MICHIGAN DEPARTMENT OF CONSERVATION
GAME DIVISION

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RESULTS OF DEAD DEER SURVEYS

Summary

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1. These surveys were designed to estimate the total number of dead
    deer in the woods in the Upper Peninsula and the northern Lower
    Peninsula in the spring of 1959.

2. Searches were made on 237 twenty-four-acre plots in the Upper
    Peninsula and 314 in the Lower Peninsula. Plots were located
    at random within strata in each of the nine northern Conserva-
    tion Districts.

3. Estimates of total losses were 35,200 for the Upper Peninsula
    and 33,900 in the Lower Peninsula.

4. Starvation caused at least 3,000 losses in the Upper Peninsula
    and about 13,100 in the Lower Peninsula. Additional starvation
    losses undoubtedly occurred in the Upper Peninsula, where many
    of the carcasses found had been so thoroughly torn up by scav-
    engers that we could not definitely determine cause of death.

5. On the basis of winter conditions, larger starvation losses had
    been expected in the northern Lower Peninsula. The anticipated
    extreme losses actually occurred chiefly in a 200-square-mile
    area in the heaviest overbrowsed section in the northeast por-
    tion of the Lower Peninsula.

METHODS

Surveys were carried out in both the Upper Peninsula and the northern Lower Peninsula to estimate the total number of dead deer on the ground in the spring of 1959.

Stratified random sampling was employed in essentially the same way as in the dead deer searches of 1955 and 1956 (Information Circular 101 gives a detailed explanation of stratification). Each square mile in the northern two-thirds of the state was classified by field men into one of five levels of estimated deer abundance. Then random samples were drawn from each group of sample sections (strata) in each of the nine northern Districts. About sixty sections were drawn from each District, and a randomly located 24-acre plot was searched in each section. A total of 551 plots were searched, 237 in the Upper Peninsula and 314 in the Lower Peninsula.

Plots were searched by two-man crews composed of personnel from the Department of Conservation and U. S. Forest Service.

Each dead deer found was carefully examined by a trained biologist to determine the time and cause of death. A specific cause of death was assigned only if definite evidence was available. All other deer were assigned to one of two categories, "unknown, but not starved," and "cause entirely unknown."

The estimates given are computed only from those deer which were believed to have died on the plots from November 15 to the time of the survey.

RESULTS

A summary of the dead deer estimates is shown below:

Upper Peninsula

Stratum	Area in sq. miles	Total dead deer	Dead deer/ sq. mile
I (highest population)	1,215	14,600	12
II	1,564	8,100	5
III	1,817	6,800	4
IV	11,253	5,700	½
V (lowest population)	562	0	0
	16,411	35,200	

Northern Lower Peninsula

Stratum	Area in sq. miles	Total dead deer	Dead deer/ sq. mile
I	190	5,000	26
II	1,566	12,500	8
III	3,741	10,000	3
IV	6,639	6,400	1
V	6,370	0	0
	18,506	33,900	

Figures given here are probably conservative since undoubtedly some deer were missed by the searchers. Statistical confidence limits for both total estimates were about plus or minus 40 percent.

Average losses (26 per section) for the highest stratum in the northern
Lower Peninsula were nearly the same as those found on two large hunting
clubs, Turtle Lake and Midforest Lodge, by crews of club members, University
of Michigan wildlife students, and biologists from the American Box Board
Company. Here searchers found dead deer at the rate of 25 and 21 per square
mile respectively.

Causes of death

Estimated losses are listed in six classes below. Obviously deer in
the two unknown categories really belong in one of the other four. A dis-
cussion of the most likely causes of death follows the tabular summary.
Comparisons with earlier surveys are also shown.

Upper Peninsula	1956	1959
Starved	19,400	3,000
Shot	7,300	6,600
Dog or predator kills	300	1,200
Accidents and disease	600	1,200
Unknown, not starved	22,000	6,500
Cause entirely unknown	24,400	16,700
	74,000	35,200

Lower Peninsula	1955	1956	1959
Starved	5,400	16,600	13,100
Shot	14,300	5,700	6,500
Dog or predator kills	1,800	3,400	650
Accidents and disease	700	1,000	4,050
Unknown, not starved	10,308	14,900	8,000
Cause entirely unknown	0	0	1,600
	35,520	41,650	33,900

Starvation Losses

We are quite certain that deer classed as "starved" died from malnu-
trition. Those classed as "unknown, not starved," did not show evidence
of starvation. The amount of fat in the body cavity and bone marrow provides
conclusive evidence of the level of nutrition and permits accurate separation
of the two classes. About 90 percent of the starved deer were fawns.

Cause Unknown

Many of the "cause entirely unknown" deer also probably starved, par-
ticularly in the Upper Peninsula where the bulk of these occurred. In most
cases the carcasses had been torn apart and scattered by scavengers and the
leg bones chewed and broken to the point where fat determination tests could
not be made. Fawns made up a sizeable portion of the deer that could be aged.
The lack of body fat and small amount of flesh on starved fawns allows them to
be readily torn apart.

Shot

The figures for "shot" deer include only those deer where there was direct evidence of a bullet wound. Some of these could have resulted from crippling loss during the deer seasons. Only about 12 percent of the deer in the shot category were adult bucks. It seems likely a large part of the group of shot deer are the result of the "shoot first, look afterward" hunter.

There was good circumstantial evidence that many of the deer in the "unknown, not starved," class were also shot in the fall. About half of both these and the "shot" deer were adults.

Dog and Predator Kills

The estimated totals for dog and predator kills are no doubt lower than actual losses. Many of the dead deer placed in both unknown classes had been fed upon and torn apart by predators and scavengers so that the actual cause of death was obliterated. Fawns weakened by malnutrition or hampered by deep snow are easy prey for deer-running dogs.

Accidents and Disease

These include deer killed by cars, fences, and falls, and those judged to have died from various maladies. There was no known outbreak of the hemorrhagic disease which killed sizeable numbers of deer in the summer and fall of 1955.

Except for those due to disease, which evidently causes only a few deaths most years, losses in this category are easily recognized by the presence of broken bones and bloody areas beneath the skin. There is little evidence that many of the unknown deer belong here.

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