

# Canadian Cooperative Wildlife Health Centre

Annual Report 2010 - 2011





Canadian  
Cooperative  
Wildlife Health  
Centre

2010 - 2011

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## Leadership Team

### CCWHC Management Committee

Ted Leighton	Executive Director
Patrick Zimmer	Headquarters Director
Kevin Brown	Information Technology Manager
Pierre-Yves Daoust	Atlantic Regional Director
Stéphane Lair	Quebec Regional Director
Ian Barker	Ontario/Nunavut Regional Director
Trent Bollinger	Western/Northern Regional Director
Susan Kutz	Alberta Regional Director
Craig Stephens	Centre for Coastal Health Director

### CCWHC Executive Committee

Douglas Freeman (Chair)	Western College of Veterinary Medicine
Ian Alexander	Canadian Food Inspection Agency
Eric Boysen	Ontario Ministry of Natural Resources
Marc Cattet	Canadian Cooperative Wildlife Health Centre
Brett Elkin	Northwest Territories Department of Environment & Natural Resources
Wade Luzny	Canadian Wildlife Federation
Virginia Poter	Environment Canada
Mark Raizenne	Public Health Agency of Canada
Jonathan Sleeman	National Wildlife Health Centre, United States Geological Survey



### White Nose Syndrome

Surveillance among  
Canada's Bat populations  
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### Our Winning Team

Staff and Associates (page 19)

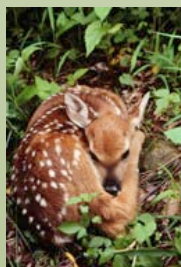


### Poisons in the Environment

Wildlife as Sentinels and Victims of  
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### Chronic Wasting Disease

Surveillance, Research and Management  
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## “The CCWHC is Canada’s wildlife health care system “



### Message from the Chair

#### CCWHC Executive Committee

It is again with great pleasure that I present to you the Annual Report of the Canadian Cooperative Wildlife Health Centre (CCWHC) for the fiscal year of 2010-11. This has been a year of many challenges which the CCWHC has met with determination and success. This report offers you the opportunity to view a summary of a full year of activity, and it is an impressive view. The CCWHC most fundamentally is *Canada’s wildlife health care system*, a coordinated network of people from universities, governments and the private sector through which Canada achieves early warning of potential problems, assessment of risks, responses to disease issues with the best available knowledge, research to close important knowledge gaps, education of the next generation of wildlife health personnel and information to inform government policies, animal and human health programs and the public. No other health system in Canada achieves the level of integration, inclusiveness and cost-effectiveness achieved by the CCWHC.

The CCWHC provided both leadership and stewardship to Canada in 2010-11. For example, Chronic Wasting Disease (CWD) continued to spread, and the CCWHC stepped in to bring managers from wildlife, agriculture and public health together with the research institutes PrioNet Canada and the Alberta Prion Research Institute, and to map out a pathway which brought science, management and affected publics together to assess current conditions and agree on the best path forward. The CCWHC Executive will need to support moving this plan forward in the coming year. As federal investment in the tracking of avian influenza viruses across Canada decreased substantially, the CCWHC found external partners to maintain an internationally credible level of vigilance for these viruses in Canada for public health and to support international trade in poultry products. The stewardship accomplished by the CCWHC in 2010-11 also is impressive. The core program of disease surveillance carried out diagnostic medical examinations of over 3300 wild animals, in addition to the 1600 tested for CWD and 6000 for avian influenza. An impressive 50 graduate students were in programs

dependent on the CCWHC, international obligations to the World Organization for Animal Health (OIE) were met, the epidemic of White Nose Syndrome in bats was tracked as it spread westward toward Manitoba and eastward into the Maritime Provinces, plague was identified in species at risk, and much more.

This year the CCWHC underwent a significant change in its governance structure. As an outcome of a two-year review, the former Board of Directors chose to dissolve itself in October 2010 and established instead an Executive Committee with a broader base of CCWHC partner representation and a higher level of engagement with the private sector. As this report goes to press, active recruitment of Committee members is underway; we anticipate a full complement by the end of 2011. We are grateful for the foresight and wisdom of the Board in crafting this new format for governance.

The CCWHC is currently under severe financial constraint, and the important gains in the capacity of our wildlife health care system achieved in the past decade are threatened. The Executive Committee must rise to this challenge in 2011-12 to ensure that this health care system does not fail our country, but rather achieves the necessary capabilities in prevention, preparedness, response capacity and risk mitigation.

Douglas Freeman  
Dean  
Western College of Veterinary Medicine  
University of Saskatchewan





## About the CCWHC

The Canadian Cooperative Wildlife Health Centre (CCWHC) is a university-based, inter-agency partnership through which Canada’s Colleges of Veterinary Medicine, government agencies at all levels and non-government agencies pool their resources and expertise to reduce the economic and ecological costs and impacts of wild animal diseases in Canada.



### What We Do

The CCWHC has four separate lines of activity, each carried out on regional and national scales. The first three activity lines, Disease Surveillance, Information Services and Education are supported by annual contributions from CCWHC partner agencies and the universities, and constitute the CCWHC’s core program. The fourth activity line—Wildlife Disease Response and Management—is supported by separate funding arrangements for each component project and program.

### Locations

The CCWHC has five university locations, each serving a large region of Canada. These include the Atlantic Regional Centre at the University of Prince Edward Island, the Quebec Regional Centre at the University of Montreal, and the Ontario and Nunavut Regional Centre at the University of Guelph. The four western provinces, the Yukon and the Northwest Territories are served collaboratively by CCWHC Centres at the Centre for Coastal Health at Nanaimo, BC, at the University of Calgary and at the University of Saskatchewan, which also hosts the CCWHC Headquarters Office.

### Partners

The CCWHC partnership was established in 1992 with leadership from Environment Canada and the Canadian Wildlife Directors, and with additional financial assistance from the Max Bell Foundation.

In 2010-2011, the CCWHC partnership included the Government of Canada as represented by Environment Canada, the Public Health Agency of Canada, Parks Canada Agency, and the Canadian Food Inspection Agency. The partnership also included all provincial and territorial governments, representing Ministries of Fish & Wildlife, Environment, Agriculture and Health. Additional partners were the University of Saskatchewan, the University of Guelph, the University of Montreal, the University of Prince Edward Island, the University of Calgary, the Centre for Coastal Health, the Canadian Wildlife Federation, Ducks Unlimited Canada and Syngenta Crop Protection.

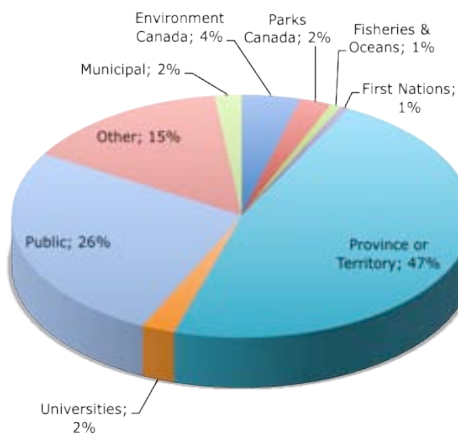




Disease Surveillance integrates four separate activities into a cohesive program: 1) Detection of diseases, 2) Identification of diseases (diagnosis), 3) Disease information management and 4) Communication. Disease detection is achieved through engagement and support of wildlife field personnel across the country. Disease identification is achieved through medical examination of specimens in fully-equipped veterinary diagnostic laboratories, primarily by CCWHC professional staff at the veterinary colleges but also elsewhere through collaboration with government laboratories. Disease information management is done through the CCWHC Information Technology Centre, which includes a national database for all surveillance data. Communication is achieved through a range of instruments: regular reports to the CCWHC Executive Director, the Canadian Wildlife Directors Committee, web site, newsletter and special program reports.

Disease Surveillance

Sources of Animals Examined



Poisons in the Environment  
Wildlife as Sentinels and Victims of Environmental Contaminants



Wild animals are exposed to a great variety of environmental contaminants. This not only poses a significant health hazard to many animals but can also serve as an indicator of the health of entire ecosystems. Surveillance for environmental contaminants via wildlife specimens has been an integral part of the CCWHC wildlife health surveillance program since its inception. In the last 3 years alone, close to 200 contaminant cases have been identified, affecting over 30 species of birds and mammals. The majority of these cases involve five main contaminants or chemical groups; organophosphates, lead, strychnine, rodenticides and petroleum oil. Some notable cases identified in 2010-2011 are highlighted below:

Strychnine Poisoning in Wild Deer

In 2010, two cases of strychnine poisoning were detected in white-tailed deer in Saskatchewan. These cases would have likely gone undetected except that one local dog died and two others became ill after scavenging on these carcasses. In fact, the landowner had buried the carcasses after they appeared to have been the source of poisoning to the dogs and the investigating Conservation Officer had to dig them up in order to submit them for analysis. Similarly, in 2009 a white-tailed deer, pronghorn antelope and two ravens were diagnosed with strychnine poisoning in Saskatchewan. The poisoning was the result of these animals ingesting strychnine-treated grain used to kill ground squirrels.

In 2007, and continuing through to the present, the federal Pest Management Regulatory Agency approved the release of a 2% strychnine liquid formulation directly to producers in response to high numbers of ground squirrels; prior to this, only a 0.4% formulation was approved for use. Similar regulatory changes have occurred in the past and Blakely (Canadian Veterinary Journal, 2009), after examining 35 years of toxicological records from Saskatchewan, demonstrated over a twofold increase in poisoning of non-target species when the 2% strychnine formulation was available; the majority of specimens submitted to the diagnostic laboratory were domestic animals. The rates of non-target strychnine poisonings in wildlife, attributable to these formulations, are unknown but we do know the cases described above represent only a very small proportion of those affected.

## Poisons in the Environment (continued)

### Secondary Poisoning in a Great Horned Owl

Poisoning of raptors, particularly owls, with anticoagulant rodenticides acquired through the consumption of poisoned prey, has been observed in other jurisdictions but has not previously been confirmed in cases examined by the CCWHC in Guelph. This year, we had our first confirmed case, in a Great Horned Owl, which had lesions typical of rodenticide poisoning and in whose tissues Brodifacoum was identified

### Lead Poisoning in Bald Eagles

In the Fall of 2010, a dead adult female bald eagle was found near a cranberry bog in Montague, PE.

The cause of death was acute lead poisoning, with the concentration of lead in liver tissue being over 10 times the normal amount. This abnormally high concentration of lead eventually caused fatal damage to the bird's blood vessels, ultimately resulting in a heart attack.

The eagle was in good body condition at the time of death, but there was evidence of its not eating nor drinking for at least 1-2 days before its death, probably due to altered behavior, a common sign in cases of lead poisoning.

Although no lead pellets or sinkers were found in the gastrointestinal tract of this eagle, the most likely source of lead remains consumption of lead ammunition. It is common for the lead object to have passed through the gut before severe clinical signs or death occurs. Lead shot can be consumed by scavengers such as bald eagles when they feed on unrecovered carcasses. Of the 83 bald eagles that CCWHC Atlantic has examined in the last three and a half years, seven (8.4 %) have suffered lead poisoning.



## White Nose Syndrome Surveillance Among Canada's Bat Populations

During late winter-spring of 2011, CCWHC centres in Atlantic, Québec and Ontario/Nunavut Regions participated in surveillance for White-nose Syndrome (WNS) of bats which extended the range of confirmed or suspected cases over an area about 2300km wide, from near Windsor NS in the east, to near Kenora ON in the west, only about 90km from the Manitoba border.

WNS, first detected in upstate New York in 2006, has since spread in all directions from the epicenter, killing over a million hibernating bats. In the United States, it poses a risk to 6 threatened or endangered species of bats, and it has been predicted to cause regional extinction of Little Brown Bats, one of the most abundant species, within a few decades. As the range of the disease expands, so does the impact on metapopulations of highly susceptible species of cave bats, principally members of the genera *Myotis* and *Perimyotis*. While none of the affected bat species are listed as a species of concern in Canada, as the impact of the disease increases, that situation may change.

*Geomyces destructans*, a fungus found in cave sediments, seems to be a primary pathogen in North America, capable of infecting the skin of normal healthy bats. It is hypothesized that fungal damage to wing membranes alters water balance in hibernating bats. More frequent arousal from torpor to maintain hydration is thought to occur, exhausting energy reserves, which must carry the animals through the 5-6 month period when insect food is not available. Bats dead of WNS have extensive *Geomyces* infection of the skin, and typically have no fat depots. Increasing evidence suggests that *G. destructans* recently was introduced to North America from Europe, where it also has been detected on hibernating bats, apparently without causing disease. Research is currently underway at the Western/Northern CCWHC regional centre in assisting researchers from the University of Manitoba, University of Saskatchewan, Bucknell University and the United States Geological Survey with a study comparing the virulence and pathogenicity of the European and North American strains of *Geomyces destructans* in little brown bats. These studies will hopefully help explain why *Geomyces destructans* does not appear to cause mass mortalities in bats in Europe whereas it causes devastating die-offs in North America. Additionally, this study will help elucidate the mechanisms by which this infectious agent causes mortality.

Surveillance for WNS in a few hibernacula in Canada began in 2008, with more intensive activity in 2009. But it was not until late winter-spring 2010 that the disease was confirmed, in several hibernacula in l'Estrie and Outaouais regions of southern and southwestern Québec, and in 9/12 localities investigated in south-central, eastern, and

### White Nose Syndrome (continued)

northeastern Ontario. The disease was detected as far north as Kirkland Lake, about 580km from the nearest known affected hibernaculum in New York State.

Up until June 1, 2011, WNS had been detected in the Ontario regions affected in 2010, and in over a dozen new localities, extending the range to most of the Niagara Escarpment in south-central Ontario, and to Timmins, Wawa, Thunder Bay and Kenora districts in northern and northwestern Ontario. In Québec, WNS was detected in regions where it was present in 2010, and had spread to about a half-dozen new localities. These include Val d'Or in the northwest, near affected regions in northeastern Ontario; and localities in Mauricie, Centre-du-Québec and l'Estrie, in south-central and southern Quebec. In southern New Brunswick an estimated 90% of bats were affected by WNS in a major hibernaculum which had showed no signs of infection in 2010. Subsequently, bats found dead on the landscape in other regions of southern New Brunswick also were confirmed with WNS. And WNS was confirmed further south, in Nova Scotia, in a number of bats found dead on the landscape in the vicinity of hibernacula in Hants County.

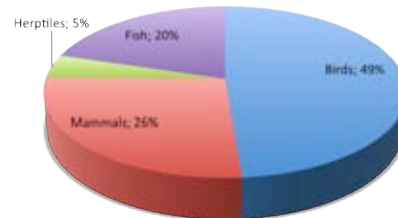
The rapid and wide dissemination of infection among cave bats is almost certainly the result of sometimes long-distance movement of infected bats. Amplification of infection occurs within hibernacula, where environmental conditions ideal for growth of *G. destructans*, which thrives in cool moist conditions, and close contact among, and intermittent movement of, hibernating bats, facilitate transmission within the population present.

Geomycosis does not lend itself to simple therapeutic, preventative, or management interventions, at the individual, population, or environmental levels. It is probable that it will run its course, very likely adversely impacting the entire North American populations of susceptible bat species with time. The situation is sufficiently serious that in the USA consideration is being given to captive breeding of the 6 endangered species of bats, as well as the Little Brown Bat, with the aim of preserving them from extinction, and providing sources for potential repopulation of the wild in the future.



### Disease Surveillance

#### Specimens Examined by Taxonomic Grouping



In 2010-2011, submissions to the core surveillance program were virtually unchanged from 2009-2010, with approximately 3,600 specimens examined, representing over 1600 distinct incidents. The majority of submissions were derived from municipal, provincial and territorial governments, together representing 49% of submissions. Bird species comprised 49% of specimens, with mammalian species representing 26%; the remaining 25% of submissions were made up of amphibians, reptiles and fish. Submissions were distributed relatively evenly across CCWHC diagnostic centres, with 28% of total incidents at the Western & Northern regional centre, 25% at the Ontario & Nunavut regional centre, 23% at the Quebec regional centre, 21% at the Atlantic regional centre and 3% at the developing Alberta regional centre.

### Disease Surveillance

#### Specimens and Incidents by CCWHC Region

Region	Incidents	Specimens
AB	61	110
W/N	602	806
ON/NU	545	783
QC	493	1223
AT	450	594

## Marine Animal Program

### Health Surveillance Program for Marine Animals in Eastern Canada

Because of the location of the CCWHC's Atlantic regional centre, marine animals have always represented a substantial proportion of its wildlife health surveillance program. These have included birds of a wide variety of species, seals, small and large whales, and, more recently, sea turtles. As with other species of wild animals, this program relies on several individuals and organizations outside the CCWHC for reporting morbidity and mortality incidents involving marine animals - organizations such as Fisheries and Oceans Canada (DFO), Prince Edward Island Department of Environment, Marine Animal Response Society (MARS) of Nova Scotia, New Brunswick Museum (NBM), Grand Manan Whale and Sea Bird Research Station, and the Canadian Sea Turtle Network.



Since the start of the CCWHC operations, the Atlantic regional centre has examined roughly 150 small and large whales (including five northern right whales), large numbers of seals, and 11 sea turtles (five leatherback, four Kemp's ridley, and two green). All three species of sea turtles that we have examined and the northern right whale are endangered. This unfortunate situation enhances the value and importance of performing necropsies on carcasses of these animals, and DFO, being mandated with the responsibility to manage and protect marine animals, has helped to facilitate access to several of these carcasses.

A recent article (Cetacean strandings in the Canadian Maritime provinces, 1990–2008. Nemiroff et al. Canadian Field-Naturalist 124: 32–44, 2010) summarized data from three organizations (MARS, NBM, and CCWHC) on a total of 640 stranding events involving 881 individuals of 19 species. Among other parameters examined, and based on necropsies performed by members of the CCWHC, causes of mortality were compared between the three most common species involved in strandings: harbour porpoise (typically an inshore species), Atlantic white-sided dolphin, and long-finned pilot whale (two species that are more commonly found offshore). Disease affected harbour porpoises more often than stranding by mishap, while white-side dolphins and pilot whales were more often involved in strandings by mishap than harbour porpoises. This has practical implications for people attempting to rescue stranded live animals, since rescue efforts would be less likely to be successful with a harbour porpoise than with an animal of the two other species if the former had an underlying disease problem.

Carcasses of the three Kemp's ridley turtles and the two green turtles were all submitted between September and November 2009. Four of them were found along the shores of the Bay of Fundy, Nova Scotia, and the fifth was found on the south-western shore of Cape Breton Island, Nova Scotia. The reason for this cluster of mortalities is unknown. Nonetheless, it is only through an efficient reporting system, as is currently provided in the Atlantic provinces by an informal network of individuals and organizations interested in the marine environment and eager to cooperate, that such unusual patterns of distribution and movement of these rare animals can be identified and documented.

Health surveillance in marine animals is an essential part of the CCWHC's mandate. We are only starting to realize the serious negative impact that human activities, particularly overfishing, have had on marine resources. This overexploitation has created some major imbalances in the marine ecosystem, including not only the collapse of several ground fisheries but, interestingly, a concurrent remarkable growth in populations of some other marine animals, such as harp seals and grey seals. The long-term consequences of these changes are impossible to predict, and therefore the collection of information derived from mortalities in marine animals becomes even more important.





The CCWHC responded to a wide range of requests for information and advice from partner agencies in 2010-2011. These included participation in regional, national and international meetings, participation on committees, and reports on specific issues. The CCWHC also provided information to the public by responding directly to inquiries, publishing a semi-annual Newsletter, providing media interviews, and maintaining an informational website: [www.ccwhc.ca](http://www.ccwhc.ca)

Regional Examples

- Maritime Marine Animal Assistance Network
Expert witness for the Crown - Wildlife Related Litigation
Parks Canada Eastern Animal Care Task Force
Nova Scotia Mainland Moose Recovery Team
West Nile Surveillance Regional Committees
Provincial Rabies Advisory Committees
Regional/Provincial Chronic Wasting Disease Surveillance and Research Planning Committees
Provincial/Territorial Avian Influenza Advisory Committees
Northwest Territories Wildlife Care Committee
Saskatchewan Epidemiology Association
Prairie Diagnostic Services: member - Board of Directors
Provincial committee for the surveillance of Hemorrhagic Septicemia Virus
Ontario Animal Health Committee
Needs Assessment: White Nose Syndrome Surveillance in Western Canada

National Examples

- Vector-borne Diseases Sub-issue Group (PHAC)
National Steering Committee on West Nile Virus (PHAC)
Arctic and Northern Non-enteric Zoonotic Diseases Sub-issue Group (PHAC)
West Nile Virus and other Vector-borne Diseases Issue Group (PHAC)
Canadian Rabies Committee Sub-issue Group (PHAC)
Canadian Zoonotic Influenza Sub-issue Group (PHAC)
Public Health & Climate Change Expert Advisory Committee (PHAC)
Aquaculture Association of Canada
Canadian Animal Health Laboratories Network
Canadian Animal Health Surveillance Network
Canada's Inter-agency Wild Bird Influenza Survey
Animal capture drug advice, acquisition and distribution to wildlife agency personnel
Chemical Immobilization of Wildlife Course
Animal Determinants of Emerging Disease (ADED): National Zoonoses Rounds
National Aquatic Animal Health Program Steering Committee
Canadian Wildlife Federation Issues Forum
Fur Institute of Canada (representative of the Canadian Association of Zoo and Wildlife Veterinarians on the Board of Directors)
Fore-CAN: Foresight for Canadian Animal Health Systems
Mapping Workshop (CFIA)
CoSEWIC Terrestrial Mammals Subcommittee

International Examples

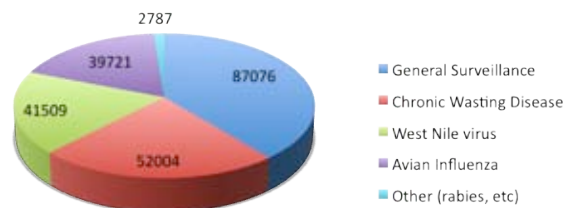
- OIE Collaborating Centre on Wildlife Disease Surveillance and Monitoring, Epidemiology and Management
OIE Working Group on Wildlife Diseases
OIE ad hoc Group on Wildlife Disease Notification
Canada-USA-Mexico Tri-lateral NGO Committee for Continental Wildlife Health Management
Wildlife Disease Informatics Working Group
Participatory Epidemiology Network for Animal and Public Health
US Fish & Wildlife Service Federal-State White Nose Syndrome Consultation
North American Rabies Management Plan
Sri Lanka: Developing Wildlife Disease Monitoring Capacity
Panama: Smithsonian Bioreerves as Listening Posts for EID's
Wildlife Disease Association Student Forum
Tajikistan: Ecology Monitoring of Murine Rodents for Parasitic and Infectious Diseases

Information Technology Centre

The CCWHC Information Technology (IT) Centre provides on-going support and service to the entire CCWHC, primarily in the areas of database and application development. 2010 saw a higher degree of stability and speed brought to the database. A comprehensive review of the entire system was also performed with a view to refining and remodeling certain aspects of the current system. The CCWHC database is being used by all CCWHC sites as well as by some partner agencies and individual researchers. CCWHC holds over 210,000 records of wildlife disease occurrences in its database systems. The Centre also provides on-going support, training and advisory services to the CCWHC at large and is engaged in several national and international initiatives to promote the sharing and use of wildlife disease data, including collaborations with researchers across Canada, the United States, Central and South America and Europe.

Information Technology

Total Data Records by Project





## Publications

A Selection of Publications and Reports by CCWHC Staff and Associates

(For a larger list of recent publications please visit [http://www.ccwhc.ca/publications\\_and\\_newsletters.php](http://www.ccwhc.ca/publications_and_newsletters.php))

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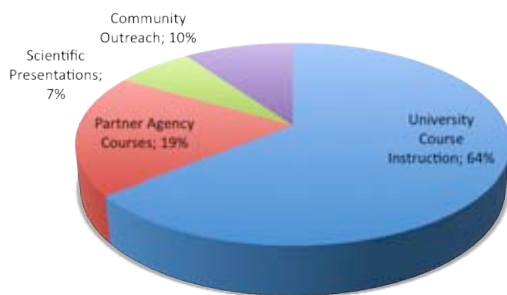
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Education is a key activity for the CCWHC. Education supports disease surveillance through instruction and engagement of wildlife field personnel and the public, and creates wildlife health specialists through university programs. Educational workshops, held nationally and internationally, promote the ongoing professional development of wildlife health professionals, the development of programs and the interchange of knowledge, while addressing current issues affecting the health of wildlife and domestic animals and human and ecological health. University-based academic programs supported by the CCWHC provide a steady flow of valuable teaching material and learning opportunities for undergraduate and graduate students, while also benefiting government agencies by contributing to the education of highly qualified personnel and by contributing to projects that address management and policy issues of direct interest to CCWHC partner agencies.

In 2010-2011 the CCWHC continued to be active in its role as a Collaborating Centre of the World Organization for Animal Health (OIE), the CCWHC participated in a number of training workshops as well as engaged in consultations in Asia concerning the development of wildlife health management programs. In total, over 200 hours of instruction were provided to partner agencies in 2010-2011 and approximately 700 hours were invested in student teaching and scientific presentations. In total, the CCWHC directly supported and/or supervised an impressive 58 graduate student projects, ranging from the study of Anthrax in Bison to the effects of climate change on Barrenground Caribou.

**Education**

Invested Time in Educational Activities



CCWHC International

**Capacity For Sri Lanka**

In July and August 2010, the Faculty of Veterinary Medicine and Animal Science at the University of Peradeniya in Sri Lanka joined with the CCWHC to carrying out a feasibility study for establishing a national program of wildlife health management in Sri Lanka and of adapting the CCWHC model for a national coordinating centre. Key potential participants were interviewed and facilities that might be made part of the program were visited. The study concluded that Sri Lanka has the will and the capacity to develop a wildlife health program and a coordinating centre. A Board of Management for the program has been established, with representatives from two key government ministries and the veterinary faculty, and initial planning has begun. The CCWHC will remain engaged with this project as the Sri Lanka Wildlife Health Centre is developed over the next five years.

**World Organization for Animal Health (OIE)**

A first series of training workshops for wildlife focal points from each OIE member country was completed in 2010 with workshops held in Bamako, Mali, and Bangkok, Thailand. The Training Manual for this series has now been published by the OIE in English and editions in French and Spanish will soon also be available. A second series of workshops for the OIE is being developed by the CCWHC and will be presented starting in October 2011.





In 2010-2011, the CCWHC responded to several important wildlife disease issues with targeted programs of enhanced surveillance, research and participation in the disease management actions of partner agencies. Many of these targeted programs also enhance the capacity of the CCWHC core program (activity lines 1-3).

Disease Response and Management activities in 2010-2011 were centered around Avian Influenza surveillance in wild birds, Rabies Surveillance in Eastern Canada, surveillance and research for White-nose syndrome among bats, as well as Chronic Wasting Disease surveillance and research. The CCWHC also was involved in wildlife health research within the Foothills Research Institute Grizzly Bear Program and Scandinavian Brown Bear Project, surveillance and monitoring of fish pathogens, and in several International Polar Year projects.

**Species Conservation**



**Avian Influenza**



**White Nose Syndrome of Bats**



**Fish Viruses**



**Chronic Wasting Disease**



**Chytrid Fungus in Amphibians**

**Raccoon Rabies**

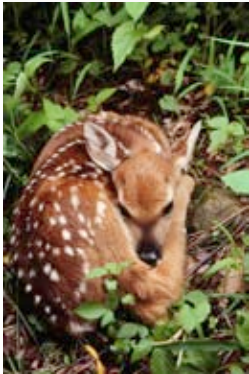


**Community-based Health Management**

**Animal Welfare**

**Ecosystem Management**

## Chronic Wasting Disease Surveillance, Research, Leadership



The Western and Northern Region has been assisting Saskatchewan Environment (SE) in chronic wasting disease surveillance in wildlife since it was first detected in farmed cervids in Saskatchewan in 1996. To date, approximately 44,000 wild cervids have been tested for CWD in Saskatchewan allowing us to approximate the geographic extent of this disease and to track the gradual expansion of its range eastward in Saskatchewan and

westward into Alberta. Increasingly the focus of continued surveillance is on larger sample sizes from areas where CWD has not yet been detected, primarily eastern and southern Saskatchewan. To encourage sample submissions SE and CCWHC have established mobile check stations during the hunting season at locations of high hunter traffic. Staffed by CCWHC employees, samples can be collected while the hunters wait. Although 2010 was the first year of this program response has been good and the program will be expanded in 2011.

Although the prevalence of CWD is generally low in affected Wildlife Management Zones, there are areas where the prevalence is much higher. One such area is along the South Saskatchewan River valley. Since 2006 the CCWHC, with funding from PrioNet Canada and SE, have been undertaking research on CWD in this area in order to better understand the nature of the disease and to attempt to develop methods for its management. To date we have captured, sampled and radio-collared over 800 deer, primarily mule deer. We have evaluated movement patterns of deer to predict spread and to determine areas over which disease management must occur in order to control spread. Findings to date show that initial CWD control areas were too small to contain the disease even if the disease had been detected shortly after its introduction. We are currently using radio-telemetry, direct observation and trail cameras to study the rates and types of contacts which occur among deer in order to better understand factors affecting disease transmission. Utilizing this information we hope to identify factors which may be modified by disease management actions to minimize CWD transmission. In addition we are estimating reproductive parameters and cause specific mortality rates to make predictions on the long-term impact of CWD on deer populations.

There is no evidence of genetic resistance to CWD in deer and elk and no geographical or ecological impediment to

its spread over most, if not all, of North America. The impact of CWD on deer populations and their ecosystems, and the social and economic activities they support, is unknown. We do know this is going to be a long-term issue which will require ongoing surveillance and research to fully understand its implications.

### CWD Policy and Management

In 2004-05, the CCWHC worked with many partners to develop a Chronic Wasting Disease Control Strategy for Canada that was endorsed as national policy by federal, provincial and territorial resource ministers in October 2005. Over the ensuing five years, the surveillance and research goals of the Strategy were largely achieved but control of CWD was unsuccessful in both wild and captive populations. The disease has continued to spread among wild and captive cervid populations. In 2010, at the request of a group of agency staff from a wide range of jurisdictions and charged with managing CWD and its attendant risks, the CCWHC established a process to review developments in science and in management since 2005 and to apply the outcome of this review to the revision of the national Strategy. A partnership was established among PrioNet Canada, the Alberta Prion Research Institute and the CCWHC to hold two workshops in 2011. The first, in Edmonton in February, brought scientists and managers together to review current challenges in CWD management and the findings of five years of intensive research; the second, in Saskatoon in April, brought a smaller group of key scientists and managers together to review the Strategy of 2005 and to recommend a new path forward. A new version of the CWD Control Strategy, updated to incorporate the new science and new realities of CWD in Canada in 2011, is now under review and discussion with the many agencies and non-government groups which must invest and collaborate in CWD control if the substantial social, economic and ecological harm which CWD is likely to produce is to be minimized. [Reports from these workshops are available on the CCWHC website at [http://www.ccwhc.ca/article\\_cwd\\_report.php](http://www.ccwhc.ca/article_cwd_report.php).]

*CCWHC Mobile Laboratory – Eastern Saskatchewan CWD testing, Fall, 2010*



## Avian Influenza Viruses in Wild Birds

The CCWHC coordinates and manages Canada's national Inter-agency Wild Bird Influenza Survey. Canada's investment in surveillance for influenza viruses in wild birds has been much reduced in the past few years compared to 2005-2008. Despite the reduction in scale, this program was a major activity of the CCWHC in 2010.

The Canadian Survey consisted of vigilance for the highly pathogenic strains of avian influenza viruses in wild birds found dead and brought to one of the network of diagnostic laboratories that participate in the program. This program is carried out in partnership with the provinces and territories, with additional investment from the Public Health Agency of Canada and the Canadian Food Inspection Agency (CFIA), and in-kind support from Environment Canada. A modest level of vigilance was achieved through examination and testing of 1845 dead birds (see Table below).

The CCWHC was able to greatly amplify the Canadian program through collaboration with the US Department of Agriculture and the US Geological Survey. Both agencies value information about the influenza viruses circulating in wild bird populations and both contracted with the CCWHC to obtain this information which then also was shared with the Canadian Survey. Likewise, the Provinces of Newfoundland and Labrador and British Columbia tested live birds and shared the results with the Survey. A total of 5885 live wild birds were sampled and tested in 2010, and avian influenza viruses were detected in 623 (11%) (Table). A highlight of the live bird testing program was the discovery, in collaboration with the CFIA, of H5N2 viruses very similar to, and likely the source of, the H5N2 virus found in a commercial turkey flock in Manitoba, thus highlighting the need for maintaining a secure barrier against transmission of viruses between wild and domestic populations.

### Response & Management

#### Avian Influenza Surveillance in Wild Birds in 2010

Survey	Species	Number tested	Number Infected (%)
Wild Birds Found Dead	Multiple Species	1845	8 (0.4%)
Live Birds	Ducks	2661	600 (22%)
	Geese	301	0
	Gulls & Terns	919	18 (2%)
	Marine Ducks	751	0
	Other Marine Birds	753	4 (0.5%)
	Shorebirds	500	1 (0.2%)
	<b>Total</b>	<b>5885</b>	<b>623 (11%)</b>

## International Polar Year

### Engaging Communities in Monitoring Zoonoses of Food Safety Concern

Over the past 3 years, the CCWHC has been fortunate to participate in an innovative and trend-setting project aimed at empowering remote communities to manage the safety of the wild animal-derived foods upon which they often depend. This project was led by Manon Simard of the Makivik Corporation in Nunavik, northern Quebec and was supported by research funds provided by Canada's International Polar Year program. CCWHC was part of the scientific team and created a data management system for this project and subsequent food safety testing in the participating regions. The project was built on Makivik's previous success in establishing rapid testing for *Trichinella* parasites in walrus meat for Nunavik communities. A

team of scientists from the Nunavik, the Northwest Territories, Ottawa, Saskatoon, Guelph and Poland developed and validated laboratory methods that can be applied reliably in small laboratories established in remote communities to detect not only *Trichinella* but also the protozoan parasite *Toxoplasma*, two important groups of food-contaminating bacteria, *Salmonella*, and *E. coli* H7:0157, and Anisakid nematode parasites of fish and marine mammals. All of these organisms can cause human diseases. Local people were trained and small laboratories were equipped in Nain (Nunatsiavut), Yellowknife (Northwest Territories) and the Nunavik Research Centre in Kuujuaq, Nunavik. This project has been an important and successful proof of principle that local communities can be empowered to take control and responsibility for important aspects of their own food safety concerns.



### Wildlife Parasitology Diagnostic Services and Research

The CCWHC has a long history of diagnosing and tracking the incidence of parasitological organisms and their effect on wildlife in Canada. This capacity continues to exist throughout all of the CCWHC regional centres and now with the development of the CCWHC Alberta regional centre as a national centre of expertise in wildlife parasitology this capacity has been greatly expanded. There are currently several projects of particular interest including the study of *Echinococcus* in wild carnivores, *Baylisascaris* in raccoons, and at the Quebec regional centre the investigation of Red vent Syndrome in Atlantic Salmon.

#### *Echinococcus* in Wild Carnivores

Echinococcosis is a parasitic disease caused by two well known tapeworms namely, *Echinococcus granulosus* and *E. multilocularis*. The adult form of these parasites resides in the gut of wild carnivores from where they shed eggs. The eggs are infective to a wide range of intermediate host that include ruminants and rodents in which each egg develops into a hydatid cyst. These tapeworms can infect humans through accidental ingestion of eggs which can lead to hydatid disease. In southern Alberta, increasing numbers of urban coyotes may be of public health concern. Dr. Alessandro Massolo, a UCVM faculty member is leading an initiative to determine the prevalence of *Echinococcus* in wild carnivores (especially coyotes) in and around Calgary. CCWHC is playing a key role in morphological and molecular identification of isolated parasites. Parasite species confirmation is done through species-specific Polymerase Chain Reaction (PCR). A cost-effective PCR based screening of fecal eggs for differential diagnosis of tapeworms is currently under evaluation.

#### *Baylisascaris* in Raccoons

*Balisascaris procyonis* is a parasitic roundworm of raccoons. It is considered endemic to the Americas and is abundant in eastern Canada; however its prevalence in western Canada has not been well documented. *Baylisascaris procyonis* is a species of concern due to its zoonotic potential. Humans can become infected with *B. procyonis* through contact with eggs in raccoon feces and larval migrans can cause serious disease, particularly in young children. *B. procyonis* can also infect other dead end hosts including domestic cattle. The population of raccoons in Alberta is growing. It is important to determine a current estimate of the prevalence of *B. procyonis* within the raccoon population in order to accurately assess the risk this disease poses to both

animal and human health. The Alberta CCWHC and UCVM faculty (Drs. Padraig Duignan, Eugene Janzen) together with provincial partners, have initiated a program to investigate the occurrence of *B. procyonis* in nuisance and road-killed raccoons. The parasite is diagnosed through morphology and PCR based molecular analysis. As the Canadian raccoon population continues to expand west, we anticipate that this parasite could become an important health risk for both humans and livestock.

#### Red Vent Syndrome in Wild Atlantic Salmon

Red vent syndrome (RVS), an emerging disease of Atlantic salmon in Europe, has been reported in salmon rivers of the province of Quebec since 2008. Because RVS is associated with embedded *Anisakis simplex* larvae in the tissues surrounding the vent, it can be hypothesized that the emergence of this syndrome is consecutive to an increase in the infection intensity of this parasite. To explore this possible relationship, the intensity of infection by *Anisakidae* larvae was compared between salmon presenting macroscopic lesions of RVS and salmon without obvious external signs. Although the intensity of infection was higher in salmon presenting RVS, the magnitude of this relationship was moderate, which suggests that, even if the number of larvae is a determinant of the pathogenesis of RVS, other factors, such as time of infection, might also play a role in the occurrence of RVS.

#### Sero-diagnosis of *Fascioloides magna* in Wild Ruminants

*Fascioloides magna*, also known as the large American liver fluke, is a liver parasite that infects a variety of wild ruminants. The parasite establishes patent infections in elk, white-tailed deer, and caribou and is diagnosed in those live animals through fecal examination for characteristic ova of the parasite. However, other ruminants, including moose and domestic cattle, act as dead-end hosts in which the eggs are not shed in feces. Infection in these hosts is a result of spill-over from wildlife reservoirs and can cause significant liver damage and in some cases illness and death. Thus, there is a demand, both from wildlife managers and the cattle industry, to have a serological test that can detect infection in these dead end hosts. In spring 2011, the Alberta node of CCWHC, in collaboration with Parks Canada and graduate student Mathieu Pruvot (UCVM), began work on developing a serological diagnostic test for *F. magna* in wild cervids and cattle. This test is investigating 1) Excretory-secretory 2) Tegumental and 3) Whole worm antigens from larval and adult *F. magna*.

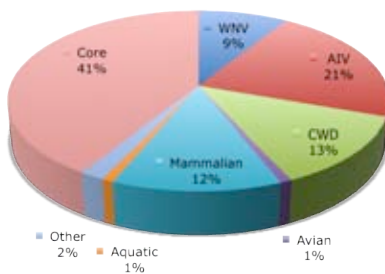
In 2010-2011, the CCWHC had total cash revenues of \$3,698,544, an increase of 5% from 2009-2010. Unfortunately, due to increasing costs of equipment, laboratory analysis and salaries/benefits total expenditures also increased to \$3,967,532, an increase of 12% from the past year. Core Program revenues (activity lines 1-3) comprised \$1,518,762 or 41% of the total, comparable to funding levels in 2009-2010. Revenues from Response and Management activities (activity line 4), mostly from targeted research programs, comprised \$2,179,782 or 59% of total revenue.

Core Program revenue from the Government of Canada accounted for \$880,000 or 58% of the total, while core revenue from the provinces and territories accounted for \$543,762 or 36%. Cash contributions from other non-government organizations especially the universities and individuals accounted for the remaining \$95,000 or 6%.

Response and Management revenues were primarily comprised of federal government funding (69%), provided primarily by the Canadian Food Inspection Agency, the Public Health Agency of Canada, PrioNet Canada (Network Centres of Excellence), NSERC-CRD, and Environment Canada. Provincial and foreign governments and the Universities provided the remaining 31%, with major contributions from Saskatchewan's Ministry of Environment, the Ontario Ministries of Natural Resources and Agriculture Food and Rural Affairs, the Government of Quebec, and the United States Department of Agriculture and the United States Geological Survey.

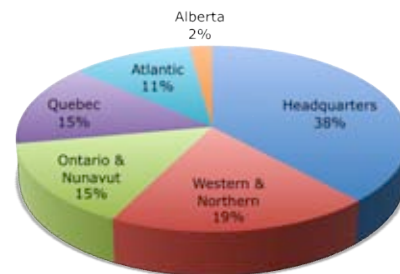
### Total Revenue

All Activity Lines



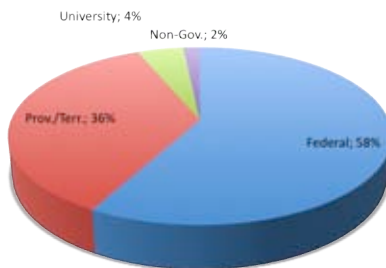
### Total Expenses

All Activity Lines by Region



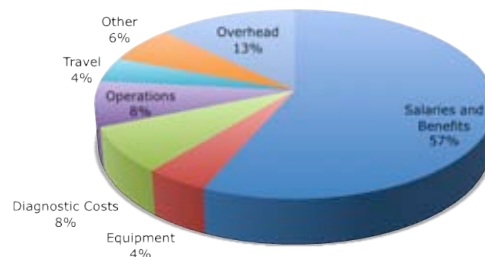
### Total Revenue

All Activity Lines



### Total Expenses

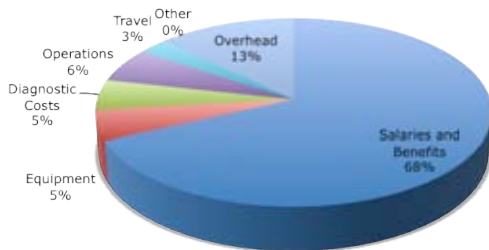
All Activity Lines by Category



Expense	2010 - 2011 Core Expenses by Region							Total
	HQ	W & N	ON/NU	QC	Atlantic	CCH	AB	
Salaries and Benefits	\$ 647,542.35	\$ 128,000.00	\$ 284,815.00	\$ 318,047.77	\$ 252,950.54	\$ 15,150.00	\$ 26,433.00	\$ 1,672,938.66
Equipment	\$ 38,377.95	\$ 37,052.87	\$ 4,882.56	\$ 1,640.26	\$ 59.00		\$ 44,500.00	\$ 126,512.64
Diagnostic Costs	\$ -	\$ 32,672.71	\$ 49,445.45	\$ 17,248.82	\$ 26,705.00		\$ 783.18	\$ 126,855.16
Operations	\$ 28,023.45	\$ 55,722.77	\$ 7,660.44	\$ 37,367.70	\$ 10,056.00	\$ 2,000.00	\$ 7,000.00	\$ 147,830.36
Travel	\$ 16,512.88	\$ 1,532.25	\$ 17,718.44	\$ 17,436.37	\$ 8,735.00		\$ 3,794.84	\$ 65,729.78
Other	\$ -	\$ -					\$ -	\$ -
Overhead	\$ 104,927.78	\$ 38,247.09	\$ 54,678.28	\$ 58,761.14	\$ 44,775.83	\$ 2,572.50	\$ 12,376.65	\$ 316,339.28
<b>Subtotal</b>	<b>\$ 835,384.41</b>	<b>\$ 293,227.69</b>	<b>\$ 419,200.17</b>	<b>\$ 450,502.06</b>	<b>\$ 343,281.37</b>	<b>\$ 19,722.50</b>	<b>\$ 94,887.67</b>	<b>\$ 2,456,205.88</b>
Cost Recovery	\$ 416,545.01	\$ 67,455.26	\$ 62,971.02	\$ 49,431.45	\$ 48,188.37	\$ 19,722.50	\$ 12,376.65	\$ 676,690.27
<b>Total</b>	<b>\$ 418,839.40</b>	<b>\$ 225,772.43</b>	<b>\$ 356,229.15</b>	<b>\$ 401,070.61</b>	<b>\$ 295,093.00</b>	<b>\$ -</b>	<b>\$ 82,511.02</b>	<b>\$ 1,779,515.61</b>

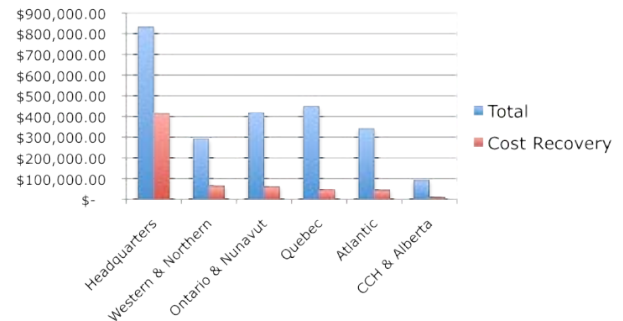
### Core Expenses

Activity Lines 1-3 by Category



### Core Expenses

Activity Lines 1-3 Cost Recovery



### Core Expenditures and Cost Recovery

In 2010-2011, the cost of delivering the CCWHC core program, including the National Wildlife Disease Surveillance Program and Educational and Informational Services (activity lines 1-3) approached \$2.5 million.

Funding for the core program totaled only \$1,518,762, creating a shortfall of \$937,443 or 38%. Fortunately, the CCWHC was able to capitalize on synergies between the core program activities and Response and Management activities to recover a total of \$672,690 (38% of total core expenditures) to help offset this deficit, however, the final cost of delivering the core program, after cost recovery, was \$1,779,516, thus incurring a deficit of approximately \$278,000 in the discharge of the program.



## Financial Highlights

Canadian Cooperative Wildlife Health Centre		Statement of Revenues & Expenses	
REVENUES	Core (General)	Special Projects	2010/2011 Total Revenues
Canadian Food Inspection Agency	130,000	278,950	408,950
Canadian Institutes of Health Research		28,000	28,000
Environment Canada	400,000	38,396	438,396
First Nations and Inuit Health		0	0
Fisheries and Oceans		30,000	30,000
Foothills Research Institute		100,000	100,000
NSERC-CRD		139,100	139,100
Parks Canada	110,000	2,500	112,500
PrioNet Canada		261,000	261,000
Public Health Agency of Canada	240,000	634,421	874,421
Alberta			
Alberta - Community Development	4,000	0	4,000
Alberta - Fish and Wildlife	7,000	0	7,000
British Columbia	20,000		20,000
Manitoba	10,000		10,000
New Brunswick			
New Brunswick - Fish & Wildlife	10,259	3,617	13,876
New Brunswick - Health	10,259	0	10,259
Newfoundland & Labrador	21,700		21,700
Northwest Territories	16,000		16,000
Nova Scotia			
Nova Scotia - Agriculture		4,667	4,667
Nova Scotia - DNR	9,500		9,500
Nova Scotia - Health	0	0	0
Nunavut	15,000	10,000	25,000
Ontario			
Ontario - Agriculture, Food and Rural Affairs		75,000	75,000
Ontario - Health and Long Term Care	100,000		100,000
Ontario - Natural Resources	80,000	40,000	120,000
Prince Edward Island			
PEI - Environment	4,735	1,050	5,785
PEI - Health		3,909	3,909
Quebec			
MAPAQ	50,000		50,000
MRNF	50,000	10,553	60,553
MSSS	80,000	63,455	143,455
Saskatchewan			
Saskatchewan Agriculture and Food		35,980	35,980
Saskatchewan Environment	41,309	208,000	249,309
Yukon	14,000		14,000
Ducks Unlimited	12,000		12,000
Canadian Wildlife Federation	10,000		10,000
Syngenta	3,000		3,000
UCVM	70,000		70,000
United States Department of Agriculture		90,314	90,314
United States Geological Survey		54,609	54,609
Miscellaneous Income		66,261	66,261
<b>TOTAL REVENUE</b>	<b>1,518,762</b>	<b>2,179,782</b>	<b>3,698,544</b>
<b>EXPENSES</b>			<b>2010/2011 Total Expenditures</b>
Salaries and Benefits	1,205,564	1,032,412	2,237,976
Equipment	89,349	88,404	177,753
Diagnostic Costs	126,855	212,154	339,009
Operations	131,647	144,335	275,982
Travel	49,217	128,023	177,240
Other	0	252,921	252,921
Overhead	194,103	312,546	506,650
<b>TOTAL EXPENSES</b>	<b>1,796,735</b>	<b>2,170,796</b>	<b>3,967,532</b>
<b>Revenue less Expenditures</b>	<b>-277,973</b>	<b>8,986</b>	<b>-268,987</b>

**Cash Revenues in 2010-2011 included \$1,518,762 in support of the core program and a further \$2,179,782 for targeted research programs. In total, CCWHC revenues for 2010-2011 were \$3,698,544.**



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Chris Pinel

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Canadian  
Cooperative  
Wildlife Health  
Centre

**Our Mission:** To provide an integrated partnership approach to the delivery of wildlife health services, research, and education in Canada and internationally.

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