

STATE OF MICHIGAN  
DEPARTMENT OF NATURAL RESOURCES  
WILDLIFE DIVISION  
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DISEASE AND MORTALITY FACTORS AFFECTING  
MICHIGAN WILDLIFE, 1973

by

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A variety of wild mammals and birds (Table 1) were received by the Wildlife Pathology Laboratory in 1973, most from Region III, many submitted for diagnosis.

The following is a brief summary of our diagnostic findings. It does not include deaths due to gunshot, automobile accidents, or cases involving animals that were not free-living, i.e., pen deer, pen grouse, game farm pheasants.

Although the data do not represent the true incidence, they are the best statistics we have on morbidity and mortality factors affecting wildlife in Michigan.

### Toxins

#### *Botulism*

There were few reports of suspected botulism and even fewer confirmed cases. There were no major outbreaks. There were no cases of type E botulism. Type C botulism was diagnosed in three mallards (*Anas platyrhynchos*) and a teal (*Anas sp.*). Two mallards were found 1 and 2 August on Lake St. Clair near Mt. Clemens, Macomb County; the other 12 August at Nayanquing Point, Bay County. The teal was found 26 August on a spoil island in Maumee Bay, Ohio.

#### *Lead Poisoning*

Lead poisoning was diagnosed in five Canada geese (*Branta canadensis*), two mute swans (*Cygnus olor*), and a mallard. The mallard and most of the geese had ingested lead shot. One of the swans swallowed two fishing sinkers.

### *Chlorinated Hydrocarbon Poisoning*

Chlorinated hydrocarbons were suspected of contributing to the death of two great blue herons (*Ardea herodias*), one from Washtenaw County, the other from St. Joseph County. There were 23.37 ppm DDD and DDT and 105.34 ppm PCB's in the combined brain tissues of the two birds. No evidence of injury or infectious disease was noted.

Chlorinated hydrocarbon poisoning was diagnosed in two herring gulls (*Larus argentatus*) found on the beach at Grand Traverse Bay, Grand Traverse County. There were 585.40 ppm DDT and its analogues, and 2608 ppm PCB's in the combined brain and liver tissues of one bird; and 459.50 ppm DDT and its analogues, and 1390 ppm PCB's in the combined brain and liver tissues of the other. One bird was seen in convulsions prior to death. No evidence of injury or infectious disease was noted.

### *Fuel Oil Poisoning*

Fuel oil poisoning was diagnosed in two muskrats (*Ondatra zibethica*). Both cases involved fuel oil spills, one in Perry, Shiawassee County, the other in Imlay City, Lapeer County. Only a few animals were found sick or dead at each location.

### *Strychnine Poisoning*

Strychnine poisoning was diagnosed in 11 blue jays (*Cyanocitta cristata*), 10 common grackles (*Quiscalus quiscula*), and a house sparrow (*Passer domesticus*). Three blue jays and the sparrow came from Portland, Ionia County. The other blue jays were found dead on the Central Michigan University campus, Isabella County. The 10 grackles were from Berkley, Wayne County. Diagnoses were confirmed by laboratory analysis.

### *Arsenic Poisoning*

Arsenic poisoning was diagnosed in a fox squirrel (*Sciurus niger*) found 1 June in Lansing, Ingham County. The squirrel had eaten arsenic treated bait intended for moles. Stomach tissue contained 146 ppm arsenic.

## Viruses

### *Rabies*

Rabies was diagnosed in nine bats (species unknown) and a red fox (*Vulpes fulva*). The fox was from Drummond Island, Chippewa County; there were no known exposures. The bats were from various locations, all in Region III; there were eight or more humans and one cat exposed. All diagnoses were made by the Michigan Department of Public Health Laboratory, Lansing.

### *Distemper*

Five cases of distemper in raccoons (*Procyon lotor*) were diagnosed. Inclusion bodies typical of canine distemper virus were seen in tissues from one of the animals, tissues from the others were not examined. Field biologists and conservation officers reported "distemper-like" illness in raccoons was common again this year in the Lower Peninsula.

### *Squirrel Pox*

Squirrel pox was diagnosed in a fox squirrel found sick 16 September near Rockford, Kent County. In some areas, pox is not uncommon in gray squirrels (*Sciurus carolinensis*). It is rarely seen in fox squirrels. The disease is caused by a virus thought to be transmitted by mosquitoes.

### *Fibromatosis and/or Papillomatosis*

Fibromas and/or papillomas were seen on two cottontails (*Sylvilagus floridanus*). This condition was quite common among cottontails in southern Michigan this year. These tumors are benign and usually disappear after a period of time. The virus causing the tumors is thought to be transmitted by mosquitoes.

### *Eastern Equine Encephalomyelitis*

The first cases of eastern equine encephalomyelitis (EEE) reported in Michigan since 1943 occurred on 7 August in Oakland and Allegan Counties. There were 26 laboratory confirmed cases between 7 August and 4 October, on 23 farms in 13 different counties: Allegan, Alpena, Calhoun, Kalamazoo, Kent, Livingston, Midland, Montcalm, Oakland, Roscommon, Saginaw, St. Clair, and Washtenaw. As far as we know, all 26 cases involved horses.

The first case of EEE was discovered 6 August at Camp Ohiyisa, Oakland County. By 13 August, three of their horses were dead and a fourth was critically ill. The camp was visited by various university and state health officials, including staff from the Wildlife Pathology Laboratory.

Eastern equine encephalomyelitis is a disease of the central nervous system caused by a virus, usually transmitted by mosquitoes. It has been known for some time that wild birds are the chief reservoir. When conditions are right, domestic animals (particularly horses) and humans near endemic foci may become infected.

Between 10 and 14 September, we caught 41 wild birds (13 species) near the horse stables at Camp Ohiyisa. A blood sample from each was submitted to the USDA laboratory in Ames, Iowa. Levels of serum neutralizing antibody in a red-headed woodpecker (*Melanerpes erythrocephalus*) robin (*Turdus migratorius*), green heron (*Butorides virescens*) and white-breasted nuthatch (*Sitta carolinensis*) indicated previous exposure to EEE virus. The antibody titer ( $> 1:200$ ) was highest in the heron. It was not known if all or any of the birds were residents of the area.

## Bacteria

### *Tularemia*

Tularemia was diagnosed in three beaver (*Castor canadensis*), a great horned owl (*Bubo virginianus*) and a cottontail. *Francisella tularensis* was isolated from all but the cottontail.

Two beaver were found dead 24 March on Hay Marsh Creek, Charlevoix County.

An inquiry was made, but no other reports of sick or dead beaver were received. The other beaver was found dead 17 April on Potts Drain, Sanilac County. The conservation officer investigating the case reported finding three more dead beaver, all in the Potts Drain watershed. The owl was found dead 3 April in a field near Lansing, Eaton County. No other reports of sick or dead owls in the area were received. The bird was fat and in good condition. The cottontail was found dead 13 September on a farm near Grand Haven, Ottawa County. The owner of the farm had found 15-20 dead rabbits of varying ages in his backyard during the summer.

In the early 40's tularemia in humans was not uncommon in Michigan. In recent years there have been few reports of the disease. The decrease in incidence is probably due to the effectiveness of new antibiotics in treating acute bacterial infections, in which case the specific cause of the illness is frequently undetermined.

#### *Salmonellosis*

Acute Salmonellosis was diagnosed in a house sparrow and a dark-eyed junco (*Junco hyemalis*). Cultures of liver tissue from each grew *Salmonella typhimurium*. Both birds were found 9 March in St. Charles, Saginaw County.

#### *Pasteurellosis*

Pasteurellosis was diagnosed in a cottontail found dead 28 December at the Rose Lake Wildlife Research Center, Clinton County. *Pasteurella multocida* was isolated in pure culture from heart blood. Lesions similar to those seen in tularemia were noted in the liver and spleen.

### Fungi

#### *Aspergillosis*

Aspergillosis was diagnosed in three Canada geese, a greater scaup (*Aythya marila*) and a ring-billed gull (*Larus delawarensis*).

#### *Mycotic Nephrosis*

(See Uremic Poisoning)

### Protozoa

#### *Leucocytozoonosis*

Leucocytozoonosis, caused by *Leucocytozoon simondi*, was diagnosed in a mallard found 24 June near Iron Mountain, Dickinson County. The bird was from a group of ducklings being raised on private ponds. Since mid-June, the owner had lost about 60 ducklings or about two-thirds of his flock. In 1972, the mortality was greater than 90 percent. The year before it was almost that high. The case history, signs of illness, and gross and microscopic lesions were consistent with the diagnosis of acute leucocytozoonosis.

Mallards first released on the ponds about six or seven years ago successfully raised many large broods (10-14 ducklings). About four years ago, the owner noticed that broods would suddenly disappear and very few young would live through the summer.

Three years ago, the owner began taking eggs from nests and incubating them artificially. The young birds were kept in brooders until they were two to three weeks old, then released on the ponds. The ducklings appeared healthy and active for about two weeks.

The first sign of illness was the inability of a duckling to keep up with the flock. Occasionally, a duckling was seen that had difficulty swimming and often one leg would drag as if the bird was partially paralyzed. Sick birds usually disappeared or were found dead the day after the first signs of illness. The mortality seemed to end as suddenly as it began.

Although wild mallards were not involved here, the case clearly illustrates how pathogenic *L. simondi* can be. Under certain circumstances this parasite can kill large numbers of young waterfowl, wild or domestic.

#### *Sarcosporidiosis*

Sarcosporidia were seen in muscle tissue of two mallards and one cottontail. The cottontail was shot 18 January near Marshall, Calhoun County.

#### *Nosematosis*

Nosematosis was diagnosed in a cottontail found sick 18 December in East Lansing, Ingham County. The rabbit held its head tilted to one side and ran in circles. No evidence of physical injury was noted. Microscopic examination of the brain stem revealed nosema organisms.

### Helminths

#### *Cerebrospinal Nematodiasis*

Cerebrospinal nematodiasis was diagnosed in three elk (*Cervus canadensis*) and a woodchuck (*Marmota monax*). *Parelaphostrongylus tenuis* was recovered from the brains of the three elk. Unidentified nematode larvae were recovered from the brain of the woodchuck. The first elk was found 26 January near Gaylord, Otsego County; the second 12 June near Storey Lake, Cheboygan County; and the third 18 July at Green Timbers, Otsego County. The woodchuck was found 5 June on the Rose Lake Wildlife Research Area, Clinton County. The animal was seen running in circles near the station headquarters.

#### *Ulcerative Hemorrhagic Enteritis*

Ulcerative hemorrhagic enteritis caused by a small trematode (*Sphaeridiotrema globulus*) was diagnosed in six mute swans. Four birds were found on Big Platte Lake, Benzie County; one on Long Lake, Kalamazoo County; and one near Gun Lake, Barry County.

## Arthropods

### *Mange*

Mange was diagnosed in five red foxes, four coyotes (*Canis latrans*) and a black squirrel (*Sciurus carolinensis*). Field biologists and conservation officers reported the incidence of mange in foxes was high, and many trappers in Regions II and III suffered a considerable economic loss. There were no cases of mange diagnosed from Region I; however, field biologists' reports indicate that it was probably present in coyotes.

## Miscellaneous

### *Encephalitis and Polioencephalomalacia*

Encephalitis and polioencephalomalacia of undetermined etiology was diagnosed in a white-tailed deer (*Odocoileus virginianus*). The animal was found 19 September wandering through a trailer camp near Boom Lake, Mecosta County. It appeared to be blind.

### *Peritonitis and/or Septicemia*

Peritonitis and/or septicemia of undetermined etiology was diagnosed in a white-tailed deer, a blue goose (*Chen caerulescens*) and a black squirrel.

### *Enteritis*

Severe enteritis of undetermined etiology was seen in a white-tailed deer and a Canada goose.

### *Cataracts*

Bilateral cataracts were seen in a white-tailed deer fawn found near Mio, Oscoda County. The cause of the condition was undetermined.

### *Congenital Defects*

A small white-tailed deer fawn was found wandering in the woods near Kalkaska, Kalkaska County. It appeared to be blind. Examination revealed the right eye was shrunken and no retina present in the left eye. Cataracts were present in both eyes. The optic nerves were poorly developed and were probably not functional.

### *Malnutrition*

Death attributed to malnutrition was diagnosed in a great horned owl and a screech owl (*Otus asio*).

### *Malnutrition and/or Exposure*

Death due to malnutrition and/or exposure was diagnosed in seven mourning doves (*Zenaida macroura*). These birds were found 16 December near a bird

feeder following a severe ice storm. No evidence of physical injury, infectious disease, or poisoning was found.

#### *Ingluvitis*

Ingluvitis or inflammation of the crop was noted in one mourning dove. The cause of the condition was undetermined.

#### *Alopecia*

Severe alopecia or hair loss of undetermined etiology was seen in one raccoon.

#### *Visceral Gout*

Visceral gout was diagnosed in a Canada goose found 10 July on the beach near Gould City, Mackinac County. The cause of this condition in birds is unknown.

#### *Uremic Poisoning*

Uremic poisoning was diagnosed in a gray squirrel caught 29 July in Interlochen State Park, Grand Traverse County. It appeared to be partially paralyzed. Examination revealed severe infection of the kidneys caused by an unidentified fungus. Uremic poisoning can cause neurological disturbances, which may account for the observed paralysis.

#### *Adenocarcinoma*

Nodular growths were seen in the peritoneal cavity of an otter (*Lutra canadensis*) trapped 30 March near East Tawas, Iosco County. Microscopic examination revealed them to be adenocarcinomas. It was thought the neoplasms in this case originated from epithelial cells of the intestine. Adenocarcinomas may appear in many parts of the body and frequently spread rapidly. Although there were many tumors present, this animal appeared to be in good health.

#### *Astrocytoma*

An astrocytoma was found in the brain of a white-tailed deer fawn. The deer was found in the woods 16 October near Mio, Oscoda County. It appeared to be blind. This kind of malignant tumor is composed of astrocytes or fibrous cells which are found normally in the brain. The cause of the tumor was undetermined.

#### *Muscular Dystrophy*

Muscular dystrophy was diagnosed in a wild turkey (*Meleagris gallopavo*) found near Atlanta, Montmorency County. The cause of the condition was undetermined.

#### *Unusual Predator Kill*

A white-tailed deer fawn was found dead 5 May by a fisherman at Canada Creek Ranch, Montmorency County. The deer had been dragged and there were coyote tracks in the area. Examination revealed the fawn may have been killed by a bobcat (*Lynx rufus*) and not a coyote.

*Unusual Traumatic Injury*

Two white-tailed deer were examined with extensive traumatic injuries caused by repeated falls on ice. Both deer were found down 19 January and unable to stand. Many deer were seen in this condition, most were euthanized by shooting. This happened in the Shiawassee State Game Area, Saginaw County, where extensive areas of lowland woods were flooded. The problem was compounded by people and dogs forcing deer to run over ice.

Table 1. Species received by Wildlife Pathology Laboratory in 1973

BIRDS

Accipitridae

Bald eagle, *Haliaeetus leucocephalus*  
Red-tailed hawk, *Buteo jamaicensis*  
Rough-legged hawk, *Buteo lagopus*  
Sharp-shinned hawk, *Accipiter striatus*

Anatidae

Black duck, *Anas rubripes*  
Blue goose, *Chen caerulescens*  
Blue-winged teal, *Anas discors*  
Canada goose, *Branta canadensis*  
Canvasback, *Aythya valisineria*  
Greater scaup, *Aythya marila*  
Green-winged teal, *Anas crecca*  
Lesser scaup, *Aythya affinis*  
Mallard, *Anas platyrhynchos*  
Mute swan, *Cygnus olor*  
Oldsquaw, *Clangula hyemalis*  
Whistling swan, *Olor columbianus*  
Wood duck, *Aix sponsa*

Ardeidae

Great blue heron, *Ardea herodias*  
Green heron, *Butorides virescens*

Bombycillidae

Cedar waxwing, *Bombycilla cedrorum*

Caprimulgidae

Common nighthawk, *Chordeiles minor*

Columbidae

Mourning dove, *Zenaida macroura*  
Rock dove, *Columba livia*

Corvidae

Blue jay, *Cyanocitta cristata*  
Common crow, *Corvus brachyrhynchos*

Gaviidae

Common loon, *Gavia immer*

Gruidae

Sandhill crane, *Grus canadensis*

Icteridae

Common grackle, *Quiscalus quiscula*

Fringillidae

American goldfinch, *Spinus tristis*  
Dark-eyed junco, *Junco hyemalis*  
Song sparrow, *Melospiza melodia*

Ploceidae

House sparrow, *Passer domesticus*

Laridae

Herring gull, *Larus argentatus*  
Ring-billed gull, *Larus delawarensis*

Meleagridae

Eastern turkey, *Meleagris gallopavo*

Parulidae

Black-throated green warbler, *Dendroica virens*  
Palm warbler, *Dendroica palmarum*  
Ovenbird, *Seiurus aurocapillus*

Phasianidae

Ring-necked pheasant, *Phasianus colchicus*

Picidae

Red-headed woodpecker, *Melanerpes erythrocephalus*

Psittacidae

Canary-winged parrakeet, *Brotogeris versicolurus*  
Indian Ring-necked parrakeet, *Psittacula kramera*

Scolopacidae

American woodcock, *Philohela minor*

Sittidae

White-breasted nuthatch, *Sitta carolinensis*

Strigidae

Barred owl, *Strix varia*  
Great horned owl, *Bubo virginianus*  
Long-eared owl, *Asio otus*  
Screech owl, *Otus asio*

Sturnidae

Starling, *Sturnus vulgaris*

Tetraonidae

Ruffed grouse, *Bonasa umbellus*

Turdidae

American robin, *Turdus migratorius*  
Swainson's Thrush, *Catharus ustulata*

Tyrannidae

Eastern kingbird, *Tyrannus tyrannus*  
Eastern wood pewee, *Contopus virens*

Tytonidae

Barn owl, *Tyto alba*

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MAMMALS

Canidae

Red fox, *Vulpes fulva*  
Coyote, *Canis latrans*

Castoridae

Beaver, *Castor canadensis*

Cervidae

Elk, *Cervus canadensis*  
White-tailed deer, *Odocoileus virginianus*

Cricetidae

Meadow vole, *Microtus pennsylvanicus*  
Muskrat, *Ondatra zibethica*

Didelphiidae

Opossum, *Didelphis marsupialis*

Leporidae

Eastern cottontail, *Sylvilagus floridanus*

Muridae

Norway rat, *Rattus norvegicus*

Mustelidae

Mink, *Mustela vison*  
River otter, *Lutra canadensis*  
Striped skunk, *Mephitis mephitis*

Procyonidae

Raccoon, *Procyon lotor*

Sciuridae

Eastern fox squirrel, *Sciurus niger*  
Eastern gray squirrel, *Sciurus carolinensis*  
Red squirrel, *Tamiasciurus hudsonicus*  
Woodchuck, *Marmota monax*

Soricidae

Short-tailed shrew, *Blarina brevicauda*

Ursidae

Black bear, *Ursus americanus*