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A REPORT ON AN INVESTIGATION OF NORTHERN MICHIGAN SQUIRREL MOVEMENTS

In August of 1949, Conservation Officers reported what appeared to be an abnormally large highway kill of squirrels in the upper part of the Lower Peninsula. This seemed to indicate that some kind of a movement was taking place and it was suggested that a general movement of gray and fox squirrels from the interior parts of District 5 to the Lake Michigan shore line was taking place. A late spring frost in 1949 resulted in a poor mast and berry crop in the interior counties and it was thought that a small scale "migration" might have been in progress to an area of better mast production along the shore line.

On August 22, 23, 24, 1949, an investigation was made throughout a large part of Districts 5, 6, and 7 to look for evidence of such a movement. This investigation consisted of three phases. First; an inspection and evaluation of the mast crop throughout the area. Second; a check of highway mortality of all species of birds and mammals. Third; a hasty appraisal of the squirrel populations throughout the area by interviewing rural residents.

Factors governing mast production are not too well understood but it appears that late spring frosts are an important factor in reducing acorn and nut production. Throughout Michigan, acorns form a large part of the fall and winter diet of both gray and fox squirrels. Failure of the acorn crop can be a contributing cause of a low squirrel population the following year in areas where there is nothing to supplement this source of food. White oaks mature their acorns in one growing season whereas trees of the black oak group require two seasons for their fruit to mature.

Spot checks of the acorn supply throughout Region II revealed that severe late spring frosts in Wexford, Missaukee, Roscommon, Ogemaw, Lake, Osceola, Clare, Gladwin, Kalkaska, Crawford, Oscoda, Montmorency, and Otsego Counties and in the interior portions of Manistee, Benzie, Leelanau, Grand Traverse, Antrim, Charlevoix, Emmet, Cheboygan, Presque Isle, Alpena and Alcona Counties have resulted in very poor to fair acorn crops on both white and black oak trees. Hard maples have been touched by frost resulting in spotty supplies of samaras on these trees. Wild fruits and berries are in poor supply.

Acorn, beechnut, and samara production has not been so adversely affected along the shores of Lake Michigan from Manistee to the Straits and along the northern Lake Huron shore line. Mast crops in these areas were spotty to fair -- certainly better than in the interior areas.

It is this difference in mast supply that prompted the suggestion that a movement of squirrels into the better areas might have been in progress.

The main factor that stimulated the thought of a possible longer-than-average movement of squirrels was an increase in highway mortality of these animals. I traveled 588 miles in three days on four classes of roads in Region II; first class highways (highspeed trunk lines), secondary paved roads, improved gravel roads, and gravel roads. Approximately 62 percent of the travel (362 miles) was over "highspeed" highways. This was done in order to obtain the highest kill figures possible since it has been shown by

various workers that highway mortality of all animals, including man, increases with the speed of the automobiles using that road. The results of the observations made on north-south and east-west roads are summarized in Table I.

Rainfall during the months preceeding the survey was below average and entirely absent on August 22, 23, and 24. Temperatures were normal to slightly below normal both prior to and during the period of the survey.

Information contained in Table I is of a simple nature and little explanation or discussion is necessary. Fox squirrels formed 12.25 per cent of the total kill while gray squirrels formed 2.41 per cent. A highway mortality of one fox squirrel per 147 miles of highway or one gray squirrel for 588 miles of highway does not seem exceptionally great especially when the check was made during the height of the tourist season in the North. Road kill is noticeably greater on roads of the same type in the southern part of the state, and it has been suggested that the greater traffic in the south accounts for this difference. However, figures obtained from the Michigan State Highway Department's Planning and Traffic Division show that during July and August, traffic on trunklines in the north is approximately 72 per cent as great as similar roads in the south. Fox squirrel kill per hunter actually reporting squirrels killed is nearly as great north of Townline 16 as in the south. (3.13 squirrels per man in the north and 3.70 squirrels per man in the south.) This fact indicates that within each unit of fox squirrel range, populations in the north are not a great deal less than in the south. It is true; however, that actual fox squirrel range is considerably less in the north and therefore, the total population of fox squirrels is much lower than in southern Michigan. Gray squirrel kill per hunter is higher north of Townline 16 (2.84) than in the South (2.54/hunter).

The question as to whether an abnormal road kill indicates a movement or migration is one of conjecture. It would seem that any amount of greater-than-normal activity on the part of squirrels would result in an increase in highway mortality. Allen has shown that the fox squirrel does not exhibit true migratory tendencies. However, in late summer and fall this species will move from three to forty miles. This movement seems to be associated with a shuffling of the populations in which the young squirrels disperse and seek new home ranges according to the carrying capacity of the range. This "shuffle" appears to be a common phenomena not closely associated with years of abnormal mast production.

The gray squirrel has exhibited migratory tendencies in the past. Seton records several examples of long range migrations in which squirrels would appear in a locality in vast numbers. In the early autumn of 1935, I observed a migration in New York and Pennsylvania. The increase in the gray squirrel population in certain localities was phenomenal and noticeable after only a casual observation. There were no such indications in Northern Michigan during this survey.

During the three days spent on this brief investigation, I interviewed 42 persons (mostly farmers) in an effort to find out if there has been a sudden increase in the number of squirrels in any locality. No one had noticed any large concentrations of squirrels nor had any one noticed

TABLE I

A Summary of Highway Mortality of Birds and Mammals in Northern Michigan

August 22, 23, 24, 1949

TYPES OF ROADS	Song Bird	Chickens	Skunks	Fox Squirrels	Red Squirrels	Muskrats	Porcupines	Snowshoe Hares	Flying Squirrels	Housecats	Ruffed Grouse	Domestic Ducks	Gray Squirrels	Chipsunks
main Highways														
Franklines-362 Mi.	16	2	3	4	3	1		1		1	1	1		1
Highway Kill	22.6	180.8	120.7	90.4	12.7	362		362		362	362	362		362
Miles/Kill														
secondary Roads														
Paved-55 Miles		2	1						1					
Highway Kill	27.5	55							55					
Miles/Kill														
improved Gravel Roads														
Tarred or Paved														
112 Miles														
Highway Kill	37	8				1							1	
Miles/Kill	373	56				112							112	
Gravel Roads														
59 Miles														
Highway Kill	2							2						
Miles/Kill	29.5							29.5						
Totals														
588 Miles														
Highway Kill	21	6	4	4	3	2	2	1	1	1	1	1	1	1
Miles/Kill	25	95	147	147	196	294	294	588	588	588	588	588	588	588

anything to suggest a movement of these animals from one area to another although most of the persons interviewed thought that a movement into areas of better mast production was possible. Four men thought the squirrel population lower than last year, 15 thought there was a slight increase and 23 thought there were about as many squirrels as in 1948. There is a higher population of both gray and fox squirrels in the counties adjacent to the northern Lake Michigan shore line but this has been true for a considerable length of time. This fact is substantiated by both unanimous public opinion as well as the computed annual squirrel kill figures. In 1948, counties bordering on Lake Michigan, north of Bay County - Mason County line had an average computed kill of 57 fox squirrels (range, 12 to 87) per ten square miles, while the interior counties average fourteen (range, less than one to 32) squirrels per ten sections. Gray squirrel kill followed the same pattern but is of course, considerably lower.

These differences are due to many and varied factors. Late spring frosts are not as prevalent along the shore line. This results in a more regular production of mast crops on which squirrels depend for winter staples. There is a greater variety of food producing trees and shrubs in the shore line areas. If, for example, the acorn crop should fail, there is a possibility that the beech nuts would be sufficient to provide for squirrels over winter. A large portion of the shore areas is made up of agricultural lands compared to a relatively low acreage available for tillage in the interior. Hence better fox squirrel range. Corn and other waste grains are known to be important winter foods for squirrels especially during years of low mast supplies.

Conclusions

(1) There is an acute shortage of mast and wild fruits and berries in the northern part of the Lower Peninsula. Late spring frosts have caused an almost complete absence of winter squirrel food in the interior areas but along the Lake Michigan shore line, nut and samara production is spotty to fair. A narrow band of fair to spotty acorn production was found along the northern Lake Huron shore line.

(2) Highway mortality in the area checked did not appear to be excessive compared to areas in the southern part of the state even when differences in squirrel population and volume of traffic were considered.

(3) From the evidence available there seems to be nothing to indicate that a movement of squirrels is taking place at the present time. A movement from certain areas of low food supply to a more favorable environment may occur in the fall but this movement may be closely associated with the fall dispersal of juvenile animals and difficult to accurately appraise. Unless some large concentrations of squirrels are observed in various localities, it would be difficult to identify a migration or extensive movement without trapping and tagging studies.

(4) If the approaching winter is severe or even moderately so, the lack of squirrel food may result in retarded breeding season in 1950, small litters, the shooting of a large number of lactating females, and a low juvenile kill in the 1950 hunting season.

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