

MICHIGAN DEPARTMENT OF CONSERVATION
Game Division

Report No. 1189

Beaver Die-off - Michigan
Spring, 1953

In early April we received first reports that numbers of beavers were found dead in ponds and streams in the west part of the Upper Peninsula. As the trapping season progressed and trappers worked nearly all of the suitable water areas, further reports indicated a much greater mortality than has been observed in recent previous years. It became apparent that many of the animals died sometime during the winter but were not discovered until the ice went out and trappers began their activities. Dead beavers were found singly and in numbers up to five within a pond or portion of stream. Possibly, mortality was one hundred per cent in some colonies inasmuch as inspection of some of the areas a few weeks later revealed an absence of beaver activities. Carcasses were found in varying states of preservation, from advanced decomposition to fresh enough that trappers skinned them out. Beaver losses occurred in widespread areas in the western Upper Peninsula and simultaneously in Wisconsin in the adjoining and more distant areas.

Tularemia was thought possibly to be involved in the die-off because of the following considerations: tularemia has been found to be the cause of extensive beaver mortalities; the pattern of events appeared similar to those described for beaver die-offs in some other states where tularemia was identified as the causative agent; three trappers became sick shortly after skinning beaver which they found dead, the sickness diagnosed clinically as tularemia.

Serological tests made later on the trappers indicated that all had had tularemia, with serum positive for B. tularensis at titers of 1:640, 1:5,120 and 1:10,040 respectively. It is not known, of course, whether the serum titers are the result of the recent sickness or infections occurring previous to the current trapping season.

Efforts were made to recover an infectious agent from beaver carcasses and from the water in which beavers were found. For reasons already given our efforts were directed toward the recovery of the tularemia organism, although the laboratory procedures used were equally applicable for the recovery of other pathogenic bacteria.

Conservation Department personnel collected carcasses of beaver found dead including three handled by two brothers who developed clinical symptoms of tularemia thereafter and forwarded them to the Game Division Laboratory. In addition, water samples from some of the same ponds and streams were collected in sterile bottles of approximately 200 ml. capacity. The water samples were transported in an automobile for about four days

exposed to the air temperatures during the collecting period. Upon delivery to the laboratory the samples were held in refrigeration for several days before animal inoculation was undertaken.

Ten beaver carcasses were brought to the Game Division Laboratory on April 10, 1953, two more on April 24, and several others the following week. The animals were found in Iron, Alger, Baraga and Menominee counties. Due to advanced decomposition of some of the beavers, examinations were limited to ten carcasses. The carcasses were examined grossly and tissues from the freshest used to inoculate mice and guinea pigs. Inoculation was accomplished by intraperitoneal and subcutaneous injections of liquid suspensions made from the tissues and by swabbing heart blood and portions of liver to the scarified skin of mice and guinea pigs. Bacterial cultures were attempted from liver, spleen and heart blood. Ascoli tests were conducted with tissue extracts and anti-tularemia rabbit serum. Portions of the water samples were injected intraperitoneally in 10 ml. amounts in guinea pigs and 1 to 2 ml. amounts in white mice. Tissue samples from three carcasses were sent to the Rocky Mountain Laboratory at Hamilton, Montana, where Ascoli tests and mouse inoculations were employed.

A second attempt was made to recover the organism from water. A number of guinea pigs and white mice were taken directly to the water areas where dead beavers were found and injected on the site in the approximate amounts of 10 ml. per guinea pig and 1 ml. per mouse. Bottom mud samples were collected at the same time and taken back to the laboratory where a water extract of the mud was injected into additional mice and guinea pigs.

Slight mortality occurred among the laboratory animals; however, our attempts to make serial passages were unsuccessful and the death of the few animals was attributed to other causes. Bacteriological cultures made from mice and guinea pigs which died did not produce growth identified as that of pathogenic organisms. The tissue samples sent to the Rocky Mountain Laboratory were reported negative for tularemia.

To date we have been unsuccessful in our efforts to produce tularemia in laboratory animals or to demonstrate the organism. Gross examination of beaver carcasses suitable for autopsy did not reveal lesions that are described as characteristic of the disease.

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11/20/53