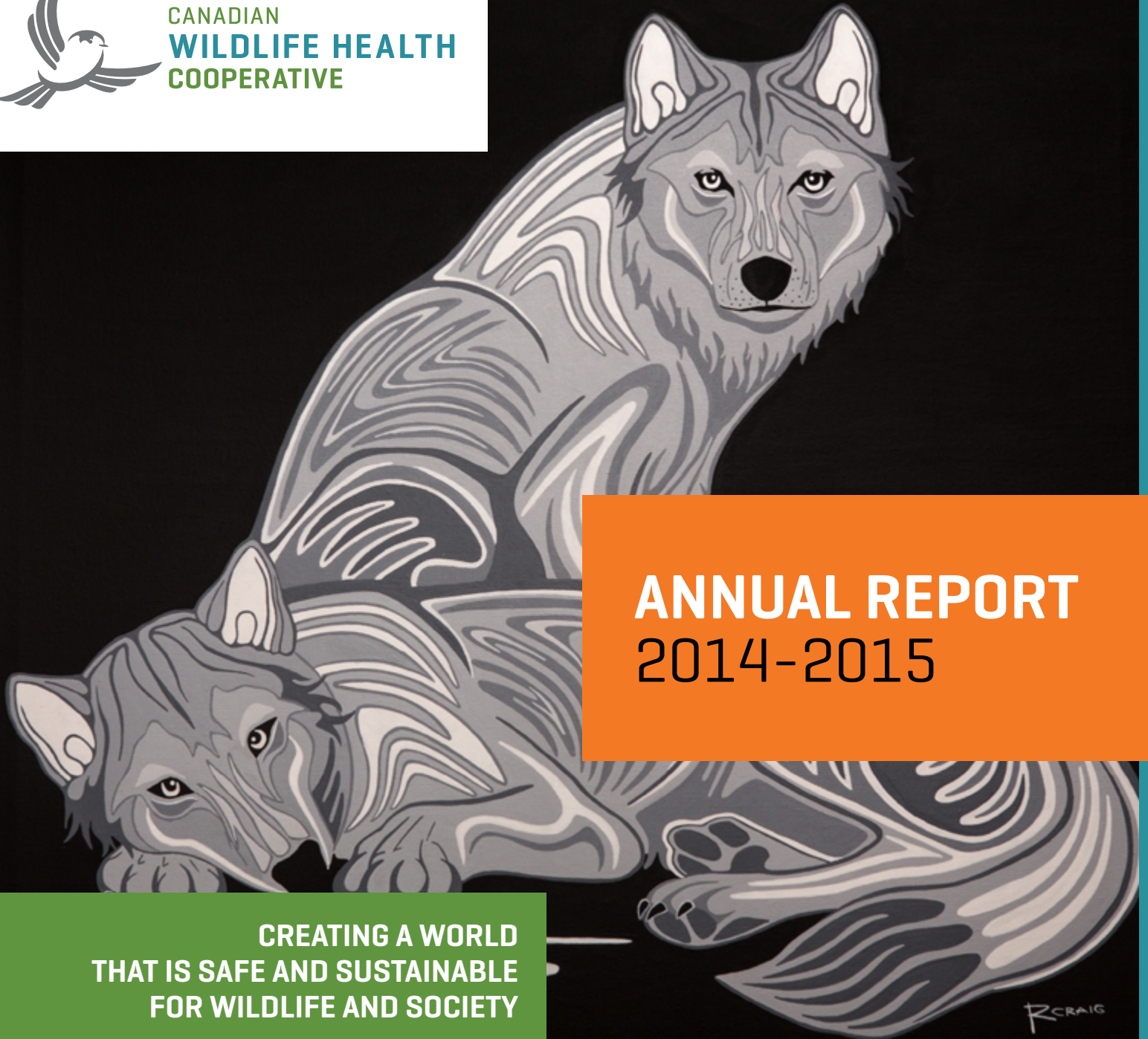




CANADIAN  
**WILDLIFE HEALTH**  
COOPERATIVE



# ANNUAL REPORT 2014-2015

CREATING A WORLD  
THAT IS SAFE AND SUSTAINABLE  
FOR WILDLIFE AND SOCIETY

R CRAIG



## OUR MISSION

To promote and protect the health of wildlife and Canadians through leadership, partnership, investigation, and action.

## OUR VISION

A world that is safe and sustainable for wildlife and society.

## TABLE OF CONTENTS

Message from the Executive Director .....	2
Why Canada needs a wildlife health program .....	3
Assurance .....	5
Case Studies .....	7
Preparedness .....	9
Response .....	11
The CWHC at a glance .....	13
Protection .....	15
Capacity Development .....	17
Community .....	19
Spreading the Word .....	21
Financials .....	23
Staffing .....	25
Acknowledgments .....	26



## MESSAGE from the Executive Director

Canada needs a national wildlife health program. That message became very clear to me as I undertook several rounds of consultations with partners, staff, governments and stakeholders in my first year as Executive Director. And I can say with pride and confidence that the Canadian Wildlife Health Cooperative is meeting that need. This report highlights some of the activities, impacts and value the CWHC provided to Canada over the past year. I am sure you will agree that Canadians can be assured that the science, expertise, partnerships and capacity that make up the CWHC are admirably serving them and wildlife.

I am equally convinced that the CWHC could not serve its national role without the passion and dedication of our directors, staff, associates, trainees and network members. This is an organization based on highly committed people who go above and beyond expectations to deliver a program that far exceeds the investments made for a national program. I cannot thank these people enough for making the CWHC an international exemplar of a high quality, trustworthy and highly valued wildlife health program. You will find many fine examples of their work in this report but please note, these are only a selection of the excellent work our team conducts. I encourage you to get to know the members of your CWHC regional centre and the national office team to learn more about our outputs and impacts.

The CWHC is fortunate to have a number of champions and advisors in a variety of government, university and non-governmental organizations. In some cases, they are our clients with whom we work to turn our outputs into actions. In other cases, they are partners in getting the messages out that help to protect wildlife. The commitment of our host institutions is unparalleled and essential to our capacity to deliver a world class program. This network of supporters and collaborators has helped the CWHC extend its impacts further and faster and is ensuring our evidence is making a difference to wildlife health. I wish to personally thank these people for their advice, input and support in my first year. They are helping us evolve to meet new needs for wildlife health and ensure we remain impactful and relevant in a rapidly changing world. You will see examples in this report of how we are expanding our abilities to provide the full spectrum of services for a national wildlife health program.

It is my honour to present the 2014-15 CWHC annual report. I hope you find that the information within the report gives you confidence that there is an organization dedicated to providing the best information available to promote and protect wildlife health.

**CRAIG STEPHEN**  
CWHC Executive Director



# WHY CANADA NEEDS a wildlife health program

A world good for wildlife is good for us. **A safe and healthy environment that includes healthy, resilient wild animal populations is fundamental to our physical, socio-economic and cultural well being.** The wildlife economy is substantial and growing and estimated to rival the agricultural economy. Interactions between wild animals and agriculture affect international trade and our food production. Diseases shared between wild animals, domestic animals and/or people have the potential to adversely affect health. Healthy and sustainable wildlife are a shared Canadian value.

At a time of unprecedented environmental change, activities and decisions to safeguard the health of wild animals are increasingly important to prepare and respond to new disease emergence, emerging food safety and food security concerns, and adversely affected economic opportunities. CWHC programs identify and assess threats to conservation, public health and economic activities. We provide evidence and advice to support policy planning and management and enable claims of a safe and healthy environment for people and wild animals. These activities help to ensure that Canada meets international obligations and expectations, supports cultural and economic opportunities, and assists in safeguarding public health.

## ASSURANCE

Assurances of wildlife health and the ability to detect emerging threats are vital CWHC outcomes. Our surveillance, research and risk assessments contribute to the necessary situational awareness required to provide assurances of no harm when none exists, in turn providing evidence of clean, safe and sustainable environments. Our national perspective of infectious diseases of wildlife helps assure access to international trade and markets. Providing an internationally acclaimed standard of threat detection underlies prevention, response and recovery from emerging threats, thereby protecting our nation's public health, conservation and economic activities.

## PREPAREDNESS

Early warning, surge capacity that is adaptable to changing circumstances, and capacity building help Canada to prepare for emerging threats. The CWHC undertakes a range of activities across Canada to monitor and forecast impending events, interpret and communicate warnings, and prepare for rapid and appropriate responses. Our educational and training activities build capacity to maintain and expand these services in response to increasing needs. The information generated from our monitoring and research, as well as our risk/policy assessments and knowledge reviews provides health intelligence, informing both policy and practice.



## RESPONSE

Converting knowledge into action is key for any health program and critical for turning surveillance and research into action. The CWHC network detects and communicates signals of wildlife health with knowledge producers and users in a timely fashion. The CWHC is the national wildlife health focal point, coordinating and connecting federal, provincial, territorial, academic and private programs, priorities and information. CWHC members contribute to numerous working groups and committees, serving as national sources of expertise and supporting local management programs. We have been at the forefront of responses to new diseases, working to limit their impacts on wildlife and Canadians.

## PROTECTION

The CWHC provides a trusted view of the state of wildlife health and together with our partners identifies strategic priorities. Our outputs raise awareness of emerging health issues and the need for action, as in the case of salamander chytrid disease. Creating awareness of wildlife health issues and influencing priorities and perceptions helps to shape future wildlife health programs. We generate evidence and insights to identify priority actions against current threats, such as chronic wasting disease, as well as to prepare us for impending threats, such as climate change. National strategy development coupled with program and policy evaluation ensures that emerging and important issues are adequately considered in plans to protect wildlife health.

## CWHC IMPACT STUDY SUPPORTING CANADA'S CLAIM OF DISEASE FREEDOM

To achieve international recognition that Canada is free of classical swine fever (CSF), the Canadian Food Inspection Agency (CFIA) was required to demonstrate that wild boar are under surveillance and have never been diagnosed with CSF. The CFIA relies on the CWHC's cross-Canada surveillance to assure trading partners that wildlife diseases are being monitored. Combined results from our 22 years of scanning surveillance and an active surveillance project carried out by our Western/Northern region provided the evidence the CFIA needed to support claims that Canada is free of CSF.





# ASSURANCE

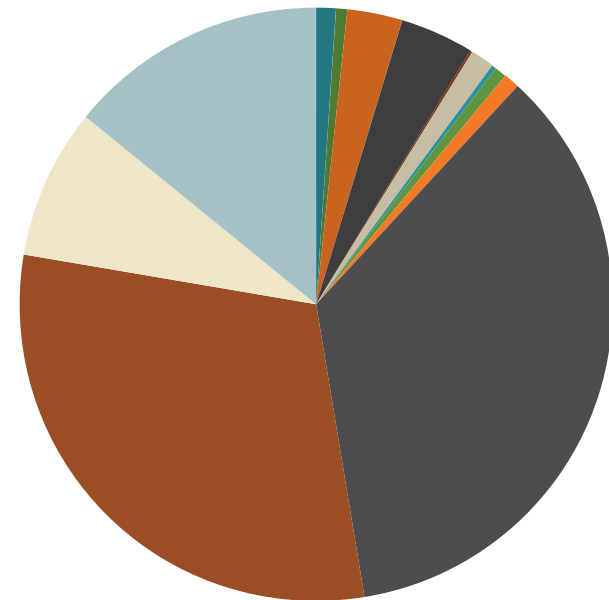
## GENERAL SURVEILLANCE

Scanning surveillance activities are a foundation of CWHC programs. By investigating causes of death and disease, the CWHC tracks changes in endemic diseases, discovers emerging diseases and interprets and communicates these findings to stakeholders that cross ministries, governments and sectors. The CWHC receives and assesses over 5000 wildlife submissions per year across all regions in Canada. These cases are subject to state-of-the-art diagnostics and expertise to provide situational awareness for conservation, public health and agriculture.

CWHC surveillance activities culminate in converting our information and assessment into useable advice and technical information, and facilitating processes to turn our outputs into action. This includes spearheading national strategies, integrating information with our partners to develop national perspectives on wildlife health issues and facilitating and coordinating management and assessment plans.

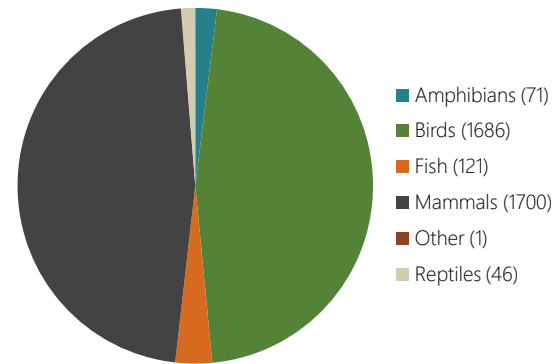


## DISEASE COUNTS & DIAGNOSTIC DATA



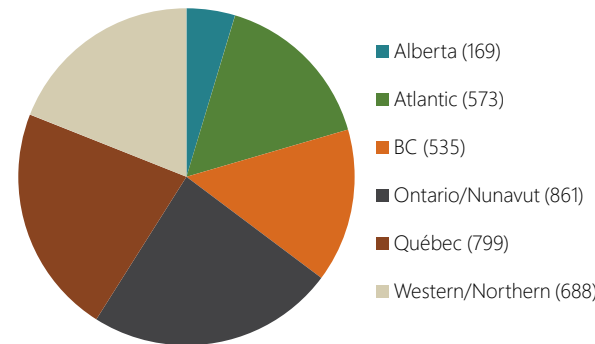
- Commercial (39)
- Conservation Groups/NGOs (22)
- DFO (109)
- Env Canada (145)
- First Nations (5)
- Municipalities (47)
- Other (9)
- Other Federal Government (23)
- Parks Canada (31)
- Provincial Government (1288)
- Public (1098)
- Academic Institutions (297)
- Zoos/Rehabilitation Centres (512)

SUBMISSIONS BY SOURCE



- Amphibians (71)
- Birds (1686)
- Fish (121)
- Mammals (1700)
- Other (1)
- Reptiles (46)

SUBMISSIONS BY TAXONOMIC GROUP

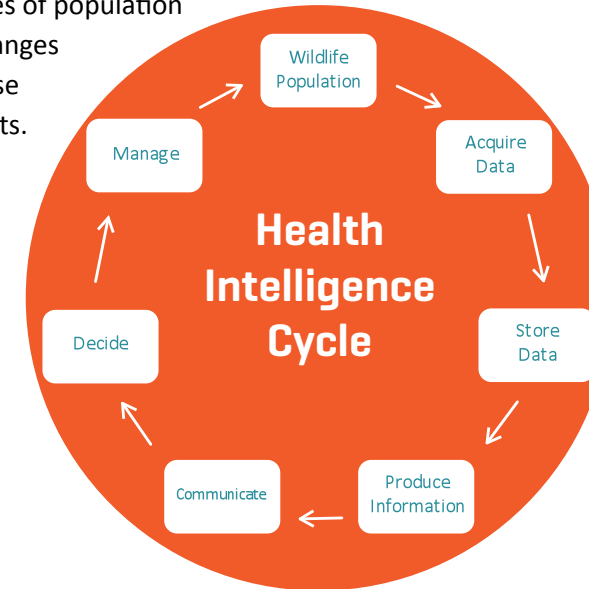


- Alberta (169)
- Atlantic (573)
- BC (535)
- Ontario/Nunavut (861)
- Québec (799)
- Western/Northern (688)

SUBMISSIONS BY CWHC REGION

## HEALTH INTELLIGENCE

The CWHC is expanding the ways we monitor wildlife health and disease to gain a better understanding of the environment in which our wildlife populations succeed or fail. Health outcome monitoring allows us to observe changes in disease patterns via core diagnostic surveillance efforts, targeted collection of samples for specific diseases or species groups, and reviews of research regarding health indicators and sentinel species. We are working with a team of geographers to develop innovative tools to monitor volunteered signals such as news sources, technical and scientific publications and citizen science projects. These data will form an information set that is used to analyze root causes of population health changes and disease movements.



### Targeted Programs

Project	Examined	Positive
Avian Influenza Virus	3133	7
West Nile Virus	925	18
Rabies	1529	18
Bat White Nose Syndrome	316	153
Chronic wasting Disease	161	21





## CASE studies



### CITIZEN SCIENCE IN SASKATCHEWAN

CWHC information and education efforts are focused on varied audiences, including the public. These efforts often result in members of the public approaching the CWHC regarding sick or dead wildlife. The importance of these activities was highlighted this past winter when an observant bird bander from Prince Albert Saskatchewan contacted the CWHC Western/Northern regional centre regarding grosbeaks and Pine Siskins that looked sick. Arrangements were made to send the necessary materials to a citizen scientist to swab affected birds and send samples back to the CWHC. Through this process the first confirmed case of conjunctivitis caused by *Mycoplasma gallisepticum* in Saskatchewan was made during the winter of 2015. Several birds were infected and showing clinical signs. Many recovered over a period of several weeks.

### ARE FREE RANGING SKUNKS IN BRITISH COLUMBIA RESERVOIRS OF EMERGING INFECTIONS?

Wild animal reservoirs are an important source of emerging and zoonotic infection. Skunks (*Mephitis mephitis*) are a reservoir of rabies virus in Canada, with the exception of some areas including the province of British Columbia (BC). A study in BC explored the role that skunks may play in emerging and zoonotic pathogen risk in BC. From March 2011 to February 2015, 50 free ranging skunks were necropsied at the BC Animal Health Centre/CWHC BC regional centre and tested for Influenza A, Aleutian disease virus (ADV), *Leptospira* species, and *Salmonella* species. Two skunks (4%) were diagnosed with respiratory disease caused by Influenza A (H1N1) pdm09 during the human flu season suggesting that skunks may be a vulnerable to reverse zoonosis of this strain of Influenza A. A high prevalence of ADV infection was found (86%). Two of the infected skunks were diagnosed with Aleutian disease (AD), suggesting that skunks can act as both a reservoir for and victim of the virus. Most studies of ADV have focused on the potential for infection of free ranging species living near mink farms. Our study suggests that urban skunks may be a primary host for the virus independent of domestic mink. *Leptospira interrogans* was detected in 18% of the skunks. Identification of the reservoir serovars is needed to determine the public health risk for leptospirosis following human contact with infected skunks. *Salmonella* spp. was isolated from 3 skunks (7%), specifically *S. Typhimurium*, *S. Muenchen* and *S. Enteritidis*. These serotypes can cause disease in people but the low prevalence of infection suggests there is a low public health risk.



### LEAD INTOXICATION IN EAGLES

Lead ammunition is still widely used for big game and upland game hunting. The CWHC Quebec regional centre collaborated with the Union québécoise de réhabilitation des oiseaux de proie (UQROP) on a study of lead poisoning in eagles. The goal was to better understand the impact that lead ammunition could have on eagle health. One hundred and forty-four Bald Eagles and 36 Golden Eagles submitted via the UQROP network to the Raptor Rehabilitation Clinic (Université de Montréal) and CWHC – Quebec were included in this study coordinated by Pauline Loos, veterinary intern at the Université de Montréal. Lead was measured either in blood, liver or kidney. Lead exposure was documented in 21% of the cases. Levels high enough to be associated with significant clinical poisoning were seen in 7% of the eagles. Lead levels were higher during or right after the big game hunting season. Analyses of lead isotopes suggest that these eagle poisonings were a consequence of scavenging the remains of hunted animals contaminated by lead fragments left by hunters in carcasses at the killing sites. This study as well as another conducted at the CWHC Western/Northern region showed that the use of lead ammunition is detrimental for Bald and Golden Eagle health. Our results will be used to raise awareness within the hunter community with the goal of promoting the voluntary use of alternative non-toxic ammunition for big game hunting.

## CWHC IMPACT STUDY CRYPTOCOCCUS GATTII IN ATLANTIC CANADA

In the summer of 2014 the CWHC Atlantic region identified a fungal infection in a white-tailed deer due to *Cryptococcus gattii*, genotype VgII. This is the second emergence of this tropical fungal pathogen in Canada following its previous identification in British Columbia over a decade ago. The fungus is responsible for the disease cryptococcosis. It affects people, companion animals and both terrestrial and aquatic wildlife. As white-tailed deer are resident species in Nova Scotia, the fungus is likely present in the local environment. The CWHC worked with Nova Scotia's Chief Public Health Officer to add cryptococcosis to the list of infectious diseases in the province, creating the diagnostic suspicion for early recognition of this disease in people and domestic animals needed to support prompt detection and treatment.





# PREPAREDNESS

## BEING READY FOR WHAT MIGHT COME

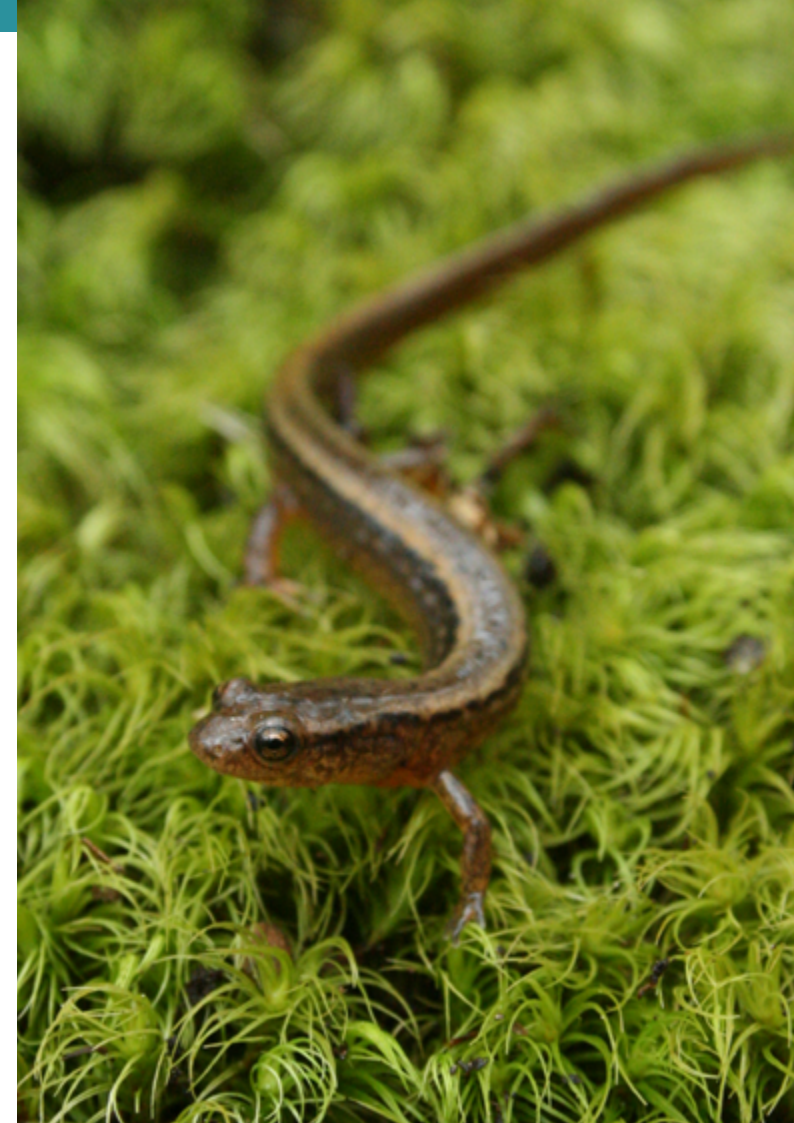
Being adequately prepared is the foundation of being able to prevent and effectively respond to wildlife disease problems. The CWHC has three preparedness roles: we help identify and triage emerging problems to inspire early action; we develop plans informed by good science; and we build capacity to be ready. CWHC surveillance and health intelligence systems allow us to detect signals of potential threats and assess their priority for actions. For example, our scanning surveillance detected a number of instances of apparent range extension of some parasites of fish and terrestrial carnivores. Subsequent messaging increased awareness of these incursions and follow-up field investigations are helping us to assess the risks to conservation and public health.

Building on our experience developing a national wildlife disease strategy, this year saw us developing advice to update avian influenza preparedness, assess threats to salamanders from an emerging fungus, and advocate for the creation of a national wildlife health strategy - all forward looking documents aiming to better prepare us for changes in wildlife diseases. Our workshop on the link between climate change and wildlife health is another example of proactive work to better prepare Canada for impending threats. Preparation requires capacity and expertise. The CWHC continues to be a major centre for training the next generation of wildlife health professionals able to protect wildlife health. This year saw renewed collaboration with our federal partners to sustain CWHC and wildlife health capacity. This included developing a business case for wildlife health that established the need for a sustained and secure national capacity to ensure we are prepared and able to protect wildlife health.

## PROTECTING SALAMANDERS FROM A SPREADING FUNGAL THREAT

*Batrachochytrium salamandrivorans* is a fungus that infects salamanders in Asia. It was recently introduced into Europe where it caused a precipitous decline in salamander populations. The CWHC undertook a rapid threat assessment for Environment Canada to provide guidance on the need for and nature of response to this threat. We concluded that Canada is vulnerable and needs to respond now. Actions were recommended to reduce the risk of importation of the fungus with the pet trade, to create increased awareness of this threat and to develop proactive biosecurity procedures. We also developed diagnostic capacity at two of our regional centres, which will ensure that Canada is prepared to detect this pathogen if it enters the country and begins to kill salamanders and newts.

CWHC members have been working closely with partner agencies in the United States to help develop a continental approach to this problem and ensure a consistent approach to surveillance and diagnostics.



European experience suggests that introduction to Canada could parallel the experience we are facing with white-nose syndrome in bats or the impacts of frog chytrid disease on amphibians worldwide, both in terms of mortality rate and ecological effects. The CWHC threat assessment is supporting Environment Canada's efforts to take action before we see such impacts, as well as preparing the country to detect and contain the disease if it were to enter Canada.





# RESPONSE

## REDUCING THE IMPACT OF WILDLIFE DISEASE

Canadians look to the CWHC to protect wildlife health and to minimize possible threats wildlife might present to public health or economic activities. **There is growing recognition of the impact of disease in conservation and human-animal relations.** Once a disease has developed, a fast and effective response is critical to soften the impact of the disease on conservation, animal welfare, public health, agriculture and other social values. **Disease response is a foundation of the CWHC.** The CWHC supports federal, provincial and local response to wildlife disease in several ways. For some diseases, such as white-nose syndrome in bats, we work with partners to develop a coordinated and harmonized response across Canada. Our diagnostic services play a key role in helping to detect the spread or containment of a problem, such as in the case of avian influenza outbreaks. Our regional centres investigate possible causes of disease issues, helping management agencies target their response efforts. At times, CWHC staff and students are also in the field, working with management agencies to implement response plans. Our capacity to help plan responses, provide evidence to target response resources, and assist in on-the-ground response allows the CWHC to offer a full spectrum of response services.

## HIGHLY PATHOGENIC AVIAN INFLUENZA – RESPONDING TO A BRAND NEW SITUATION

North America found itself in a new situation in 2014-15. Three types of highly pathogenic avian influenza appeared, including some novel reassortments of the virus which contained genes from North American waterfowl. The Canadian poultry industry controlled disease outbreaks in British Columbia and Ontario. Massive outbreaks in the United States were ongoing in late 2014, causing the destruction of millions of domestic birds. The CWHC played a central role in the Canadian response to this new situation.

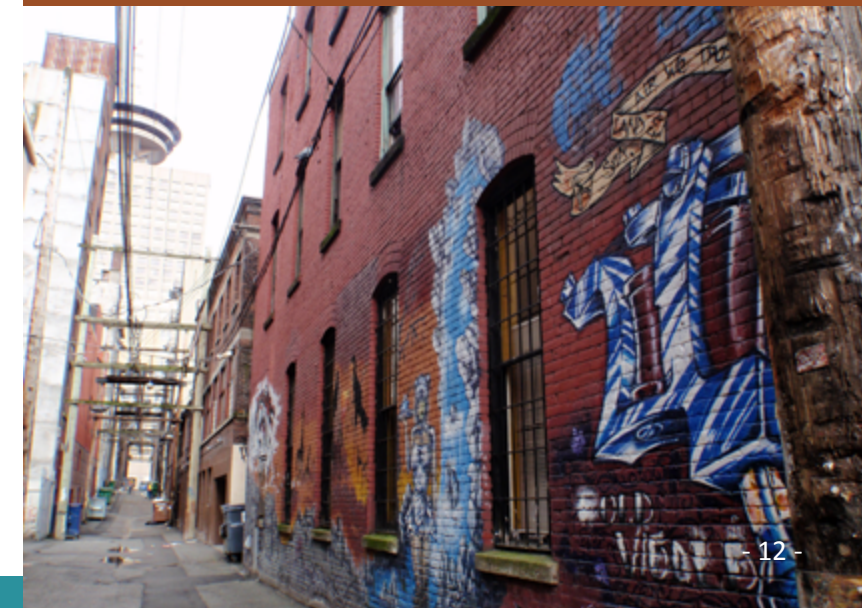
In BC, the CWHC worked with the local interagency wild bird mortality response team to develop and coordinate an enhanced surveillance program that sought to establish if the new virus was still present in the environment and to help with source attribution. Our BC regional centre at the BC Animal Health Centre was key to working with the local interagency team to secure samples for active surveillance. Dr. Chelsea Himsworth also developed new genomic methods to search for the virus in sediments of water bodies used by waterfowl. Working closely with the CFIA, the CWHC coordinated a local response plan, which included securing surge capacity to reach out to other agencies and individuals to secure samples to detect the virus. These efforts resulted in the only detection to date of highly pathogenic strain in a wild bird in Canada.



In Ontario, our Ontario/Nunavut regional centre led efforts to enhance surveillance through outreach to wildlife agencies and enthusiasts to increase submissions of dead birds. They provided triage and diagnostic services and incorporated archived and research samples into the surveillance program. In addition to our ‘on-the-ground’ activities in BC and Ontario, our National Office worked with the CFIA to refine response plans and explore needs to adjust the Canadian wild bird avian influenza program in light of the new epidemiological situation and past experience in influenza surveillance. The CWHC was involved from pond, to bird, to population, to policy as we helped Canada’s response to the emergence of new highly pathogenic avian influenza strains.

## CWHC IMPACT STUDY VANCOUVER RAT PROJECT

Rats are a source of a number of diseases transmissible to people that are responsible for significant human illness and death in cities around the world. Despite the fact that urban rat populations are thriving, very little is known about the ecology of rats and rat-associated diseases. This is problematic because without an understanding of rats and the pathogens they carry, we cannot gauge rat-related public health threats or develop effective strategies to monitor and mitigate those threats. The Vancouver Rat Project was initiated in 2010 to address this knowledge gap. The project has already made a number of interesting and important discoveries. For example, it was found that rats can be the source of a number of unexpected pathogens, such as the ‘superbug’ MRSA (methicillin-resistant *Staphylococcus aureus*) and that by disturbing rat family groups, current methods of rat control might actually increase disease prevalence. To find out more about the VRP and what we have discovered, visit [www.vancouverratproject.com](http://www.vancouverratproject.com).





**CWHC BRITISH COLUMBIA**

The Animal Health Centre  
Abbotsford, BC

**CWHC ALBERTA**

Faculty of Veterinary Medicine  
Calgary, AB

**CWHC WESTERN/NORTHERN**

Western College of Veterinary Medicine  
Saskatoon, SK

**CWHC ONTARIO/NUNAVUT**

Ontario Veterinary College  
Guelph, ON

**CWHC QUÉBEC**

Faculté de médecine vétérinaire  
Saint-Hyacinthe, QC

**CWHC ATLANTIC**

Atlantic Veterinary College  
Charlottetown, PE

**CWHC NATIONAL**

Western College of Veterinary Medicine  
Saskatoon, SK

**National Information Line:** 800.567.2033 (inside Canada only)  
306.966.5099 (from anywhere)

**Email:** [national@cwbc-rscf.ca](mailto:national@cwbc-rscf.ca)



## WHO we are

The Canadian Wildlife Health Cooperative is a collection of highly qualified people within a cross-Canada network of partners and collaborators dedicated to wildlife health. Our Cooperative includes internationally renowned wildlife disease diagnosticians and researchers, experts in population health, skilled educators and experienced policy advisors. The CWHC is dedicated to generating knowledge needed to assess and manage wildlife health and working with others to ensure that knowledge is put to use in a timely fashion.

At the core of the CWHC is a partnership linking Canada's five veterinary colleges and the British Columbia Animal Health Centre. Branching from that core is a network that stretches into the public and private sectors that allows us to access critical expertise needed to detect and assess wildlife health issues and ensure our results find their way to decision-makers in wildlife management, wildlife use, public health and agriculture.

## WHAT we are doing

We provide a Canada-wide perspective on wildlife health at the same time as helping to identify and assess emerging problems at a local level. The CWHC facilitates and supports teams, programs and partnerships needed to meet this goal. We build capacity through training the next generation of experts and advocating for strategic investment in wildlife health. Our research creates new wildlife health information and identifies ways to translate that knowledge into action. All of these activities work toward the goal of creating awareness of the importance of wildlife health and providing credible and trustworthy information to effect positive change at a local, national and international level.

**CANADA'S NATIONAL  
WILDLIFE HEALTH NETWORK**



# PROTECTION

## BACKGROUND

As a trusted and fair broker of information, the CWHC is looked toward to anticipate and respond to the increasing scale and pace of challenges effecting wild animals. Climate change, habitat loss, pollution, invasive alien species, consumerism, trade and disease challenge wild animals. The changing dynamics between the environment, in particular wild animals, and our socio-economic and physical well-being are rapidly evolving with urbanization, globalization and resource use. The CWHC is meeting these challenges by leading discussion on future approaches to wild animal health management and policy. This includes research on the links between wild animal health and cumulative effects assessment and developing tools linking wild animal resilience to land use. It also includes advocacy to raise awareness of the importance of wild animal health to our well-being in the form of business cases, strategy development and vulnerability assessments. Broadening our capacity to recognize trends, through partnered surveillance and citizen science initiatives, expanding our information services, and exploring management options with governments are a few of the initiatives taken in the past year.

## LINKING WILDLIFE HEALTH AND CUMULATIVE EFFECTS

Over the last few years, assessing and managing cumulative effects has become a critical issue in Canadian environmental and health policy. **The CWHC is leading several efforts to better link wildlife health with the growing needs for cumulative effects assessment.** The concept of cumulative effects recognizes that the effects of individual activities or changes can combine and interact to result in outcomes that may be different from those caused by the individual change.

At the same time as this growing policy need, the conception of wildlife health as a cumulative effect has emerged. Health is the ability to thrive despite all of life's challenges. It is the sum of an animal's genetic endowment, its physiological capacity, its disease status, its exposure to multiple environmental threats, its interactions with people, its climate and more. A cumulative effects perspective is needed to understand how to account for the fact that wildlife are simultaneously confronted by several social and environmental changes when assessing or managing their health.

The CWHC has launched a number of efforts to foster a cumulative effects approach to wildlife health. Research is providing an evidence-based foundation for future work. Dr. Claire Jardine is supervising Dr. Diana Sinclair's doctoral research, which explores how wildlife health is conceived and managed in Ontario. CWHC Associate Dr. Colin Robertson is supervising the work of Lauren Yee, a geography MSc student focused on developing methodologies to transition wildlife surveillance from its disease focus to a system able to also capture information on a broader set of social and ecological determinants of health. Julie Wittrock is a PhD candidate working with Dr. Craig Stephen to explore the potential to develop indices of wildlife health that can be smoothly integrated into cumulative effects assessments or vice versa.



We are also working to influence policy and practices. Dr. Marc Cattet's work is developing methods to link preclinical indicators of stress to landscape change and other stressors. Dr. Craig Stephen has been exploring ways to reconceive salmon health with Fisheries and Oceans Canada, First Nations Fisheries Councils and others in British Columbia concerned with salmon conservation. Kevin Brown is leading a CWHC working group to see how we can more effectively capture and report on a wider suite of determinants of wildlife health to enhance our ability to identify vulnerable populations. The CWHC is working with Dr. Colleen Duncan of Colorado State University to examine how cumulative effects perspectives of health can influence wildlife health monitoring and management in national parks as well as in northern marine species.

**The CWHC leadership in these initiatives is addressing knowledge gaps and creating new capacity and perspectives to link wildlife health practice to growing policy and societal expectations** that we can monitor and manage wildlife health as a whole rather than only examining its parts one at a time.

## CWHC IMPACT STUDY DISCOVERING BABESIA

This past year the CWHC Western/Northern regional centre successfully developed new diagnostic tools to identify the parasite *Babesia odocoilei*. The parasite infects cervid and bovid species, including wild and domestic animals, destroying red blood cells leading to anemia, weight loss and in some cases death. Using the newly validated techniques, *B. odocoilei* was identified in both farmed elk and wild white-tailed deer in Saskatchewan, the first identification of this pathogen in Canada. The only known competent vector for the parasite is the deer tick (*Ixodes scapularis*), a tick not native to Saskatchewan. It is possible that infected ticks are being transported by migratory birds resulting in sporadic infections in Saskatchewan cervids. This has interesting parallels to the sporadic occurrence of Lyme disease in the province, another disease that requires *I. scapularis* for transmission. With new awareness and tools, we can better forecast and monitor changes in prevalence of *B. odocoilei* and by extension *I. scapularis* projected as a result of climate change.





# CAPACITY development

## MEETING GROWING DEMANDS

The growing demand for wildlife health capacity in the past decade will continue. Local, national and global changes are producing new challenges for wildlife health. Emerging infections, introduced diseases, climate change and pollution continue to impact conservation, public health and economies. **Part of our mission is to provide support, wherever it is most needed, to people on the ground as well as governmental and non-governmental organizations to strengthen Canada's wildlife health capabilities.**

## HUMAN CAPACITY

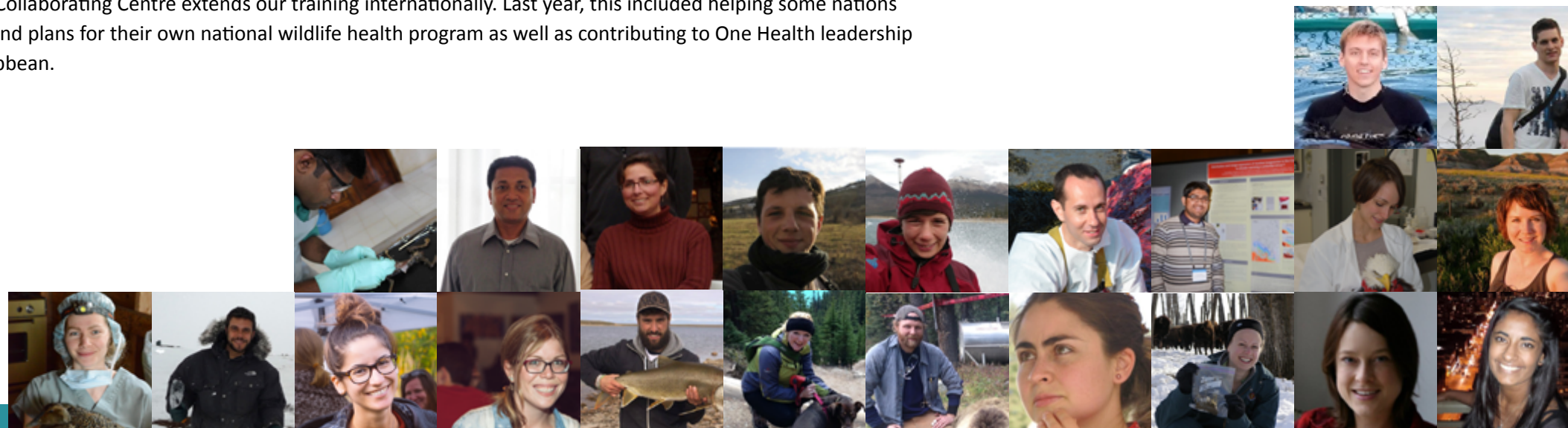
Capacity cannot be separated from sustainable human development. Growth of knowledge, skills and experience in individuals is the foundation of our capacity development strategy. CWHC programs provide residents, graduate students and other trainees with a window into wildlife health. Our staff and directors routinely bring their observations, cases and experiences into the classrooms of our host institutions. Whether introducing undergraduates to wildlife health or identifying graduate student research opportunities, **CWHC case load and infrastructure is a capacity development cornerstone.**

Every year, the CWHC enables and supports the work of a cohort of graduate students studying a range of projects. Some are focused on internships and residencies to gain diagnostic and investigative skills while others emphasize research. This year, 33 graduate students, interns, and post-docs were supervised by CWHC faculty members and CWHC staff members have contributed over 600 hours to teaching and various courses. A complete list of graduate students can be found on the CWHC website at [www.cwhc-rcsf.ca/gradstudents](http://www.cwhc-rcsf.ca/gradstudents).

Our role as an OIE Collaborating Centre extends our training internationally. Last year, this included helping some nations develop rationale and plans for their own national wildlife health program as well as contributing to One Health leadership training in the Caribbean.

# RESEARCH AND DEVELOPMENT

CWHC staff and associates can be found at key centres of research across Canada. Much of our research and development is in partnership with and at the request of management agencies. Cutting edge science pioneered at these centres is funneled back into practice through the CWHC network of animal and health managers. This past year saw research and development activities in 5 key themes: (1) wildlife disease ecology and epidemiology; (2) disease discovery and description; (3) identification of risk factors and mechanisms of diseases; (4) new tools for health intelligence; and (5) health measurement and management. A diverse set of research topics spring from these themes such as zoonotic disease ecology in urban wildlife, population ecology of chronic wasting disease, web-tools to identify emerging issues, disease investigations in northern ungulates, review of cumulative effects policies, and tracking of pollutants in indicator species. Our team shared their results in 76 scientific publications and 31 conference presentations. A comprehensive list of conferences and committees can be found on the CWHC website at [www.cwhc-rcsf.ca/committees-and-conferences](http://www.cwhc-rcsf.ca/committees-and-conferences).





# COMMUNITY

## OUR NEW LOOK

This year saw a new logo, web-site and look for the CWHC. Our logo is a Gray Jay in flight. These highly curious birds are found throughout Canada and represent our desire to know about the status of wildlife in all corners of the country. Showing the bird in flight reflects our desire to be an action oriented organization.



## OUR COMMUNITY OF PRACTICE

The CWHC is a community – we are a group of people who share a concern for wildlife health and learn how to protect it better by regularly interacting. Our regional and national offices form the core of the community but our strength comes from our diverse network of individuals and organizations. The partnership among provincial, territorial and federal government departments, non-government organizations, the private sector and individual researchers and academics allows the CWHC to continue functioning at a high capacity. Fostering this community and **functioning as a “super-connector” among varying mandates and jurisdictions is a key activity of the CWHC and a valued service.** CWHC has played a major role in coordinating national teams (such as for avian influenza and white-nose syndrome), facilitating new approaches (as with our climate change meeting) and ensuring people are connected across the country (as with our new associates policy).

The heart of the CWHC network is individuals whose expertise and dedication contribute to the understanding and improvement of wild animal health in Canada. In addition to staff and CWHC directors are those individuals who work closely with the CWHC and whose activities and expertise align and complement CWHC programs and values; examples include government partners, academics and former staff and directors. We would like to take the opportunity to acknowledge our many partners.



## ASSOCIATES

The CWHC is evolving to meet the unprecedented changes in the environment and wild animal interactions with people. A key element in meeting these challenges is broadening and diversifying our network of partners, associates and collaborators. New policies and processes have been put in place over the past year to ensure that the CWHC develops, acknowledges and supports ongoing relationships with members of the wildlife health community. A nomination and review process to identify and recognize potential or existing partners is now in effect. Eleven individuals have already been appointed as CWHC Associates. A complete list of these individuals along with their biographies can be found on the CWHC website at [www.cwhc-rcsf.ca/associates](http://www.cwhc-rcsf.ca/associates).

## CWHC IMPACT STUDY SUPPORTING CONSERVATION AND PROTECTION

Diseases and pollution have increasingly been seen to impact conservation. CWHC research and surveillance outputs equip us with information key to developing policies and plans to protect and recover wildlife. Our work in white-nose syndrome continues to focus on preventing spread at its margins but has expanded to supporting recovery in endemic areas. Our white-nose syndrome coordinator, Jordi Segers, is contributing to species recovery planning. Dr. Scott McBurney is part of the Nova Scotia mainland moose recovery team and helps to track the health of the population. Dr. Craig Stephen is working with a graduate student, Dr. Malcolm McAdie, to establish means to measure effects of recovery programs on population health of endangered Vancouver Island Marmots. The ongoing work of Dr. Stéphane Lair and his team at the Université de Montréal has been an essential part of the recovery plan for the St. Lawrence beluga whales.









# FINANCIALS

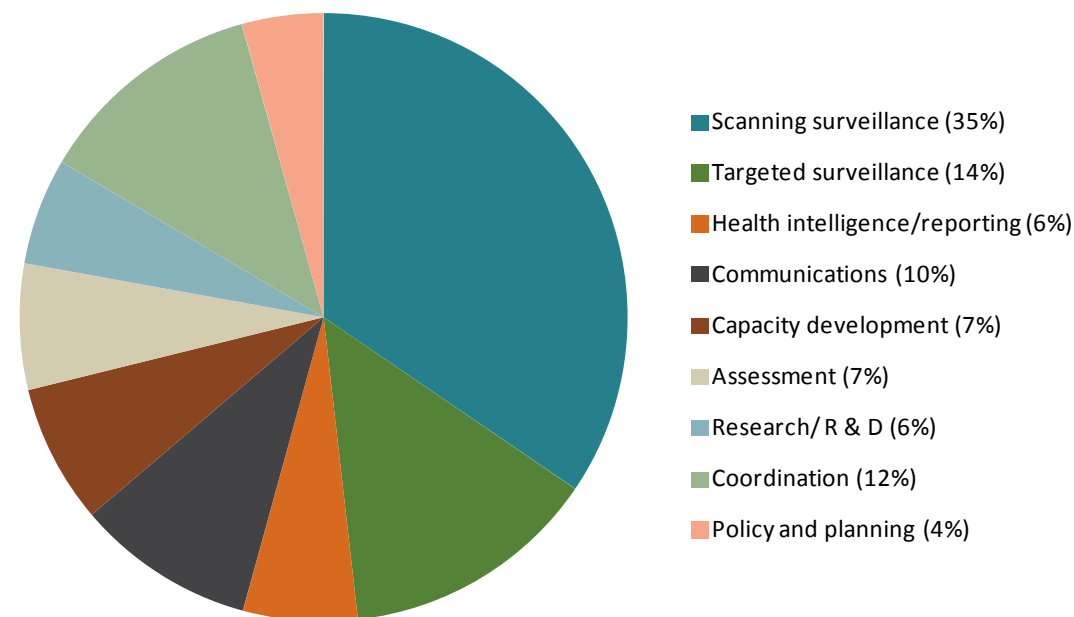
## REVENUES

	General	Targeted Programs	Total Revenues
Agriculture and Agri-Food Canada		98,563	98,563
Canadian Food Inspection Agency	200,000	507,763	707,763
Environment Canada	400,000	131,665	531,665
First Nations and Inuit Health Branch	4,972		4,972
Fisheries and Oceans		23,861	23,861
Foothills Research Institute		121,092	121,092
Parks Canada	150,000	15,000	165,000
Public Health Agency of Canada	240,000	40,000	280,000
Alberta - Community Development	4,000		4,000
Alberta - Fish and Wildlife	5,000	7,000	12,000
British Columbia Agriculture	29,125		29,125
British Columbia Environment	10,000		10,000
British Columbia Forests, Lands & Natural Resource Operations	52,000	4,240	56,240
Manitoba	10,000		10,000
New Brunswick - Fish and Wildlife	10,259	3,500	13,759
Newfoundland & Labrador	21,711		21,711
Northwest Territories	20,500	4,800	25,300
Nova Scotia	9,500		9,500
Nunavut	15,000	3,420	18,420
Ontario - Agriculture, Food and Rural Affairs		50,000	50,000
Ontario - Health and Long Term Care	100,000		100,000
Ontario - Natural Resources	100,723	112,300	213,023
Prince Edward Island - Environment	4,735		4,735
Prince Edward Island - Health		1,050	1,050
Québec - MAPAQ	33,000		33,000
Québec - MFFP	63,333	69,550	132,883
Québec - MSSS	5,000		5,000
Saskatchewan Agriculture and Food		10,000	10,000
Saskatchewan Environment	41,309	10,000	51,309
Saskatchewan Health		3,909	3,909
Yukon	10,000	990	10,990
Canadian Wildlife Federation	10,000		10,000
University of Calgary Faculty of Veterinary Medicine	125,000		125,000
United States Geological Survey		30,415	30,415
Miscellaneous Income/Fee-for-service		63,809	63,809
<b>TOTAL REVENUE</b>	<b>\$ 1,675,167</b>	<b>\$ 1,312,926</b>	<b>\$ 2,988,093</b>

## EXPENSES

EXPENSES	Core (General)	Targeted Programs	Total Expenditures
Salaries and Benefits	1,273,248	810,721	2,083,969
Equipment	13,546	9,645	23,191
Diagnostic Costs	149,706	127,672	277,378
Operations	60,712	112,625	173,337
Travel	46,490	70,068	116,559
Other	11,501	12,460	23,961
Overhead	190,268	123,309	313,576
<b>TOTAL EXPENSES</b>	<b>1,745,472</b>	<b>1,266,499</b>	<b>3,011,970</b>
<b>REVENUE LESS EXPENSES</b>	<b>\$ (70,305)</b>	<b>\$ 46,427</b>	<b>\$ (23,878)</b>

## EXPENSES BY FUNCTION



## CWHC IMPACT STUDY HELPING NORTHERN COMMUNITIES

The Canadian Wildlife Health Cooperative is involved in a wide number of initiatives in Northern Canada aimed at understanding disease patterns and environmental factors affecting wildlife. We are actively working with Northerners, including harvesters, wildlife managers, and public health professionals to monitor and identify changes in the health of wildlife. In partnership with universities, territorial wildlife managers, and local hunter and trapper and co-management organizations, the CWHC is establishing baselines for health of muskoxen and caribou for infectious disease, contaminants, stress, and production indices (body size, condition, pregnancy).

In the past 5 years, with the help of Nunavut Tunngavik Incorporated, observations of the bowhead whale hunt were made in 5 different Nunavut communities. The purpose of these observations has been to better characterize the methods and tools used for the hunt, with the purpose of decreasing time to death. This will in turn promote hunter safety as well as animal welfare.





# STAFFING



## CWHC BRITISH COLUMBIA

**Chelsea Himsworth** - Regional Director  
**Helen Schwantje** - Regional Director  
**Cait Nelson** - Wildlife Health Biologist  
**Michelle Coombe** - Wildlife Veterinarian



## CWHC ALBERTA

**Susan Kutz** - Regional Director  
**Padraig Duignan** - Veterinary Pathologist  
**Mani Lejeune** - Parasitologist



## CWHC WESTERN/NORTHERN

**Trent Bollinger** - Regional Director  
**Lorraine Bryan** - Veterinary Pathologist  
**Marnie Zimmer** - Wildlife Biologist



## CWHC ONTARIO/NUNAVUT

**Claire Jardine** - Regional Director  
**Erin Scharf** - Wildlife Technician  
**Doug Campbell** - Veterinary Pathologist  
**Lenny Shirose** - Biologist  
**Paul Oesterle** - Research Assistant  
**David Cristo** - Communications and Project Coordinator



## CWHC QUÉBEC

**Stéphane Lair** - Regional Director  
**André Dallaire** - Veterinary Pathologist  
**Kathleen Brown** - Lab Manager  
**Judith Viau** - Wildlife Technician  
**Viviane Casaubon** - Wildlife Technician  
**Pauline Delnatte** - Veterinary Pathologist/Clinician



## CWHC ATLANTIC

**Pierre-Yves Daoust** - Regional Director  
**Scott McBurney** - Veterinary Pathologist  
**Darlene Weeks** - Wildlife Technician



## CWHC NATIONAL OFFICE

**Craig Stephen** - Executive Director  
**Patrick Zimmer** - National Director  
**Kevin Brown** - Information Services Manager  
**Marc Cattet** - Research Professional  
**Erin Moffatt** - Data and Communications Technologist  
**Bevan Federko** - Programmer/Analyst  
**Nadine Kozakevich** - Accountant  
**Jane Parmley** - Epidemiologist  
**Jordi Segers** - National White-Nose Syndrome Coordinator

# ACKNOWLEDGMENTS

The CWHC would like to thank all our sponsors, partners, and collaborators for their continued support. Without this crucial network of funding and collaboration, we would not be able to offer the comprehensive national programs that we do.

The CWHC would like to thank artist Robbie Craig for generously allowing the use of his artwork throughout this report. To learn more about Robbie, please visit his website: [www.rcraig.org](http://www.rcraig.org). Our appreciation is also extended to Hamilton Greenwood, Bill Pennell, and Patrick Moldowan for the use of wildlife photographs throughout this report.

*“During my first year in the North, I found myself in an art store purchasing a sketchpad and some pencils. It had been a long time since I had sketched or drawn anything. I’m not sure what made me purchase these materials after so many years. Perhaps it was the childlike voice inside my head urging me to regain my former creativity... or maybe it was that the untouched landscape that surrounded me was simply begging to be revealed... Either way, the beauty of the North inspired me to connect with my creative side and passion for art.” - Robbie Craig*



The Untouched Place





CANADIAN  
**WILDLIFE HEALTH**  
COOPERATIVE

CREATING A WORLD  
THAT IS SAFE AND SUSTAINABLE  
FOR WILDLIFE AND SOCIETY



*The Subarctic Bear*

## CONTACT US

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