



Canadian Cooperative Wildlife Health Centre



Safeguarding the health of Canada's wildlife

CANADIAN COOPERATIVE WILDLIFE HEALTH CENTRE



ANNUAL REPORT

2011-2012

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The views, opinions or positions expressed in this report do not necessarily reflect those of participating groups, agencies, organizations, jurisdictions or any employee thereof.



About the CCWHC

Who We Are

Established in 1992, the CCWHC is uniquely positioned across Canada's schools of Veterinary Medicine and as a Collaborating Centre of the World Organization for Animal Health (OIE) to provide ongoing regional, national, and international monitoring, research and education programs in support of wildlife health.

What We Do

Health Surveillance is a national program that integrates the detection of disease occurrences, the identification of those diseases (diagnosis), the collection of health and disease information into a single database, and analysis and communication of results into a coordinated Canada-wide system for vigilance, assessment and response to wildlife health issues. CCWHC professional staff are skilled in coordinating, conducting and interpreting broad-scale monitoring programs, reporting on them in program-specific reports and databases, and providing ongoing advice, information and data management services

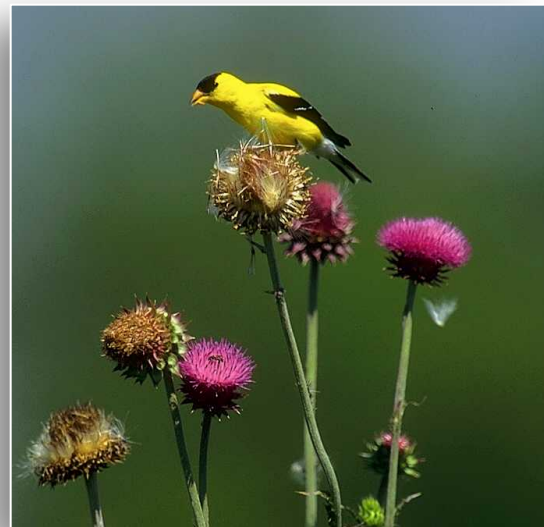
Education The CCWHC is dedicated to advancing the field of wildlife health through contributions to University curricula, training courses and workshops for continuing education, and development of future wildlife health professionals through programs of advanced study. The CCWHC also is dedicated to educating the public through informational websites, public presentations and the news media.

Research and Management The CCWHC participates in and often leads many targeted programs of enhanced disease surveillance, research, strategy development and management activities pertaining to important wildlife disease issues. Some of the variety of programs currently underway include Avian Influenza surveillance in wild birds, White Nose Syndrome surveillance and research among bats, Chronic Wasting Disease surveillance and research among wild deer and activities pertaining to Grizzly Bear conservation, amphibian health, wild animal welfare and community-based health management.

Wildlife Health

Healthy wildlife populations are part of Canada's identity, and for good reason. Wild animal health is an indicator of the health of Canada's ecosystems. Monitoring of wildlife health is vital to maintaining and enhancing the well-being of our wildlife, our environment, and ourselves.

The CCWHC objective is to monitor and understand the health of Canada's wild animals and to keep decision-makers and the public informed and aware of wildlife health issues.





A Message from the Chair Executive Committee



Each year, as I review the accomplishments and activities of the CCWHC, I am impressed with the high level of efficiency and productivity of the organization. The CCWHC business model is one that could and should be used to deliver other national science-based programs in Canada. The model maximizes the mutual benefits of collaboration and co-investment in a single program that serves the needs of the whole country. No government agency or non-government group pays the full cost of Canada's national health care system for wildlife. Instead, many government agencies, non-government groups and several universities invest together in the CCWHC and receive the services and activities each needs. In addition, the CCWHC serves as a coordinating centre among many groups in Canada engaged in aspects of wildlife health work, and our national program is the sum of all these activities, with some strategic additions provided by the CCWHC itself. Ours is a robust public-private partnership that serves the country extremely well.

This report highlights the work of the CCWHC on the ground and in the trenches – surveillance, research, education and international development. But this year has also been an important year of renewed governance and strategic planning. The newly-created Executive Committee, our senior governing body, has come together with a new level of energy and commitment. Meeting in Ottawa in March, the Committee spent a full day on forward planning and on its members' own personal engagement with achieving CCWHC objectives, including sufficient financial resources. Furthermore, the CCWHC took the historic step of recruiting five Committee members from Canada's business community. The enthusiasm of these new members for the mission and objectives of the CCWHC gives me great optimism that, with the new Executive Committee behind it, the CCWHC will reach a new level of capacity and performance in 2012-13 and beyond.

I invite you to visit the new public-interest website of the CCWHC, www.healthywildlife.ca, and to follow the CCWHC via Facebook or Twitter. I also invite you to consider making a donation, large or small, to help make Canada's wildlife health program the best it can be and, perhaps, the best in the world.

Douglas Freeman
Dean
Western College of Veterinary Medicine
University of Saskatchewan

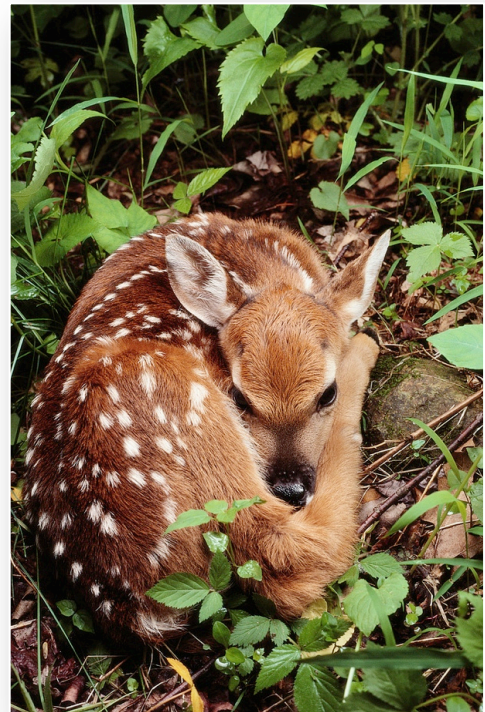




Leadership Team

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
James Gray-Donald	Bentall-Kennedy
Wade Luzny	Canadian Wildlife Federation
Moira McKinnon	Saskatchewan Health
Darryl Neate	Oxford Properties
Virginia Poter	Environment Canada
Mark Raizenne	Public Health Agency of Canada
Jonathan Sleeman	National Wildlife Health Centre, United States Geological Survey
David Smith	Sobey's Inc.



Management Committee

Ted Leighton (co-chair)	Executive Director
Patrick Zimmer (co-chair)	Headquarters Director
Trent Bollinger	Western/Northern Regional Director
Kevin Brown	Information Technology Manager
Marc Cattet	CCWHC Executive Committee Member
Susan Cork	Alberta Regional Director (Acting)
Pierre-Yves Daoust	Atlantic Regional Director
Claire Jardine	Ontario/Nunavut Regional Director
Susan Kutz	Alberta Regional Director (on leave)
Stéphane Lair	Quebec Regional Director
Dale Smith	Associate Director Ontario/Nunavut Region
Craig Stephens	Centre for Coastal Health Director



Alberta Region

Located at the Faculty of Veterinary Medicine, University of Calgary, the Alberta Centre is lead by Susan Cork (Acting Director), Susan Kutz (Director, on leave) and a core group of staff, including; Mani Lejeune (Parasitologist), Padraig Duignan (Pathologist), Jian Wang (Lab Manager/Technician), and associates; Craig Stephen, Judit Smits, Nigel Caulkett, Sylvia Checkley, Alessandro Massolo, and Karin Orsel.

Health
Surveillance

Education &
Information
Services

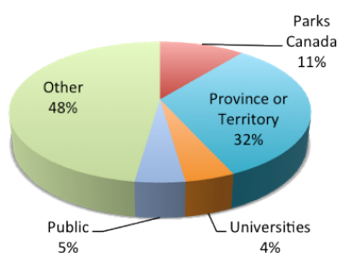
Research &
Management



Submissions to the core surveillance program remained consistent with previous years. In 2011-12, 111 specimens were examined representing 103 unique incidents. Bird species comprised 60% of specimens with mammalian species representing the remaining 40%.

Submissions were derived from a number of sources with the Alberta provincial government and the nearby National parks providing close to half of all submissions. Another significant source of submissions were both wildlife rehabilitation and conservation groups, together accounting for 48% of submissions.

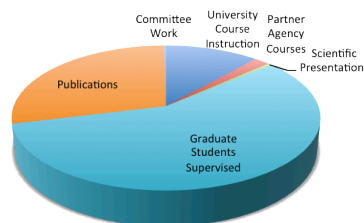
Sources of Animals Examined



Education is comprised of a range of activities; in 2011-12 this included University course instruction, scientific presentations, community outreach and hosting a number of workshops and courses. Other key educational activities include graduate student programs and supervision, there are currently 6 graduate students and associated projects supervised and conducted via the CCWHC and it's associates in Alberta.

Representatives from the AB centre participate on a number of scientific and advisory committees, including the Committee on the Status of Endangered Wildlife in Canada – Terrestrial Mammals sub group and contributed 9 scientific papers, 3 book chapters, and online informational material. For additional details please see our [website](#).

Invested Time in Educational Activities



The CCWHC Alberta regional centre was engaged in a number of targeted surveillance and research programs in 2011-12. These projects reflect the AB Centre's area of specialization, notably wildlife parasitology. Targeted surveillance programs include zoonotic parasites (*Echinococcus multilocularis*) among urban coyotes, tracking the occurrence of Trichomonosis in wild birds, monitoring the parasitic roundworm *Baylisascaris procyonis* in raccoons, and the examination of rodent ectoparasites,, for example ticks and fleas, for pathogens of zoonotic importance.

Research projects were focused on the development and validation of diagnostic methods pertaining to various parasites known to affect Canadian wildlife; this included a blood test for the diagnosis of the large American liver fluke (*Fasioloides magna*) among wild ruminants, such as caribou, elk and deer.



Feature Items

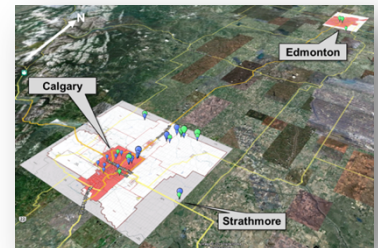
Better Wildlife Rehabilitation in Alberta

CCWHC-Alberta collaborated with the Alberta Wildlife Rehabilitator's Association (AWRA) to organise a one-day Wildlife Wellness Workshop on October 15, 2011 at the University of Calgary Faculty of Veterinary Medicine (UCVM). The workshop covered topics such as 1) the diseases of importance to rehabilitated animals, 2) parasitic diseases of wildlife in Alberta that can affect people, and 3) Health and safety issues for wildlife rehabilitators. The morning session consisted of lectures and the afternoon of practical, hand-on activities demonstrating techniques such as fecal analysis, blood smear examination, and parasite pathology and identification. . Around 40 participants, mostly the members of AWRA, attended the workshop. The event was well received by those participants and may be repeated annually.



Urban Coyotes and Public Health

Echinococcus multilocularis (E.m.) is a tiny tapeworm that can cause a big disease, called “alveolar echinococcosis” of AE, in some species, including people. The adult worm lives harmlessly in the intestines of carnivores like foxes and coyotes. The larval stage normally lives in rodents. This is the stage that can grow like a cancer and which can also affect host animals that don't normally participate in its life cycle, such as humans. AE is important because it requires costly long-term therapy, and can be fatal in people. In parts of North America, coyotes may be the important carnivore host species that maintains E.m. Coyotes are common in urban environments, however the rate of infection with E.m. in urban coyotes in Alberta has never been studied. Ecologist Alessandro Massolo is leading an initiative to determine this in coyotes in and around Calgary, supported by the CCWHC parasitology centre. Initial results indicate that 23 of 91 coyotes (25%) from urban centres were infected, thus, Alberta must be added to the growing list of places in the Northern Hemisphere where E.m. is emerging as a public health concern.



Occurrence of *E. multilocularis* in Alberta

Raccoon Roundworm in Alberta

Baylisascaris procyonis is a parasitic roundworm of raccoons. This parasite is of concern 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 hosts including domestic cattle. Over the past 30 years, raccoons have become increasingly abundant within Alberta. As a part of regional surveillance, CCWHC-Alberta together with provincial partners have initiated a program to investigate the occurrence of *B. procyonis* in nuisance and road-killed raccoons. Ms. Dayna Goldsmith, DVM student of UCVM was employed as a summer student for this project. With this surveillance, the occurrence of *B. procyonis* in Calgary and Strathmore in Alberta was confirmed. More study is needed to estimate the actual prevalence of this deadly parasite in Alberta. In the course of this work a manual for identification and differentiation of common roundworms of domestic animals and raccoons was developed by CCWHC-Alberta.



Western & Northern Region

Located at the Western College of Veterinary Medicine, University of Saskatchewan, the Western & Northern Centre is lead by Trent Bollinger (Director) and core group of staff and associates, including; Lorraine Bryan (Pathologist), Marnie Zimmer (Biologist), and Crystal Rainbow (Technician), associates included; Janet Hill, Emily Jenkins, Vikram Misra, and Cheryl Waldner.

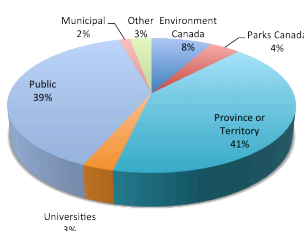
Health
Surveillance



Submissions to the core surveillance program rose considerably from the previous year, by approximately 25%. In 2011-12, 1053 specimens were examined representing 712 unique incidents. Avian species comprised 44% of specimens, mammalian 31%, and fish and herptile species equally comprising the remaining 25%.

Submissions were derived from a number of sources with the western provinces and territories providing roughly 34% of all submissions, a further 34% were derived from Universities. Federal agencies accounted for approximately 13% of submissions, in particular Environment Canada and Parks Canada. The remaining 19% of submissions were predominantly derived from the public.

Sources of Animals Examined



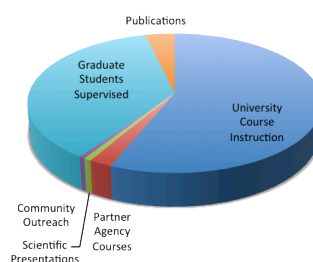
Education &
Information
Services



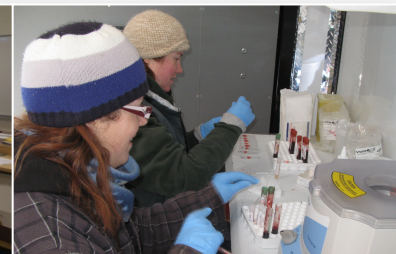
The Western and Northern CCWHC centre was engaged in numerous educational activities in 2011-12. These included the development and management of several graduate student programs, including research on fish mortality, Chronic Wasting Disease and Big Horn Sheep, 4 in total. As well both graduate and undergraduate level course instruction. Educational activities extended beyond the Universities to include several community and partner agency courses.

Informational services included scientific presentations and publications (7 in total), including presentations at the North American Fish & Wildlife Officer's Conference and PrioNet Canada. For more information please visit our [website](#).

Invested Time in Educational Activities



Research &
Management



2011-12 saw the continuation of several important and long-standing surveillance and research programs as well as the development of several new projects. The targeted surveillance program for Chronic Wasting Disease (CWD) in wild cervids in Saskatchewan entered its 14th year. A total of 1100 samples were collected and tested in 2011, with 27 new positives. The associated CWD research program continued for the 5th year investigating the movement and transmission rates of CWD among wild deer in southern Saskatchewan.

New programs included the Investigation of Big Horn Sheep Lamb Mortality in British Columbia, in association with several collaborators the W/N centre was involved in experimental Infection Trials of Little Brown Bats with *Geomyces destructans*, the fungus responsible for White Nose Syndrome and worked on developing a graduate student project investigating fish die-offs in Saskatchewan.



Feature Items

Chronic Wasting Disease on the Canadian Prairies

Chronic wasting disease continues to spread slowly across North America including the Canadian Prairie Provinces. The disease is now present in wild cervids in at least 15 US states and has continued to spread within the provinces of Saskatchewan and Alberta.

There is accumulating evidence that CWD will cause population declines and altered age structures among wild cervids. In the only population of free-ranging deer in Canada being closely monitored for changes in CWD prevalence and survival, we estimate CWD prevalence in adult deer is now approximately 50% and is the main cause of mortality in adult deer. The study area is immediately adjacent to one of the first elk farms to test positive for CWD and it is likely that close to 15 years of infection in this wild population has resulted in ever increasing environmental burdens of prions, which is now driving the outbreak. Detailed radio-tracking and motion sensitive photography is showing that mule deer in this area repeatedly and heavily use leaking grain bins, cattle salt blocks, hay bales, and similar points of wild animal attraction created by people. Increased congregation and contamination of these sites with urine, saliva and feces increases the risk of CWD transmission. In essence these wild deer are behaving similar to deer on game farms except their movement isn't constrained by a fence. The outcome is likely to be the same, extremely high infection rates and drastic population declines.

Because of its long incubation period and long environmental persistence, it will take decades before the effects of chronic wasting disease in wild cervids will be known. One thing is for certain; chronic wasting disease is now an integral part of the ecology of deer in affected areas. Strategies to manage deer and current hunting regulations will need to be evaluated based on CWD. Long term research programs and sustained commitment by hunters and wildlife agencies is needed in order to develop a rational strategy for dealing with this calamitous disease.

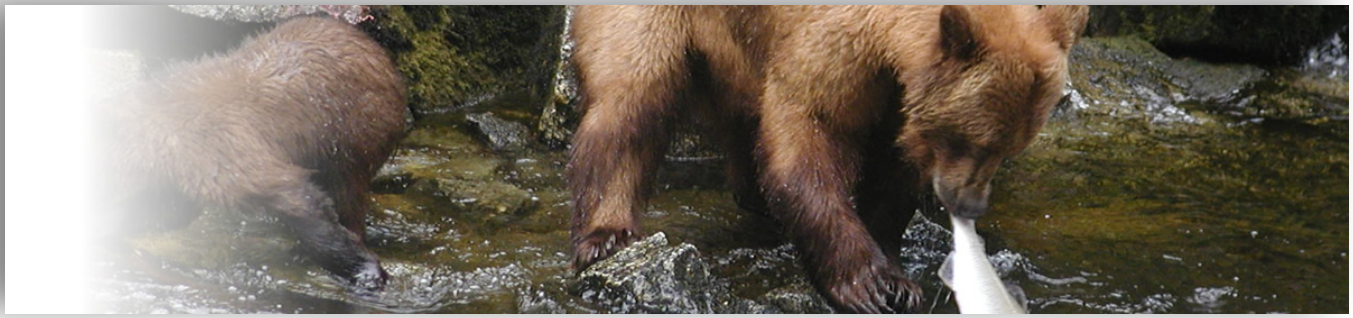


Causes of Lamb Mortality in Bighorn Sheep in British Columbia

Poor lamb survival in bighorn sheep herds has been a long-standing problem in many areas throughout the western United States and Canada. Reported causes of lamb mortality vary depending on the location and year, and include predation, inclement weather and disease. However, pneumonia appears to be the most significant cause of mortality in lambs. The causes of pneumonia are complex and include lungworm (*Protostrongylus* sp.), several species of bacteria, viruses and stress. Pneumonia die-offs in bighorn sheep are frequently associated with contact with domestic sheep, which carry many of these disease-causing agents. The variable causes of pneumonia and the involvement of multiple host species has made the management of bighorn sheep pneumonia difficult.



In 2011, the Canadian Cooperative Wildlife Health Centre, in collaboration with the British Columbia Ministry of the Environment, began a research program to study the causes of persistently poor lamb survival in herds of bighorn sheep in the East Fraser Valley northwest of Kamloops, BC. Herds in this area have seen a steady decline in numbers and sick lambs have been observed in early to mid-July. Autopsies of a limited number of dead lambs and ewes have revealed pneumonia as the cause of death. To better understand factors causing lamb mortality, lambs and ewes were monitored daily for approximately 4 weeks from late June to mid-July. Coughing lambs were observed throughout the study period and, by the middle of July, approximately a third of the lambs were sick. In addition to coughing, lambs often had diarrhea and were thin. Two sick lambs were euthanized and a third died; autopsies revealed the presence of *Mycoplasma* bacteria, including *Mycoplasma ovipneumoniae*. Lungworm was not involved in the pneumonia. *M. ovipneumoniae* appears to be the initiator of pneumonia in these lambs. It is likely that secondary infection with opportunistic bacteria, predation of sick lambs, and other factors subsequently increase mortality. Research in the Fraser Valley will continue in 2012 to determine if *M. ovipneumoniae* this is a consistent finding among herds and years, to identify sources of this bacterium, and to begin to identify the relative importance of other factors in lamb mortality. The identification of a single pathogen, which is potentially responsible for initiating many, if not most, of the bighorn sheep pneumonia outbreaks, is an important first step in developing techniques to control this devastating disease.



Ontario & Nunavut Region

Located at the Ontario Veterinary College, University of Guelph, the Ontario & Nunavut Centre is led by Claire Jardine (Director) and Dale Smith (Associate Director) as well as a core group of staff and associates, including; Doug Campbell (Pathologist), Lenny Shirose (Biologist), Dave Cristo (Communications), Erin Scharf (Technician), and Carol-Lee Ernst (Secretary). Associates include Ian Barker, Jane Parmley, John Lumsden and David Pearl.

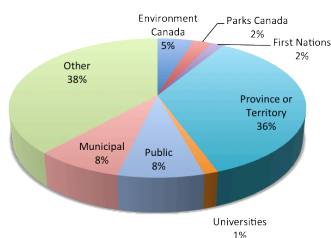
Health Surveillance



Submissions to the core surveillance program declined by 21% in 2011-12; 621 specimens were examined representing 476 unique incidents. Bird species comprised 61% of specimens while mammalian species represented 36% of submitted cases.

Submissions were derived from a number of sources; 36% of all submissions derived from the province of Ontario and a further 38% derived from "other" sources predominantly made up of Zoos and wildlife rehabilitation centres. The remaining 26% of submissions were derived predominantly from federal agencies, and local municipalities.

Sources of Animals Examined



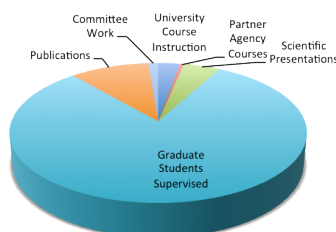
Education & Information Services



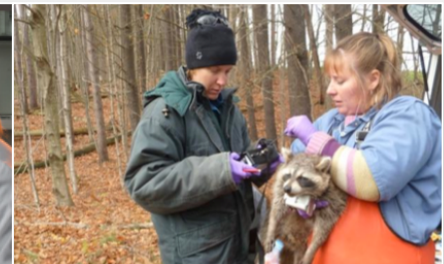
Education is comprised of a range of activities; in 2011-12 this included University course instruction, scientific presentations, community outreach and partner agency instruction, including a Veterinarian's Update Course for the CFIA. 16 graduate student and associated projects were supervised and conducted via the CCWHC and it's associates in Guelph in 2011-12.

Representatives from the ON & NU centre participate on a number of regional, national and international committees, including various WNS working groups, wildlife recovery teams and several disease surveillance groups. In addition, the ON & NU centre contributed 27 scientific/conference presentations. For more information please visit our [website](#).

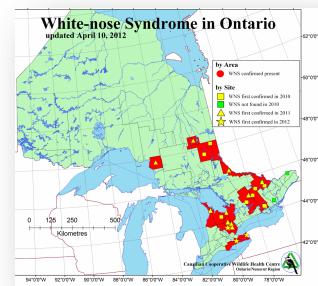
Invested Time in Educational Activities



Research & Management



The CCWHC ON & NU regional centre was engaged in a number of targeted surveillance and research programs in 2011-12. Of particular emphasis is the enhanced surveillance project for White-Nose Syndrome (WNS) among bat populations. Additional research projects included Loggerhead Shrike mortality investigation, Lyme disease transmission in the Thousand Islands region in eastern Ontario and avian bornavirus surveillance.





Feature Items

Antimicrobial Resistance in Wildlife

Resistant strains of infectious agents that were once easily treated with antimicrobials are emerging as serious human and animal health threats. The emergence of resistant populations of microbes typically occurs as a consequence of exposure to antimicrobials; however, resistance determinants can spread between microbial populations making the epidemiology of antimicrobial resistance quite complex. Resistant bacteria have been isolated from wildlife; however the role of wildlife in the maintenance and dissemination of resistant bacteria is not well understood. We have detected resistance to antimicrobials in a variety of wildlife species living in diverse environments, including farms, urban areas, and conservation areas in Ontario. In addition we have detected a significant association between proximity to livestock and the occurrence of resistance in small mammals in Ontario, which raises concern about the potential for wildlife to spread resistance determinants throughout the environment. Members of CCWHC Ontario/Nunavut (Drs. Jardine and Pearl) are co-applicants in a successful \$1.8 million, international study led by Jeff LeJeune at The Ohio State University aimed at reducing the transmission of antimicrobial resistant organisms by wildlife within the food supply. The fieldwork for this study begins in the summer of 2012 and we plan to have preliminary data by the summer of 2013.



Canine Distemper Virus in Southern Ontario

This spring 2012, sick raccoons were observed over a broad geographic range in southern Ontario. Affected animals were observed out during daylight hours, showing no fear of humans, and exhibiting a variety of nervous signs. Many also had discharges from the nose and eyes.

It is highly likely that these animals are infected with Canine Distemper Virus (CDV). This is by far the most common infectious disease in raccoons in southern Ontario, and large numbers of cases of it are diagnosed each year. The virus requires close contact in order to spread from an affected to a susceptible animal. Peak times of year for the disease appear to be both spring and fall. These are times of year when there is likely to be the most contact among animals and, in the fall there also are large numbers of previous summer's young are on the move attempting to establish themselves in new areas and who are highly susceptible to infection.

This year, there have been reports of observations of sick raccoons all the way from Windsor to the Niagara Peninsula and north to Grey and Bruce counties. Not all of these geographic foci of disease have yet been confirmed by post-mortem examination of affected animals from each area. Nonetheless, given the pattern of disease and the clinical signs reported, CDV is the most likely diagnosis.

The possibility that rabies may be present in these areas should not be completely dismissed. There are cases of raccoon rabies occurring on the American side of the Niagara River and raccoons do cross back and forth. It is important that the possibility of rabies be considered in the examination of raccoons from this area. Also, there is still a small amount of rabies activity in southwestern Ontario, north of Guelph and Kitchener-Waterloo, primarily in skunks. Although the disease has almost been eradicated in this area, it is necessary to rule it out in cases of neurological disease, particularly in skunks, from this area.





Quebec Region

Located at the Faculté de médecine vétérinaire Université de Montréal, the Quebec Centre is lead by Stéphane Lair (Director) as well as a core group of staff and associates, including; André Dallaire (Pathologist), technicians Kathleen Brown, Audrey Daigneault St-Germain, Judith Viau, Joëlle Benoit, and Viviane Casaubon and associates Sylvain Larrat, Arianne Santamaria-Bouvier, Julie Arenault, Guy Fitzgerald Denise Bélanger and Fidiso Rasambainarivo.

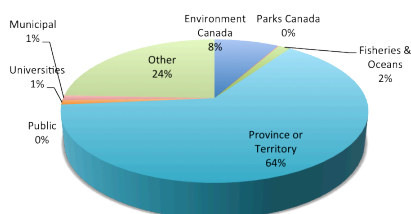
Health Surveillance



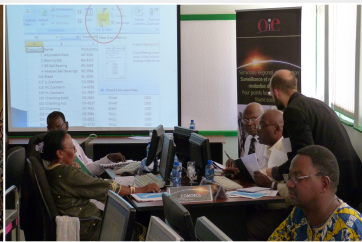
In 2011-12 the number of specimens submitted to the core surveillance program declined by over 30%, with 805 specimens examined, the number of incidents, however, which represent the total number of submissions rose by 12% to 557. Bird species comprised 74% of the specimens examined while mammalian species represented 20% of submitted cases and fish species the remaining 6%.

Submissions were derived from a number of sources; 64% of all submissions derived from the province of Quebec, 10% of submissions were from federal agencies and a further 26% derived from “other” sources predominantly made up wildlife rehabilitation centres.

Sources of Animals Examined



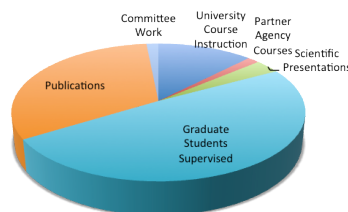
Education & Information Services



In 2011-12 staff and associates from the Quebec regional centre provided a range of educational activities including; University course instruction, scientific presentations, community outreach and hosting a number of workshops and courses, including the 60th Annual Wildlife Disease Association Conference. There were 7 graduate students and associated projects supervised and conducted via the CCWHC and it's associates at the Quebec Centre.

Representatives from the Quebec centre participate on a number of regional, national and international committees, including regional animal care and surveillance committees, the committee on the Training Program Standards of the American College of Zoological Medicine. In addition, the Quebec centre contributed 21 scientific/conference presentations. For more information please visit our [website](#)

Invested Time in Educational Activities

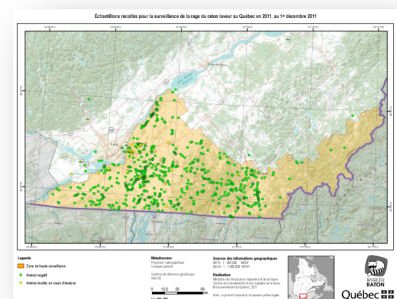


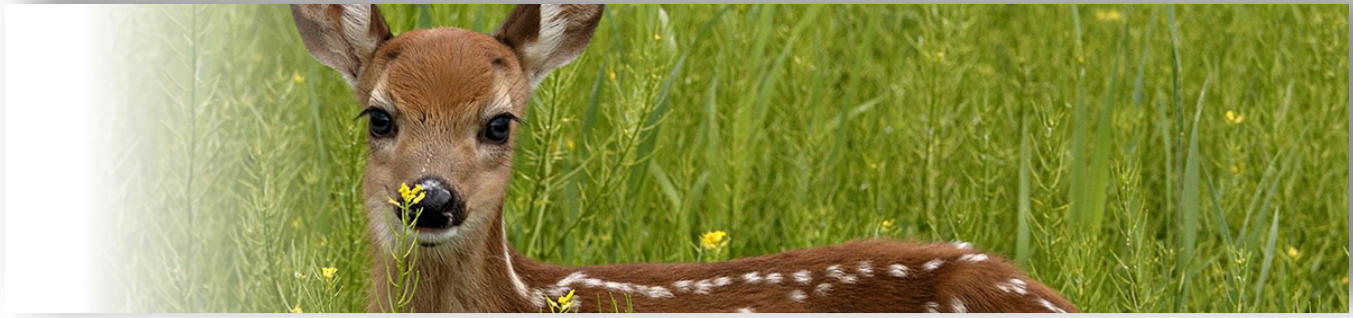
Research & Management



The CCWHC Quebec regional centre was engaged in a number of targeted surveillance and research programs in 2011-12. Targeted surveillance and research programs included White Nose Surveillance among bats, participation in the provincial Chronic Wasting Disease Surveillance program, Raccoon rabies surveillance and continued health assessments of the St. Lawrence Estuary Beluga whale population.

Raccoon Rabies Surveillance





Feature Items

Reoccurrence of West Nile Virus in Quebec

Following its introduction in North America in 1999, the West Nile Virus (WNV) was associated with important mortalities in native birds, especially raptors and corvids. However, after several years of high WNV activity, particularly 2003 and 2004 in Quebec, the number of cases documented in birds and humans markedly declined. During the summer of 2011, Quebec experienced a reoccurrence of cases of WNV in both birds and people. Fatal disease was documented in crows and in different species of raptors, mainly during the month of August. As expected, clinical disease caused by WNV in birds was detected two weeks before the disease occurred in people. The cause of this reoccurrence of WNV activity is unclear, but may relate to environmental conditions favourable to mosquitoes and the virus: a wet spring and hot summer. The resurgence of WNV in the summer of 2011 shows that this virus remains endemic in Canada and remains a health risk to wildlife and people



Reproductive Anomalies in St. Lawrence Beluga Whales

In the past two years, 5 (42%) of the mature female beluga whales found dead in the St Lawrence estuary and examined for cause of death were discovered to have died while giving birth. Three of these were documented in 2011-12. Concurrently, estimates of the number of newborn calves in the summer of 2011, via standardized photo-identification surveys, were at the lowest level since 1996. This low apparent calf production or survival, and the unusual occurrence of death of both mother and calf during birth suggest some recent reproductive impairment among beluga whales in this already “at risk” population. The cause of the apparent cluster of birth-related deaths is currently under investigation. Potential contributing factors to be investigated include increasing contamination with endocrine disrupting chemicals such as polybrominated diphenyl ethers, and increased exposure to saxitoxins produced by harmful algal blooms. Ongoing monitoring of calf production and of causes of mortality will help determine whether these changes are transient or a new significant health issue threatening the recovery of this population.



Episodes of Winter Mortalities in Harp seals in the Gulf of St. Lawrence

Harp seals are ice-dwelling seals that spend the summer in the Arctic and migrate south during the winter to the Gulf of St. Lawrence as well as to the pack ice fields off the coasts of Labrador and Newfoundland. During the winter of 2010-2011, unusually high numbers of dead harp seals were reported along the coasts of the provinces of Quebec and Newfoundland and Labrador. A sample of 15 seals from Newfoundland and Labrador and 3 from Quebec were collected for autopsy. These animals were in good nutritional condition, and medical examination did not precisely identify the cause of death. However, infectious and toxic diseases were ruled out. It is possible that these seals drowned due to the exceptionally small amount of sea ice available to them that winter combined with the occurrence of severe winter storms in the area. The absence of extensive ice packs can increase storm surges and prevent the seals from hauling out to rest. This single episode of mortality is unlikely to have had a significant impact on this harp seal population, but, in the context of climate change, such episodes should be monitored to evaluate the impact of the alteration of the North-western Atlantic ice coverage on harp seals.





Atlantic Region

Located at the Atlantic Veterinary College at the University of Prince Edward Island the Atlantic Centre is lead by Pierre-Yves Daoust (Director) as well as a core group of staff and associates, including; Scott McBurney (Pathologist), Maria Forzán (Pathologist and PhD student), technicians Darlene Weeks and Fiep de Bie and associates Gary Conboy, Marion Desmarchelier, Heather Fenton, Dave Groman, Fred Kibenge, Shannon Martinson and Raphael Vanderstichel.

Health
Surveillance

Education &
Information
Services

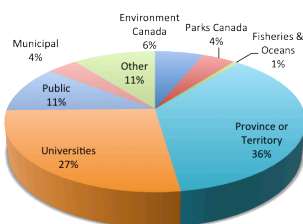
Research &
Management



In 2011-12 the number of specimens submitted to the core surveillance program increased by 25% with 786 specimens examined, representing 490 unique incidents. Bird species comprised 55% of the specimens examined while mammalian species represented 36% of submitted cases while reptiles and amphibians represented the remaining 9%.

Submissions were derived from a number of sources; 37% of all submissions derived from the Atlantic Provinces, 11% of submissions were from federal agencies, 27% derived from Universities and educational institutions and the remaining 25% largely derived from municipal sources and the public.

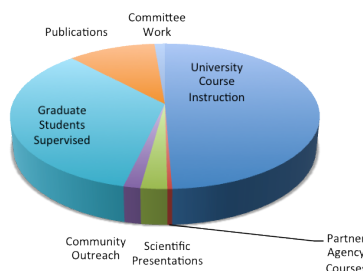
Sources of Animals Examined



Education is comprised of a range of activities; in 2011-12 this included approximately 260 hours of University course instruction, scientific presentations, including those at the 30th World Veterinary Congress in South Africa, and community outreach. Another key educational activity are graduate student programs and supervision, there are currently 5 graduate students and associated projects supervised and conducted via the CCWHC and it's associates at the Atlantic Centre.

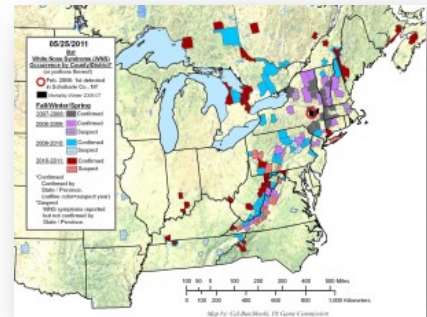
CCWHC Atlantic representatives participate on a number of regional, national and international committees, including regional recovery teams, the Maritime Marine Animal Response Network, the Fur Institute of Canada, and the Wildlife Disease Association, Latin America Section. For more information please visit our [website](#).

Invested Time in Educational Activities



The CCWHC Atlantic regional centre was engaged in a number of targeted surveillance and research programs in 2011-12. Targeted surveillance and research programs included White Nose Surveillance among bats, surveillance and research pertaining to Trichomoniasis in wild bird populations, Aleutian disease studies in wild mink, continued surveillance for chytrid fungus in amphibians and diagnostic and mortality investigations of marine animals in the Maritime provinces.

North American WNS





Feature Items

White Nose Syndrome Surveillance

In the Maritime provinces, Bat White Nose Syndrome (WNS) was detected very early in the winter 2011-12 surveillance season. In the second week of December 2011, the first incidents of WNS were confirmed in three New Brunswick (NB) hibernacula. This was followed shortly by the confirmation of WNS in a day-flying bat and a bat found dead on the landscape outside of its hibernaculum at two separate geographic locations in Nova Scotia (NS) during the second week of January 2012. The 2011-12 surveillance season resulted in the confirmation of WNS in four new counties: Colchester County (NS) in little brown bat (*Myotis lucifugus*) and Northern long-eared bat (*M. septentrionalis*); Westmorland County (NB) in little brown bat; Kings County (NB) in little brown and northern long-eared bats; and Charlotte County (NB) in little brown bats. In addition, WNS was found for the first time in Canada in a tricolored bat (*Perimyotis subflavus*) in Albert County, NB. The WNS surveillance program in the Atlantic region is collaboration between Don McAlpine and Karen Vanderwolf (NB Museum); Mary Sabine (NB Department of Natural Resources); Hugh Broders (Saint Mary's University); Mark Elderkin (NS Department of Natural Resources); and Scott McBurney, Canadian Cooperative Wildlife Health Centre, Atlantic Region.



Winter Mortality in American Crows

In 2001, a new virus causing severe, often fatal, disease in American Crows (*Corvus brachyrhynchos*) was discovered in the United States and was first observed in Canada in Ontario in the winter of 2003-04. The virus belongs to a group known as the orthoreoviruses, some members of which cause important diseases of domestic poultry. This virus was discovered killing crows in Prince Edward Island in the winter of 2008 – 2009 and the disease has occurred sporadically in Prince Edward Island and Ontario since then, including in the winter of 2011-12.

This new virus is an emerging infectious pathogen of wild birds and raises concern about how little is known about the role, if any, of wild birds as reservoirs of orthoreoviruses that can cause disease in domestic poultry. A collaborative research project has been initiated among the CCWHC, the OIE Reference Laboratory for Infectious Salmon Anemia at the University of Prince Edward Island, and Animal Health Laboratory at University of Guelph to characterize the orthoreoviruses in crows and to determine if they can cause disease in domestic poultry. Dr. Anil Kalupahana, a PhD candidate at the University of Prince Edward Island, is a key player the research.





Headquarters Office

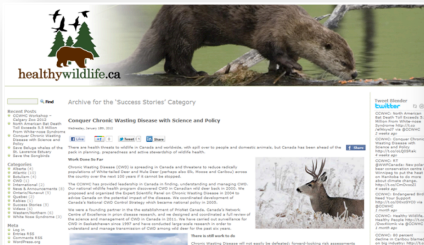
The Headquarters Office (HQO) provides a range of technical and administrative services to the Regional Centres to maximize the breadth, depth and efficiency of the CCWHC across Canada. It supports internal governance of the Centre by the CCWHC Management Committee and external governance by the CCWHC Executive Committee, the senior governing council of the CCWHC. HQO coordinates national and international programs, and serves as the Centre's portal for communication with a wide range of government and non-government partners in the CCWHC. HQO maintains partnerships with key associates like the Centre for Coastal Health, National Centre for Foreign Animal Diseases, National Microbiology Laboratory, and serves as the hub of Canada's active and diverse network of wildlife health professionals.

Located at the Western College of Veterinary Medicine at the University of Saskatchewan, the HQO is the primary management and administrative body of the CCWHC and is made up of a diverse team of individuals including the CCWHC Executive Director, Ted Leighton, the CCWHC Administrative Director and HQO Director, Patrick Zimmer, and the CCWHC Information Services Manager, Kevin Brown as well as Marc Cattet (Senior Research Scientist), Nadine Kozakevich (CCWHC Accountant), Chris Pinel (Systems Analyst), Bevan Federko (Programmer Analyst), and Christine Wilson (Technician). Associates include Catherine Soos and Gordon Stenhouse.

Information
Services

Education

Research &
Management



The Information Services group brought the CCWHC giant steps forward in public profile in 2011-12 by consolidating production and delivery of information to the public through the new Healthywildlife.ca website and active presence on Facebook and Twitter. On the technical front, the current version of the CCWHC database was completed and the next iteration, a fully web-based version, designed and initiated. Interest in the CCWHC database by outside groups grew substantially in 2011-12, expanding the Group's active support of wildlife health data management inside and outside of Canada. The CCWHC database holds over 220,000 records of wildlife disease occurrences and is used by all CCWHC sites

Headquarters staff were engaged in many educational activities in 2011-12, including the teaching of graduate and undergraduate university courses (3 in total), graduate student supervision (5) and partner agency courses and workshops, including approximately 100 hours of instruction in wildlife chemical immobilization to government partners as well as organizing and coordinating the 3rd biennial CCWHC Workshop for Wildlife Health Professionals. In addition several international courses were organized and conducted in association with the World Organization for Animal Health (OIE).

The Headquarters office participated on approximately 20 regional, national and international committees in 2011-12, presented and participated in another 20 conferences and workshops and published 12 scientific papers and reports.

The CCWHC Headquarters Office was engaged in several research and management related activities in 2011-12. These included coordinative roles for several Inter-agency surveys and committees, such as the Wild Bird Influenza Survey and planning committees for White Nose Syndrome and Rabies Surveillance (Data Management).

Research surrounding species conservation and health continued in 2011-12 in particular collaborations with the Foothills Research Institute Grizzly Bear Program and the Scandinavian Brown Bear Research Project aimed at preserving and enhancing the health of Grizzly Bear Populations in Western Canada and Scandinavia as is a study examining the effects of radio collars on caribou/reindeer.



National and International

2nd Global Cycle of OIE Workshops Completed

Between October 2011 and April 2012, the CCWHC delivered a series of five 2-day workshops in each of the five global regions of the World Organisation for Animal Health (OIE). This project was carried out as a part of the CCWHC role as a Collaborating Centre of the OIE. These were training workshops for the OIE “Focal Points for wildlife,” individuals designated to assist the OIE Delegate in each country to meet OIE standards and reporting obligations with respect to wildlife health and disease. This is the second cycle of training workshops provided to the OIE by the CCWHC. The first was a general introduction to the socio-economic and ecological importance of pathogens in wildlife. The current, second cycle focused specifically on wildlife disease surveillance.

The wildlife curriculum for the workshops was developed by Drs Ted Leighton and Jane Parmley. Emphasis was placed on learning by doing, and the workshop was based on a Work Book with exercises in data evaluation, diagnostic test selection and performance, and calculation of sample sizes needed for various surveillance objectives. Data from surveillance programs in the imaginary *Dominion of Atlantis* were provided for evaluation and critical review. Integrated into the surveillance curriculum was information about the OIE and the resources it provides through its published international standards and reference centres, and some hands-on practice with the wildlife disease reporting system used by the OIE.

The Workshop was presented in Kenya (in English) by Drs Parmley and Leighton, in Argentina (in Spanish) by Drs Maria Forzan, Javier Sanchez (CCWHC) and Marcela Uhart (Wildlife Conservation Society), in Botswana (in French) by Drs Sylvain Larrat, Raphael Vanderstichel (CCWHC) and Marc Artois (VetAgro-Sup, France), in Bulgaria (English with Russian translation) by Drs Ted Leighton, Dan Walsh (National Wildlife Health Centre, USA) and Marc Artois, and in Sri Lanka (English) by Drs Ted Leighton, Asha Perera (CCWHC) and Jonathan Sleeman (National Wildlife Health Centre, USA). The Work Book is now available in English, French, Spanish and Russian. The OIE expects to publish the Work Book on its website in the near future.



White Nose Syndrome – An Extraordinary New Epidemic

White Nose Syndrome (WNS) is a fungus infection lethal to some species of cave-hibernating bats in North America. It was first recognized in New York State in 2006 and has since killed approximately 6 million bats in eastern North America. The fungus, *Geomyces destructans*, appears to be newly introduced to North America. Affected bats become emaciated during hibernation and fly out of caves in daylight in late winter, searching for food that is not available. The CCWHC is coordinating the multi-agency response to WNS in Canada.

Surveillance for White Nose Syndrome (WNS) began in Canada in the winter and spring of 2008-09 in areas adjacent to affected regions of the northeastern United States: Nova Scotia, New Brunswick, Quebec and Ontario. Wildlife officials and the public were asked to report and collect specimens where day-flying and dead bats were observed on the landscape, and the interiors or entrances of some known hibernacula were inspected. In 2008-09, a small number of bats with external signs compatible with WNS were examined in Ontario but WNS was not confirmed. In 2009-10, WNS was confirmed in Little Brown Bats (LBB) and Northern Long-eared Bats (NLEB) at 9 of 12 sites under surveillance in Ontario and in 2 regions of Quebec. Substantial mortality (hundreds of dead bats) was detected at one Ontario site. Eight hibernacula were monitored in New Brunswick and six in Nova Scotia, but WNS was not detected. In 2010-11, WNS was detected at 9 new locations in Ontario, at least one with substantial mortality, 8 new locations in Quebec, and at 13 locations in Nova Scotia and New Brunswick. Massive mortality was reported from one hibernaculum in New Brunswick that had been under study prior to arrival of WNS. The bat population at that New Brunswick site was 6000 bats in the fall of 2010, prior to WNS, fell to 300 bats after the WNS in the fall of 2011 and contained 5 bats in spring 2012, all with signs of WNS. This near-100% mortality is typical of many affected hibernacula in North America.

In 2011-12, WNS was detected at 3 new locations in SE Ontario but no evidence of further westward spread was found. In Quebec, WNS was detected at a new site in the Saguenay-Lac-St-Jean area, east of previous locations. Day-flying bats also were reported near Quebec City but no specimens were secured for diagnosis. Affected bats were found in 17 different areas in New Brunswick and Nova Scotia and at 5 known hibernacula. So far, there is no evidence of WNS in Newfoundland or west of Marathon, Ontario.

In February 2012, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended to the federal Minister of Environment that LBB, NLEB and Tri-colored Bat be officially designated as *endangered* because of Canadian and continental population declines due to WNS.



National and International

CCWHC Workshop for Wildlife Professionals

The Canadian Cooperative Wildlife Health Centre hosted its third biennial CCWHC Workshop for Wildlife Health Professionals on February 21-22, 2012 at the Calgary Zoo. The workshop program addressed three themes with the first day devoted to a stand-alone theme whereas the second day focused on two complementary themes. A total of 82 attendees participated over the two days.

The theme for Day 1 was *Wildlife Health Issues in Large-scale Disasters and Response Planning*, a topic prompted in large part by the apparent global increase over recent years in large-scale disasters, both natural- and human-caused, and questions regarding the potential broad implications of these disasters for free-ranging wildlife. Through a series of presentations by specialists in the field and scenario-based open discussion, participants gave consideration to (i) whether the types of large-scale disasters likely to occur in Canada could pose significant threats to wildlife, and (ii) whether and how wildlife health professionals should plan and respond. Overall, there was general agreement that the types of large-scale disasters that have occurred and will continue to occur in Canada do pose significant threats to wildlife, but we currently lack the appropriate training, planning, and preparation to effectively mitigate these threats.

The first theme for Day 2 was *Major Wildlife Health Issues in Canada – Updates and Perspectives*. For this, several speakers from across Canada and the United States provided overviews and updates on a wide range of major current wildlife health and disease issues that included (i) zoonotic diseases and environmental change, (ii) wildlife toxicology, (iii) diseases of freshwater fish, (iv) bovine tuberculosis, (v) botulism on the Great Lakes, (vi) white nose syndrome, (vii) chronic wasting disease, and (viii) rabies. Throughout this session, participants actively contributed comments and discussion points for each presentation. The transition from this session to the second theme of the day, *Canada's Capacity for Rapid Wildlife Disease Investigation and Response*, was seamless. For this, all participants engaged in round-table discussions to explore, through a scaled series of scenarios of broadening consequences, Canada's current capacity for rapid investigation of potentially important wildlife disease occurrences, and for mounting a rapid response. Significant weaknesses were identified in both national and regional capacities, and there was broad recognition that commitment and effort is required to bring our current capacity up to an adequate level.

CCWHC Scientists Emeriti



Drs Barker (top) and Wobeser (bottom)



An important event in the life of the CCWHC in 2011-12 was the retirement of the second of those who founded CCWHC in 1992: Dr Ian Barker. The first founder to retire was Dr. Gary Wobeser in the previous year. Both Drs Barker and Wobeser are eminent wildlife disease scientists and expert veterinary pathologists on the national and world stages. Ian directed the Ontario/Nunavut Regional Centre through its entire evolution, having carried on since 1975 the wildlife research, teaching and diagnostic program at the Ontario Veterinary College begun by Dr. Lars Karstad in 1961. Similarly, Gary Wobeser, who had worked with Dr. Karstad in the 1960s while a DVM student at OVC, established in 1970 a full academic program in wildlife diseases at the Western College of Veterinary Medicine that became the CCWHC program in Western Canada, which he co-directed. Both have written, edited or contributed chapters to key reference books in the fields of wildlife diseases and pathology that are used worldwide, and have contributed to numerous scientific papers. Their former graduate students are scattered in academic, institutional and government positions in Canada (including CCWHC), and elsewhere around the world. Of equal importance to the CCWHC has been their wise counsel as the organization has evolved over its first 20 years. Now, neither Ian nor Gary has any formal obligations to the CCWHC program but both remain emeritus members, whose continued participation and advice are anticipated and welcomed.



Financial Highlights

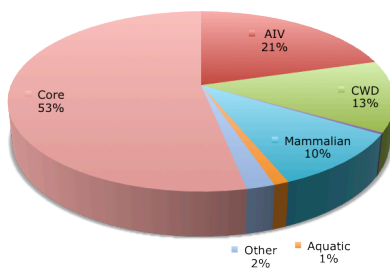
A financial review of 2011-12 reflects a strong demand for services and expertise while experiencing a softening in funding to maintain this level of activity. In 2011 CCWHC finances reflected the continuing impact of the global and national economic downturn and the lack of program funding, particularly from government partners, which accompanied this downturn. Total cash revenues were down approximately 20% from 2010-11 and totaled \$2,939,720. In reflection of decreased revenues total expenditures were also reduced, by 17% from the previous year to \$3,303,421, resulting in an overall deficit of \$363,701.

Core program revenues comprised \$1,559,170, comparable to previous years, but for the first time in 5 years core revenue exceeded that generated by targeted programs (response and management), comprising 53% of total revenues. Cash contributions from the Government of Canada accounted for \$890,000 or 57% of the total, while core revenue from the provinces and territories accounted for \$518,170 or 33%. Cash contributions from other non-government organizations, including universities accounted for \$151,000, 10% overall.

Response and Management Revenues were down considerably from 2010-11 and totaled \$1,380,550, representing 47% of overall funding and a reduction of 37% from the previous year. Revenues in this category were derived from the Government of Canada (46%), Provincial and Territorial Governments (38%), as well as foreign governments and miscellaneous income, 16%.

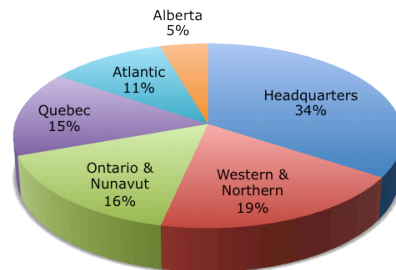
Total Revenue

All Activity Lines



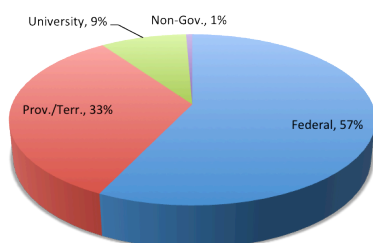
Total Expenses

All Activity Lines by Region



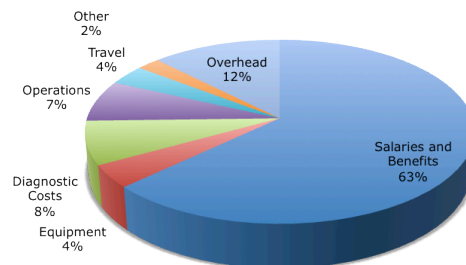
Total Revenue

All Activity Lines



Total Expenses

All Activity Lines by Category



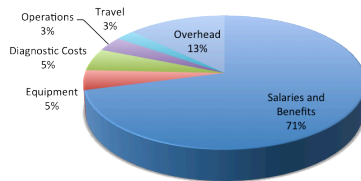


Financial Highlights

Expense	2011 - 2012 Core Expenses by Region						Total
	HQ	W & N	ON/NU	QC	Atlantic	AB	
Salaries and Benefits	\$ 529,650.99	\$ 183,535.34	\$ 313,961.49	\$ 385,235.91	\$ 252,950.54	\$ 83,758.69	\$ 1,749,092.96
Equipment	\$ 20,880.12	\$ 41,759.18	\$ 3,039.00	\$ 6,722.68	\$ 59.00	\$ 44,728.00	\$ 117,187.98
Diagnostic Costs	\$ -	\$ 31,777.92	\$ 42,774.00	\$ 16,858.79	\$ 26,705.00	\$ 14,069.69	\$ 132,185.40
Operations	\$ 28,301.39	\$ 18,719.41	\$ 8,040.00	\$ 21,296.98	\$ 10,056.00	\$ 555.41	\$ 86,969.19
Travel	\$ 24,384.98	\$ 2,500.00	\$ 6,592.00	\$ 19,790.37	\$ 8,735.00	\$ 795.29	\$ 62,797.64
Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,846.00	\$ 2,846.00
Overhead	\$ 85,881.87	\$ 41,743.78	\$ 56,160.97	\$ 67,485.71	\$ 44,775.83	\$ 22,012.96	\$ 318,061.12
Subtotal	\$ 689,099.35	\$ 320,035.63	\$ 430,567.46	\$ 517,390.44	\$ 343,281.37	\$ 168,766.04	\$ 2,469,140.29
Cost Recovery	\$ 164,786.07	\$ 74,143.29	\$ 121,199.33	\$ 147,816.97	\$ 48,188.37	\$ 22,012.96	\$ 578,146.99
Total	\$ 524,313.28	\$ 245,892.34	\$ 309,368.13	\$ 369,573.47	\$ 295,093.00	\$ 146,753.08	\$ 1,890,993.30

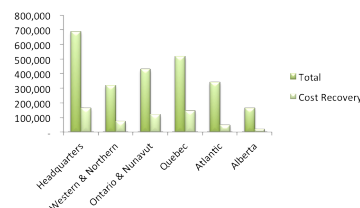
Core Expenses

By Category

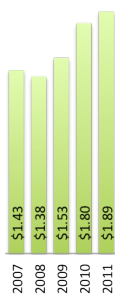


Core Expenses

Cost Recovery



Core Expenses (in millions)



Total Revenue (in millions)



During the 5 year period from 2007 to 2011 the cost of delivering the CCWHC core program, including the National Wildlife Disease Surveillance Program and Educational and Informational Services has risen by approximately 23%. This is reflection of increasing demand for these services and a corresponding expansion in capacity as well as increasing costs, notably salary and diagnostic expenditures. During this same period core sponsorship and revenues have increased by only 5%, placing increased reliance on cost recovery opportunities usually in the form of capitalizing on existing synergies with targeted research and surveillance programs. In 2011-12 funding for the core program totaled \$1,559,170, core program expenses before cost recovery totaled \$2,469,140 creating a funding shortfall of \$909,970. A total of \$578,146 was recovered, 23% of total core expenditures, to help offset this deficit, however the final cost of delivering the core program, after cost recovery, was \$1,890,993, thus incurring a deficit of approximately \$331,823.

Although demand for the CCWHC program is growing the funding to support these activities is not, total revenues from 2007 to 2011 have declined by approximately 35% placing greater strain on the core program and the ability to recover these costs.



Statement of Revenue and Expenses

In 2011-12 cash revenues included over \$1.5M in support of the core program and a further \$1.38M for targeted research programs.

In addition to cash revenues the CCWHC receives vital in-kind support from it's host universities and colleges, participating diagnostic laboratories and numerous collaborators and associates.

REVENUES	Core (General)	Special Projects	Total Revenues
Canadian Food Inspection Agency	130,000	249,953	379,953
Environment Canada	400,000	7,620	407,620
Fisheries and Oceans		31,160	31,160
Foothills Research Institute		25,000	25,000
Parks Canada	120,000	2,500	122,500
PrioNet Canada		105,500	105,500
Public Health Agency of Canada	240,000	210,001	450,001
Alberta			
Alberta - Community Development	4,000		4,000
Alberta - Fish and Wildlife	5,000		5,000
British Columbia	20,000		20,000
Manitoba	10,000		10,000
New Brunswick	10,259	3,617	13,876
Newfoundland & Labrador	21,700		21,700
Northwest Territories	16,000		16,000
Nova Scotia	9,500		9,500
Nunavut	15,000		15,000
Ontario			
Ontario - Agriculture, Food and Rural Affairs		50,000	50,000
Ontario - Health and Long Term Care	100,000		100,000
Ontario - Natural Resources	80,000	99,500	179,500
Prince Edward Island			
PEI - Environment	4,735		4,735
PEI - Health		1,050	1,050
Quebec			
MAPAQ	50,000		50,000
MRNF	50,000	6,036	56,036
MSSS	66,667	63,054	129,721
Saskatchewan			
Saskatchewan Agriculture and Food		35,280	35,280
Saskatchewan Environment	41,309	268,000	309,309
Yukon	14,000		14,000
Canadian Wildlife Federation	10,000	60,000	70,000
UCVM	141,000		141,000
United States Department of Agriculture		51,124	51,124
Miscellaneous Income		111,155	111,155
TOTAL REVENUE	1,559,170	1,380,550	2,939,720
EXPENSES			Total Expenditures
Salaries and Benefits	1,433,000	642,870	2,075,870
Equipment	70,212	61,760	131,972
Diagnostic Costs	96,905	158,362	255,268
Operations	75,317	166,044	241,362
Travel	44,641	72,834	117,475
Other	2,846	70,408	73,254
Overhead	168,071	240,149	408,221
TOTAL EXPENSES	1,890,993	1,412,428	3,303,421
Revenue less Expenditures	-331,823	-31,878	-363,701



Safeguarding the Health of Canada's Wildlife

The Canadian Cooperative Wildlife Health Centre's mission is to provide an integrated partnership approach to the delivery of wildlife health services, research, and education in Canada and internationally.



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