This report has been submitted: 2017-01-17 19:42:28

<table>
<thead>
<tr>
<th><strong>Title of collaborating centre:</strong></th>
<th>Research, Diagnosis and Surveillance of Wildlife Pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Address of Collaborating Centre:</strong></td>
<td>USGS National Wildlife Health Center 6006 Schroeder Road Madison, WI 53711 USA</td>
</tr>
<tr>
<td><strong>Tel.:</strong></td>
<td>+1(608) 270 2400</td>
</tr>
<tr>
<td><strong>Fax:</strong></td>
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</tr>
<tr>
<td><strong>E-mail address:</strong></td>
<td><a href="mailto:jsleeman@usgs.gov">jsleeman@usgs.gov</a></td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><a href="http://www.nwhc.usgs.gov">www.nwhc.usgs.gov</a></td>
</tr>
<tr>
<td><strong>Name of Director of Institute (Responsible Official):</strong></td>
<td>Dr. Jonathan Sleeman and Dr. Craig Stephen</td>
</tr>
<tr>
<td><strong>Name (including Title and Position) of Head of the Collaborating Centre (formally OIE Contact Point):</strong></td>
<td>Center Director (NWHC) and Chief Executive Officer (CWHC)</td>
</tr>
<tr>
<td><strong>Name of writer:</strong></td>
<td>Patrick Zimmer (CWHC)</td>
</tr>
</tbody>
</table>
ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories

ToR: To identify and maintain existing expertise, in particular within its region

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE

| Epidemiology, surveillance, risk assessment, modelling |
|-----------------------------------------------|--------------------------------------------------|
| Title of activity                             | Scope                                                                                     |
| Avian Influenza Surveillance in Wild Birds by the NWHC | In 2016, the USGS National Wildlife Health Center tested 731 wild birds as part of the US wild bird mortality surveillance program. From these tests, 13 birds were positive for the avian influenza virus (AIV) matrix gene, including 2 that were positive for an H5 subtype of AIV and 0 that were positive for an H7 subtype. None of the birds harbored highly pathogenic AIVs. In addition, we performed 6808 RT-PCR tests for AIV in support of the US Government Interagency Avian Influenza Surveillance Program for Wild Birds. From these tests, 1357 samples were positive for the avian influenza virus (AIV) matrix gene, including 156 that were positive for an H5 subtype of AIV and 39 that were positive for an H7 subtype. Similar to results from mortality surveillance, none of these birds harbored highly pathogenic AIVs. Comprehensive results from Interagency Surveillance for Avian Influenza in Wild Birds will be reported by the US Department of Agriculture. |
| White Nose Syndrome/P. destructans Surveillance by the NWHC | In 2016, the NWHC evaluated carcasses of 122 bats from 15 states for white-nose syndrome/Pseudogymnoascus destructans by a combination of histopathology, fungal culture, and/or PCR. In addition, another 2,149 live bats and 307 environmental substrates were sampled for surveillance of Pseudogymnoascus destructans nationwide. In all, samples representing 21 species of bats and more than 185 locations were received from 25 states, including 10 western states conducting surveillance during winter hibernation and spring emergence periods. White-nose syndrome and/or P. destructans, the causative agent of WNS, was identified in 326 bats from 49 sites in 12 states, including the first confirmation of the disease in Minnesota, Rhode Island, and Washington (USA). |
### Snake Fungal Disease Surveillance by the NWHC

In the last decade, reports of wild snakes from parts of the eastern United States with severe and often fatal skin infections have increased. These infections, referred to as snake fungal disease (SFD), are caused by the fungus *Ophidiomyces ophiodiicola*. Clinical signs of SFD are variable and range from thickened, necrotic scales and nodules below the skin to skin ulcers and severe swelling of the head. The NWHC recently published a study demonstrating that SFD is widespread in eastern North America, has a broad host range among snakes, and is the predominant cause of skin infections in wild snakes. The study also showed that *O. ophiodiicola* frequently causes non-lethal infections in snakes, and that environmental changes may be responsible for the recent emergence of severe and fatal infections in some snake populations. In 2016, NWHC continued to participate in a multi-state collaborative project aimed at better understanding SFD and its potential impacts on snake populations. In support of this effort, NWHC has analyzed samples from over 100 submissions, including whole carcasses, and biopsies, from snakes exhibiting clinical signs consistent with SFD. The NWHC is also working with researchers to better understand the epidemiology of SFD in different snake populations, and is collaborating on a project lead by researchers in the United Kingdom to screen for *O. ophiodiicola* in wild snakes in Europe.

### Chytrid Fungus (Batrachochytrium dendrobatidis-Bd and Batrachochytrium salamandrivorans -Bsal) Surveillance by the NWHC

In 2016, NWHC collaborated with the USGS Amphibian Research and Monitoring Initiative (ARMI) to conduct a spatial risk analysis of the introduction and consequences of the invasive salamander fungus *Batrachochytrium salamandrivorans* (Bsal). Bsal is currently not known to exist in the U.S. and the NWHC-ARMI collaboration used the risk analysis to collect samples from live amphibians with the goal of detecting Bsal if it were present in the highest risk areas. This effort collected 7,735 samples from over 30 species in 20 states and all samples were negative for Bsal using real-time PCR diagnostics. We detected the presence of *Batrachochytrium dendrobatidis* (Bd) by real-time PCR in 2,588 out of the 7,735 samples tested. We detected Bd positive samples in salamander and frog species from all regions of the U.S.

In 2016, NWHC diagnosed chytridiomycosis by histopathology in 6 amphibians from Oregon (rough-skinned newt), Idaho (Columbia spotted frog), and Minnesota (northern leopard frog). The causative agent in each of these cases was Bd based on real-time PCR diagnostics.

### Canadian Wildlife Health Surveillance Program by the CWHC

Wildlife health monitoring activities by the CWHC include a nationwide surveillance program providing a set of observations and signals that have relevance for conservation, public health and economic development. In 2016 the CWHC examined approximately 8500 animals in our targeted and scanning surveillance programs, including 3852 animals from all 13 provinces and territories under the latter program. Diagnostic highlights include increasing spread of Trichomonosis among wild birds in Eastern Canada as well as the discovery of Whirling Disease in Western Canada, the first known case in Canada. Complete reporting for both scanning and targeted surveillance can be found at the CWHC website http://www.cwhc-rcsf.ca/index.php
### Avian Influenza surveillance among wild birds by the CWHC

In 2016 the CWHC examined 2147 wild birds for avian influenza virus via RT-PCR. This includes 970 birds found dead from across Canada of which 58 were matrix PCR positive, including 6 H5 positives. The remaining 1177 samples were collected from live trapped waterfowl from the prairie provinces and Ontario. 93 of these samples were matrix positive, including 2 H7 positives. All strains were LPAI.

### White Nose Syndrome/P. destructans Surveillance by the CWHC

In 2016 the CWHC examined 232 bats for the causative agent of White Nose Syndrome (P. destructans). Bats were subjected to necropsy and tested via PCR and culture. 14 of the 232 bats were diagnosed with WNS from central and eastern Canada.

### Snake fungal disease surveillance and risk assessment by the CWHC

The CWHC discovered the first reported case of Snake Fungal Disease in Canada in 2015. Since that time the CWHC has examined 126 animals from Ontario, 4 of which were given SFD positive diagnosis. An additional 23 cases were PCR positive for O. ophiodiicola. Given the potential seriousness of the disease and the many uncertainties of its range and threat to Canadian wildlife the CWHC undertook a rapid threat assessment of Snake Fungal Disease in Canada on behalf of the Canadian Federal Government in 2016.

### Zoonotic disease surveillance by the CWHC

In 2016 the CWHC conducted targeted surveillance programs for Rabies and West Nile Virus. 1124 animals were examined for Rabies, 39 were positive via IHC and/or DRIF from multiple jurisdictions in Canada. 1564 wild birds were examined for WNV in Canada (RT-PCR), 24 birds were found positive from British Columbia, Saskatchewan, Ontario and Quebec.

### Chronic Wasting Disease surveillance by the CWHC

The CWHC conducts ongoing surveillance for CWD with a long running targeted surveillance program in Saskatchewan. In 2016 330 animals (including Mule Deer, White-tailed deer and Moose) were tested, 31 were positive via IHC including several from new geographic ranges within the province.

### Risk Assessment by the CWHC

In addition to the Snake Fungal Disease rapid threat assessment the CWHC also conducted a risk assessment of pathogen transmission from domestic small ruminants to wild sheep in Yukon and northern BC. A risk assessment associated with the threat of WNS in BC and the importation of Bat guano was conducted. Finally, a climate change vulnerability report was prepared for the Public Health Agency of Canada exploring candidate early warning signals at the wildlife-environment-human nexus to inform public health decisions.

### Training, capacity building

<table>
<thead>
<tr>
<th>Title of activity</th>
<th>Scope</th>
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<tbody>
<tr>
<td><strong>2016 International Wildlife Disease Association Workshop: Field Techniques for Wildlife Research and Disease Surveillance (7/31/16, Virgil, NY)</strong></td>
<td>The NWHC was a co-instructor for this full-day workshop and presented on Principles of Field Investigations as well as proper PPE demonstrations and Necropsy wetlab. Other instructors included Cornell University, Univ. of North Dakota, Univ. of WI-Stevens Point, USDA-Forest Service and Wildlife Services, Maryland DNR, and NY Dept. of Environmental Conservation. The workshop was attended by 25 participants representing state and international wildlife agency personnel and students.</td>
</tr>
<tr>
<td><strong>St Georges University College of Veterinary Medicine, St Georges, Grenada West Indies Training on Wildlife Parasites.</strong></td>
<td>During Feb 5-21, 2016, at St Georges University College of Veterinary Medicine, St Georges, Grenada West Indies NWHC provided lectures on the Parasites of free-ranging North American Wildlife. Series of 10 lectures 2 laboratories covering helminths, acanthocephala, protozoa and ectoparasites of aves, mammalia, reptilia, amphibia.</td>
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<tr>
<td>Event</td>
<td>Description</td>
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<tr>
<td>Visiting Veterinary Epidemiologist from Thailand</td>
<td>The NWHC hosted Dr. Wansane Toanan, a veterinarian from the Department of National Parks, Wildlife, and Plant Conservation in Thailand, from April 25th - May 26th. His particular interests were in wildlife disease surveillance and outbreak investigations and spent his time at the Center learning about wildlife disease surveillance programs in the US.</td>
</tr>
<tr>
<td>Wildlife Disease Epidemiology Workshop,Korea Research Institute of Bioscience and Biotechnology in Daejong, Korea October, 2016</td>
<td>The NWHC presented at a Wildlife Disease Epidemiology Workshop held at the Korea Research Institute of Bioscience and Biotechnology in Daejong, Korea, from October 24th to 28th. Drs. Sleeman and Walsh provided technical and management expertise regarding strategies and techniques for wildlife disease surveillance. This information will be helpful in the development of the Korean National Wildlife Health Center. The workshop was sponsored by the Biological Diversity Division of the Ministry of Environment. Republic of Korea.</td>
</tr>
<tr>
<td>Joint US-Korea Workshop on Wildlife Diseases, Madison, Wisconsin, August 2016</td>
<td>The USGS NWHC and the Korea National Institute of Environmental Research hosted a joint workshop on Highly Pathogenic Avian Influenza (AI) and Other Diseases of Wildlife on August 10 and 11, 2016 in Madison, Wisconsin. The two-day workshop included presentations by NWHC staff and visiting scientists on current research. The workshop also included facilitated discussions on research priorities and proposals for future work. Scientists from the Korea National Institute of Environmental Research presented on AI activity, rabies outbreaks, and the planning for the new National Wildlife Health Center in South Korea. Other international visitors included Dr. Tiggy Grillo, National Coordinator for Wildlife Health Australia and the Australian OIE Focal Point for Wildlife who provided an overview of AI in Australia. Other topics presented at the workshop included: AI research on wild waterfowl, migratory pathways and AI dispersal, and spatial modeling of AI risk factors at the interface of wild and domestic birds in Asia. The wildlife disease threats we face often have an international origin, and this workshop was an opportunity to continue developing international collaborations. Coordination and collaboration with our international colleagues is increasingly important to prevent and manage wildlife diseases of global concern. This is especially important as other countries increase capacity and infrastructure to research wildlife diseases.</td>
</tr>
<tr>
<td>University capacity building by the CWHC</td>
<td>The CWHC is situated in Canada’s 5 Veterinary Colleges and contributed to 21 veterinary graduate or undergraduate courses and supported the training of 48 graduate students.</td>
</tr>
<tr>
<td>Visit by Bulgarian Animal Health Officials</td>
<td>In February of 2016 the CWHC National Office at the University of Saskatchewan hosted the Chief Veterinary Officer of Bulgaria as well as the manager of animal and food safety. The purpose of the visit was to assist in the development of a wildlife health surveillance program in Bulgaria.</td>
</tr>
<tr>
<td>Wildlife health surveillance in Sri Lanka</td>
<td>The CWHC is a founding partner and continues to contribute to ecohealth research, policy and management in Sri Lanka. In 2016 the CWHC hosted an exchange student from Sri Lanka and provided onsite training and education in both Colombo and Kandy Sri Lanka.</td>
</tr>
<tr>
<td>Caribbean One-Health training</td>
<td>The CWHC contributes to the development and delivery of a Caribbean One-Health leadership training program. In 2016 this included onsite training in Jamaica, Grenada, and Guyana.</td>
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</table>
The CWHC assisted in teaching a One Health program at Ross University exploring research options and wildlife health.

<table>
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<tbody>
<tr>
<td>Avian Influenza Research in Iceland</td>
<td>In 2016 NWHC Scientists continued work with collaborators from the University of Iceland, the Southwest Iceland Nature Research Centre, and the Sudurnes Science and Learning Center to investigate the ecology of avian influenza viruses in migratory birds in a region noted for the mixing of migratory birds from both the Eastern and Western Hemispheres.</td>
</tr>
</tbody>
</table>

ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare

<table>
<thead>
<tr>
<th>Proposal title</th>
<th>Scope/Content</th>
<th>Applicable area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop on Evidence-Based Design of National Wildlife Health Programs (2016 WDA Meeting)</td>
<td>In 2016, the USGS National Wildlife Health Center’ Dr. Jonathan Sleeman and Dr. Natalie Nguyen in collaboration with the Canadian Wildlife Health Center (CWHC) hosted the Workshop on Evidence-Based Design of National Wildlife Health Programs at the Wildlife Disease Association Conference in Ithaca, New York. The participants of the workshop included a group of 14 wildlife managers, researchers, and veterinarians from 11 countries (Australia, Canada, China, Netherlands, New Zealand, Republic of Korea, Sweden, Switzerland, Thailand, United Kingdom, and United States). Attendees also represented the OIE, the Wildlife Disease Association, a non-profit organization, and one person had specialist knowledge of wildlife health programs in Latin America. The expected outcomes of the workshop were to describe a shared vision of the essential attributes, promote and support the establishment and/or ongoing operations of national wildlife health programs, and develop a network and forum for a support network for national wildlife health program managers. Dr. Nguyen and Dr. Sleeman in collaboration with the CWHC are leading the development of a report and peer-reviewed publication that summarizes the expert opinion of national wildlife health program leaders and/or managers that can assist countries or organizations working to justify, design, or explain critical capacities and resources needed for effective national wildlife health programs.</td>
<td>☐ Surveillance and control of animal diseases  ☐ Food safety  ☐ Animal welfare</td>
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<tr>
<td>Section</td>
<td>Description</td>
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<td><strong>Avian Influenza (AI) Workshop on April 11 in British Columbia, Canada, for the BC Ministry of Agriculture</strong></td>
<td>The NWHC attended an Avian Influenza (AI) Workshop on April 11 in British Columbia, Canada, for the BC Ministry of Agriculture. The workshop was a multi-stakeholder meeting focused on how wild bird AI surveillance can contribute to protecting the health of poultry and people in BC. Participants included key individuals and agencies, including government and industry, which identified their organizations’ needs and concerns regarding wild bird AI surveillance. Ultimately, input from participants will be used to produce a comprehensive and integrated plan to monitor and mitigate threats associated with AI in wild birds in BC.</td>
<td></td>
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<tr>
<td><strong>US National Response to White-Nose Syndrome in Bats</strong></td>
<td>The USGS National Wildlife Health Center serves on the Executive and Steering Committees of the US National Plan for the Management of White-Nose Syndrome. The NWHC also Chairs the Diagnostic Working Group to standardize diagnostic testing for this disease.</td>
<td></td>
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<tr>
<td><strong>US National Response to Batrachochytrium salamandrivorans (Bsal)</strong></td>
<td>NWHC serves on the multi-agency Diagnostic Working Group to standardize a case definition and diagnostic testing for Bsal. NWHC also serves on the multi-agency Surveillance Working Group to design surveillance strategies and sample collection from wild salamanders in the United States for Bsal testing.</td>
<td></td>
</tr>
<tr>
<td><strong>US National Response to Highly Pathogenic Avian Influenza</strong></td>
<td>The USGS National Wildlife Health Center serves on the US Interagency Wild Bird Avian Influenza Steering Committee to standardize surveillance for this disease and also serves as an affiliate member of the National Animal Health Laboratory Network to standardize diagnostic testing for this disease.</td>
<td></td>
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<tr>
<td><strong>Wildlife Health Information Platform by the CWHC</strong></td>
<td>The CWHC National Wildlife Disease database is being redeveloped to be capable of tracking incident and event-based data. This new platform will support Canadian wildlife health needs for disease assurance and enhance it competitiveness by augmenting current surveillance systems with new technology and information streams. In collaboration with Agriculture and Agri-Food Canada a Avian Influenza module of the platform is being designed in cooperation with poultry industry and government representatives.</td>
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</table>
The CWHC developed a decision tree associated with risk and management action. Snake Fungal Disease was employed as a issue test case on behalf of Environment and Climate Change Canada. This policy tool is now being augmented with a policy triage decision tool utilizing Bsal as a test case. The Federal Government of Canada has commissioned this work.

In 2016 the CWHC developed a tick surveillance protocol in association with migratory birds and developed a shared diagnostic protocol for Bsal and Snake Fungal Disease testing in Canada. In partnership with the Canadian Federal Government (Environment and Climate Change Canada and Parks Canada) the CWHC developed a White Nose Syndrome decontamination protocol for researchers and the public to minimize the spread of the fungus between geographic regions.

The CWHC coordinates Canada’s wild bird AIV surveillance program. In 2016 the CWHC conducted a critical review of the program, including jurisdictional performance metrics, reevaluated program objectives and established performance expectations for 2016 and 2017.

ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines

ToR: To carry out and/or coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations

3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

<table>
<thead>
<tr>
<th>Name of OIE CC/RL/other organisation(s)</th>
<th>Location</th>
<th>Region of networking Centre</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Wildlife Health Cooperative</td>
<td>Saskatoon, Canada</td>
<td>□Africa □Americas □Asia and Pacific □Europe □Middle East</td>
<td>Our Collaborating Centre is a consortium with the CWHC and there was regular and frequent communication between the two Centers, including co-organizing a workshop and co-authorship on a scientific paper. NWHC staff attended the CWHC annual meeting in Charlottetown, Prince Edward Island, June, 2016</td>
</tr>
</tbody>
</table>
Our Collaborating Centre is a consortium with the NWHC and there was regular and frequent communication between the two Centers, including co-organizing a workshop and co-authorship on a scientific paper. CWHC staff assisted in a strategic review of the NWHC field station in Honolulu.

4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

<table>
<thead>
<tr>
<th>Name of OIE CC/RL/other organisation(s)</th>
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<th>Region of networking Centre</th>
<th>Purpose</th>
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<tbody>
<tr>
<td>USDA Southeastern Poultry Research Laboratory (SEPRL)</td>
<td>Athens, Georgia, USA</td>
<td>Africa, Americas, Asia and Pacific, Europe, Middle East</td>
<td>We held a joint scientific meeting between USGS and SERPL to develop collaborative research projects on avian influenza.</td>
</tr>
<tr>
<td>Aquatic Animal Diseases Collaborating Centre</td>
<td>Charlottetown, Canada</td>
<td>Africa, Americas, Asia and Pacific, Europe, Middle East</td>
<td>Founding member of the Centre. Assist in centre establishment and frequent interaction between the centre and our Atlantic regional centre at the University of PEI</td>
</tr>
<tr>
<td>Chronic Wasting Disease Reference Laboratory (CFIA)</td>
<td>Winnipeg, Canada</td>
<td>Africa, Americas, Asia and Pacific, Europe, Middle East</td>
<td>The CWHC serves as a tissue and data bank for Chronic Wasting Disease.</td>
</tr>
<tr>
<td>HPAI reference laboratory (CFIA)</td>
<td>Winnipeg, Canada</td>
<td>Africa, Americas, Asia and Pacific, Europe, Middle East</td>
<td>The CWHC collaborates with the Winnipeg lab to provide confirmatory testing for Canada’s wild bird AIV surveillance program.</td>
</tr>
<tr>
<td>Centre of Expertise for Rabies (CFIA)</td>
<td>Ottawa, Canada</td>
<td>Africa, Americas, Asia and Pacific, Europe, Middle East</td>
<td>The CWHC provides samples and data to the Rabies Centre in collaboration for Rabies surveillance in Canada.</td>
</tr>
</tbody>
</table>
The NWHC collaborates with the NVSL on diagnostic testing of samples collected from wild birds for avian influenza surveillance.

**ToR: To place expert consultants at the disposal of the OIE.**

5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

Yes

<table>
<thead>
<tr>
<th>Name of expert</th>
<th>Kind of consultancy</th>
<th>Subject</th>
</tr>
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<tbody>
<tr>
<td>Dr. Dan Walsh</td>
<td>Assistance in preparing workshops for OIE Focal Points for Wildlife.</td>
<td>Wildlife Outbreak Investigation and Epidemiology</td>
</tr>
<tr>
<td>Dr. Julie Lenoch</td>
<td>Assistance in preparing workshops for OIE Focal Points for Wildlife.</td>
<td>Wildlife Outbreak Investigation and Epidemiology</td>
</tr>
<tr>
<td>Dr. Jonathan Sleeman</td>
<td>Assistance in preparing workshops for OIE Focal Points for Wildlife.</td>
<td>Wildlife Outbreak Investigation and Epidemiology</td>
</tr>
<tr>
<td>Dr. Craig Stephen</td>
<td>Serves as the OIE wildlife focal in Canada.</td>
<td>Wildlife health surveillance and Epidemiology</td>
</tr>
<tr>
<td>Dr. Stéphane Lair</td>
<td>Assistance in preparing workshops for OIE Focal Points for Wildlife.</td>
<td>Wildlife Outbreak Investigation and Epidemiology</td>
</tr>
<tr>
<td>Dr. Ted Leighton</td>
<td>Member of the OIE Working Group on Wildlife</td>
<td>Wildlife health surveillance and Epidemiology</td>
</tr>
</tbody>
</table>

**ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries**

6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?

Yes

a) Technical visits: 0
b) Seminars: 2
c) Hands-on training courses: 2
d) Internships (>1 month): 0
<table>
<thead>
<tr>
<th>Type of technical training provided (a, b, c or d)</th>
<th>Content</th>
<th>Country of origin of the expert(s) provided with training</th>
<th>No. participants from the corresponding country</th>
</tr>
</thead>
<tbody>
<tr>
<td>b and c</td>
<td>Workshop for OIE Wildlife Focal Points on Wildlife Disease Outbreak Investigation and Surveillance, Minsk, Belarus, July, 2016</td>
<td>All countries from the European Region</td>
<td>50</td>
</tr>
<tr>
<td>b and c</td>
<td>Workshop for OIE Wildlife Focal Points on Wildlife Disease Outbreak Investigation and Surveillance, Lake Nakuru, Kenya, November, 2016</td>
<td>All countries from the Middle East and English Speaking Africa Region</td>
<td>50</td>
</tr>
</tbody>
</table>

ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE

7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?

No

ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty

8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE

a) Articles published in peer-reviewed journals: 73
intestinal helminths in female lesser scaup Aythya affinis during spring migration from the upper Midwest, USA. Journal of Helminthology.


CWHC


Molecular Ecology “Bacterial genomics reveal the complex epidemiology of an emerging pathogen in arctic and boreal ungulates” by Forde, Taya; Orsel, Karin; Zadoks, Ruth; Biek, Roman; Adams, Layne; Checkley, Sylvia; Davison, Tracy; De Buck, Jeroen; Dumond, Mathieu; Elkin, Brett; Finnegan, Laura; Macbeth, Bryan; Nelson, Cait; Niptanatiak, Amanda; Sather, Shane; Schwantje, Helen; van der Meer, Frank; Kutz, Susan

In press - Journal of Wildlife Disease “Capture of Free-ranging White-tailed deer (Odocoileus virginianus) and Mule deer (Odocoileus hemionus) with a combination of medetomidine, azaperone and alfaxalone”


b) International conferences: 49


CWHC


Raverty, S, Hanson, B, Cottrell, P, Rotstein, D, Dennison, S, Goldstein, T, McLlveen, T, Spavin, L and Gaydos, J. Satellite tag deployment, detachment, and loss of a resident killer whale (L95) in British Columbia, Canada. American College of Veterinary Pathologists and American Society of Clinical Pathology Annual Meeting, New Orleans, LA, December 3-6, 2016


Health, Climate Change and Northern Coast. Florida-Arctic sea Level Rise Summit. Ft. Lauderdale


c) National conferences:  90


4. Erik Hofmeister presented on West Nile Virus Research at NWHC and the National Wildlife Health Center to the Student Chapter of AVMA and Exotic Animal Health Club at the College of Veterinary Medicine at Kansas State University, Manhattan, KS on January 27, 2016.

5. Jonathan Sleeman was an invited speaker at a workshop on strategic planning for future research at the University of Minnesota’s Raptor Center on February 16, 2016 in St. Paul, MN.

6. Dan Grear presented a wildlife mortality and investigation summary relevant to the Atlantic migratory bird
flyway to state partners at the Atlantic Flyway Council Winter Meeting in Virginia Beach, VA on February 22 – 23, 2016.


8. Julie Lenoch and Wildlife Disease Specialist Barb Bodenstein participated in the One Health Group Alaska/Canada quarterly meeting on February 23rd. Barb Bodenstein presented an update on the work the NWHC has been doing to date on the extended Sea Bird/ Common Murre die off in Alaska.


11. Jeff Hall presented on “Investigating the role of peridomestic species in highly pathogenic avian influenza outbreaks: The interface of wildlife and poultry production” at the North Central Avian Disease Conference in St. Paul, Minnesota, on March 14, 2016. This conference was part of the Midwest Poultry Federation Convention.

12. Bryan Richards presented on chronic wasting disease (CWD) to the Wisconsin Conservation Congress, Deer and Elk Committee at their meeting on March 19, 2016.

13. Bryan Richards presented on chronic wasting disease (CWD) to the Wisconsin Department of Natural Resources, Deer Management Assistance Program Workshop in Wisconsin Dells on April 9, 2016.

14. Jonathan Sleeman presented “Emerging zoonotic diseases, surveillance and control at the National Institutes of Health NIAD Office of Global Research Seminar in Bethesda, MD on April 12, 2016. He also presented a talk at the NIH Demystifying Medicine Series.


16. Bryan Richards presented an update on morbidity & mortality events, lead a discussion on chronic wasting disease, and discuss on the online wildlife disease reporting system, WHISPers at the Midwest Fish and Wildlife Health Committee workshop in Galena, IL on April 12-13, 2016.

17. Anne Ballmann presented at a White-Nose Syndrome Field Investigation Workshop in conjunction with the USFWS and WA Department of Fish and Wildlife to wildlife biologists and managers on April 21 at the Nisqually National Wildlife Refuge near Olympia, WA. A separate half-day workshop for staff from area wildlife rehabilitation centers regarding bats and white-nose syndrome was held on April 22, 2016.


19. Rebecca Cole presented a guest lecture on “Deciphering life cycles: Tales from the field” at the University of Wisconsin-Madison for a Department of Zoology course on parasitology on May 5, 2016.


24. Jeffery Lorch presented “Fungal skin communities in hibernating bat species that are susceptible and resistant to white-nose syndrome” at the 2016 White-nose Syndrome Workshop in Denver, CO on June 16, 2016.

25. Rebecca Cole presented “Capillariasis in Common Goldeneye, Barrow’s Goldeneye and Bufflehead ducks heavily infected with Baruscapillaria obsignata from Hanford, Washington, USA” at the American Society of Parasitologists Meeting in Edmonton, CA on July 11 to July 14, 2016.

26. Elizabeth A. Falendysz presented “Writing and reviewing animal care and use protocols for wildlife research: Tips on planning for the unexpected” at the 2016 Joint AAZV/EAZWV/IZW Conference held in Atlanta, GA from July 16, 2016 to July 22, 2016.


28. Rebecca Cole presented “Potential effects of gapeworm (Syngamus trachea) on Greater Prairie-Chickens (Tymananuchus cupido) in Wisconsin” at the 65th Annual International Conference of the Wildlife Disease Association in Cortland, NY on July 31 to August 5, 2016.

29. David Blehert presented “Defining determinants of Pseudogymnoascus destructans within hibernacula to
inform surveillance and management of bat white-nose syndrome” at the 65th Annual International Conference of the Wildlife Disease Association in Cortland, NY on July 31 to August 5, 2016.


31. Tonie Rocke presented “The impact of the prairie dog oral sylvatic plague vaccine on non-target small rodents in the grassland ecosystem” at the 65th Annual International Conference of the Wildlife Disease Association in Cortland, NY on July 31 to August 5, 2016.


33. Marcos Isidoro Ayza presented “Severe Perkinsea infection (SPI) in frog tadpoles of the USA” at the 65th annual international conference of the Wildlife Disease Association-July 31 - August 5, 2016 in Cortland, New York, USA


35. Barbara Bodenstein presented “Alaska’s largest recorded murre wreck: 100,000s estimated dead” at the Aleutian Life Forum in Dutch Harbor, Unalaska Island, AK on August 16-20, 2016.

36. Jeffrey Lorch presented “Ophidiomyces ophidiicola, the pathogen associated with fungal dermatitis detected in free-living snakes in Great Britain” at the 12th European Wildlife Disease Association meeting in Berlin, Germany on August 27th to 31st, 2016.


38. Hon Ip presented “Transmission dynamics of Asian-origin H5 highly pathogenic avian influenza in United States” at the ISIRV Options IX for the Control of Influenza meeting in Chicago, IL on August 24-28, 2016.

39. Barbara Bodenstein presented on “Multi-taxa morbidity and mortality investigations and the role of NWHC” to the NOAA Marine Mammal Stranding Network in Sheperdstown, WV on Sept. 5 to 9, 2016.

40. Barbara Bodenstein presented on “Pathologic investigations of extensive seabird mortality along Alaska Coastline” to the NOAA Marine Mammal Stranding Network -Sept. 5 to 9, 2016 in Sheperdstown, WV.


42. Susan Knowles presented “Interagency cooperation for a cold-stressed manatee (Trichechus manatus) stranded in Maryland” at the National Marine Animal Health and Stranding Network Conference held on September 6 to 9, 2016 at the U.S. Fish and Wildlife National Conservation Training Center in Shepherdstown, WV.

43. Hon Ip presented “Observations on embryo mortality during avian influenza virus propagation from wild birds” at the annual meeting of the American Association of Veterinary Laboratory Diagnosticians on October 13-19, 2016 in Greensboro, NC.

44. Jonathan Sleeman presented “Big science and wildlife diseases: Applying One Health approaches in the real world” at The Wildlife Conference on October 15-19, 2016 in Raleigh, NC.


46. Hon Ip presented an abstract for the American College of Veterinary Pathologists Annual Meeting held in New Orleans, Louisiana (Dec 3-7, 2016) on the “Detection and sequencing of PPMV-1 in paraffin-embedded tissues from wild pigeons by next-generation sequencing”.


C Stephen. Zoonotic warnings at the nature-society interface: Wildlife as strategic early warning for climate change. Adaptation 2016 Ottawa

Evolving expectations and opportunities for wild bird surveillance. National avian biosecurity advisory committee meeting. Ottawa

What can be gained from cross-sectoral collaboration for chronic wasting disease. North Plains Ecosystem CWD workshop. Alberta PrionNet meeting. Calgary


Nemeth N, D Campbell, L Shirose, *P Oesterle, B McEwen, C Jardine. The red fox (Vulpes vulpes) as a potential sentinel for Blastomyces dermatitidis in Ontario, Canada. The International Conference on Diseases in Nature Communicable to Man; Guelph, Ontario; Aug. 7-9, 2016 (Presenter).


*MacDonald A, C Jardine, N Nemeth. Mycoplasma species in Ontario wild turkeys (Meleagris gallopavo). Poultry Health


Beluga Whale Health Assessment Workshop
"Health assessment of the St. Lawrence population"
"Health assessment of the Beaufort sea population"
Lair, S. (30 minutes) November 2016, Anchorage, Alaska, USA

Institut Maurice Lamontagne, Fisheries and Oceans "Nutritional diseases in fish" Lair, S. (60 minutes) May 2016, Mont-Joli, Québec

Séminaire en biologie - UQAM "Diseases, anthropogenic contaminants and wildlife health" Lair, S. (60 minutes) March 2016, Montréal, Québec


Équipe québécoise de contrôle des maladies avicoles. "Avian influenza surveillance in wild bird in Quebec" Lair, S. (30 minutes) February 2016, Drummondville, Québec

McBurney, S. "Wildlife Health in Atlantic Canada: A collaboration between disciplines." (1.5 hours) for Wildlife Biology BIO-411, Department of Biology, UPEI, Charlottetown, PE, November 8, 2016.


McBurney, S. “Wood Buffalo National Park: Bison, tuberculosis and brucellosis the controversy continues.” (30 minutes) for VPM 201 Bacteriology and Mycology, AVC, UPEI, Charlottetown, PE, October 8, 2015 (Invited Lecture).

McBurney, S. “Wildlife health surveillance in Atlantic Canada; Bat white-nose syndrome emergence in Canada; and Trichomonosis in Maritime songbirds.” (3 hours) for VPM 495D Wildlife Health Rotation, Atlantic Veterinary College, UPEI, Charlottetown, PE, March 9, 2016.


MacDonald A, C Jardine, E Rejman, J Barta, N Nemeth. Disease assessment of wild turkeys (Meleagris gallopavo) in Ontario. Canadian Association of Veterinary Epidemiology and Preventive Medicine, Guelph, Ontario, May 16-17, 2016.


d) Other
(Provide website address or link to appropriate information): 3
Wildlife Health Information Partnership event reporting system

(WHISPers) is a partner-driven online database for recording current and historical wildlife morbidity and mortality events in the United States. The system uses geospatial mapping to depict wildlife events that meet the appropriate criteria from data collected by multiple partners. To date, WHISPers has data for over 7,000 events dating back to 1910 from over 43 million affected animals, including over 700 species and 250 diagnoses.

https://www.nwhc.usgs.gov/whispers/
CWHC

The CWHC website provides up-to-date reporting on a number of wildlife diseases http://www.cwhc-rcsf.ca

The CWHC produces quarterly reports highlighting surveillance numbers on a 3 month basis, diagnostic highlights, project features and wildlife health news stories. The reports are available at http://www.cwhc-rcsf.ca/quarterly_report.php. The CWHC Annual Report is available at http://www.cwhc-rcsf.ca/annual_reports.php