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A PROPOSED ZONING APPROACH FOR THE CONTROL OF CHRONIC WASTING DISEASE IN CANADA

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EXECUTIVE SUMMARY

- Chronic wasting disease (CWD) is an infectious prion disease of North American captive and wild cervids with an expanding geographical range. Since the first detection of CWD in Canada, the disease has been found in wild cervids from much of southern Saskatchewan and into southeastern Alberta. Currently, 65 cervid farms have been identified as infected with CWD — with all but two located in Saskatchewan. The continuing spread of CWD has impacts for Canadian ecosystems including risks to agriculture, biodiversity, and society.

- The CFIA eradication program for CWD has included quarantine and stamping-out measures which have proven effective for the control of several reportable animal diseases. To date, however, this approach has been costly and ineffective in Saskatchewan due to the enzootic nature of CWD in wild cervids and the environmental persistence of the infectious prions.

- The CFIA is shifting its CWD strategy from that of eradication to control with the objective of aggressively preventing the further spread of CWD into new species and into new geographic areas so that potential environmental, economic, and health impacts are minimized.

- The CFIA has examined a range of disease control options within existing limited resources and propose moving forward with a zoning approach to CWD control. Zoning is a World Organization for Animal Health (OIE) concept introduced as a means of establishing and maintaining an animal subpopulation with a distinct health status based on geographic separation. The CFIA's goal is to limit the spread of CWD by captive cervids to zones where CWD is not known to presently exist in captive and wild cervid populations.

- It is proposed that zones be defined based on provincial/territorial CWD disease status. Zone 1 (e.g., BC, MB, ON, etc.) is defined as a zone in which CWD is not enzootic in both captive or wild cervid populations. Zone 2 is defined as a zone in which CWD is enzootic in wild cervid populations but not in captive cervid populations (e.g., Alberta). Zone 3 is defined as a zone in which CWD is enzootic in both captive and wild cervid populations (e.g., Saskatchewan).

- Requirements and CFIA activities would differ between zones. Most significantly, zone 3 will not be permitted to move live cervids (except directly to slaughter) outside of the zone and will have reduced CFIA disease control responses to new positive cases of CWD. This could include limited disease investigations at the farm level, no issuance of declarations of infected premises, and no issuance of compensation. Furthermore, while the Voluntary Herd Certification Program will be strengthened for herds in zones 1 and 2, it will become unavailable for herds in zone 3.

1. PURPOSE

- To describe the framework of a proposed CFIA disease control program for Chronic Wasting Disease (CWD) that is based upon the establishment of distinct disease status zones. This document is to serve as a reference point for discussions with the provincial Council of Chief Veterinary Officers and the Canadian Wildlife Disease Committee planned for autumn 2011.

2. BACKGROUND

- First recognized in North America in the 1960s, CWD is a progressive, invariably fatal neurodegenerative disease known to affect cervids (deer, elk, and moose). It is a member of the group of prion-related diseases known as the transmissible spongiform encephalopathies which also include bovine spongiform encephalopathy (BSE) in cattle, scrapie in sheep and goats, and Creutzfeldt-Jakob disease in humans.

- CWD is a reportable disease under the *Reportable Disease Regulation* (*Health of Animals Act*). The CFIA's eradication program, developed in the year 2000, was based on (i) an understanding of the science of CWD at that time, (ii) the commitment of both industry and the provinces to active surveillance, strict inventory control, and the tracking and reporting of animal movements via animal identification, (iii) a limited presence of CWD in Canada with most captive CWD cases traceable to a point source, and (iv) a perceived absence of established disease in the wild populations.

- Management efforts in wild cervids have been unsuccessful in slowing the spread of CWD in North America and the disease has the potential to gradually spread across the continent. In Canada, the first wild case of CWD was identified in a mule deer sampled near the Alberta-Saskatchewan border in 2000. The disease has since been detected in wild cervids from much of southern Saskatchewan and southeastern Alberta. There is apprehension that CWD may eventually spread to adjacent provinces and to the caribou populations of northern Canada.

- Infected cervids shed the CWD agent in saliva, urine, and feces thereby contaminating the environment (e.g., soil). Research indicates that prions are extremely stable in the environment and experiments have demonstrated that healthy cervids can become infected solely from environmental exposure. There are currently no decontamination procedures for CWD prions in the environment that can be applied to contaminated premises. Consequently, the CFIA maintains any imposed declaration of infected place and associated quarantine for premises for which there is evidence of environmental transmission. Such premises remain under indefinite quarantine requiring the CFIA to ensure full maintenance of perimeter fencing for the exclusion of wild cervids.

- In the early years of the CWD eradication program, positive cases were epidemiologically linked to the movement of captive cervids and the eradication program was deemed successful[1,2]. More recently, however, positive cases are increasingly independent of the movement of captive cervids. Rather, exposure to wild cervids and/or their contaminated environment is the suspected source of disease transmission. At present, CWD has been diagnosed on 63 cervid farms in Saskatchewan and 2 cervid farms in Alberta.

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- Recent multi-stakeholder meetings[3] to update Canada's National CWD Control Strategy proposes that the ultimate objective is "*eradication of CWD from Canada, or failing this, the tightest possible control of CWD so that it does not spread to new geographic areas or new species, and so that its environmental, economic, social and public health impacts are minimized*."[4]

- Many of the assumptions of the CFIA's original CWD eradication program have come under scrutiny prompting an evaluation of whether the eradication program was meeting the intended goal. The review concluded that it is not currently possible to eradicate CWD through quarantines and stamping-out measures in areas where the disease is enzootic in the wild. The program has been costly to government and industry and, in its current form, is unsustainable. In response, the CFIA is shifting its CWD strategy for captive cervids from that of eradication to control. The CFIA's objective, consistent with the National CWD Control Strategy, is to prevent the spread of CWD from captive cervids into new geographic areas and into new species.

- The CFIA has examined a range of program options to control the spread of CWD amongst/from captive cervids. As a way to apply limited resources most effectively, the CFIA proposes a zoning approach to control that is based on CWD disease status. The model is to be scientifically based and provide a foundation from which effective CWD disease control measures are evaluated and adjusted over time.

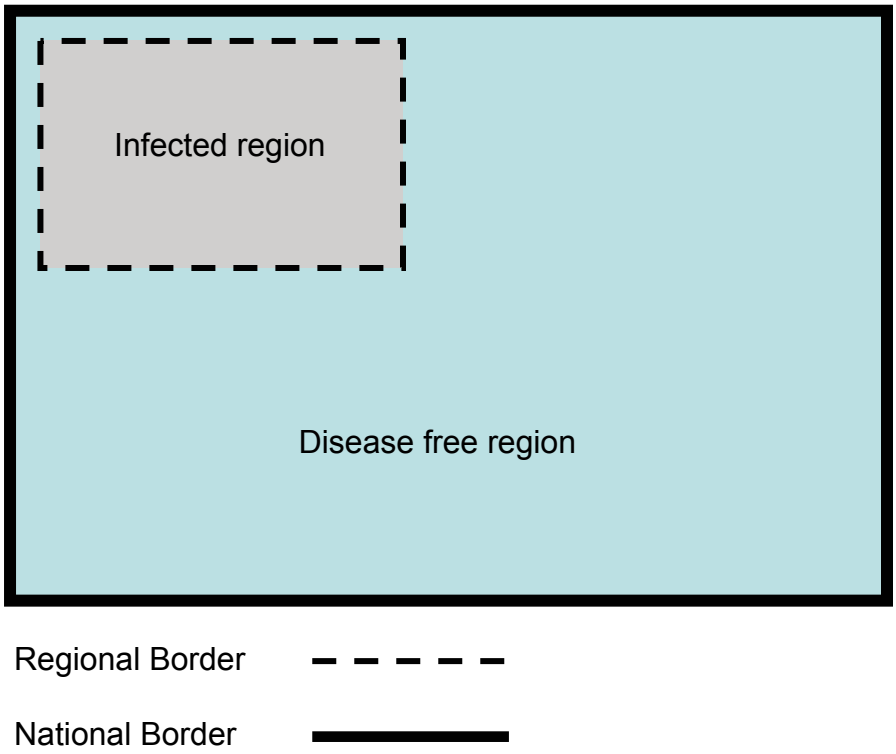
3. THE PRINCIPLE OF ZONING

The World Organization for Animal Health (OIE) has recognized the difficulty some members face in establishing and maintaining a disease-free status for an entire territory. The concept of a

[1] Kahn S, Dubé C, Bates L, Balachandran A. 2004. Chronic wasting disease in Canada: Part 1. Can Vet J, 45:397-404.
[2] Argue C, Ribble C, Lees V, McLane J, Balachandran A. 2007. Epidemiology of an outbreak of chronic wasting disease on elk farms in Saskatchewan. Can Vet J, 48:1241-1248.
[3] Meetings to update Canada's National CWD Control Strategy: February 2011, Edmonton AB and April 2011, Saskatoon, SK.
[4] A Proposal for Canada's National Chronic Wasting Disease Strategy: http://www.ccwhc.ca/publications/A_Proposal_for_a_National_CWD_Control_Strategy_2011_final.pdf

zone[5] was introduced as a means of establishing and maintaining an animal subpopulation with a distinct health status based on geographical separation for disease control and international trade purposes. Zoning is applied globally and particularly within the European Union (EU) where it forms the basis for the EU common market for live animals and animal-based products. Further, zoning is a common measure used by many countries in disease eradication/control programs. For example, zoning has been widely applied in countries affected by Foot and Mouth Disease (FMD) and allowed them to maintain exports while being infected with FMD in some parts of the country. A specific chapter on zoning and compartmentalization (Chapter 4.3 of the Terrestrial Animal Health Code) has been adopted by the OIE International Committee. A schematic overview of the principle of zoning is given in Figure 1.

Figure 1. Zoning



International standards are set by those organizations recognized by the World Trade Organization (WTO) as international standard-setting bodies (ISSBs), operating within the framework of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS agreement). For commodities derived from livestock, the relevant ISSBs are the Codex Alimentarious Commission (for human food safety) and the OIE (for animal health). By

[5] Zoning is also often referred to as regionalization.

extension, the OIE sets the guidelines on how to implement zoning[6] and how to officially recognize a free zone. Through the SPS agreement, there is a treaty level obligation to consider zoning through Article 6 of the agreement. At the same time, Article 3.3 of the SPS agreement indicates that WTO members may not follow the OIE recommendations if doing so can be justified by achieving a higher level of protection. In other words, the final decision whether or not to accept a proposed zone is on the side of the trading partners of the infected country. Indeed, past experience has shown that zoning has not always been accepted by trading partners.

4. A PROPOSED APPROCH FOR ZONING CANADA FOR CWD

Although CWD infects both captive and wild cervids, it is worth emphasizing that the CFIA's mandate and the proposed zoning model apply only to captive cervids. Controlling the spread of CWD by wild cervids will continue to require provincial/territorial programs. A CFIA zoning approach for CWD control in captive cervids was previously considered (2005), however, the approach received significant stakeholder resistance and was subsequently abandoned. In light of the current status of CWD in Canada and as a way to make the most efficient and effective use of limited resources, the CFIA proposes moving forward with zoning Canada for CWD disease control in captive cervids. Under the zoning model, the CFIA's objective is to control the spread of CWD by captive cervids from zones where CWD is enzootic to zones where CWD is not known to exist presently in captive and wild cervid populations. The CFIA's preliminary zoning discussions with stakeholders indicated the need for a description of how zoning could be defined and implemented before meaningful feedback could be provided. What follows is an outline of a proposed CWD zoning model for captive cervids in Canada that will serve as the starting reference point for consultations with the provinces/territories, industry, and other stakeholders.

4.1 Defining the Zones:

The most common question that arises when discussing zoning for disease control purposes is how and where to define the geographic limits of a zone. The first principle in defining a zone is that there should be a clear definition of the animal subpopulation contained in the zone to ensure recognition and traceability[7]. For application to CWD, the infection status and risk factors related to spread of CWD by both captive and wild cervids must be also be considered. Other factors to be considered include regulatory authority, enforcement capability, operational functionality, means of public education/awareness, etc. After consideration of various options, it is proposed that limits of zones be defined using provincial/territorial boundaries. Table 1 below defines three zones based on CWD status and provides examples of current provincial status under this framework.

[6] The OIE outlines the steps on which the trading partners' decisions should be based. They include an evaluation of the infected countries veterinary service, a risk assessment and its own animal health situation among others (OIE 2007).

[7] 2010 OIE – Terrestrial Animal Health Code, Chapter 4.3 Zoning and Compartmentalization

Table 1. Definition of proposed captive cervid CWD zones in Canada based on CWD infection status

Zone	Captive Cervid Status	Wild Cervid Status	Current Examples
Zone 1	Not enzootic*	Not enzootic**	BC, MB, ON, NB, etc.
Zone 2	Not Enzootic	Enzootic	AB
Zone 3	Enzootic	Enzootic	SK

*Definition of enzootic in captive cervids for a zone to be determined through a CFIA epidemiological assessment
**Definition of enzootic in wild cervids for a zone to be determined by provincial wildlife authority/CWDC.

It is important to note that much remains to be determined from a regulatory standpoint for applying provincial boundaries to the zoning approach. Can we make use of existing provincial controls on cervid movement? Would new regulations be required? If there is direction to pursue zoning further, these issues will be addressed with stakeholders and CFIA legal services.

One may question the proposed use of static zones that encompass an entire province when disease distribution is dynamic and not currently known to exist uniformly throughout a province. For example, CWD is currently only known to be present in specific geographic areas of Alberta and Saskatchewan. An alternative approach would apply fluid boundaries to zones that are adjusted based on knowledge of new positive CWD cases. Although reasonable in theory, the CFIA does not view this approach as practical under its regulatory framework. In contrast, the use of provincial boundaries to define zones offers significant advantages: i) it may be practical to use the existing provincial movement requirements to control cervid movements between zones, ii) it would allow surveillance to be targeted to a limited number of high risk areas, iii) it would facilitate the application of the existing CWD Voluntary Herd Certification Program or other, as yet undeveloped, provincial control program administered under provincial legislative authority, and iv) it would provide a consistent regulatory framework applied and communicated to industry and the public. From the CFIA perspective the last point is essential for the application of different disease control measures based on zone status (e.g., withholding compensation, see Table 2). Under zoning, the CFIA will be required to inform the public of zone boundaries and their respective disease status. If the CFIA were to apply moving boundaries to zones, the expansion of CWD distribution amongst wild cervid populations would put the CFIA in a difficult legal position with respect to providing sufficient ongoing public notification of zone status. The use of static zone boundaries allows for a consistent CFIA public awareness approach over time as well as providing clarity and equality for industry with respect to the impact of zoning on cervid producers across a province.

4.2 Application of the Proposed Zoning Approach:

Table 2 summarizes differences in conditions and actions that would apply to the three zones of the model. As these are provided for discussion purposes, the conditions are general in nature and are not comprehensive.

Movement Controls

Critical to the success of zoning is the ability to control the movement of cervids between zones. The proposed controls are designed to preserve the health status of the cervids within a particular zone. In general, a zone may only import live cervids from a zone of equal status or higher with the exception of transport directly to slaughter (subject to provincial conditions/requirements). The CFIA would like to explore the use of existing provincial movement requirements to control live cervid movements between zones. Alternatively, regulatory changes may be required.

Surveillance

Surveillance is an epidemiological practice by which the spread of disease is monitored in order to establish patterns of progression, as well as to increase our knowledge of what factors might contribute to changes in progression of the disease within a population. In the context of zoning, surveillance needs to be at a sufficient level such that it will identify CWD cases if they occur in captive or wild cervids (i.e. substantiate the presence or absence and distribution of CWD within a zone). For this purpose, and in light of limited resources, it is recommended that surveillance be targeted to areas of highest risk. Databases, information analysis and data sharing protocols can be developed to ensure timely interpretation and distribution of CWD surveillance information to all relevant participants (e.g., Canadian Co-operative Wildlife Health Centre, Canadian Animal Health Surveillance Network).

CWD Disease Control Response

The CFIA's resources will be focussed on zones 1 and 2 where aggressive disease control responses will be triggered by the occurrence of any case of CWD. This may include the destruction of all at risk cervids as well as epidemiological investigations to identify and trace-in/trace-out at-risk cervids. In contrast, the response to any CWD case identified in enzootic areas (zone 3) will be limited. This may include investigating trace-in/back cervids to any premises that may be outside of the enzootic zone and the subsequent execution of appropriate control actions. In general, actions in zone 3 would not include the imposition of quarantines, the destruction of additional at risk cervids, nor the issuance of compensation. In order to minimize the risk of transmission to new species or adjacent zones, however, criteria could be established in specific areas of zone 3 that would initiate aggressive eradication techniques. This may include, for example, instances where CWD is detected within a fixed distance (buffer) to a new at-risk species (e.g., caribou range), adjacent to the boundary with a province of higher zone status, or within a large contiguous non-enzootic area. If, following evaluation, the zone status of a province were to change from zone 1 or 2 to zone 3, the CFIA may no longer respond aggressively to every new case of CWD.

Table 2. Overview of a CWD disease control program requirements based on zoning

	Zone 1	Zone 2	Zone 3
Movement Controls - Based on existing provincial movement controls. CFIA to examine regulatory authority.	▪ Movement of captive cervids allowed to all zones. ▪ May accept captive cervids from zones of equal status (zone 1). ▪ Accept captive cervids from zones of lower status (i.e. zone 2/3) if direct to slaughter (with conditions/requirements).	▪ Movement of captive cervids to zones of equal status or lower (i.e. zones 2/3). May move cervids to zones of higher status if direct to slaughter (with conditions/ requirements). ▪ Accept captive cervids from zones of equal status or higher (i.e. zones 1/2). ▪ Accept captive cervids from zones of lower status (i.e. zone 3) if direct to slaughter (with conditions/requirements).	▪ Movement of captive cervids to zones of equal status (i.e. zone 3). May move cervids to zones of higher status if direct to slaughter (with conditions/requirements). ▪ Accept captive cervids from zones of equal status or higher (zones 1/2/3).
Surveillance	▪ Slaughter testing program - Slaughter animals over 12 months of age - 4D animals ▪ Active surveillance of susceptible wildlife: - suggest targeted to areas at highest risk of incursion and passive surveillance in the rest of the zone.	▪ Slaughter testing program - Slaughter animals over 12 months of age - 4D animals ▪ Active surveillance of susceptible wildlife: - suggest targeted to areas at highest risk of spread and passive surveillance in the rest of the zone where CWD has not been found in wildlife.	▪ Not a priority unless zone is attempting to demonstrate a change in disease status.
CFIA Disease Control Response	▪ Response to CWD positive: - Aggressive, stamping-out approach including depopulation of exposed cervids, trace-in/trace-out investigations, mandatory surveillance, quarantines, compensation, etc.	▪ Response to CWD positive: - Aggressive, stamping-out approach including depopulation of exposed cervids, trace-in/trace-out investigations, mandatory surveillance, quarantines, compensation, etc.	▪ Response to CWD positive: - Minimal, notify owner, owner guidance, province manages farms/wildlife, no quarantines, no compensation. - Possible criteria established in which more aggressive actions could be undertaken e.g., buffer distance from a boundary with zone 1 or 2, adjacent to new species range (caribou), or non-enzootic area.
Biosecurity	▪ Cervid/CWD specific measures to be developed and communicated to producers.	▪ Cervid/CWD specific measures to be developed and communicated to producers.	▪ Cervid/CWD specific measures to be developed and communicated to producers.
International Export	▪ CFIA to support export of live cervids from certified and un-certified herds as per OIE guidelines with respect to zoning.	▪ CFIA to support export of live cervids from certified herds as per OIE guidelines with respect to zoning.	▪ Export of live animal cervids not supported. ▪ - possible trade with zones of similar status in the US e.g., Colorado.
Herd Certification	▪ Herds eligible for enrollment into an updated and more restrictive herd certification program with new national standards, audit, and CFIA oversight.	▪ Herds eligible for enrollment into an updated and more restrictive herd certification program with new national standards, audit, and CFIA oversight.	▪ Not eligible to enrol.

Biosecurity

Successful implementation of biosecurity in relation to CWD requires the adoption of a set of attitudes and behaviours by people to reduce risk in all activities involving cervids and their products. The CFIA, in collaboration with industry, would develop/publish CWD specific biosecurity measures that reduce the risk of the introduction and spread of CWD. Important elements of such a plan could include quality assurance schemes, procedures for animal and human movement control, cervid health measures, the use of double fencing, control over vehicles, security of feed (e.g., prohibiting the use of screening pellets) and water sources, and control of pests.

International Export

The strong cooperation of neighbouring countries and trade partners is required to adopt a harmonized approach to effective cervid movements. With regard to the export of live cervids from herds of zone 1 and from certified herds of zone 2, importing countries will be requested to recognize the status of these zones and accept the application of the appropriate measures as recommended by the OIE. As mentioned previously, and in light of small number of countries affected by CWD, it is expected that there will be resistance from some trading partners to recognize zoning. The USDA, however, is expected to view this approach favourably and as an improvement on the current approach of requiring certification that any exported cervid from Canada not be from within a 40 km distance of a wild cervid case.

CWD Voluntary Herd Certification

Currently, the audit function for the CWD Voluntary Herd Certification Program (VHCP) is being implemented and enforced across the country, and a training manual module is being created to strengthen the existing program. Following consultation with industry and the provices/territories, an update to the national standards for the CWD VHCP will take place (currently under development). Under the zoning model, only herds from zone 1 and 2 will be eligible to enroll in this strengthened program.

4.3 Recovery of Zone Status and Evolution of the Zoning Plan

Once CWD becomes enzootic in wild or captive cervids, it is currently unrealistic to expect a zone to be able to eradicate the disease. As a result, once a zone acquires level 2 or 3 status, there are currently no provisions to return to a zone of higher status. Because the control of CWD is based on limited knowledge and experience, the zoning approach will be subject to timely review, evaluation and revision. Advances that address current scientific/knowledge gaps may allow additional tools that could be incorporated into the zoning approach and potentially the recovery of higher zone status. These include the development of diagnostic tests that reliably detect CWD in live animals, methods for the detection of CWD prions in the environment, treatments to inactivate or destroy CWD prions in the environment, and a protective vaccine against CWD.

5. RESPONSIBILITIES

The success of a zoning approach to disease control necessitates close co-operation between multiple jurisdiction both in the public and private sectors. The following outlines potential responsibilities of the various parties:

CFIA Responsibility
- define zones, establish geographical limits, and minimum requirements
- surveillance and confirmatory laboratory testing
- control measures on CWD positive premises as dictated by the zone requirements
- provide guidelines for biosecurity management
- conduct international negotiations and provide relevant health certification for export from zones
- oversight, national standards development, and audit of CWD Voluntary Herd Certification Program
- ongoing timely communication with agricultural, public health and wildlife agencies
- cervid movement permits
- regular review of design and evaluation of the effectiveness of the zoning program

Provincial/Territorial Responsibility
- surveillance and laboratory testing
- administration/assessment of CWD Voluntary Herd Certification Program (optional)
- provincial movement restrictions
- conditions/requirements for import of cervids directly to slaughter

Industry Responsibility
- application of biosecurity measures
- document and record movement of animals and personnel and maintenance of records in a readily accessible format
- quality assurance schemes
- monitor the efficacy of the measures
- document corrective actions
- submit samples for surveillance
- rapid reporting
- administration/assessment of CWD Voluntary Herd Certification Program (optional)
- develop and implement national identification/traceability program

6. NEXT STEPS

The CFIA recognizes the multi-jurisdictional nature of CWD management and supports open collaboration and communication amongst all players. To this end, the CFIA invites comment on this zoning proposal from other government departments and agencies (federal and provincial/territorial), the industry, and other stakeholders.

7. GLOSSARY OF TERMS

Biosecurity – is the implementation of measures that reduce the risk of the introduction and spread of disease agents which requires the adoption of a set of attitudes and behaviors by people to reduce risks in all activities involving domestic, captive exotic and wild cervids and their products

Cervid – any member of the Cervidae family considered at risk to CWD including but not limited to mule deer (*Odocoileus hemionus*), elk/red deer (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), black-tailed deer (*Odocoileus hemionus*), fallow deer (*Dama dama*), Sika deer (*Cervus Nippon*), reindeer/caribou (*Rangifer tarandus*) and moose (*Alces alces shirasi*).

CWD Voluntary Herd Certification Program – a voluntary program established and maintained to reduce the occurrence and spread of CWD, to identify herds that have been free of evidence of CWD over specific time periods.

CFIA – Canadian Food Inspection Agency

Direct movement to slaughter – animals that are transported to a facility for slaughter without unloading en route and that are not commingled with any other animals during transport.

Enzootic – present or usually prevalent in a population or geographical area at all times, in contrast to epizootic.

Premises – the ground, area, buildings, and equipment occupied by, or used for, one or more herds of cervids.

Stamping-out – the destruction of all infected and potentially contaminated animals. The carcasses are not introduced into the food chain, but disposed of by incineration, burying, etc. The premises in which the animals are kept are cleaned and disinfected.

Surveillance – a program to assess the health and disease status of a given population and to promote the early detection of disease to maximize the effectiveness of control measures and minimizes costs and economic losses.

Terrestrial Code – the World Organization for Animal Health (OIE) Terrestrial Animal Health Code

Trace – all actions required to identify the herd or origin or destination of a cervid.

Zone - a clearly defined part of a territory containing an animal subpopulation with a distinct health status with respect to CWD for which required surveillance, control, and biosecurity measures have been applied for the purpose of disease control and international trade.