

Canadian Cooperative Wildlife Health Centre

Annual Report 2008 - 2009



Université
de Montréal



Sponsored by Federal, Provincial and Territorial Governments, the Canadian Wildlife Federation, Ducks Unlimited and Syngenta Crop Protection



Message from the Chair, Board of Directors



It is my pleasure to present to you the Annual Report of the Canadian Cooperative Wildlife Health Centre (CCWHC) for the fiscal year 2008-09. This report has been reviewed and approved by the CCWHC's Board of Directors, and gives a clear overview of the CCWHC's many programs and functions.

Canada was well-served by the CCWHC in 2008-09. Our key program of wildlife disease surveillance continued its incremental growth to include more specimens and more regions of the country. It tracked the devastating "red tide" event in the St. Lawrence Estuary in August 2008, detected a recurrence of high activity of Newcastle Disease virus, probed outbreaks of avian cholera, and intensified surveillance for White-nosed Bat syndrome. The national Survey for important strains of avian influenza virus was maintained despite diminished resources, and the seemingly relentless spread of chronic wasting disease (CWD) was closely monitored. The research and education strengths of the CCWHC were harnessed to better understand these and other wildlife diseases in order to reduce their social, economic and ecological impacts. For example, six graduate students worked within CCWHC programs in the field and in the laboratory to better understand critical features of the spread of CWD, while several others worked in partnership with northern communities on the interdependence of human and animal health. A total of 30 graduate students were engaged in wildlife health and disease projects within the CCWHC program across Canada. As this Annual Report shows, most of the CCWHC program is focused on mammals and birds. We hope that very soon the CCWHC will have the resources and partners needed to extend its program to include wild aquatic animals with equal intensity.

The CCWHC also was an ambassador for Canada on the world stage in 2008-09. As a Collaborating Centre of the World Organization for Animal health (OIE), the CCWHC is mandated to make its expertise available to other nations, within its capacity to do so. In this role, CCWHC personnel traveled to Sri Lanka to provide a 3-day workshop on wildlife health issues in public health, agriculture and environmental conservation, to PR China to participate in a regional workshop on avian influenza, and met in Canada with delegations from PR China and from Japan interested in the CCWHC as a model for collaborative program delivery.

I hope you will find this Annual Report both interesting and informative. For more information, please visit the CCWHC's website at <<http://www.ccwhc.ca>>.

Sincerely

Charles Rhodes
Dean, Western College of Veterinary Medicine
Chair, CCWHC Board of Directors



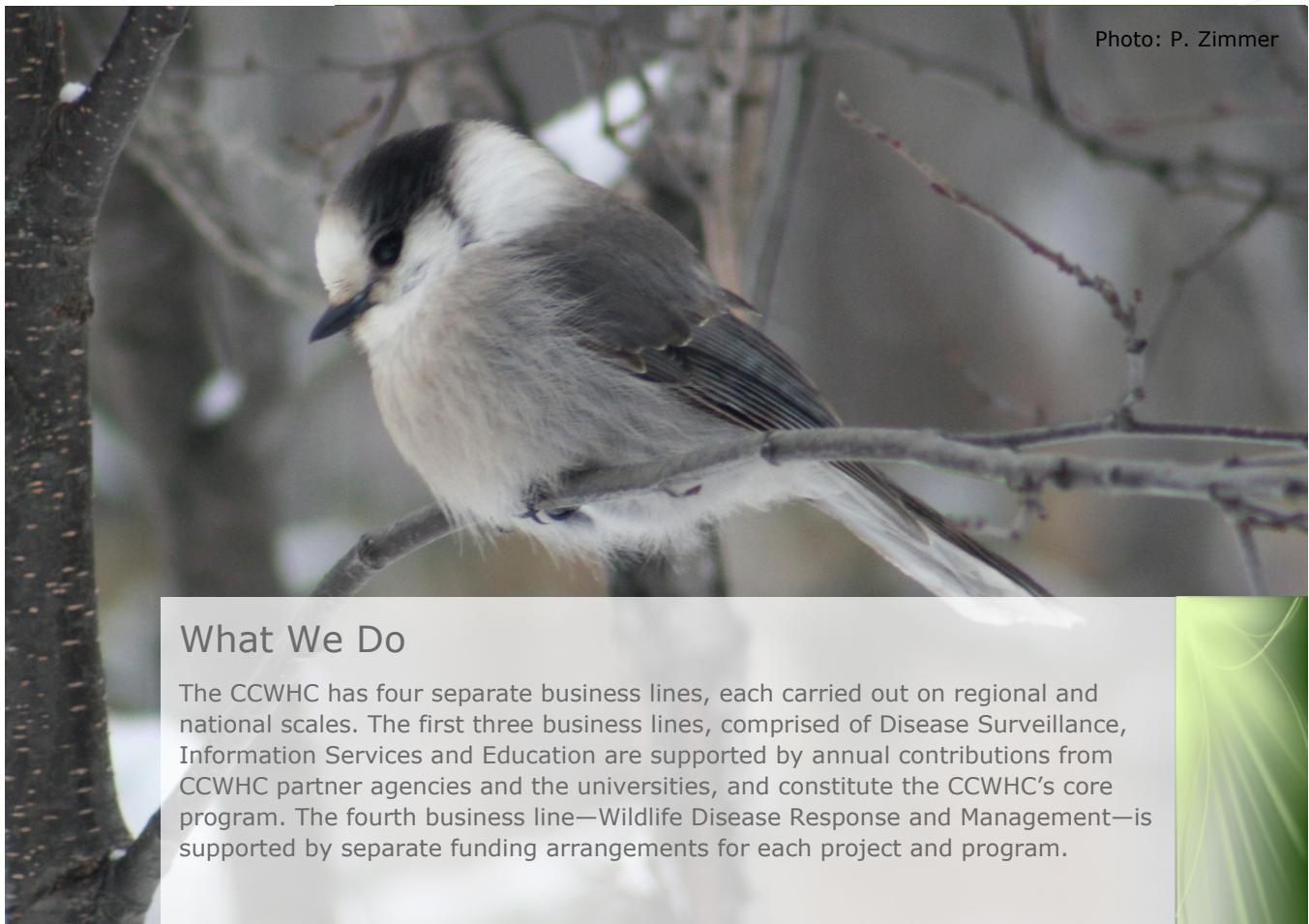
About the CCWHC

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.

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 2008-2009, the CCWHC partnership included four Government of Canada agencies: Environment Canada, the Public Health Agency of Canada, Parks Canada, and the Canadian Food Inspection Agency. The partnership also included all provincial and territorial governments, representing 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, and the Centre for Coastal Health, as well as Ducks Unlimited Canada, the Canadian Wildlife Federation and Syngenta Crop Protection.



What We Do

The CCWHC has four separate business lines, each carried out on regional and national scales. The first three business lines, comprised of 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 business line—Wildlife Disease Response and Management—is supported by separate funding arrangements for each 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, 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.

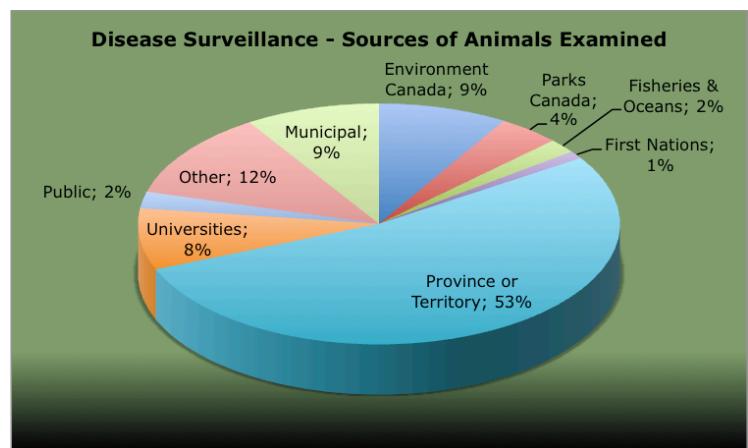


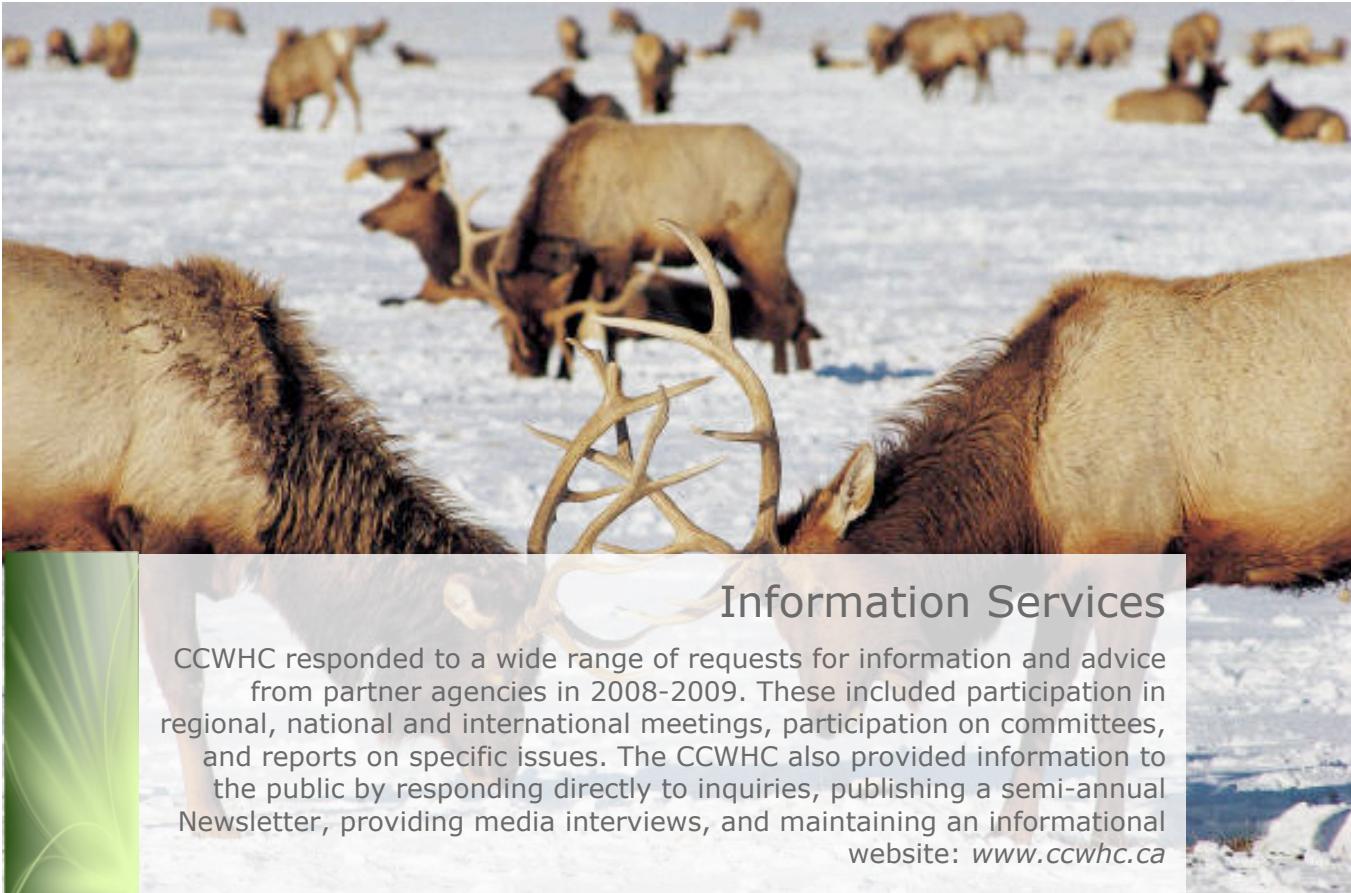


Disease Surveillance

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 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 Board of Directors and the Canadian Wildlife Directors Committee, web site, newsletter and special program reports.

Submissions to the core diagnostic program again increased in 2008-2009, with approximately 3,500 specimens examined, an increase of 9% from the previous year. The majority of submissions were derived from municipal, provincial and territorial governments, together representing 53% of submissions. Bird species comprised 71% of specimens, with mammalian species representing 25%; the remaining 4% of submissions were made up of amphibians, reptiles and fish species. Submissions were evenly distributed across CCWHC diagnostic centres, with 30% of total specimens examined at the Ontario/Nunavut regional centre, 25% at the Western & Northern centre, 23% at the Quebec centre and 22% at Atlantic regional centre.





Information Services

CCWHC responded to a wide range of requests for information and advice from partner agencies in 2008-2009. 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

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
Veterinary expertise for the intervention plan for oiled birds - rehabilitation action plan
Provincial committee for the surveillance of Hemorrhagic Septicemia Virus

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)
Aquaculture Association of Canada
Canadian Animal Health Laboratories Network
Canadian Animal Health Surveillance Network
Canada's Inter-agency Wild Bird Survey

Animal capture drug advice, acquisition and distribution to wildlife agency personnel
Animal Determinants of Emerging Disease (ADED):

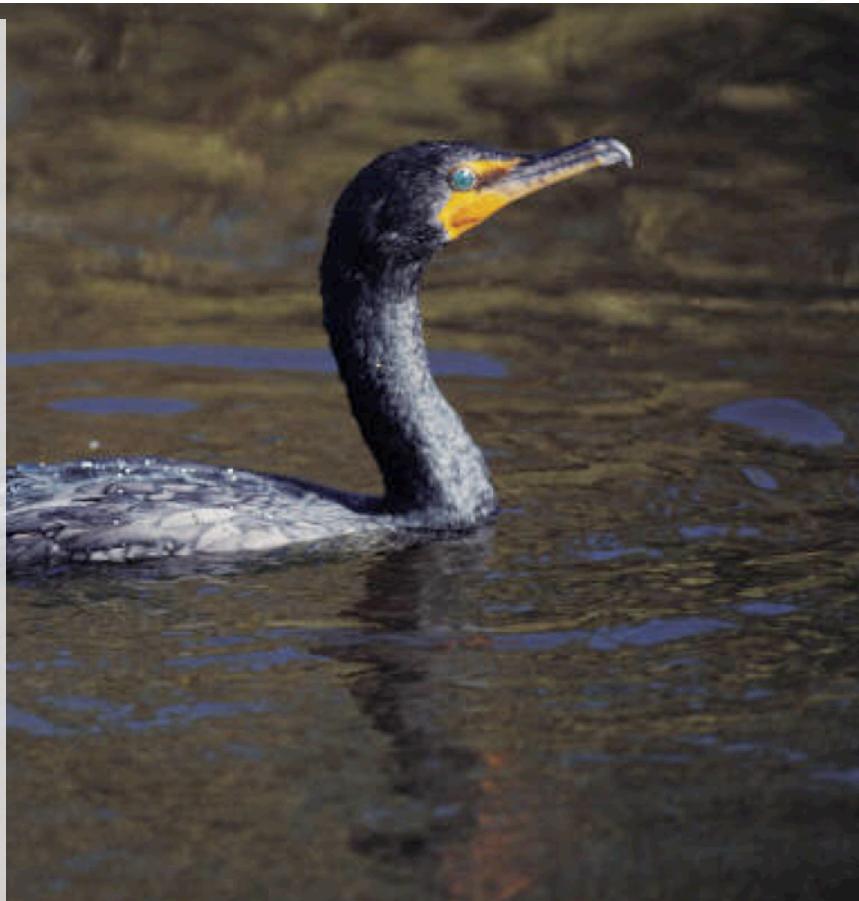
National Zoonoses Rounds
National Aquatic Animal Health Program consultation
Canadian Wildlife Federation Issues Forum
Fur Institute of Canada (representative of the Canadian Association of Zoo and Wildlife Veterinarians on the Board of Directors)

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 Committee on Surveillance for Avian Influenza in Wild Birds
Wildlife Disease Informatics Working Group
CircumArctic Rangifer Monitoring and Assessment Network
Expert Consultation: One World, One Health - From Ideas to Action
Great Lakes Basin Botulism Coordination Workshop
North American Rabies Management Plan
China: Site Visit by Ministry of Agriculture
Sri Lanka: Workshop on Wildlife Diseases and Public Health
Japan: Site Visit by Ministry of Agriculture
Scientific Advisory Board: Centre for Rapid Influenza Surveillance and Research (NIAID - USA)
Wildlife Disease Association Student Forum

Newcastle Disease in Cormorants

Unusual mortality was noted at Double-crested Cormorant colonies in Ontario and Saskatchewan in summer 2008. Mortalities and birds with neurological impairment were observed on several Ontario and Saskatchewan lakes and marshes. Of those birds that were submitted to the CCWHC for testing, Avian Paramyxovirus-1 was isolated from 21 of the total birds tested. Upon further characterization at the National Centre for Foreign Animal Disease in Winnipeg, all of the virus isolates were classified as highly pathogenic. One of the isolated viruses was fully tested and determined indeed to be Newcastle Disease virus (NDV). NDV can cause devastating outbreaks of disease in poultry and thus has been closely monitored by the CCWHC since 1992. NDV outbreaks occur frequently in Double-crested Cormorants across their breeding range in Canada.

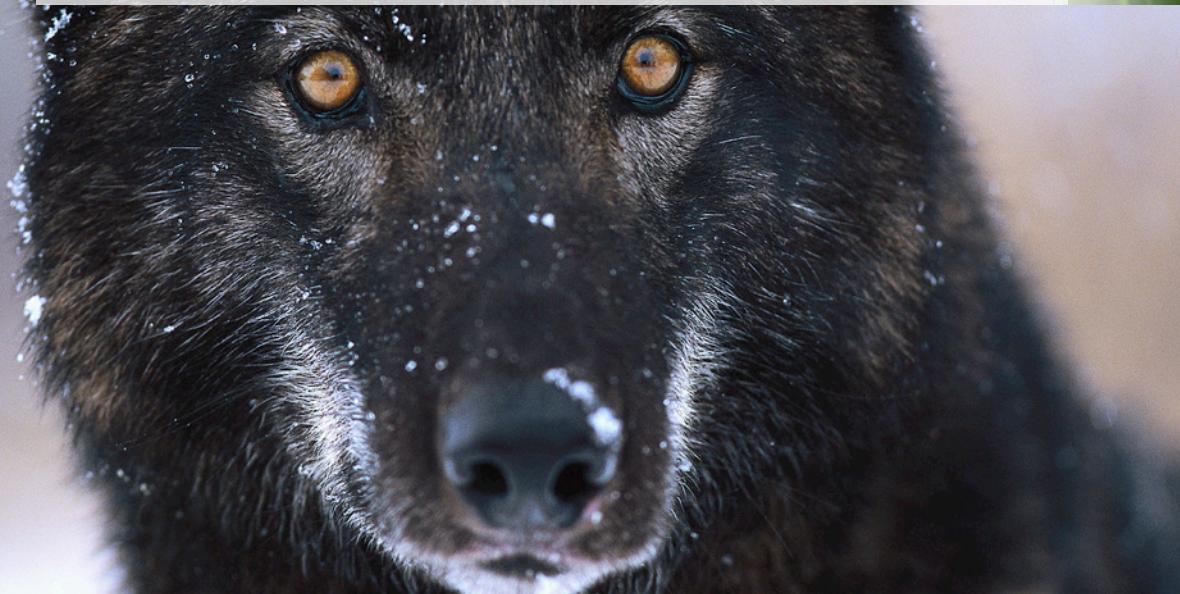


Information Technology Centre

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. 2008 saw a continued shift in focus from an older system to a new more flexible database. This database is being used by all CCWHC sites as well as by some partner agencies and individual researchers. CCWHC holds almost 200,000 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.

Education

Education is a key activity of 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. Instruction in a wide range of topics related to wild animal health and disease was provided to community groups, partner agency personnel and University students in 2008-2009.



The Education Dividend

The veterinary colleges and universities which are hosts to, and partners in, the CCWHC expect and receive significant returns on their investments in the CCWHC in the form of enhancements to their academic programs: externally-supported research, a steady flow of valuable teaching material, and learning opportunities for undergraduate and graduate students, all derived directly from the CCWHC. However, these same benefits accrue to government agencies and other supporters and partners in the CCWHC as a substantial extra dividend for their investment. Each dollar invested in disease surveillance and targeted disease management programs also contributes to the education of highly qualified personnel, many of whom will be sought as employees by the CCWHC's partner agencies themselves.

Agency partners benefit from the CCWHC education program in another way as well. Each year, graduate and undergraduate students carry out projects and address management and policy issues of direct interest to CCWHC partner agencies. For example, in 2008-09, graduate students working with CCWHC faculty and professional staff have addressed the population decline of muskrats in Prince Edward Island, avian cholera in eiders and Besnoitiosis in caribou in Nunavut and Quebec, Lyme Disease and zoonotic parasites of raccoons in Quebec, Viral Hemorrhagic Septicemia and the immune systems of fish in Ontario, four different aspects of Chronic Wasting Disease in wild deer in Saskatchewan, community-based monitoring of animal health and food safety and integration of traditional and scientific knowledge in the Northwest Territories, the role of Brucellosis in the population decline of caribou on Southampton Island (NU), human hydatid disease in an aboriginal community, the impact of tar sands extraction tailings on wildlife health and the measurement of long-term stress in wildlife populations in Alberta, and development of a wildlife disease decision support tool for use by national park staff in British Columbia. Undergraduate veterinary students also have regularly carried out health risk assessments and disease management policy analysis as part of courses offered by CCWHC faculty and staff, and their reports have been highly valued by several of the CCWHC's agency partners.

These education dividends – creation of the next generation of wildlife health professionals and continuous research attention given to partner agency issues – are delivered to the CCWHC's partners at no extra cost, and constitute a key advantage and cost-efficiency of the government-veterinary college partnership that is the CCWHC.

CCWHC Graduate Student Programs

A sample of graduate students affiliated with the Canadian Cooperative Wildlife Health Centre

Guylaine Séguin (DES M.Sc, University of Montreal) Residency program in wildlife health management / *Pasteurella* in eider ducks

Julie Ducrocq (M.Sc, University of Montreal) *Besnoitia* in caribou

Maëlle Gouix (M.Sc, University of Montreal) Verminous pneumonia in beluga whales

Sylvain Larrat (DES Residency program, University of Montreal) in wildlife health management

Pauline Delnatte (Internship, University of Montreal) Growth of feathers in raptors

Catherine Bouchard (PhD, University of Montreal) Lyme disease in Québec

Andrée Lafaille (M.Sc, University of Montreal) *Baylisascaris procyonis* in raccoons in Quebec

Catherine Dubé (M.Sc, University of Montreal) Anemia in raptorial birds

Lowia Al-Hussinee (PhD, University of Guelph) Pathogenesis of VHSV in Ontario fish

Alex Reid (DVSc, University of Guelph) Innate immunity of walleye

Joanne Tataryn (M.Sc, University of Saskatchewan) Demonstrating freedom from CWD using multiple data sources and scenario trees

Erin Silbernagel (M.Sc, University of Saskatchewan) Factors affecting movement patterns of mule deer and white-tailed deer in southern Saskatchewan

Nicole Skelton (M.Sc, University of Saskatchewan) Factors affecting dispersal of yearling deer

Champika Fernanda (M.Sc, University of Saskatchewan) Factors affecting disease prevalence in deer: CWD, gastrointestinal parasites, BVD, IBR, *Neospora* sp.

Bryanne Hoar (PhD, University of Calgary) Conceptual and Predictive Models for the Bionomics of *Ostertagia gruehneri* (Nematoda: Trichostrongylidae) in Barrenground Caribou, with Respect to Northern Climate Change

Pat Curry (PhD, University of Calgary) A New Community-based Technique for Monitoring Disease in Caribou: Assessing and Implementing the Use of Blood-on-filter-paper Collected by Hunters

Nathan deBruyn (M.Sc, University of Calgary) Development and Application of a Rapid, Non-Invasive Diagnostic Tool for the Identification of Gastrointestinal Nematodes in Northern Ungulates

Ryan Brook (Postdoctoral Fellow, University of Calgary) The Rangifer Anatomy Project: Integrating Traditional and Scientific Knowledge

Danna Schock (Postdoctoral Fellow, University Calgary) Detection of pathogen DNA from caribou blood on filter paper

Jane Harms (MVetSc, University of Saskatchewan) "Wildlife Diseases" (Health of tree swallows on oil sands reclaimed wetlands)

Chelsea Himsworth (MVetSc, University of Saskatchewan) "Wildlife Diseases" (Epidemiology of Bovine Tuberculosis in the Hook Lake Bison Recovery Project)

Johan Lindsjo (M.Sc - University of Saskatchewan) Development and application of a health function score system for grizzly bear (*Ursus arctos*) in western Alberta

Scott Nielsen (Postdoctoral fellow, University of Saskatchewan) Wildlife Health Research

Amanda Salb (M.Sc, University of Calgary) Using population and environment to inform surveillance decisions for anthrax in free ranging bison

Sarah Boyle (MEM, Royal Roads University) Development of a decision support tool for national parks staff regarding wildlife disease events

Kate Sawford (PhD, University of Calgary) Use of front-line veterinarians for surveillance for early warning of emerging diseases

Michele Anholt (PhD, University of Calgary) Pets as sentinels for emerging environmental hazards

Colin Robertson (PhD, University of Victoria) Space-time surveillance of emerging infectious diseases risk

Garry Gregory (M.Sc, University of Prince Edward Island) Investigation into the decline of muskrat populations on PEI

Soraya Sayi (MVetSc, University of Prince Edward Island) Wildlife Diagnostic Pathology

CCWHC International

In accepting the designation as a Collaborating Centre of the World Organization of Animal Health (OIE) in 2007, the CCWHC agreed to share its expertise and experience in wildlife disease surveillance, epidemiology and management with the global community of nations, within its capacity to do so. Some of the CCWHC's international activities in 2008-09 are outlined below.

Sri Lanka – Building capacity in wildlife diseases and public health

In July 2008, the CCWHC and the Centre for Coastal Health presented a 3-day workshop on wildlife diseases, disease surveillance, and public health to approximately 30 Sri Lankan public service and university veterinarians in Peradeniya, Sri Lanka. This event was sponsored by the University of Peradeniya and the Ministry of Livestock Development, Department of Animal Production and Health. Two veterinarians from Thailand and one from Indonesia also participated. This workshop was a component of a multi-year development program in veterinary public health designed and managed by the Centre for Coastal Health and supported by Canada's Teasdale-Corti Global Health Research Partnership.

Peoples' Republic of China – Wildlife Disease Surveillance and Organizational Models

The CCWHC participated in a workshop convened by the Institute of Zoology, Chinese Academy of Science (IOZ/CAS) and the United States Department of Agriculture from 6-9 October 2008 in Beijing. The objectives of this meeting were (1) to provide an opportunity for promoting USA, Canada, Russia, Mongolia and China collaborations in the field of Avian Influenza and migratory wild birds, and sharing the related wildlife activities ongoing in each country; (2) to coordinate efforts undertaken by avian, wildlife and disease specialists in this region; (3) to gain a better understanding of within-country and regional needs. Later in October, the CCWHC met in Canada with a delegation from the Ministry of Agriculture and the Chinese Academy of Agricultural Sciences to explain the organization of the CCWHC as a government-university partnership which assists government ministries to deliver their programs. This unique governance structure for disease surveillance and management stimulated enormous interest and discussion among the delegates.

The Netherlands – Data management for the Dutch Wildlife Disease Centre

The CCWHC concluded agreements with the Dutch Wildlife Disease Centre (a multi-agency partnership with headquarters at the University of Utrecht) through which the data management IT system developed by the CCWHC will be used by The Netherlands to store, retrieve and report on wildlife disease surveillance information.

World Organization for Animal Health (OIE)

In 2008, the permanent Working Group on Wildlife Diseases of the OIE was re-organized and the CCWHC Executive Director was appointed as a regular member of this seven-person Group. Ted Leighton also participated in an *ad hoc* Group on wildlife disease notification established to advise the OIE Information Department on how to incorporate wild animal species into the global on-line disease reporting system of the OIE.

Disease Response and Management

In 2008-2009, 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. CCWHC personnel also participated in research to extend the knowledge of wildlife health and welfare in Canada. Many of these targeted programs also enhance the capacity of the CCWHC core program (business lines 1-3).

Disease Response and Management activities in 2008-2009 were centered around Avian Influenza surveillance in wild birds, Rabies Surveillance in Eastern Canada, West Nile Virus surveillance and research projects, 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, surveillance and monitoring of fish pathogens, and in several International Polar Year projects.



Response & Management Activities

Wildlife Disease Surveillance, First Nations & Inuit Health Branch, Ontario Region
West Nile Virus Surveillance
Chronic Wasting Disease Surveillance in Saskatchewan
Animal Health Surveillance for Early Detection of Emerging Infectious Disease Risks
Surveillance for Highly Pathogenic Avian Influenza in Dead Wild Birds in Ontario
Scientific Solutions to Reduce the Impact of Viral Hemorrhagic Septicemia Virus on the Gt. Lakes Spring Viremia of Carp Detection by PCR
Global Avian Influenza Network for Surveillance Data Sharing Project
PCR Testing for Koi Herpes Virus in Wild Carp
Lake Winnipeg Fish Health Assessment
CircumArctic Rangifer Monitoring and Assessment Network
The Suitability of Dried Blood on Filter Paper for the Detection of pathogens in Northern Caribou and Reindeer
Exposure Levels for Pesticides in Birds of Prey
Black-footed Ferret Study, Grasslands National Park
Plague Mitigation Study, Grasslands National Park
Epidemic Diseases in Double-crested Cormorants
Canada's Inter-agency Wild Bird Influenza Survey
PrioNet Canada: Research Management Committee
PrioNet Canada: Theme leader - Chronic Wasting Disease
PrioNet Canada: CWD Tissue Bank
Whole-genome Sequencing of Avian Influenza Viruses

Engaging Communities in the Monitoring of Zoonoses, Country Food Safety and Wildlife Health (IPY)
Assessment of Disease Status of Bison in the MacKenzie Bison Sanctuary, Northwest Territories
Clinical Biochemistry Associated with Capture of Muskoxen Hydatid Disease in a Northern Community
Relationships Between Environmental Change and Wildlife Population Performance
Biomarkers of Long-term Stress in Wildlife
Health Assessment of the Beluga Whales from the St. Lawrence Estuary
Evaluation of Verminous Pneumonia in Beluga Whales
Raccoon Rabies Surveillance in Quebec
Community-based Collections of Arctic Barren-ground Caribous (CARMA/IPY)
Intervention Plan for Oiled Birds - Rehabilitation Action Plan
Nova Scotia Moose Recovery Program
Health Assessment of Northern Fulmars in the Northwest Atlantic
Assessment of Stunning and Bleeding Methods Used During the Grey Seal Hunt in Nova Scotia
Investigation of Muskrat Decline on Prince Edward Island
Consultation for the Establishment of a Marine Animal Response Network for the Gulf and Maritime region
Assessment of the Health Status of Green and Leopard Frogs on PEI
New Brunswick 2008 Wildlife Rabies Control Program Post -Oral Rabies Vaccination Surveillance

International Polar Year Report

The CCWHC has been linked to 3 International Polar Year (IPY) projects since IPY's official launch in March of 2007. The first project entitled "Resilience of Caribou and Reindeer Populations: Validation and Application of the Filter Paper Technique to Assess Exposure to Pathogens" continues to evaluate the use of filter paper blood collection as a method of community-based monitoring of caribou health across the Canadian North. The second project "Starting the clock for the CircumArctic Rangifer Monitoring and Assessment Network (CARMA): Global Change, Resilience and Human-Rangifer Systems of the CircumArctic" is an international, multidisciplinary project to establish the current status of human-Rangifer systems and to evaluate the resilience of these systems. The third project, "Engaging Communities in the Monitoring of Zoonoses, Country Food Safety, and Wildlife Health," is led by the Nunavik Research Centre in Kuujjuaq, Quebec, and focuses on 5 main zoonotic pathogens in arctic wildlife.

These projects are empowering communities to test their own food and communicate the results locally, and to carry out general surveillance of wildlife health and disease. Educational materials have been developed, including a hunter training video, the Rangifer Anatomy Project, which integrates scientific and traditional knowledge of caribou, local school programs, and hands-on experience with integrating local-scale observations, sample collection and science-based monitoring. In addition to local educational programs and materials, the projects have provided opportunities for graduate and undergraduate training and projects among several Universities.

The projects continue to examine the diversity of pathogens and the effects of climate change on caribou and northern wildlife species and to examine the relationship of this information to the overall health of the animal and human populations.



Canada's Inter-agency Wild Bird Influenza Survey

2008-09 was the fourth consecutive year of surveillance in Canada for avian influenza viruses in wild birds. This year, the program was focused on testing wild birds found dead and the early detection of highly-pathogenic, disease-causing strains of avian influenza virus. A total of 2871 dead birds were examined and tested for virus; avian influenza virus was detected in 40 of these. Live wild birds also were sampled and tested in Canada in 2008-09 in a collaborative program with the U.S.

Department of Agriculture. A total of 2203 live birds were tested and 33, all of them wild ducks, were found to be infected with avian influenza virus. This is a very low rate of infection compared with previous Survey years and demonstrates the wide year-to-year range in infection rates; these have varied among years from 2% to 37% in live wild ducks. All influenza viruses detected in this survey were of North American origin and were not disease-causing strains of concern to poultry or people.

A major accomplishment of the Survey in 2008-09 was the full characterization of H7N3 viruses detected in wild birds in 2007. Genetic analysis of these low-pathogenicity (LP) strains revealed that they are nearly identical to the disease-causing, highly-pathogenic (HP) strains associated with recent influenza outbreaks in Canadian poultry. Thus, the Survey has realized one of its initial goals: identifying potential sources of the LP virus strains which underwent genetic change within poultry populations to become the HP strains causing recent epidemics.

Chronic Wasting Disease Surveillance and Research

In partnership with the Ministry of Environment, CCWHC has carried out surveillance for Chronic Wasting Disease (CWD) in Saskatchewan since 1997. Samples from 5700 wild deer were tested in 2008 and 50 affected animals were detected: 42 mule deer, 5 white-tailed deer and 3 elk. CWD now is established in wild deer in at least three different regions of Saskatchewan, has spread into Alberta and is moving closer to Manitoba. The proportion of deer affected in these areas appears to be 1-2% on average, but in some small sub-areas may be as high as 15%.

The CCWHC also has taken a leadership role in conducting research aimed at finding some means of controlling CWD in wild deer. With funding from PrioNet Canada and the Alberta Prion Research Institute, and with collaborators at the University of Alberta, populations genetics and radiotelemetry are being used to determine the structure and movement patterns of deer populations. Other studies are focused on factors affecting local transmission and persistence of CWD and its impacts on deer populations. Recent studies in the US have found wild deer populations with 25% of animals affected and associated declines in these affected populations. CWD will be a significant wildlife management issue in Canada and throughout North America for the foreseeable future.

To aid scientists grappling with various aspects of CWD, PrioNet Canada and the CCWHC have established a bank of frozen tissues from CWD-affected animals at the Western and Northern Regional Centre in Saskatoon. This tissue bank currently contains samples from 226 affected mule deer, white-tailed deer and elk, all derived from Saskatchewan's CWD surveillance program.

Algal Bloom in the St. Lawrence Estuary

In August, the Quebec Regional Centre of the CCWHC collaborated with several government and non-government agencies in Quebec in an urgent response to sudden high mortality of marine animals of many different species in the St. Lawrence Estuary. In just one month, at least 10 beluga, over 80 seals and larger numbers of marine birds and fish were found dead along both the north and south shores of the estuary. Medical examination and toxicological tests determined that this event was due to poisoning by saxitoxin, a biological toxin produced in an intense bloom of the toxin-producing dinoflagellate *Alexandrium tamarense*. While algal blooms sometimes occur due to nutrient pollution, this event appears to have been triggered by a combination of natural events: unusually heavy rain in early August, which stimulated the bloom, and two weeks of very calm weather, reducing the normal dispersion of algal blooms by wind. The number of seals and whales found dead in August 2008 constituted as many or more than the total annual mortality of these species detected in past years.



Photo copyright National Geographic Society

Rangifer Anatomy Project

The Rangifer Anatomy Project began in 2008, building on our long-term work with northern hunters and government biologists in the Northwest Territories. We are integrating scientific information with the traditional knowledge of elders and hunters from northern communities to view caribou anatomy through their eyes. This interaction will enable the scientists to share their knowledge, obtain insight into the user needs, and will also provide opportunities to gather information on traditional uses of caribou from participating Dene, Inuit, Cree, and Métis hunters, youth, and elders. Communication of the results will be done in both web-based and print forms designed for scientists, students, youth, and hunters.

The project is funded by the CircumArctic Rangifer Monitoring and Assessment Network, the Nasivvik Centre for Inuit Health and Changing Environments, Natural Science and Engineering Council of Canada PromoScience, and the UCVM Department of Ecosystem and Public Health.

An Unusual Hazard for Migrant Song Birds

Resource companies often are highly aware of the hazards to wildlife posed by aspects of their operations, and often take steps to be vigilant for any negative effects. Through such vigilance by ExxonMobil employees, an unusual mortality event involving fall migrant song birds was detected off the Atlantic coast of Canada, 160 km from the nearest land.

Many Blackpoll Warblers make a remarkable flight to South America each fall, departing the Atlantic coast of Canada and the US, and flying non-stop 3500 km, and nearly 4 days, across open ocean. Most often, such migrants fly high in the air, but sometimes the most favourable conditions for flight are closer to the ocean surface. In October 2008, 44 blackpoll Warblers were found dead on the Thebaud natural-gas platform off the Nova Scotia coast. All were in excellent nutritional condition and appeared to have died from collision with platform structures. Seventeen of these had moderately to severely burned feathers, indicating that they had made contact with the flame of the gas flare on a high tower above the main platform. It appears that these migrants were flying at an unusually low level at night when they encountered the platform and some may have been fatally attracted to the light of the flare. Lights and lighted buildings also are known to attract migrant song birds with similarly fatal results. Such an event on the open ocean is unusual, but not unprecedented; ships occasionally report similar small mortality events.

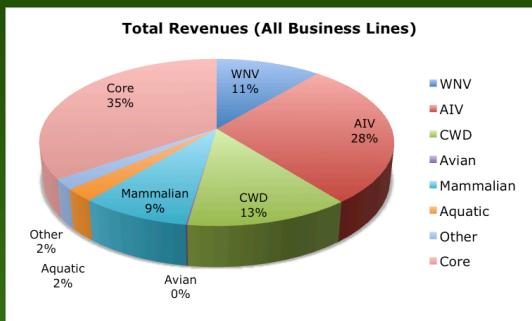


Financial Highlights

In 2008-2009, the CCWHC had total cash revenues of \$4,190,531, a decrease of 9% from 2007-2008. Core Program revenues (business lines 1-3) comprised \$1,445,762 or 35% of the total, comparable to funding levels in 2007-2008. Revenues from Response and Management activities (business line 4), mostly from targeted research programs comprised \$2,744,769 or 65% of total revenue. An additional \$246,000 was received as in-kind contributions from the host Universities.

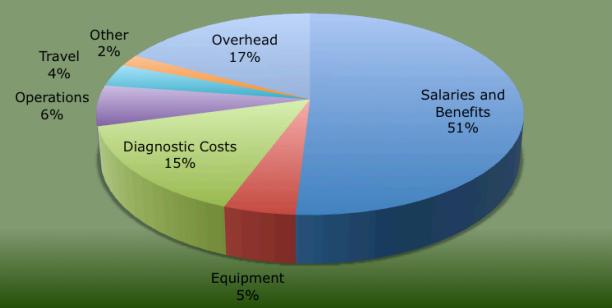
Core Program revenue (business lines 1-3) from the Government of Canada accounted for \$910,000 or 63% of the total, while core revenue from the provinces and territories accounted for \$510,762 or 35%. Contributions from other non-government organizations and individuals accounted for the remaining \$25,000 or 2%.

Cash Revenues in 2008-2009 included \$1,445,762 in support of the core program and a further \$2,744,769 for targeted research programs. In total, CCWHC revenues for 2008-2009 were \$4,190,531.

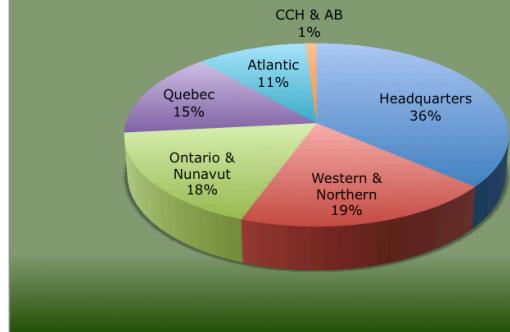


Response and Management revenues (business line 4) were primarily comprised of federal government funding (69%), provided by the Canadian Food Inspection Agency, the Public Health Agency of Canada, PrioNet Canada (Network Centres of Excellence), NSERC-CRD, and Environment Canada. Provincial and foreign governments and the Universities provided the remaining 31%, with major contributions from Saskatchewan's Ministry of Environment, the Ontario Ministries of Health and Long-Term Care, Natural Resources and Agriculture Food and Rural Affairs, the Government of Quebec , and the United States Department of Agriculture.

Total Expenses (All Business Lines) by Category



Total Expenses (All Business Lines) by CCWHC Region



Expense	2008-2009 Core Expenses by Region						
	HQ	W & N	ON/NU	QC	Atlantic	CCH & AB	Total
Salaries and Benefits	\$ 610,856.00	\$ 151,100.00	\$ 147,490.00	\$ 327,012.38	\$ 227,235.34	\$ 28,500.00	\$ 1,492,193.72
Equipment	\$ 10,218.64	\$ 9,890.00	\$ -	\$ 2,214.00	\$ 2,274.00		\$ 24,596.64
Diagnostic Costs		\$ 55,160.00	\$ 59,377.00	\$ 32,063.00	\$ 33,954.00		\$ 180,554.00
Operations	\$ 78,865.91	\$ 7,850.00	\$ 3,118.00	\$ 18,517.00	\$ 8,975.00	\$ 7,000.00	\$ 124,325.91
Travel	\$ 33,202.54	\$ 2,040.00	\$ 7,783.00	\$ 11,190.00	\$ 10,642.00	\$ 6,500.00	\$ 71,357.54
Other							\$ -
Overhead	\$ 63,934.29	\$ 39,426.00	\$ 39,426.00	\$ 38,291.00	\$ 30,901.57	\$ 4,500.00	\$ 216,478.86
Subtotal	\$ 797,077.38	\$ 265,466.00	\$ 257,194.00	\$ 429,287.38	\$ 313,981.91	\$ 46,500.00	\$ 2,109,506.67
Cost Recovery	\$ 246,899.77	\$ 144,937.68	\$ 67,320.91	\$ 134,588.78	\$ 129,076.34	\$ 4,500.00	\$ 727,323.48
Total	\$ 550,177.61	\$ 120,528.32	\$ 189,873.09	\$ 294,698.60	\$ 184,905.57	\$ 42,000.00	\$ 1,382,183.19



Core Expenditures and Cost Recovery

In 2008-2009, the cost of delivering the CCWHC core program, including the National Wildlife Disease Surveillance Program and Educational and Informational Services (business lines 1-3) exceeded \$2,100,000.

Funding for the core program totaled only \$1,445,762, creating a shortfall of \$663,745 or 31%. Fortunately, the CCWHC was able to capitalize on synergies between the core program activities and Response and Management activities to recover a total of \$727,323 (34% of total core expenditures). The final cost of delivering the core program, after cost recovery, was \$1,382,183.

Canadian Cooperative Wildlife Health Centre		Statement of Revenues & Expenses			
REVENUES		Core (General)	Special Projects	In-Kind	2008/2009 Total Revenues
Canadian Food Inspection Agency		100,000	680,882		780,882
Canadian Institutes of Health Research			71,000		71,000
Environment Canada		440,000	67,000		507,000
First Nations and Inuit Health			4,993		4,993
Fisheries and Oceans			50,000		50,000
Parks Canada		130,000	9,849		139,849
PrioNet Canada			280,000		280,000
Public Health Agency of Canada		240,000	680,214		920,214
Alberta					
Alberta - Fish and Wildlife		27,000			27,000
Alberta - Community Development		4,000			4,000
British Columbia		30,000			30,000
Manitoba		10,000			10,000
New Brunswick					
New Brunswick - Health		10,259	4,711		14,970
New Brunswick - Agriculture		0	0		0
New Brunswick - Fish & Wildlife		10,259	3,617		13,876
Newfoundland & Labrador		21,700			21,700
Northwest Territories		16,000	18,000		34,000
Nova Scotia					
Nova Scotia - DNR		9,500			9,500
Nova Scotia - Agriculture		8,000	4,667		12,667
Nova Scotia - Health		7,000	9,378		16,378
Nunavut		12,000	20,000		32,000
Ontario					
Ontario - Agriculture, Food and Rural Affairs			50,000		50,000
Ontario - Environment		25,000			25,000
Ontario - Natural Resources		80,000	76,000		156,000
Ontario - Health and Long Term Care		50,000	74,391		124,391
Prince Edward Island					
PEI - Environment		4,735	21,050		25,785
PEI - Health			5,761		5,761
Quebec		130,000	72,815		202,815
Saskatchewan					
Saskatchewan Environment		41,309	260,000		301,309
Saskatchewan Agriculture and Food			38,815		38,815
Yukon		14,000			14,000
Ducks Unlimited		12,000			12,000
Syngenta		3,000			3,000
Canadian Wildlife Federation		10,000			10,000
Universities			26,667	246,000	272,667
United States Department of Agriculture			158,460		158,460
NSERC-CRD			56,500		56,500
Miscellaneous Income					0
TOTAL REVENUE		1,445,762	2,744,769	246,000	4,436,531
EXPENSES		2008/2009 Total Expenditures			
Salaries and Benefits		772,505	1,329,741		2,102,246
Equipment		16,152	179,809		195,961
Diagnostic Costs		198,775	423,752		622,527
Operations		110,826	155,932		266,758
Travel		70,811	79,396		150,208
Other		0	77,149	246,000	323,149
Overhead		213,114	502,117		715,231
TOTAL EXPENSES		1,382,183	2,747,897	246,000	4,376,080
Revenue less Expenditures		63,579	-3,128	0	60,451

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