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Wildlife Health Centre Newsletter, Volume 1-3, Summer 1993

Canadian Cooperative Wildlife Health Centre

Centre Canadien Coopératif de la Santé de la Faune

Newsletter 1 - 3, Summer 1993

In this issue:

News from the CCWHC

Work Underway at CCWHC

The CCWHC Disease Investigation Manual is nearly complete. Many useful suggestions on the draft version have been received from supporting agencies. The manuscript has been revised and portions sent to those who supplied suggestions for further comment. The manual will be completed this autumn.

The Directory of Wildlife Health Expertise now contains information on approximately 150 Canadian scientists with diagnostic expertise in many aspects of wildlife health. While the directory is not in final form, it is being used internally and we can answer requests for information on specific expertise.

The CCWHC is developing a Database of Wildlife Disease Information. The database is designed to store two primary types of information: postmortem examination findings and mortality incident reports. Results of diagnostic examinations are stored as individual cases. This provides a single, uniform recording system for all specimens examined by the diagnostic services of the CCWHC regional centres. The CCWHC also encourages provincial and federal veterinary diagnostic laboratories to contribute results of wildlife specimens they examine to the database. By summarizing wildlife disease information on a regional basis, the database will provide a better understanding of the distribution and occurrence of disease in wildlife. If you have data that you wish to contribute to the database, please contact the Information Specialist (Dwight Welch) at (306) 966-5152.

The CCWHC is cooperating with Canadian Wildlife Service and several provincial wildlife departments in monitoring for Newcastle Disease Virus (NDV), a virus that caused widespread mortality in double-crested cormorants and white pelicans during 1990 and 1992. During the spring of 1993, cormorant eggs were collected from 20 colonies across Canada. These eggs are currently being analyzed for antibodies to NDV. Presence of antibody in yolk indicates previous exposure of the hen to the virus. Ten yolks from each colony have been tested to date. Eggs with a positive titre (>1:20) have

been found from 19 of the colonies. Prevalence of exposure appears highest in the prairies and the Pacific coast. No confirmed or suspected cases of NDV have been reported in wild birds in Canada or the United States as of September 1.

Residents in Wildlife Pathology

Stéphane Lair

Dr. Stéphane Lair is a resident in wildlife pathology at the Quebec region of CCWHC based at the Faculty of Veterinary Medicine at Saint-Hyacinthe. Under the supervision of Dr. Daniel Martineau, he is in charge of the wildlife diagnostic cases presented at the Quebec Regional Center. Stéphane obtained his DVM in 1989 from the Faculty of Veterinary Medicine of Saint-Hyacinthe (University of Montreal). Stéphane has acquired a strong background in medicine and pathology of birds of prey. He specialized in avian pathology and worked for two years as a veterinary clinician at the University Birds of Prey Rehabilitation Clinic. This "Raptor Hospital" receives approximately 275 injured birds of prey per year. In October 1993, he joined the pathology and microbiology department where he is presently undergoing a post-graduate program in pathology (Diplôme d'étude supérieur). Stéphane has recently worked on pathology of wild fish while assisting in an evaluation of the health status of the Saint-Lawrence population of Atlantic tomcods (Microgadus tomcod). Stéphane can be contacted at (514) 773-8521.

Scott McBurney

Dr. Scott McBurney is a resident in wildlife pathology at the Atlantic region of the Canadian Cooperative Wildlife Health Centre. Scott's primary responsibility is the examination of specimens submitted to the laboratory at the Atlantic Veterinary College, PEI. He also provides consultation on issues related to wildlife health and presents continuing education programs. Scott completed a B.Sc. in wildlife management from the University of Guelph in 1982 and a DVM from the Atlantic Veterinary College at the University of Prince Edward Island in 1990. After completing his DVM, he spent a year in private practice before returning to the Atlantic Veterinary College as a resident in morphologic pathology. Scott is a field-oriented person and has spent several years working as a Park Warden in the Resource Conservation Section of four National Parks in the Atlantic Region. Scott has authored or co-authored reports on various resource management concerns and is co-author on two refereed articles dealing with wildlife issues. Scott is available for questions and/or consultation by phoning (902) 628-4322 or by E- mail at SMCBURNEY@UPEI.CA

Feature Article

Rabies in Canadian Wildlife

Distribution of Rabies in North America

Rabies occurs in many species of wild mammal in Canada. The disease is caused by a virus which is transmitted by direct contact between an infected and a susceptible animal, usually by a bite. Numerous antigenic variants, or strains, of rabies have been identified through the use of monoclonal antibodies. In North America, 5 distinct variants of rabies have been identified in terrestrial animals and several other variants occur in bats. These variants differ in geographic distribution and in which animals they infect most commonly (Figure 1).

The names associated with variants of rabies have resulted in some confusion. Prior to 1980, a rabid skunk was an example of skunk rabies wherever it occurred, and a rabid fox was fox rabies. Development of monoclonal antibody techniques allowed variants to be identified based on antigenic differences. It is now apparent that each variant is strongly dependent on 1 or 2 highly susceptible vector species which are primarily responsible for maintaining and transmitting the infection. Transmission to other species occurs but is only a spillover from the primary vector population. Thus, a rabid skunk may be infected with skunk rabies in Saskatchewan, fox rabies in Ontario, or raccoon rabies in Pennsylvania. Likewise, a rabid raccoon does not necessarily constitute a case of raccoon rabies. To date, no rabid raccoons diagnosed in Canada have been infected with the raccoon variant of the virus.

In some areas, distributions of several variants overlap. The specific variant in an infected animal can only be determined by monoclonal antibody typing, not by its species or geographic location. The following is a brief summary of the common strains of rabies in North America.

Fox Rabies, also known as Arctic rabies, occurs in Arctic foxes throughout much of the Canadian arctic and Alaska. It is also established in red foxes of Ontario, Quebec and the northeastern United States. The current distribution of fox rabies is a result of 1 or more waves of rabies which appear to have originated in the arctic. During the early 1950's, rabies spread rapidly southward across the prairie provinces and westward into British Columbia in foxes and coyotes. This epizootic disappeared by 1957, perhaps due in part to depopulation efforts. An epizootic spread southward through Ontario between 1954 and 1956. During the following decade, it spread through eastern Canada and the northeastern states. Self-sustaining cycles of fox rabies persist in southern Ontario and Quebec.

Raccoon Rabies is a variant that established in raccoons in the southeastern United States prior to 1950. In 1977, a new outbreak of raccoon rabies began in West Virginia, probably as a result of translocation of infected raccoons from the southeast. That outbreak has rapidly spread northward through raccoon populations in the eastern states

and has now reached upstate New York. At the time of this printing, raccoon rabies has not been detected in Canada.

Skunk Rabies refers to either of 2 distinct variants which occur in the southcentral states and northcentral states, respectively. The latter of these two variants entered Manitoba in 1959 and spread westward across southern Saskatchewan and Alberta during the 1960's. It is currently enzootic from southern Alberta to extreme western Ontario. Over the past decade, skunk rabies has gradually advanced northward in Saskatchewan but appears to be stable in southern Alberta.

Bat Rabies is a general term applied to a group of rabies variants isolated from numerous species of bats. Isolates of these variants have been reported throughout the range of bats in Canada. Red bats, hoary bats and big brown bats are the common reservoirs of these variants in Canada. Variants of bat origin can be transmitted to a wide variety of terrestrial mammals and cause disease. Bats are commonly a source for human exposure to rabies. The most recent human death due to rabies in North America resulted from a bat strain of rabies.

Recent geographic distribution of terrestrial rabies is presented in Figure 1. Several recent expansions of rabies have been added to the rananges published by Smith (1989). The most important change is the northward expansion of raccoon rabies across Pennsylvania and much of New York state. Because of its almost inevitable spread into southern Ontario, its movements are being monitored closely by the Ontario Rabies Research Unit.

The range of fox rabies has expanded in several directions from the enzootic area of southern Ontario. During 1991-92 rabies spread through fox populations in Sudbury, Timiskiming and Cochrane districts of northern Ontario. It also spread northward and eastward in Quebec. Periodoic waves of rabies continue to sweep southward through Labrador, occasionally reaching Newfoundland and Central Quebec. Dwight Welch - CCWHC

Information for this article was extracted from:

MacInnes, C.D. 1987. Rabies. pages 910-929 In Wild Furbearer Management and Conservation in North America, edited by M.Novak, J.A. Baker, M.E. Obbard, and B.Malloch. Ontario Trappers Association, North Bay, Ontario.
Smith, J.S. 1989. Rabies Virus Epitopic Variation: Use in Ecologic Studies. Advances in Virus Research 36:215-253.
Tabel,H., A.H.Corner, W.A.Webser, and G.A.Casey. 1974. History and Epizootiology of Rabies in Canada. Canadian Veterinary Journal 15:217-281.

Ontario Rabies Research Unit

The Ontario Rabies Research Unit was established in 1967, following the death of a 12-year-old girl due to rabies. It is part of a joint undertaking by the ministries of Natural Resources, Health, and Agriculture and Food to control rabies in Ontario. The unit is based at the Wildlife Research Station in Maple, Ontario. Its mandate is to develop

methods for eliminating rabies from wildlife populations in Ontario, particularly the red fox. The Rabies Unit's research activities fall into 5 general areas: ecological modelling of rabies, biology of rabies vectors, development of oral vaccines and baits, field testing of vaccination programs, and the vaccination of urban wildlife.

A simulation model was employed to integrate available information on fox ecology with the epizootiology of rabies. Computer simulation was first used to evaluate the sensitivity of many biological parameters and identify those most important in controlling rabies. In addition, the model has been used to evaluate the probable success of costly field trials before their implementation. The development of this model has also provided new insight into the biology of enzootic rabies.

Vaccination of free-ranging foxes required the development of a suitable oral vaccine and a delivery system capable of reaching a high proportion of the foxes over a large area. The rabies unit has tested oral vaccines for foxes and developed baits that could entice foxes to contact the vaccine. The vaccine bait, currently in use in Ontario, contains a 2-ml packet of ERA vaccine moulded into a matrix of tallow, wax, and attractants; tetracycline is used as a biomarker. These baits have been extensively tested for palatability to foxes and efficacy of vaccine delivery. In cooperation with several private firms, the Rabies Unit has developed machines for the rapid and efficient distribution of baits from an aircraft. During a typical baiting program 40,000 baits can be distributed over an area of 2,000 km2 by a single aircraft in one day.

In 1989, the Rabies Unit began a 5-year field trial of their vaccine-baiting system over a 30,000 km2 area of eastern Ontario. Prior to the trial, that area had experienced predictable, cyclic outbreaks of rabies every 3 to 4 years since the mid 1960's. Annual baiting of this area for 4 years has prevented an eruption of rabies that should have occurred last year, and it has almost eliminated rabies from the area. Meanwhile, rabies outbreaks have occurred on all sides of the baited area.

Methods are also being developed for vaccinating urban populations of foxes, skunks, and raccoons. The most populated urban areas of Canada are within the area of enzootic fox rabies; they are also directly in the path of the front of raccoon rabies advancing from the northern states. Within Toronto, foxes inhabit ravines, highway allowances and other undeveloped lands. Vaccine baits are distributed by hand in these areas. Each year in Scarborough, skunks and raccoons are captured, vaccinated, tagged and released. Now in its fifth year, that study has lowered rabies cases in the treated area to near zero and has enhanced our understanding of the dynamics of urban vectors of rabies. Techniques developed through this program will be employed to combat raccoon rabies when it reaches southern Ontario. Dave Johnston - OMNR Wildlife Research and Dwight Welch - CCWHC.

Raccoon Rabies

Rabies spread by raccoons was first reported in Florida in 1947. This appeared to be a strain of rabies for which the raccoon was the primary vector. Raccoon rabies was

restricted to the southeast coastal plain of Florida and Georgia until 1977 when it was found in West Virginia. By 1980, it was clear this was a new focus of infection from which rabies spread northward at 25-40 miles per year. By 1993, the front was well into the New England states. The dramatic spread of raccoon rabies across New York state has been monitored closely by the N.Y. State Department of Health (Figure 2). The first cases were detected in 1989; by mid-1993, more than half the state was involved.

The northward spread of raccoon rabies is consistent with natural passage of the virus from one raccoon to another . However, human transport, either deliberate or unwitting, has been suspected. Raccoon hunters in Virginia and West Virginia imported raccoons from the south to restock favourite hunting grounds; rabies was detected in at least two such shipments. Rehabilitators and nuisance animal control personnel may have released animals many miles from the capture sites. Translocation of raccoons could explain several well-documented jumps in the advance of this epizootic. The first rabid raccoons east of the Hudson River were found 60 miles ahead of the front. In 1992, raccoon rabies suddenly appeared near Albany, jumping 50 miles north of the front. Despite active surveillance, no rabies was found in the intervening countryside for several months. The first focus of raccoon rabies in Massachusetts was at a large landfill site known to receive garbage from inside the epizootic zone of Connecticut.

Raccoons have been found riding both inside and outside of transport trucks and presumably they may also ride trains. Fishermen taking covers off their boats prior to launching, have found raccoons hiding inside. Since many U.S. residents bring boats into Canada, this is a source of concern. In the past 18 months, 2 raccoons have arrived in Toronto inside transport trucks from New York. In both cases, the trailers were opened inside warehouses and alert workers notified authorities. These case histories illustrate the potential for transporting rabid raccoons anywhere on the continent.

The first cases of raccoon rabies are expected in Canada by 1994, probably in the Niagara peninsula. An second influx of raccoon rabies can be expected along the St. Lawrence River by 1997.

A joint task force of the Ontario ministries of Natural Resources, Agriculture and Food, and Health, and Agriculture Canada, has produced recommendations to impede the spread of raccoon rabies into Canada. These include increased surveillance for rabid raccoons, a Trap-Vaccinate-Release belt along the Niagara River, a contingency plan to control point outbreaks, and acceleration of research towards a vaccine-bait effective for raccoons.

If raccoon rabies spreads across Ontario, the number of rabid animals and human post-exposure treatments can be expected to more than double. The impact on public health will be especially severe because raccoons are so abundant in cities. In southern Ontario, rural raccoon densities are 4 - 8 / km2, whereas in the City of Scarborough, densities are 8 - 16 / km2 or higher. By comparison, in Ithaca, New York, the average density is over 50 / km2.

Our knowledge of factors that accelerate or limit the spread of raccoon rabies is incomplete. The northward and eastward spread has been relentless, yet there has been very little westward spread in Pennsylvania for at least 5 years. Will the northward spread be limited by more severe winters, which keep raccoons isolated for long periods when the snow is deep? What are the critical densities of raccoons necessary for spread? There are many unknowns. It is certain, however, that raccoon rabies is persistent. In the U.S., it has remained for at least 10 years following the initial epizootic in Virginia. Dr C.D. MacInnes and Dave Johnston - OMNR Rabies Research Unit

Disease Updates

Atlantic Region

Drowning of herring gull chicks

On June 24, several hundred herring gull chicks were found dead along the south shore of Malpeque Bay, a large bay in central PEI. The previous day, a heavy storm with very strong winds had occurred. Presumably, the entire colony of herring gull nests (approximately 200-300) on a small island in this bay had been washed off by waves during that storm. During strong winds, coinciding with high tide, this island can be completely covered by water. Heavy storms normally tend to occur later in the year in the Gulf of St. Lawrence, i.e. at a time when young gulls have already fledged. This die-off was investigated by the PEI Fish & Wildlife Division.

Antifreeze poisoning in a raccoon

A male raccoon was submitted to the Nova Scotia Veterinary Pathology Laboratory by the Nova Scotia Department of Natural Resources after it had been killed by an individual who found it in his garage. He reported the animal to be distressed, shaking and immobile. The raccoon had normal body fat stores and no significant gross lesions. Histology showed an oxalate nephrosis compatible with antifreeze toxicosis.

Egg binding in a cormorant and a northern gannet

On two consecutive weeks, a female double-crested cormorant (from Malpeque Bay, PEI) and a female northern gannet (from the New Brunswick side of the Northumberland Strait) were found dead with a decomposing egg impacted in their cloaca. In both birds, this egg binding had resulted in a locally extensive peritonitis. Both birds were in poor body condition, and the latter may have caused inertia of the oviduct. We have no information on the incidence of egg binding in wild birds at breeding time, although this is a well recognized problem in pet birds. The northern gannet was submitted by members of the Canadian Wildlife Service, Sackville, New Brunswick.

Loon mortality

Two common loons were submitted, one by members of the Canadian Wildlife Service in Nova Scotia, the other by wardens from Kouchibouguac National Park in New Brunswick. Both birds were in very poor body condition. The first bird also had severe intestinal parasitism (estimated count of 9220 flukes, Cryptocotyle lingua). The second bird had severe pulmonary aspergillosis and marked intestinal parasitism (estimated count of 5528 flukes of 4 different species). It also had 22.3 ppm (wet weight) of mercury in its kidneys, a level which should be considered at least potentially significant. Natural mortality of common loons is closely monitored in New England, where lead poisoning from ingestion of lead sinkers is one of the main problems observed. A similar surveillance program should be considered in Canada.

Unhatched piping plover eggs

Nineteen piping plover (Charadrius melodus) eggs that failed to hatch were submitted for post mortem examination as part of the ongoing Piping Plover Monitoring Program by the Resource Conservation Section of Prince Edward Island National Park. The eggs came from eleven nests with variable histories. Four nests were abandoned for unknown causes and four nests were lost in storms due to flooding of the nest or sand covering the nest. Two other nests had three of four eggs in the clutch hatch successfully, but the fourth unhatched egg remained in the unoccupied nest. One egg was found washed up on the beach and not associated with a known nesting site. Various causes were attributed to the eggs' failure to hatch. Incomplete incubation was a frequent occurrence (7 eggs) in the nests abandoned or lost in storms. Another common occurrence was infertile eggs (6 eggs). Abnormal pipping occurred in 1 egg. We believe the most interesting finding in these eggs was the apparently high proportion of infertile eggs. The causes of infertility in domestic poultry flocks are numerous and many would not apply to a wild population of birds. However, a few causes may apply to this case. Male birds tend to fight and/or interfere with each other if their numbers are high. It is interesting to speculate that the males associated with these nests may have been spending a disproportionate amount of their time defending their territory from other males, resulting in insufficient insemination of the female. A seasonal decline in fertility is also reported in domestic birds. Of five nests containing infertile eggs, three were known or suspected to have been second or third nesting attempts. This may suggest that fertility decreases with subsequent nesting attempts. Infertility can have a major impact on wildlife populations. Further investigation is required before any accurate conclusions can be reached about potential infertility problems in this piping plover population. Dr. P.-Y. Daoust - CCWHC.

Québec Region

Salmonellosis in ring-billed gull

On July 22nd, about forty immature and adult ring-billed gulls were found dead on the shore of the St. Lawrence River in Varenne, Quebec. With two major chemical factories in the proximity, toxic etiology was first suspected by the Canadian Wildlife Service. In addition, the local television station was hasty in identifying these factories as being responsible for the birds' death.

Three immature gulls, one of which was alive, were then submitted to the CCWHC Quebec Regional Centre at the Faculty of Veterinary Medicine (Saint-Hyacinthe) for postmortem examination. The live bird was very weak, able to stand, and its eyes were half-closed. All three birds were emaciated. Macroscopic exam revealed an enlarged caeca in one bird. At histopathology, necrotic granulomatous multifocal hepatitis and severe fibrinous ulcerative typhlitis were present in all birds. These lesions were consistent with avian salmonellosis (paratyphoid infection). The isolation of Salmonella typhimurium from the three livers confirmed the tentative diagnosis.

Salmonella typhimurium often causes songbirds' deaths in backyard bird feeding stations (see CCWHC Newsletter vol. 1, no. 2). Aquatic birds (ducks, coots, gulls) are also occasionally involved in salmonellosis die-offs. Quebec's largest colony of ring-billed gulls resides on a St. Lawrence River island close to the shore where the dead gulls were found. The high population density observed at that location during breeding time could have played a role in the outbreak.

No measures were taken to control the outbreak, which seemed to disappear on its own. No more deaths were reported after this event. This case emphasizes the importance of a complete postmortem exam (macroscopic, microscopic, bacteriologic,...) in bird die-offs. Dr. Daniel Martineau and Dr. Stéphane Lair - CCWHC Quebec Region

Ontario Region

Lead poisoning of swans

Lead poisoning, caused by ingestion of shot, occurred among trumpeter swans involved in species reintroduction at the Wye Marsh, part of which is sanctuary, and part of which is open to waterfowl hunting. Eight of 20 swans on the marsh were clinically ill, and half of these died. Subsequent to this event, the marsh has been declared a steel shot zone.

Loon Mortalities

A number of loons have been examined. Prominent problems included emaciation involving entanglement in fishing lines/hooks (3), trauma and gunshot (4), gastritis due to

penetrating bone (1), and probable lead poisoning, associated with ingestion of a fishing sinker (1).

Pesticide poisoning of birds

Presumptive Avitrol intoxication has been responsible for a number of rock dove submissions from the Guelph and Fergus areas over the summer. Diazinon drift during the spraying of an ornamental orchard around a commercial building in the Burlington area resulted in the death of an entire family of Canada geese inhabiting the grounds.

Congenital defects in piscivorous birds

Congenital defects were detected in unhatched ring-billed gull embryos from Hamilton Harbour and Lake Huron, submitted by CWS personnel. These included bill deformities, sometimes associated with holoprosencephaly or exencephaly, missing limbs, and schistosomus with axial skeletal anomalies. Bill deformity and an accessory limb were also detected in unhatched black-crowned night heron embryos. The etiology and significance of these observations are unknown. Unhatched herring gull, common tern, Caspian tern and double-crested cormorant embryos examined were normal.

Yersiniosis in beavers

Yersiniosis was diagnosed in a beaver submitted from the Oak Ridge area, north east of Toronto, by the Metropolitan Toronto Region Conservation Authority. The animal was found in a moribund state, in the company of a second beaver that was also considered to be ill, but which was not collected.

Canine distemper

Canine distemper continues to be a sporadic problem in raccoons in a variety of areas in southern Ontario, and parvovirus infection was diagnosed in a raccoon admitted to an animal shelter.

Botulism

A botulism outbreak smouldered in the Frenchman's Bay area of the Lake Ontario waterfront east of Toronto during mid-August. The outbreak was reported by a rehabilitator in the area. Affected waterfowl were collected by the rehabilitator along with Ontario Ministry of Natural Resource staff and were submitted for diagnosis. Dr. Ian K. Barker - CCWHC Ontario Region

Western/Northern Region

Mycotoxins in blighted grain: a risk to waterfowl?

Wet and inclement weather has caused fungal infections in a number of grain crops in various regions of Canada. An outbreak of fusarium head blight, commonly referred to as scab or tombstone disease, has been reported in the Red River valley of southern Manitoba. This disease has been observed periodically throughout most wheat-growing areas of Canada, although severe outbreaks are confined to areas of Ontario, Quebec, the maritime provinces, Manitoba, and the Peace River region of Alberta. In Manitoba, the incidence of this disease has been on the increase since 1984.

Mycotoxins produced by these fungi can cause clinical disease or death in animals and man. Waterfowl consume large amounts of grain during fall migration and on wintering grounds, and are potentially exposed to high levels of mycotoxins. Mortality of free-flying waterfowl due to ingestion of mycotoxins is reported only occasionally on wintering areas in the southern United States. In two separate areas of Texas, approximately 500 snow geese and 7,000 ducks died after ingesting a mycotoxin called aflatoxin. An estimated 9,500 sandhill cranes are thought to have died after ingesting mycotoxin-contaminated, moldy peanuts in Texas and New Mexico. Mycotoxicosis has not been reported in free-flying waterfowl in Canada.

Fusarium head blight is caused by several species of Fusarium. One common pathogen, Fusarium graminearum, produces vomitoxin (deoxynivalenol or DON). As its name implies, vomitoxin causes feed refusal and vomition when contaminated feed is consumed by pigs; poultry appear to be relatively insensitive to this toxin. To our knowledge, the effects of vomitoxin on waterfowl have not been reported, but it is thought that waterfowl, like poultry, are relatively insensitive to vomitoxin. Waterfowl probably avoid affected grains before toxic quantities are consumed.

Fusarium graminearum and other species of Fusarium infecting grains can produce other types of toxins, such as zearalenone and various compounds of the trichothecene family. These compounds have the potential to be more detrimental or pathogenic to waterfowl. Symptoms in other avian species are variable and include weakness, lameness, inability to fly, and death. Migrating waterfowl exhibiting these signs should be submitted to veterinary diagnostic laboratories for analysis. Dr. Trent Bollinger - CCWHC Western / Northern Region

Anthrax in bison in the Northwest Territories

On August 1, five dead bison were located in the Mackenzie Bison Sanctuary (MBS), west of Great Slave Lake. Three carcasses were from animals that had died during mid to late July, two were found only hours after death. No bleeding was apparent from the nose or anus of the freshly dead animals. There was no sign of terminal thrashing of legs. Samples were sent to ADRI Lethbridge for analysis; anthrax was confirmed about one week later. Between August 3 and September 3, our Anthrax Emergency Response Plan

was implemented. Dead animals were located using aerial surveillance. A helicopter-mounted infra-red camera was invaluable in finding even long-dead bison in wooded habitat. Ground crews wearing protective clothing burnt carcasses using wood, coal and diesel fuel. Some carcasses were drenched with formalin to deter scavengers in the interval before burning could be started. All burnt carcasses and immediately surrounding areas were subsequently drenched with formalin. Over 150 bison, mainly adult males, died during the outbreak. Males were likely particularly susceptible because they wallow in dust baths during the July to August rut. Activation of this disease is probably related to recent high flooding and subsequent drying of meadow habitat around lakes. This is the first anthrax outbreak in the MBS since wood bison were reintroduced in 1963. There have been 8 confirmed outbreaks of anthrax in bison in and around Wood Buffalo National Park between 1962 and 1991, resulting in the death of at least 1,100 bison. Dr. Derek A. Melton, Wildlife Management Division, GNWT

Duck plague in British Columbia

Duck Viral Enteritis (DVE), also commonly referred to as Duck Plague, was diagnosed in 4 muscovy ducks and 2 barnacle geese from a public park in Vancouver , on June 7, 1993. A second case was diagnosed 3 days later in a muscovy duck from a private pond in Surrey. A third case was confirmed June 30 in a 2-week-old muscovy duckling from the Parksville area of Vancouver Island. DVE is suspected, but unconfirmed, in several other cases involving acute, rapidly spreading mortality of muscovy ducks. All premises in question have ponds that are frequented by wild waterfowl.

DVE is an acute, highly contagious disease of ducks, geese and swans caused by a herpesvirus. It has the potential to cause devastating losses in susceptible waterfowl populations. Infected "carrier" birds serve as the source of infection. Domestic species are at greatest risk but wild waterfowl, especially recently hatched young, are also susceptible. The Canadian Wildlife Service and lower mainland wildlife rehabilitators have been notified and mortality surveillance efforts have been increased. Dr. V. Bowes, Animal Health Centre, Abbotsford, B.C.

Strychnine poisoning in gulls

During July, strychnine poisoning was diagnosed in ring-billed gulls from a resort community in central Saskatchewan. The total number of birds involved was not established. Strychnine had been placed in bread cubes and poisoning was likely intentional.

Tree swallow nestling mortality

Cold wet weather during the summer created problems for insectivorous birds in Saskatchewan. Almost all broods of tree swallows in a large study near Saskatoon died during June. No infectious or parasitic disease was identified in a sample of 10 broods examined; it was thought the nestlings died of hypothermia/starvation. Dr. Gary Wobeser - CCWHC

Phorate poisoning in northern harriers

In early May, 27 northern harriers were found dead along a 6 km stretch of the shore of Beaverhill Lake in central Alberta. Phorate, a systemic organophosphorous insecticide licensed for control of soil insects, was confirmed as the cause of death. Phorate has a high acute toxicity in a wide range of mammals, birds, fish, and insects. The harriers died as a result of secondary poisoning following ingestion of contaminated prey. Illegal activity is suspected and charges have been laid. Dr. Margo Pybus - Wildlife Disease Research Biologist : Alberta Fish & Wildlife.

Online @ http://wildlife1.usask.ca/newsletters/newsletter1-3.htm