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Canadian Cooperative Wildlife Health Centre

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Loon Survey to Continue in 1996 on a Fully National Scale

Over the past two years, a special effort has been made to secure specimens of loons found dead in the wild. The major emphasis has been on the Atlantic and Ontario regions. The purpose of this survey has been to gain a better understanding of the causes of mortality in loons, particularly the Common Loon (Gavia immer), and of the occurrence and relative importance of lead poisoning associated with ingestion of lead weights used in angling. Some of the impetus for this survey has come from the Toxicology Division of the Canadian Wildlife Service. A survey of loon mortality organized by the Ontario Ministry of Natural Resources has been a major contributor to the overall survey effort, and there has been particular cooperation and assistance from the Canadian Lakes Loon Survey coordinated by the Long Point Bird Observatory.

Results to date indicate considerable loss of loons to lead poisoning in Ontario and the Atlantic provinces (see Regional Reports, Atlantic Region, in this issue). Now it is essential to extend the survey to full national coverage to determine if the same patterns of mortality occur nation-wide or differ by region. We call on all readers and their organizations to assist in this survey by ensuring that all dead loons of which they become aware are sent to a laboratory participating in this survey. Participating laboratories include all four Regional Centres of the CCWHC (see list of addresses at the end of this Newsletter). In British Columbia, loons also can be forwarded to the Animal Health Centre of the Ministry of Agriculture and Food, in Abbotsford. Personnel from other diagnostic laboratories that receive loons for diagnostic examination are asked to contact the nearest CCWHC Regional Centre for information on the samples required for the lead survey and other aspects of diagnostic protocol that will ensure the uniform gathering of essential data. Our thanks go to all who have participated in this survey, and we ask you to continue to participate in 1996.

Meet More CCWHC Staff

Hélene Philibert

Hélène Philibert is a full-time veterinary pathologist with the Headquarters office and the Western/Northern Regional Centre of the CCWHC in Saskatoon. Hélène is from Trois Rivières, Quebec and received her DVM from the Faculté de médecine vétérinaire, University of Montreal in 1987. She joined the Department of Veterinary Pathology, Western College of Veterinary Medicine, Saskatoon first in 1988 as a graduate student working toward a Master of Veterinary Science degree. Part of this program involved a comparison of methods used to detect wild bird mortality. Hélène remained in the Department as a Senior Diagnostic Fellow, as a diagnostic pathologist and, in 1992, she joined the CCWHC as a diagnostic pathologist and clinical teacher. In 1995 she became a diplomate of the American College of Veterinary Pathologists. Hélène can be contacted at (306) 966-7307.

Igor Mikaelian

Igor Mikaelian is a resident in wildlife pathology at the Québec Region of CCWHC based at the Faculty of Veterinary Medicine at Saint-Hyacinth. Under the supervision of Dr. Daniel Martineau, he is in charge of the wildlife diagnostic cases presented at the Québec Regional Centre. Igor obtained his DMV in 1987 from the National Veterinary School of Lyons (France) where he contributed to the set up of a raptor rehabilitation centre. He then passed advanced courses in laboratory animal pathology and in immunology before leaving for his military service to Saudi Arabia as a wildlife veterinarian. Afterwards, he worked as a toxicopathologist for toxicological studies in rodents and intramuscular tolerance testing. He joined the Department of Pathology and Microbiology at St-Hyacinth in July 1995 and is working toward a post-graduate program in pathology (Diplôme d'Etudes Supérieures). Igor can be reached at 514 773 8521, ext. 8347.

Feature Articles

Waterfowl Die-off in Mexico

During the winter of 1994/95 a die-off of 20,000 to 40,000 waterfowl occurred in the Silva Reservoir located approximately 35 km south of the city of León in central Mexico. This die-off received considerable media attention in Mexico, the United States and Canada. The involvement of migratory birds, uncertainty as to the cause of the die-off, the possible involvement of toxins and pollutants originating from industrial and residential sewage, as well as a growing environmental movement in Mexico contributed to the attention given this die-off. Ultimately, the issue was brought before the Commission on Environmental Cooperation (CEC), a commission created by an

environmental side accord to the North American Free Trade Agreement, signed by Canada, Mexico and the United States. The National Audubon Society, the Grupo de Los Cien International and the Centro Mexicano de Derecho Ambiental asked that the CEC launch an inquiry to determine the cause of the mortality in central Mexico and to make recommendations on ways to prevent similar mortalities in the future. The CEC formed a scientific panel consisting of 3 specialists from each of Canada, United States and Mexico. In Canada, the Canadian Cooperative Wildlife Health Centre was asked to participate in the investigation along with members from Environment Canada and Department of Fisheries and Oceans. In this article, I will summarize the findings and recommendations of the Panel.

The Silva reservoir is a shallow impoundment averaging less than 1 meter in depth and covering an area of about 120 ha (296 acres). The reservoir receives most of its water from the nearby Turbio River via a 2 km long diversion canal. Historically, the Rio Turbio was dry from November through June but now flows continually due to untreated industrial and residential waste-water from the city of León; the water originates from large underground aquifers. The city of León has a large leather tanning industry and effluent from these tanneries, such as chromium and dyes, was suggested as a possible cause of the die-off. Water from the reservoir is used to irrigate nearby crops.

The die-off at Silva Reservoir began in October or November, 1994 and continued until the end of February, at which time the reservoir had been almost completely drained in order to stop the die-off. The heaviest mortality was among dabbling ducks and shore-birds. Twenty different species were identified including: cattle egrets, white faced ibis, Mexican duck, green-winged teal, American widgeon, northern pintail, northern shoveler, blue-winged teal, cinnamon teal, ruddy duck, lesser scaup, American coot, American avocet, black-necked stilt and long-billed dowitcher. The Ecological Foundation of Guanajuato and other volunteers collected carcasses and buried them in large pits adjacent to the reservoir. They also treated sick birds and managed to save several hundred birds with basic palliative care. Veterinarians at the León Zoo also treated birds and performed necropsies on several hundred dead birds. Several government agencies, non-government agencies and university groups were involved in investigating the die-off; however, there was no consensus as to the cause of death in these birds. Early reports linked the deaths to chromium toxicity. Chromium is produced in a local plant upstream from Silva reservoir and is used extensively in tanneries which discharge effluent upstream into the Rio Turbio. These reports were followed in January by a letter written by the National Water Commission, the lead agency appointed by the Mexican government to investigate this die-off, stating that the die-off was caused by the agricultural insecticide endosulfan due to a single deliberate discharge. This conclusion was not accepted by many of the other agencies involved. Another group identified a red dye in the water and in sediments of the reservoir and attributed the mortality to this compound; they suggested the dye originated from the tanneries. Considerable controversy still existed in July of 1995 when members of the Panel visited the reservoir.

The Panel's investigation consisted of reviewing reports, reviewing videotapes taken during the die-off, interviewing individuals directly involved in the disease investigation

and treatment of sick birds, and visiting the site to collect samples. Members of the Panel visited the Silva Reservoir on July 12th,, collected soil samples from the almost dry basin and were given 15 frozen duck carcasses found dead in January at the reservoir by members of the Fundacion Ecologica de Guanajuato. Soil samples and 7 ducks were taken to the Canadian Cooperative Wildlife Health Centre in Saskatoon for further study and 8 ducks were taken to the National Wildlife Health Centre of the U.S. National Biological Service in Madison, Wisconsin. Heavy metal analysis on tissues were performed by the Department of Fisheries and Oceans, Winnipeg, Man. and the Patuxent Analytical Control Facility (National Biological Service), Laurel, Maryland. Analysis for endosulfan residues was performed at the Mississippi State Chemical laboratory.

Soil samples were cultured anaerobically which resulted in the production of botulinum type C toxin, indicating botulism spores were present in the soil of the Silva Reservoir basin. Although spores are present in many water basins, research has shown that spores are more likely to be isolated from water bodies with histories of botulism than from water bodies with no history of botulism. As well, botulinum type C toxin was identified in blood and tissue extracts from many of the 15 dead birds. Although botulinum toxin can be produced in decomposing carcasses dead from causes other than botulism, an absence of significant lesions or pathogenic bacteria in the majority of the birds suggested botulism was the cause of death. The observations of flaccid paralysis in many of the birds videotaped during the die-off and the response of sick birds to basic supportive care also supported the diagnosis of botulism. Thus, there was strong circumstantial evidence, but no definitive proof, that botulism caused the die-off at Silva reservoir.

From the results of chemical analysis, endosulfan or other insecticides did not appear to be involved in this die-off. High levels of chromium and mercury were identified in a small number of birds and may have contributed to the death of some of these birds. Birds dead from other causes, such as heavy metal toxicity, may have been important in initiating the botulism outbreak. Another factor considered important in the development of botulism was the high organic load in the reservoir associated with residential sewage. The eutrophic conditions in the reservoir might be conducive to the development of anaerobic conditions and botulism outbreaks.

The death of 40,000 birds in Mexico due to botulism is not that noteworthy when you consider that botulism outbreaks of this size, and frequently larger, occur commonly in other locations in North America (see Pakowki Lake, Alberta article in regional updates). One of the issues that arose from the panels' investigation was the absence in Mexico of an agency familiar with diseases and disease investigation in waterfowl or other wildlife, and the lack of a contingency plan to deal with mortalities in wildlife such as occurred at Silva Reservoir. One of the recommendations of the Panel was that Mexico develop a national program for wildlife health surveillance, and for the investigation and response to wildlife disease outbreaks. This agency could collaborate and communicate with existing agencies in Canada and the United States on wildlife issues of common concern. As wildlife can act as sentinels of environmental degradation, information gathered by this agency would have implications to human health as well.

The Panel also recognized the need to improve the water quality in the Rio Turbio. The Mexican government has a plan in place to move tanneries and other industries to an industrial park and to build water treatment facilities for industrial and residential sewage. This plan has been delayed due to severe economic constraints within Mexico. The Panel recommended the Mexican government work toward full implementation of this clean-up initiative. The Panel was impressed by the efforts and cooperation of biologists, veterinarians, scientists and others in trying to deal with the die-off in Mexico and in the assistance given the Panel. I hope there will be continued cooperation between Canada, the United States and Mexico on wildlife health issues and perhaps before long we will be corresponding with a "Mexican Wildlife Health Centre". (Trent Bollinger, CCWHC - Western/Northern Regional Centre, and CEC Panel member).

Newcastle Disease in Double-crested Cormorants - Summer 1995

Newcastle Disease (ND) occurred in double-crested cormorants (Phalacrocorax auritus) in 1995 in at least four, and possibily six, Canadian provinces. Disease was observed in late July at colonies on Lac la Biche, Alberta (Lat. 54 50'N, Long.112 00'W) and Doré Lake, Saskatchewan (Lat. 54º43'N, Long. 107º32'W), and between August 1 and 11 in birds from colonies on High Bluff and Gull Islands near Presqu'ile Point, ON (Lat. 44º00'N, Long. 77º45'W) and in a single bird found near Cumberland, ON (Lat. 45º30'N, Long. 75º25'W). The virus also was identified in a Caspian tern (Hydroprogne caspia) also from the Presqu'ile Point area. ND virus was isolated from a fledged double-crested cormorant found on the north shore of Prince Edward Island in late August. Probable occurrences of ND also were reported from Quebec and Manitoba: a double-crested cormorant was found at Point-au-Père, Quebec with bilateral wing paralysis consistent with ND, but virus was not isolated from this bird; two cormorants were found in a yard in Ashern, Manitoba. They were unable to fly. ND virus was not isolated from these birds, but one had a high level of antibody against ND virus (1:128) which indicated recent exposure to the virus.

Large-scale mortality was observed only at Doré Lake; there mortality was estimated at 2,000 fledglings on the main colony and an unknown but large number of fledged birds dead or doomed to die of starvation due to paralysis of wings and/or legs. All birds recognized as affected on Doré Lake were young-of-the-year and were close to fledging when the disease first was recognized. Sick birds were observed at the large main colony as well as at the two other much smaller colonies on the lake. Total mortality was on the order of 10-20% of the cormorant population on the lake. At other locations, mortality appeared to be small: about 30 affected birds from Lac la Biche and on the order of 1% of the 500 birds present on the two colonies in Ontario.

Detection of these occurrences of ND was accomplished through the actions of provincial wildlife agency personnel and provincial veterinary diagnostic laboratories in Alberta, Ontario and P.E.I., the Virology Laboratory of Agriculture and Agri-Food Canada in Hull, and the Ontario, P.E.I and Western/Northern Regional Centres of the CCWHC. The

virus isolates from Saskatchewan and Ontario have been confirmed by Agriculture and Agri-Food Canada as ND viruses highly pathogenic (velogenic) in domestic chickens. Evaluation of the Alberta and P.E.I. isolates is pending. All occurrences or suspected occurrences of ND in any bird species in Canada must be reported to the regional veterinary office of Agriculture and Agri-Food Canada. Canada's poultry population is free of ND. The last occurrence of velogenic ND in Canadian poultry was in 1973. Any further occurrence of the disease in domestic poultry would be met with a vigorous program of eradication. All commercial poultry species are susceptible to ND and poultry producers should be advised to prevent contact between their birds and wild bird species. ND previously occurred in double-crested cormorants in Canada in 1975, 1990 and 1992. For further information on ND, readers are referred to an article in Vol 2, No.1 (Jan./1994) of the CCWHC Newsletter. (F.A. Leighton, CCWHC - Headquarters Office)

The Northward March of Raccoon Rabies - Update

Rabid raccoons now have been detected along much of the Niagara River separating Ontario from the State of New York on the state's northwestern border and within 25 km of the Ivy Lea bridge across the St. Lawrence River in the northeast (see map - locations given are approximate). New York State distributed some 79,000 raccoon baits containing the V-RG recombinant oral vaccine (Raboral®, Rhône-Mérieux) in the Niagara area and also established a vaccinated zone between the Adirondack Mountains and the St. Lawrence River in Jefferson, St. Lawrence and Lewis counties to act as a barrier to the spread of raccoon rabies toward southeastern Ontario and southwestern Quebec. The Ontario Ministry of Natural Resources assisted with this vaccination program because of its direct effect of limiting the spread of raccoon rabies into Ontario. Trap-vaccinate and release (T-V-R) programs for raccoons have been implemented in Ontario in the immediate areas of the four bridges that cross the St Lawrence River and in St. Lawrence National Park, and also at the New York State end of the Ivy Lea bridge. T-V-R is continuing on the Niagara peninsula and in Scarborough. (summarized, with permission, from The Rabies Reporter Vol.6, No.2, July 1995, Rabies Unit, Ontario Ministry of Natural Resources).

Rabbit Viral Hemorrhagic Disease on the Loose in Australia

In Newsletter Vol. 2, No. 1 (Jan.,1994), readers were introduced to two related virus diseases of rabbits and hares that do not occur in Canada but that have caused considerable concern to wildlife managers and veterinary regulatory authorities in Europe and elsewhere. One of these diseases, Rabbit Viral Hemorrhagic Disease (RVHD - also known as Rabbit Calicivirus Disease or RCD), has been under investigation in Australia as a potential biological control agent for the introduced European wild rabbits that constitute an environmental disaster for both Australia and New Zealand. After experimental infections of 28 species of domestic, feral and native wild vertebrates that

showed no evidence of disease in these species, a field trial was conducted in a quarantine area on Wardang Island, 4 km off the Australian coast, beginning in the austral fall of 1995. During fall and winter, the virus spread minimally within the quarantine area of the experimental release, but in spring its behaviour changed. New warrens both inside and outside of the quarantine area became infected. In early October, the virus escaped to the mainland. A program of rabbit extermination aimed at containing the virus on Point Pearce where it first reached the mainland appeared successful at first. However, during the last week of October, rabbits dead of RVHD were found 260 km from Point Pearce. The virus containment program now has been abandoned and, instead, plans drawn up for the eventual use of RVHD as a rabbit-control agent have been advanced and are being implemented as quickly a possible in order to try to gain some advantage from this un-intended release of RVHD on mainland Australia. (Many thanks to the several Australian colleagues who provided the official news releases from which the above information was extracted.)

This event highlights the risks inherent in the transportation and release of disease-causing agents, whether the release is accidental or intended. These are biological organisms that reproduce and spread on their own. Once released, they generally are beyond human control. They also have the capacity to evolve new characteristics and establish new biological relationships with other living creatures. The spread of raccoon rabies in North America, also reported in this issue, is another example of a problem initiated by the transportation and release of an exotic virus strain in an area with a susceptible population of host animals. (F.A. Leighton, CCWHC Headquarters)

Disease Updates

Atlantic Region

Verminous pneumonia in red foxes

In July 1995, park wardens from Fortress of Louisbourg National Historic Park submitted two female red fox pups for necropsy. These pups were from the same litter, and both animals had shown extremely laboured breathing prior to death. One pup was found dead and the other was shot for humane reasons. At necropsy, the cranioventral lung lobes of both foxes were diffusely tan and very firm. A pale yellow exudate was easily expressed from the larger airways. Microscopically, the airways of the affected tissue contained abundant purulent exudate mixed with nematodes (roundworms) and their eggs. These findings were compatible with a severe verminous pneumonia, and the morphology of the parasites was consistent with Capillaria aerophila. Capillaria aerophila has a direct life cycle. The adult females, present in the airways of the lungs, lay eggs which are coughed up, swallowed and passed with the feces. In the external environment, the eggs become infective after 5-7 weeks and can remain viable for greater than a year under favourable conditions. When infective eggs are swallowed by a suitable host, the larvae hatch out of

the eggs in the intestine and migrate to the lungs where they develop to maturity, approximately 40 days after infection. Severe infections occur primarily in young foxes up to 18 months of age. The parasites damage and irritate the airways, causing production of exudate and mucus that literally clogs the airways, making breathing very difficult.

This disease was identified in animals submitted from this park in 1991 and 1993 (see Wildlife Health Centre Newsletter Volume 2, Number 1). In ranched foxes, problems with this parasite tend to occur in breeding boxes where eggs are allowed to accumulate. Similar conditions may exist in Louisbourg's wild fox population because the denning sites are utilized for several consecutive breeding seasons, resulting in the infection of successive generations of foxes. (S. McBurney and G. Conboy, CCWHC, and Leeanne Reeves, National Park Warden)

Common Loons: Complex Causes of Mortality

As in other parts of the country, we are continuing a detailed study of the causes of mortality in common loons (Gavia immer). Results obtained from the 28 birds necropsied since 1993 show some definite trends. Six birds were in good body condition, having drowned or died from acute trauma. Twenty-two were in poor body condition; obvious causes of emaciation and death in these birds included lead poisoning (six), respiratory aspergillosis (five), and oil contamination (five). The cause of emaciation and death in the remaining six birds was not obvious. There were statistically significant differences between birds in poor body condition and those in good body condition with regard to loads of intestinal parasites and renal mercury. Adults in poor condition had a higher average amount of mercury in their kidneys (24.0 ppm; range 0.5 - 61) (wet weight basis), as compared to immatures in poor condition (2.3 ppm; range, 0.1 - 2.9), adults in good condition (3.9 ppm; range, 1.9 - 5.6), and immatures in good condition (1.05 ppm; range, 1.0 - 1.1). The average number of intestinal trematodes (primarily Cryptocotyle species and echinostomes) in immature and adult birds in poor body condition was 4,675 (range, 0 - 30,080), as compared to 82 (range, 0 - 210) in immature and adult birds in good body condition.

Since mercury is bound to cellular proteins in the body, we wonder whether gradual emaciation associated with other disease problems (e.g. lead poisoning) in the adult group in poor body condition may have resulted in redistribution of mercury bound to muscle proteins into more sensitive organs such as the kidneys and, particularly, the brain, as the muscle mass was mobilized as an endogenous source of protein. Also, relative inhibition of the birds' defense mechanisms caused by poor body condition may have allowed the development of an abnormally large number of trematodes in their intestinal lumens following ingestion of fish infected by these parasites. These results suggest that, in loons and quite possibly in other wild species, morbidity and death may result from a synergistic interaction among two or more disease processes, some more obvious than others. Therefore, it may be misleading to study the effects of one group of diseases, e.g. infections, parasites, or environmental pollutants, in isolation from other potentially pathogenic factors. (P.-Y. Daoust, S. McBurney and G. Conboy, CCWHC Atlantic Regional Centre, and Neil Burgess, Canadian Wildlife Service).

Quebec Region

Parvovirus in Raccoons

Three juvenile raccoons (Procyon lotor) were found in the wild and were presented to a raccoon rehabilitation centre. They all exhibited dramatic diarrhea and weight loss which prompted the rehabilitation centre manager to destroy one of the raccoons two days after arrival. Another one was destroyed three days later, and the last one eight days later. After admission of these three animals to the raccoon rehabilitation centre, two other juvenile raccoons exhibited similar although milder digestive system signs. Necropsy of the three raccoons revealed dehydration, emaciation and swollen mesenteric lymph nodes. Microscopic changes in the intestine and lymph nodes were typical of parvovirus infection and immunoperoxidase stain demonstrated the presence of parvovirus antigens. Persons involved in raccoon rehabilitation should be aware of this common disease in order to prevent its spread among their patients. (Daniel Martineau and Igor Mikaelian, CCWHC Québec Region)

Giardia in Voles

To monitor toxic changes in small rodents from gold and copper mine tailings dumps, some specimens were caught from the wild in Aldermac area in June 1995. Protozoan parasites resembling Giardia sp. were found in the duodenum of 5/9 Gapper's red-backed vole (Clethrionomys gapperi) examined microscopically. No inflammatory reaction was associated with this infestation. Similar parasites were not found in 21 deer mice (Peromyscus maniculatus) from the same location. (Daniel Martineau and Igor Mikaelian, CCWHC Québec Region).

Beluga Whales in the St Lawrence Estuary

A newborn male beluga whale (Delphinapterus leucas) was found stranded on August 11, 1995 at Parc du Bic (Lat.48 20' N., Long. 68 50' W.). Necropsy revealed an incomplete closure of the umbilicus associated with severe peritonitis and dramatic pyemia. This is the second case of a congenital abnormality causing death in a beluga whale. An adult female beluga whale was found stranded on June 30, 1995 at Saint-Ulric-de-Matane (Lat. 48 45' N., Long. 67 45'W.). Necropsy revealed a sharp-edged spiroid wound located close to the anus and opening into the abdominal cavity. Focal severe fibrinous peritonitis and intestinal adhesions were found in the vicinity of this lesion. The wound is attributable to motor boat propeller.

A male beluga whale stranded on October 4 1995 at Escoumins (Lat. 48 20' N., Long 69 20' W.) had a dissecting aneurism of the pulmonary trunk. The aneurysm originated 1 cm distal to the pulmonary valve, was sinusoid in shape, 15 cm long and was located on the

ventral wall. It resulted in hemopericardium; cardiac tamponade is the presumptive cause of death. This case differed from previous cases in that widespread focal to coalescing bilateral intimal erosions were found in the pulmonary trunk and aorta. This is the third report of dissecting aneurisms of the pulmonary trunk in male beluga whales from the Saint-Lawrence estuary (see Vol. 3, No. 1, Winter 94/95). (Daniel Martineau and Igor Mikaelian, CCWHC Quebec Region).

Ontario Region

Insecticide Poisoning in Robins

In May, a member of the public in Kitchener reported finding several dead American robins (Turdus migratorius) in her neighbourhood following lawn treatment with pesticides. Two birds were submitted for post mortem examination. No abnormalities were seen at necropsy. Stomach content and liver samples were submitted to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) toxicology laboratory for analysis. In one of the two birds, stomach content was positive for the organophosphate insecticides Diazinon (2.8 ug/g) and Chlorpyrifos (41 ug/g). These concentrations are each potentially lethal. It remains unclear exactly how this bird acquired the pesticide, and it is impossibleto know whether the other birds reported dead were affected in a similar manner. The fact that only one of the two birds examined tested positive also is puzzling. From discussion with officials of the Ontario Ministry of Environment and Energy who are responsible for monitoring pesticides, this sort of incident is considered unusual. (Doug Campbell - CCWHC Ontario Region).

Emaciated Great Horned Owls

The great horned owl (Bubo virginianus) is likely the most common owl in southern Ontario and is the species most often submitted for necropsy. In 1994-95, 35 great horned owls were examined at CCWHC - Ontario. Trauma was the most common problem which caused these birds to come into human hands. Many of the birds were emaciated, and carried parasite burdens, primarily hematozoa and intestinal flukes and roundworms. Usually, it was not possible to determine which of trauma, emaciation or parasitism was the principle cause of illness, with the others occurring as secondary events predisposed by the principle cause. Preliminary examination of tissues from these owls shows that many have a mild inflammation of the heart muscle associated with an as-yet-unidentified protozoan parasite. A more systematic examination of parasite burdens and myocardial lesions in great horned owls seems warranted. These owls also may serve as indicator species of exposure to a variety of toxins. Due to their role as top predators and their sedentary and territorial nature, they can provide information on the presence of various compounds within the local terrestrial food chain. As a preliminary examination of this, tissues from a number of great horned owls will be examined by the Canadian Wildlife Service for the presence of various environmental contaminants. (Doug Campbell - CCWHC Ontario Region).

Parvovirus and Trichinosis in Urban Raccoons

Raccoons are routinely trapped, vaccinated and released on the grounds of the Metropolitan Toronto Zoo. Animals showing evidence of disease are not released. Interesting incidental findings in these animals include a case of parvovirus enteritis and a case of trichinellosis. Parvovirus is a very common problem in young raccoons kept in "raccoon orphanages" and refuges, but is rarely reported in wild animals. Trichinella spiralis has been described in carnivores in Ontario, primarily from more northerly locations, but has never been diagnosed in raccoons submitted to the Ontario Veterinary College or the CCWHC. The source of infection for this raccoon is not known. (D. Campbell and Stéphane Lair, CCWHC, and Karrie Rose - Metropolitan Toronto Zoo).

Western and Northern Region

Botulism At Pakowki Lake, 1995.

Type-C botulism caused large-scale mortality at Pakowki Lake (Lat. 49 20'N, Long. 110 55'W) in southeastern Alberta in 1995. Between mid-July and late October, over 100,000 carcasses were collected, and new cases were still occurring as of 17 October. Green-winged teal (Anas crecca) and northern pintail (Anas acuta) comprised approximately 50 and 20%, respectively, of a verified subsample of over 7,000 birds. In 1994, a total of 31,517 carcasses were collected from this lake (see Vol.2, No.3, Autumn, 1994 of this Newsletter). Total mortality in each year is uncertain; in some cases, the carcasses collected may represent only one third of the total mortality in such die-offs, but in areas of repeated and intensive searching, such as Pakowki Lake in 1995, the carcasses collected may more closely approximate that actual total mortality that occurred. We believe total losses to be in the range of 200,000 birds.

The die-off was identified during scheduled weekly surveillance of the lake. Botulism intoxication was confirmed at the Regional Veterinary Diagnostic Lab (Alberta Agriculture) in Lethbridge and by the Western/Northern Regional Centre of the CCWHC - Saskatoon. The Contingency Plan for Waterfowl Disease Cleanup on Pakowki Lake was implemented as a coordinated effort among Alberta Fish and Wildlife, Ducks Unlimited Canada and Environment Canada. CCWHC- Saskatoon also provided assistance during two visits to the lake. A concerted clean-up effort was undertaken from mid-July to late September. However, surveillance and carcass collection continued until the end of October. Up to 6 air boats scoured the lake and a squad of ground crews with quads and trailers cleaned the shorelines and shallows (lake surface area 100 Km2.). Birds were buried in two large pits dug on high ground.

Local conditions included high temperatures, minimal rainfall, and high evaporation. Blue-green algal blooms were seen in mid and late August in the northeast and southeast regions of the lake, but their contribution to mortality, if any, could not be determined. The majority of the carcasses collected were fresh (24-48 h old) and many debilitated

birds were collected prior to death. The objective of the intensive clean-up campaign was to reduce the number of toxin-containing maggots available to live birds; these maggots appear to be the principle source of botulism toxin for other birds. (For more general information on avian botulism, see Vol 3, No.1,Winter 1994-95 of this Newsletter) Where do we go from here? A cooperative working group has been established involving staff from Alberta Fish and Wildlife, Ducks Unlimited Canada and Environment Canada with the goal of trying to limit future losses at Pakowki. Initially, all possible alternatives and options will be evaluated, incorporating the assistance and expertise of water resource specialists (hydrologists, limnologists, algal specialists), disease specialists (including CCWHC personnel), and local resource managers. The group is charged with providing environmentally, logistically, and financially reasonable options for managing disease on this problem lake. (M.J. Pybus, Alberta Fish and Wildlife.)

The Case of the Killer Cookies: Apparent Chocolate Poisoning of Gulls

On July 12 and 13, 1995 a total of 35 dead adult California gulls (Larus californicus) was found in the vicinity of St. Paul, Alberta (54 00'N, 111 20'W). The birds were found face-down with their wings outstretched and many had a thick red/brown material accumulated on the bill, in the mouth, and on adjacent feathers of the head and neck. Small mounds of red/brown paste were found on the ground adjacent to some of the dead birds and at other loafing and roosting sites used by the local gull population. Twelve carcasses were frozen and submitted to the Alberta Agriculture Veterinary Diagnostic Laboratory in Edmonton for analysis. Most of the gulls had brown semi-solid material in the mouth, oesophagus, and proventriculus. The material smelled strongly of chocolate. There were no other gross lesions of significance. Intestinal contents and kidney tissues were positive for theobromine, a component of chocolate. Subsequently, it was learned that a truckload of out-dated chocolate chip cookies had been dumped at the landfill on July 11. The cookies had not been contaminated or damaged prior to being put in the landfill. The landfill operator observed a 'feeding frenzy' of gulls eating the cookies and within an hour all exposed cookies (30-40 kg) were gone. Adult California Gulls were the predominant birds seen at the landfill site on July 11 and they actively defended the treasure laid before them. Apparently the cookies were 'double-chocolate'. The birds died soon after ingesting the cookies.

[Editor's note: Theobromine is the caffeine-like alkaloid found in chocolate preparations; A small cup (120 ml or 4 ounces) of chocolate milk contains about 240 mg of theobromine. Ingestion of 90 mg of theobromine as chocolate per kg body weight is lethal for dogs. Excessive stimulation of the brain and heart are the causes of death in theobromine poisoning.] (M.J. Pybus, Alberta Fish and Wildlife, J.A. Hanson, Alberta Agriculture, Food and Rural Development, and B. Rippin, Alberta Fish and Wildlife.)

Unusual Mortality of Franklin's Gulls in Saskatchewan

During the week of 17 July, 1995, large numbers of dead and dying young-of-the-year Franklin's gulls (Larus pipixcan) were reported at two sites in Saskatchewan: Rice Lake (Lat. 52º04'N, Long.107º06'W) located 30 km west of Saskatoon and Mud Lake (Lat. 55ºN, Long. 104º10'W)), a small freshwater lake located between Big Quill and Middle Quill lakes in east-central Saskatchewan. There are nesting colonies of Franklin's gulls at both sites. Initial observations at Rice Lake were made by personnel from Ducks Unlimited Canada (DU), and at Mud Lake by Mr. K. Holderness of Quill Lake Nature Tours. At both sites, large numbers of young gulls were found dead along the shoreline and many live but weak and listless birds were hidden in emergent vegetation and in adjacent uplands. A few ring-billed gulls were included among the sick and dead birds at Mud Lake. Specimens for diagnostic examination were secured by personnel from DU and Saskatchewan Environment and Resource Management, and, during field investigations, by CCWHC staff. All birds were thin, with small pectoral muscles and no body fat. All had recently fledged. Some live affected birds could fly or run weakly while others remained immobile. Mouse-inoculation tests for botulism or other serum-born toxins were negative. Brain cholinesterase levels, measured to assess exposure to carbamate or organophosphorus pesticides, were normal. No pathogenic infectious agents were isolated consistently from affected birds and there were no gross or microscopic pathological changes other than emaciation. No adult birds were affected. From all of the evidence available, it was concluded that the birds were simply starving. At Rice Lake, DU personnel undertook a complete carcass pick-up and 1,200 Franklins gulls were retrieved. Mortality appeared to cease by approximately 1 August. No count or pick-up was attempted at Mud Lake. It is not clear why these young birds starved at the time of fledging. Clearly, the area immediately around the colony did not provide sufficient food resources for these newly-independent fledglings. Adults may have been unaffected because they could forage further afield. Whether these events at Rice and Mud lakes were unusual or were repeated elsewhere across the prairies is not known. In Saskatchewan, there is evidence that Franklin's gull populations currently are in decline but no studies to explain this have been undertaken. (Ted Leighton - CCWHC Western and Norther Regional Centre).

Pelican deaths caused by storm

On August 29th, 1995, personnel from Saskatchewan Environment and Resource Management responded to a report of dead and injured white pelicans (Pelecanus erythrorhynchos) and found 15 dead and 10 injured white pelicans in a grain field near Wolseley, SK, (Lat. 50 25'N, Long. 103 20' W.) approximately 90 km east of Regina. The grain field had received severe hail damage the evening of August 26th and it was thought these birds were injured in the storm. Necropsy findings confirmed this. All birds had extensive hemorrhages under the skin and internally, and many birds had fractured wings. Death was attributed to blood loss from injuries sustained in the hail storm. Livestock and horses in the vicinity also were severely injured in the storm. (Trent Bollinger - CCWHC Western/Norther Region).

Pesticide poisonings in eagles - Update

In the spring 1995 issue of the newsletter (Vol 3, No. 2) we reported on insecticide poisoning of at least 12 bald eagles (Haliaeetus leucocephalus) in southern Saskatchewan. The first incident was in February of 1994 and 7 others occurred in the winter and spring of 1995; one of these incidents involved only a coyote while the others involved several species including eagles. Stomach contents were sent to the Wildlife Toxicology and Surveys Branch, Canadian Wildlife Service, Ottawa, for analysis. The results indicated that the carbamate insecticide carbofuran was responsible for 6 of the 7 incidents for which we had stomach contents; the other poisoning was caused by the organophospate insecticide terbufos. In one of these incidents, a sheep rancher confessed to using carbofuran to kill coyotes and in many of the other cases it appears coyotes were the intended victims. Use of insecticides in this manner is illegal and, as demonstrated by these cases, can lead to significant mortality in non-target species. As a further note, 3 eagles (2 of which were dead), found in close proximity to each other, were submitted to the CCWHC this fall. These too have reduced brain cholinesterase activity, indicating that they have been poisoned by an organophosphate or carbamate insecticide. (Trent Bollinger, CCWHC - Western/ Northern Region and Pierre Mineau, National Wildlife Research Centre).

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