	2	12	1	Carcasses of horse and sheep	4 in.	5 ft.			
	3	12	1	Carcasses of horse and sheep	4 in.	5 ft.	R. S. Hawk	Two toes	4-15 A. M.
	4	12	1	Carcasses of horse and sheep	4 in.	5 ft.	S. S. Hawk	Both legs above feet	4-23 A. M.
VII	1	11	1	White rooster in crate—wire top	2 in.	18 ft.			
	2	11	1	White rooster in crate—wire top	3 in.	10 ft.			
	3	11	2	White rooster in crate—wire top	5 in.	4 ft.	Screech Owl Screech Owl	Both legs Both legs	4-14 A. M. 4-17 A. M.
	4	11	0	White rooster in crate—wire top	6 in.	6 ft.	Meadowlark Marsh Hawk	Two toes One leg above foot	4-20 A. M. 4-23 A. M.
VIII	1	12	2	White rooster in crate—wire top	4 in.	9 ft.	Barred Owl	With legs above feet	4-23 A. M.
	2	12	0	White rooster in crate—wire top	8 in.	3 ft.	Fox Squirrel	Front foot	4-23 A. M.

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
IX	1	12	0	White rooster in crate—slat top	2 in.	9 ft.	Blackbird Song Sparrow	One leg One leg	4-17 A. M. 4-23 P. M.
	2	12	0	White rooster in crate—slat top	3 in.	4 ft.			
X	1	9	1	White rooster in crate—wire top	3 in.	20 ft.			
	2	9	2	White rooster in crate—wire top	4 in.	5 ft.			
	3	9	2	White rooster in crate—wire top	4 in.	5 ft.			
XI	1	12	1	White rooster in crate—wire top	3 in.	12 ft.			
	2	12	1	White rooster in crate—wire top	5 in.	5 ft.			
	3	12	0	White rooster in crate—wire top	5 in.	5 ft.			
XII	1	11	2	White rooster loose	3 in.	15 ft.			
	2	11	1	White rooster loose	2 in.	10 ft.	Vesper Sparrow	One foot	4-12 P. M.
	3	11	0	White rooster loose	2 in.	10 ft.			
XIII	1	11	1	White rooster tethered out	4 in.	5 ft.	Broad-wing Hawk	Escaped with trap, identified in air by assistant	4-12 P. M.
	2	11	0	White rooster tethered out	4 in.	5 ft.			

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
	3	11	1	White rooster tethered out	4 in.	5 ft.			
	4	11	0	White rooster tethered out	4 in.	5 ft.			
XIV	1	9	0	No bait	5 in.	4 ft.			
XV	1	10	2	No bait	3 in.	15 ft.			
XVI	1	11	1	White rooster tethered out	3 in.	12 ft.			
	2	11	0	White rooster tethered out	4 in.	8 ft.			
	3	11	2	White rooster tethered out	4 in.	8 ft.	R. S. Hawk Screech Owl	One leg broken Both legs broken	4-13 A. M. 4-18 A. M.
XVII	1	6	2	No bait	3 in.	14 ft.	Meadowlark		4-13-28

Thus it appears that even the traps that are equipped especially to take only the heavier birds cannot be safely set if the majority of the larger hawks and owls are to be generally conserved, as is very definitely demonstrated by competent authorities to be advisable in most instances.

As a result of this experiment, it appears that under conditions existing at the time a larger preponderance of harmless or beneficial birds were captured. The number of harmful species captured was so small as to be insignificant in so far as the protection of game on natural areas is concerned. The height at which the trap was set and the diameter of the pole had no significant effect upon the proportion of harmful and beneficial species taken. It is true that the experiment covered a relatively short period of time, and there is of course a possibility that results at another season might be more favorable for the pole trap, but there is no evidence, either published or within our experience to indicate that such would be the case.

Therefore, until further evidence is available it seems wise to limit carefully the use of pole traps to those areas where game is concentrated in unnaturally large numbers, such as at game farms, or where it can be definitely established that damage of a serious nature is being done by species which can best be controlled by these devices. Our observations indicate that on the majority of the privately owned game refuges investigated in Michigan, the damage done by predatory birds is too small to justify the sacrifice of innocent birds and mammals that pole trapping evidently entails.

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